

## Perception grammar for loanwords\*

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**Perception Grammar for Loanwords.** Kang, Hyunsook. *Studies in Phonetics, Phonology and Morphology* 7.2. 301-313. This paper is concerned with how perception influences the surface forms of loanwords. I argue that the /t+s/ cluster in English is adopted as [ch] in loanwords due to its perceptual similarity to [ch] rather than [ts] in Korean. I also argue that different surface forms of /ts/ and /tʃ/ in English appear in loanwords due to different acoustic cues. Furthermore, I consider surface forms of liquid in loanwords and show that perception is again responsible for the appearance of /r/ in phrase-initial position and different surface realizations of /Consonant+Liquid/ clusters. (Hanyang University)

### 1. Introduction

This paper is concerned with how foreign words are adopted into Korean and, in particular, how perception affects the surface forms of loanwords. Silverman (1992) argues that loanwords are not equipped with their own phonological representation. Rather, host-language speakers perceive foreign forms according to the phonological system of their native language and apply their native phonological representations on the raw acoustic signal. By fitting the raw acoustic input into the native phonological system as closely as possible, speakers obtain optimal loanword forms.

Perception of the raw acoustic material, however, is not the only important factor in adopting a loanword. Written forms of the source language also affect the borrowed forms in the host language. As is shown in (1), the same raw acoustic input form is adopted differently in different languages, such as Cantonese and Korean.

|            |           |            |
|------------|-----------|------------|
| (1)        | Cantonese | Korean     |
| a. print   | [p'lin]   | [phirinθi] |
| b. warrant | [wəlɒn]   | [wərənθi]  |
| c. friend  | [fɛn]     | [phirendi] |

Silverman (1992) argues that the /t/ in 'print', which often remains unreleased in English, and which is in many cases realized as a laryngeal stop, is quite possibly imperceptible to Cantonese speakers. Since native Cantonese phonotactics do not permit vowel-consonant-obstruent strings,

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the Cantonese speaker cannot easily discern obstruents in this environment. Input whose acoustic phonetic properties cannot be discerned due to an impoverished context are not perceived and thus are not represented.

In contrast, the same word 'print' is adopted into Korean as [phirinθi], with inserted vowels after the first consonant and at the end of the word. In fact, all foreign words with final consonant clusters are borrowed into Korean with their final consonant clusters pronounced: Korean does not allow complex coda like Cantonese, but unlike Cantonese the final consonant clusters are pronounced by inserting vowels. I suggest that this is due to orthographic influence rather than perception. When the influence of perception is stronger than that of orthography, forms without the (perceptually) non-salient final consonant will appear. If the influence of orthography is stronger than that of perception, even (perceptually) non-salient sounds will appear in the borrowed words.

There are, however, some perception related phenomena in loanword phonology in Korean. In this paper, I consider these perception-related phenomena and argue that perception in fact influences the surface forms of loanwords. In section 2, I discuss how the /t+s/ cluster in English is adopted into Korean. I argue that perception is responsible for the appearance of [ch]<sup>1</sup> for the /t+s/ of the source language. I also argue that the different surface forms of /tʃ/ and /t+s/ as [chi] and [chi] in Korean are due to the different perceptual cues of these segments in the source language. An alveopalatal affricate /tʃ/ is perceived with the release phase of the alveopalatal place, whereas a coronal stop+coronal fricative /t+s/ is perceived with the release phase of the coronal place. The release phase of a consonant is perceived by Korean speakers as the acoustic cue to a vocalic segment. Therefore, the release phase of an alveopalatal place will be perceived as the high front vowel [i], whereas coronal place will not be so perceived. In section 3 and 4, I examine liquid related phenomena. In section 3, I specifically discuss why tap appears in the phrase-initial position of loanwords, even though in native and Sino-Korean words it is avoided by being changed into [n]. In section 4, I discuss why certain /CL/ clusters appear with their liquid segment showing in the loanwords, whereas other /CL/ clusters appear with their liquid segments changed into [n].

## 2. THE /t+s/ cluster

In this section, I consider how a /stop+s/ cluster is adopted into Korean. I show that an example of /stop+s/, /t+s/ in English is borrowed into Korean as [ch] due to its perceptual similarity to the Korean [ch] sound. I also show that perception is responsible for the difference surface forms of /tʃ/ and /t+s/ when borrowed into Korean. Consider the following examples:

<sup>1</sup> In this paper, I distinguish English alveopalatal /tʃ/ from Korean alveopalatal affricate /ch/. /tʃ/ has a round quality whereas /ch/ does not.

- (2) a. Max [mæksi]  
 b. cops [kapsi]

Since the word final consonant cluster cannot be properly syllabified in Korean (Korean allows a maximal CVC syllable structure), the default vowel [i] is inserted to save the unsyllabified consonant /s/. As we see in (a, b), the word final /obstruent+s/ cluster is syllabified as two segments across the syllable boundary in Korean. However, if /s/ comes after the homorganic stop /t/, instead of [t+s+i] or [th+i+s+i], [ch+i] appears in Korean, as is shown in (3) (cf. Oh 1996).

- (3) a. Mets [mechi] \*[methisi] ?\*[me(t)s'i]<sup>2</sup>  
 b. contents [khənthenchi] \*[khənthenthisi]  
 c. shirts [ʃəchi] \*[ʃəthisi] ?\*[ʃə(t)s'i]

I suggest this is due to the perceptual similarity of [ts] in English to the coronal affricate [ch] in Korean. The stop [t] of the /t+s/ cluster in English is perceived as the closure phase of the affricate [ch], and the fricative [s] is perceived as the release phase of the affricate [ch]. The substitution of [ch] for /t+s/ of the source language is related to the way a Korean /ts/ cluster is pronounced in Korean. Note that Korean /t+s/ is not pronounced as [ts] but rather as [s'], a tense fricative as shown in (4).

- (4) /us-/: 'laugh, smile'  
 a. ut + ta [utt'a]  
 b. ut +so [us'o]

Since Korean syllable structure does not permit [s] as coda, /s/ in /us-/ is pronounced as [t] in coda position. As we see in (4b), if an /s/-initial suffix follows the (derived) /t/-final stem, /t+s/ is pronounced as a tense [s']. Thus, the consonant cluster /t+s/ in English, which is perceived as the combination of stop and fricative qualities, are borrowed as [ch] rather than [s'] since perceptually [s'] is quite different from the sound of [ts] in English. Thus, instead of [s'i], [chi] appears in loanwords for a /t+s/ cluster in English.

In addition to influencing the substitution of [ch] for a /t+s/ cluster of the source language, perception also accounts for the different surface forms of an affricate /tʃ/ and a coronal homorganic /t+s/ cluster in English. Consider the English words in (5a, b) with an affricate and the words in (5c, d) with a /t+s/ cluster.

- (5) a. bench [penchi]  
 b. catch [khechi]  
 c. Mets [mechi]

<sup>2</sup> ?\*[mes'i], is marginally acceptable to the author.

d. contents [khənthenchi]

As we see in (5), a coronal affricate /tʃ/ in English is borrowed into Korean as the combination of a coronal affricate [ch] and the high front vowel [i], whereas the /t+s/ cluster is borrowed as the combination of a coronal affricate [ch] and the vowel [ɪ]. This is also related to perception. An alveopalatal affricate in English is perceived by Korean speakers as a segment with the palatal release phase, as we see in (6) (cf. Steriade 1992).

(6) a. /tʃ/                      b. /t+s/  
 palatal                      coronal  
       / \                      / \  
       A<sub>0</sub> A<sub>f</sub>                      A<sub>0</sub> A<sub>f</sub>

Since the release phase of a consonant is allowed only in onset position, the release phase is perceived as the cue of a vocalic segment by Koreans. In addition, the release phase with the palatal place will be perceived as a palatal vowel, namely, the high front vowel [i]. In contrast, the coronal /t+s/ cluster is not released with the cue of palatal place. Therefore, the release cue of a coronal /t+s/ cluster will be perceived by Koreans as the cue to a vocalic segment but not as the cue to the high front vowel [i]. Rather, it will be perceived as the default vowel [ɪ]. Therefore, what decides the quality of an inserted vowel is not the substituted segment in the host language but the segment in the source language. If the vowel quality of the inserted vowel is determined after the substitution of English consonants with Korean consonants, as is shown in (7), an incorrect surface form appears.

(7) substitution  
       b e n tʃ → b e n ch      (con) t e n ts → th e n ch  
       | | | |      | | | |            | | | |  
       C V C C      C V C C            C V C C      C V C C

Syllabification (Vowel Insertion) -----  
       b e n tʃ → b e n ch i      (con) t e n ts →\* th e n ch i  
       | | | |      | | | |            | | | |            | | | |  
       C V C C      C V C C V            C V C C            C V C C V

Silverman (1992) argues that there are two levels in loanword phonology: at Perceptual Level, the segments in the source language are substituted with native segments; at Operative Level, phonological rules apply, fitting the output of Perceptual Level into the appropriate forms allowed in the phonology. On this view, the following derivations occur:

- (8) a. Level 1 (Perceptual Level)
- |    |   |      |    |   |    |
|----|---|------|----|---|----|
| tʃ | → | ch y | ts | → | ch |
|    |   |      |    |   |    |
| C  |   | C    | C  |   | C  |
- b. Level 2 (Operative Level) –Vowel Insertion
- |      |   |      |    |   |      |
|------|---|------|----|---|------|
| ch y | → | ch i | ch | → | ch i |
|      |   |      |    |   |      |
| C    |   | C V  | C  |   | C V  |

As we see in (8), at Perceptual Level, segment substitution has occurred. Since an alveopalatal affricate and an alveolar affricate are perceived differently, a floating feature [y] for the original alveopalatal affricate is specified in (8a). When a vowel slot is inserted at Operative Level, the floating [y] will be associated with the vowel slot and appear as [i]. Note that substitution at Perceptual Level is not phonemic: a floating feature also needs to be specified to distinguish an alveopalatal affricate from a coronal /ts/ cluster.

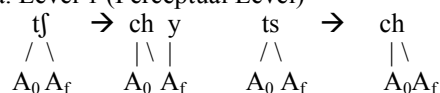
However, the representation (8) is not enough to explain the different surface forms of /tʃ/ and /ts/. In Korean, if an affricate is syllabified as a coda, it surfaces as a stop, not triggering vowel slot insertion, as we see in (9).

- (9) kkoch [kkot] \*[kkochi] ‘flower’

Therefore, one needs to explain why vowel slot insertion is necessary in loanwords, as in (8), but while neutralization is necessary for native Korean words, as in (9). One might assume that different phonology is adopted depending on the origin of a word. That is, if it is an affricate in native Korean, the ranking  $\text{Dep}[V] \gg \text{Max}[\text{ch}]$  is adopted, and thus an affricate will be neutralized to a stop [t] in coda position. And if it is an affricate in English, a different ranking of  $\text{Max}[\text{ch}] \gg \text{Dep}[V]$  is adopted, and thus an affricate of English will be adopted as [chi] in loanwords. However, this does not explain why such a different ranking exists depending on the origin of a word.

I suggest that different ranking of constraints is selected due to the different acoustic cues of affricates. That is, Korean speakers/learners hear the release phase of an English affricate in all context; hence, these affricates will be specified with the release phase when borrowed into Korean. This release phase is the acoustic cue to a vocalic segment to Korean speakers, so a vowel always appears following an affricate in English. In contrast, an affricate in coda position of native Korean words is not heard with the release phase in all contexts and thus it does not trigger vowel epenthesis. Therefore, if we adopt the two level phonology for loanwords, the following levels should be assumed.

## (10) a. Level 1 (Perceptual Level)



## b. Level 2 (Operative Level) –Vowel Insertion



Note that with this representation, we can understand why a vowel is inserted to an affricate adopted from English. Release phase represented for affricates can be licensed only in the onset position in Korean, so a vowel is inserted to license the release phase.

In this section, we have examined how /stop+s/ clusters in English are borrowed into Korean. I have argued that surface forms reflect the perception of language learners and that the difference of consonants in the source language can be represented as the difference of a vowel in the host language due to different perception in two languages. The release phase of an affricate in English is perceived as cue to an open phase of the vowel in Korean and thus the place difference between /tʃ/ and /t+s/ is perceived as place difference in vowels. In the next section, we will examine how English words with liquid are borrowed into Korean.

### 3. Consonant--liquid

In South Korean dialects, an underlying liquid in native and Sino-Korean words shows different surface forms depending on the context. Consider the following:

- (11) a. yuLæ      [yuræ]      'origin'  
       b. səLmyəŋ    [səlmyəŋ]    'explanation'  
       c. toL        [tol]        'stone'  
       d. kyəkLyə    [kyəŋnyə]    'encouragement'  
       e. Lotoŋ      [nodoŋ]      'labor'

In (11a), liquids appear as tap [ɾ] intervocalically. If an underlying liquid appears before another consonant or word-finally as in (11b, c), it surfaces as a lateral. If an underlying liquid appears post-consonantly and word-initially, as in (11d, e), it surfaces as nasal [n]. That is, liquids in South Korean dialect alternate with lateral, tap, and nasal depending on their phonological site.

As we see in (12), liquids in English are adopted into Korean as tap [ɾ]. As expected, liquids in English are influenced by the phonological system of the host language. Like native Korean words, intervocalic /l/ or /r/

appears as [r], as in (12a), and post-consonantal liquids surface as nasal as we see in (12b,c). Note, however, that as we see in (12d, e), words with an initial liquid are borrowed as words with initial tap, unlike those in native Korean and Sino-Korean words.

- (12) a. Mary [meri]  
 b. Hamlet [hemnit]  
 c. Camry [kemni]  
 d. light [rait]  
 e. rail [reil]

Why does this difference in loanwords exist? As Silverman (1992) notes, if host language speakers perceive foreign language forms in accordance with their indigenous phonological system and instantiate native phonological representations on the incoming acoustic signal, the same phonological pattern of the native words should appear in loanwords. However, this is not the case with the liquids in recent loanwords in Korean.

Kang & Lee (1997) and Lee (2001) assume that the Du-im constraint in Korean is not active in recent loans. Du-im constraint is given in (13).

- (13) Du-im constraint  
 \*<sub>(word)</sub> [liquid]...  
 A word should not begin with a liquid.

Kang & Lee (1997) assume that the Du-im constraint is active only in native and Sino-Korean words, whereas Lee (2001) assumes that ID(approximant), which requires identity between an input and an output approximant, outranks the Du-im constraint in English loans, as in (14). In either case, the correct form with surface [r] will be derived. Consider (14) in which ID(approximant) is ranked above Du-im.

- (14) English loan: ID(approximant) >> Du-im

| /rail/    | ID(app) | Du-im |
|-----------|---------|-------|
| ☞ a. reil |         | *     |
| b. neil   | *!      |       |

Candidate [reil] in (14a) violates the Du-im constraint, whereas [neil] in (14b) violates ID(app). Since ID(app) is ranked higher than Du-im, [reil] in (14a) is selected as optimal.

However, Kang & Lee (1997) and Lee (2001) do not provide any explanation of why the Du-im constraint does not affect English loanwords or why the re-ranking of the constraints in (14) is necessary. Both the domain specification of the Du-im constraint to native words (cf. Kang & Lee 2001) and the re-ranking of constraints (cf. Lee 2001) describe the

phenomena but do not explain why [r] occurs in word-initial position. I suggest that the appearance of tap in word-initial position is due to the perceptual salience of its position.

Steriade (1997) proposes that for a given contrast, a perceptibility scale which shows how easily the contrast can be perceived in each segmental context may be postulated. Steriade (1997) argues that this kind of knowledge enters the grammar as constraints and that the interaction of these constraints with the rest of constraints determines whether a given contrast will be maintained in a given position. That is, a given contrast will be neutralized in positions where the relevant auditory cues are weak, whereas in positions where cues are perceptually salient, the contrast will be maintained.

Inouye (1995) shows that cross-linguistically, intervocalic position is the most preferred position for the appearance of tap [r]. According to Bradley (2001), Walsh (1997) found that taps tend to prefer intervocalic position and avoid word edges in order to maintain voicing and enhance perceptibility. Bradley (2001) arrived at the same conclusion that intervocalic position is the most salient position for the perception of [r]. Similarly, I assume the perceptibility scale of tap in (15), in which intervocalic position is perceptually the most salient position for the perception of [r]<sup>3</sup>.

(15) Perceptibility Scale of [r]

\*Cr, \*##r >> \*VrV

\*Cr: A tap should not be perceived post-consonantly.

\*##r: A tap should not be perceived word-initially.

\*VrV: A tap should not be perceived intervocalically.

In the following discussion, Faith[r] represents Faith[liquid]. Note that in South Korean dialects, Faith[r]<sup>4</sup> is ranked above \*VrV but lower than \*Cr, \*##r, as is shown in (16a). Therefore, native Korean and Sino-Korean words show a tap only in intervocalic position. Why, then, does [r] appear in word-initial position in English loanwords? Many linguists (Steriade 1997, etc.) agree that word-initial position is a perceptually salient, conspicuous position. Therefore, it is in this position that more phonological contrasts tend to be licensed. Faith[r] can be located above \*##r, as in (16) and thus tap [r] appears in the word-initial position in English loanwords.

<sup>3</sup> In this paper, I do not discuss syllable final liquid in Korean.

<sup>4</sup> In this paper, I assume that [r] is the underlying phoneme for Korean liquid. Note that the distribution of lateral [l] or tap [r] in Korean is quite limited: [r] appears intervocalically and [l] appears if it (at least one part of the segment is) is syllabified as coda. If one assumes that /l/ is the underlying phoneme of Korean liquid, one can replace Faith[r] with 'Maintain n-number contrast' and \*<sub>onset</sub>[l].



- (16) a. South Korean dialect: \*Cr, \*##r >> Faith[r] >> \*VrV  
 b. Recent Loanwords: \*Cr >> Faith[r] >> \*##r, \*VrV

If we consider more data, however, it becomes clear that it is not the word-initial position that licenses the appearance of [r]. Consider the words in (17).

- (17) a. ot##lobby [onnobi] ‘A lobby through clothes’  
 b. kom##ribbon [komnibon]<sup>5</sup> ‘A bear ribbon’

As we see in (17), if a liquid-initial word becomes a part of a compound, a word-initial liquid cannot surface as tap. It surfaces as a nasal, like the post-consonantal liquid. I suggest that the domain of the constraints ranked in (16) is the accentual phrase (cf. Jun 1995). The constraint tableau is given in (18).

(18)

| /kom##ribbon/ | *Cr | Faith[r] | ##r |
|---------------|-----|----------|-----|
| a. komribon   | *!  |          | *   |
| b. komnibon   |     | *        |     |

Candidate [komnibon] which violates a less fatal constraint than [komribon], is selected as optimal. Therefore, tap is ensured only in the (accentual) phrase-initial position for foreign loans. This is due to the perceptual salience of phrase initial position.

In this section, I have shown that [r] appears in word-initial (or more specifically phrase-initial) position of recent loans in Korean since it is this position that licenses more segments due to its perceptual salience. The constraint ranking which reflects the perceptual salience, was given in (16b). Note that \*Cr still outranks Faith[r], which explains why ‘kom##ribbon’ surfaces as [komnibon] but not as [komribon]. However, not all sequences of /C+liquid/ in the source language are borrowed as [nasal+nasal] sequence. This is the concern of the next section.

#### 4. The /obstruent+liquid/ cluster

In this section, we will consider how a /Consonant+Liquid/ sequence in the source language is adopted into Korean. In the previous section, following Inouye (1995) and Bradley (2001) I suggested that [r] in a /Cr/ sequence is not as perceptually salient as that in /VrV/. Since Faith[r] is outranked by \*Cr, [r] should appear, not as [r] but as another segment even in loanword phonology. However, this is not always the case. Consider the following:

<sup>5</sup> An anonymous reviewer pointed out that [komlibon] is another possible form for him/her.

- (19) a. grey [girei]  
       b. Christmas [khirisimasi]  
       c. climax [khiraimaksi] [khillaimaksi]  
       d. air supply [eəsəphirai] [eəsəphillai]

As we see in (19), the liquid in a /Consonant+liquid/ cluster of the source language is borrowed as [r] both in the word-initial position and in the word medial position. The /consonant+liquid/ sequence is borrowed as [consonant+inserted vowel+liquid]. Therefore, it looks like Faith[r] outranks \*Cr. However, not all sequences of /Consonant+liquid/ omit in the source language appear as tap in recent loans. Consider (20).

- (20) a. Hamlet [hemnit] \*[hemrit]  
       b. Camry [kemni] \*[kemri]  
       c. Meg Ryon [meŋnaïən] \*[meŋraiən]

The examples in (20a, b), taken from (12b,c), show that if a liquid appears after a nasal, it is changed into [n]; in addition, no inserted vowel appears in the surface forms. It seems then that some difference among the borrowed words exists due to the preceding consonant. However, if we consider (20c), we notice that the difference is not due solely to the nasality of the preceding consonant. An /Obstruent+liquid/ sequence also appears as [nasal+nasal].

For the surface forms in (19) and (20), I suggest both a perceptual and an articulatory account. First, following Kang (1996), I suggest that the acoustic cues of the consonant cluster in the source language influences the surface forms of loanwords in Korean. The obstruent in the consonant clusters in (19) is pronounced with a release phase. Therefore, I propose the following representation.

- (21) grey
- $$\begin{array}{ccccc}
 & g & & r & \\
 & C & & C & \\
 / & \backslash & & | & \\
 A_0 & A_{\max} & & A_{\max} & 
 \end{array}$$

Note that the consonant [g] is released in (21) and that a released consonant in Korean can appear only in onset position. Therefore, a vowel is inserted between the obstruent and the liquid. How about the forms in (20)? In (20 a,b), a liquid after an unreleased nasal appears as [n], not as a liquid. In addition, no vowel is inserted between a nasal and the following liquid. I suggest that this is due to both perceptual and articulatory factors. Perceptually, the preceding consonant, which in these cases is a nasal, is unreleased. Therefore, /mL/ will be represented as (22).

$$\begin{array}{cc}
 (22) & m & L \\
 & C & C \\
 & | & | \\
 & A_0 & A_{\max}
 \end{array}$$

Since the preceding consonant [m] does not have a release phase, it will be perceived as a coda. Therefore, no vowel will be inserted between the consonants. As we noted earlier, only the release phase of the consonant will be perceived as a vocalic segment and thus trigger vowel insertion. And the subsequent liquid will be syllabified as the onset of the vowel that follows it.

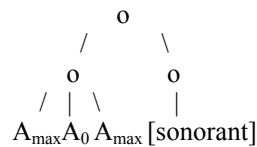
However, a liquid after a nasal might not be as perceptually salient as a liquid after an obstruent: the sonorant feature of the preceding nasal may mask the perception of the following sonorant due to the similarity of sonorancy. In addition, there is some reason to avoid a liquid, [l] or [r], after a nasal. As Flemming (1995) argues, in strong positions such as onset of the syllable, a segment with high intensity such as [l] may not be preferred. Flemming (1995) proposed that /d, n, l/ have the following (auditory) intensity specifications.

|      |                 |   |   |   |
|------|-----------------|---|---|---|
| (23) |                 | d | n | l |
|      | Int: lowest int | + | - | - |
|      | low int         | + | - | - |
|      | high int        | - | - | + |
|      | highest int     | - | - | - |

He suggests that the constraint “Fortition” in South Korean is satisfied by a [-high int] onset and thus, [l] cannot appear as an onset in post-consonantal position.

Why then, cannot [r] appear after [n]? I suggest that it is due to articulatory difficulty. Inouye (1995) and Bradley (2001) argue that taps have the following structure.

(24) Aperture-theoretic representation of tap



Inouye (1995) claims that the articulatory characteristics of ballistic taps require both the approach  $A_{\max}$  and release  $A_{\max}$  phases. The approach phase makes the following stop closure  $A_0$  extra short. She also adds that the approach phase  $A_{\max}$  and the release phase  $A_{\max}$  are due to the spreading of the aperture feature of the adjacent segments, such as vowels.

Therefore, if the surrounding environment of the tap does not have  $A_{\max}$ , which can be spread to the tap, the articulation of tap becomes difficult. I believe that this is due to the preceding unreleased stop which does not have release  $A_{\max}$  phase. In particular, the approach phase of the tap cannot be properly executed and thus [ɾ] cannot appear in this position.

A similar account can be provided for the liquid after an obstruent in /megraɪn/ in (20c). The obstruent /g/ in /gr/ clusters is not released in English, so /g/ is represented with the aperture closure  $A_0$  only, not with the release  $A_{\max}$  phase, as is given in (25).

$$(25) \begin{array}{cc} g & L \\ C & C \\ | & | \\ A_0 & A_{\max} \end{array}$$

When borrowed into Korean, /g/ is syllabified as coda and due to the [+sonorant] feature spreading triggered by the following liquid, it surfaces as [ŋ]. Again, the following liquid cannot surface either as [l] or [r] due to either auditory or articulatory factors. Therefore, a nasal appears.

In this section, I have argued that different surface forms of the same consonant cluster, namely /Consonant+liquid/ is realized into different forms in the source language depending on whether the preceding consonant is released or not. The release phase of the preceding consonant affects the articulation of the following liquid.

## 5. Conclusion

In this paper, we have examined a few perception-related phenomena of English loanwords. I have shown that a /stop+s/ cluster and a liquid in English may appear in forms that were not expected from Korean phonology. I have argued that this is due to perception. Specifically, I have shown that, due to perception, [ch] appears in loanwords for a /t+s/ cluster in English. I have also argued that, due to the different acoustic cues of the release phases of /tʃ/ and /t+s/, these /tʃ/ and /t+s/ appear as [chi] and [chi] respectively, in Korean loanwords. An alveopalatal affricate is perceived with the release phase of alveopalatal place, whereas a coronal stop+a coronal fricative is perceived with the release phase of a coronal place. The release phase of a consonant is perceived as the acoustic cue to a vocalic segment by Korean speakers and thus, the release phase of an alveopalatal place is perceived as a high front vowel [i], whereas coronal place is not so perceived.

I have also argued that due to the perceptual salience of the phrase-initial position, tap is licensed in that position in loanwords. Additionally, due to different acoustic cues, a /CL/ cluster with the released C appears as [CVɾ], whereas other /NL/ cluster, with its preceding nasal segment unreleased

appears with its liquid segment changed into [n]. If the following is correct, it is clear that perception greatly influences the surface forms of loanwords.

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