

Adaptation of English words with liquids into Korean*

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Kang, Hyunsook. 2003. Adaptation of English words with liquids into Korean. *Studies in Phonetics, Phonology and Morphology* 9.2. 311–325. This paper discusses how foreign words with a liquid are adapted into Korean. I examine cases where a liquid appears as a part of a cluster and cases where a liquid appears as a singleton in a foreign word. I first show that liquids within a cluster in a foreign word are adapted as different segments in Korean depending on which segment precedes them. In specific, I examine how a liquid within a /t+l/ cluster or within a /nasal+liquid/ cluster is adapted into Korean and discuss what critical constraint rankings are involved in this adaptation process. Secondly, I discuss why a singleton liquid in the word-initial position of a foreign word surfaces as a liquid in a recent loanword even if liquid is avoided in this position in Korean phonology. Following the usage-based model by Bybee (1988, etc.), I argue that words are the units that are stored in lexicon and that words tend not to have variants. Therefore, words that surface as nasal-initial should be represented as nasal-initial rather than liquid-initial. That is, I argue that a Sino-Korean word ‘labor’ might be represented as /nodon/, not as /Lodon/ in lexicon. (Hanyang University)

Keywords: liquid, adaptation, Korean phonotactics, usage-based model, lexicon

1. Introduction

This paper is concerned with how a liquid in English is borrowed into Korean. I will show that perception plays a major role when foreign words with liquids are borrowed into Korean.

In order to investigate how foreign liquid sounds are adapted into Korean, we need to first consider how liquids in native and Sino-Korean words surface in outputs. Consider (1).

- (1) Surface forms of a liquid in Korean
- | | | |
|------------|----------|-----------------|
| a. yu+L: | [yu:] | ‘origin’ |
| b. sL+my. | [s]my. | ‘explanation’ |
| c. toL | [to] | ‘stone’ |
| d. taL+Lyk | [tallyk] | ‘calendar’ |
| e. kyk+Ly | [ky.]ny | ‘encouragement’ |
| f. Lo+to. | [noto.] | ‘labor’ |

An intervocalic liquid appears as a tap [ɾ] in (a). If an underlying liquid appears before another consonant, word-finally or as a geminate as in (b, c, d), it surfaces as a lateral. If an underlying liquid appears

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¹ /L/ in these examples represents a liquid in the input.

post-consonantly or word-initially as in (e, f), it surfaces as a nasal [n]. That is, a liquid in South Korean alternates with a tap, a lateral, and a nasal depending on its phonological context.

Liquids in English words are uniformly substituted as liquids in Korean when adapted as we see in (2a-h). This adaptation is also reflected in spelling: Liquids in the source language appear as Korean liquids in the spelling of loanwords. One exception is English words with a syllable final [r] (cf. 2h). A syllable-final English [l] is adapted into a Korean liquid [l] (cf. 2g) whereas a syllable-final English [r] is adapted as a null segment (cf. 2h). These different ways of adaptation seem to be taken to preserve the contrast between the syllable-final [l] and [r] of the source language.

(2)	English	Loanwords	English	Loanwords
a.	Mary	[meŋi]		
b.	Hamlet	[hemnit]	homeless	[homnis'ŋ] ²
c.	outlet	[aulet]	(Microsoft) outlook	[aulluk]
d.	outline	[aut ^h ŋain]	Atlanta	[at ^h ŋlant ^h a]
e.	light	[ait ^h ŋ][lait ^h ŋ]		
f.	radio	[atio][latio]		
g.	sale	[s'eil]		
h.	center	[s'ent ^h ŋ]		

Consider how well the liquids in loanwords (2) conform to Korean phonotactics. The liquid in (2a) in the source language appears as a tap [ŋ] in a loanword. Other liquids in the source language also appear as a nasal in (2b), a lateral in (2c) or an intervocalic tap in (2d), depending on their phonological contexts in loanwords, just like those in native and Sino-Korean words. The only liquid in loanwords that do not conform to Korean phonotactics is word-initial one: a word-initial liquid in (2e, f) appears as a liquid, not as a nasal that is the expected segment in native and Sino-Korean words (cf. 1f). It can be concluded, then, that liquids in English are adapted as Korean liquids with an exception of a syllable final [r] and that loanwords with liquids conform to Korean phonotactics with an exception of liquid-initial words.

A close look at the /consonant+liquid/ sequences in loanword forms in (2) also reveals that an English liquid is not just substituted with a Korean liquid, with the concomitant application of Korean phonological processes. Other changes have also occurred to segments near the liquid in loanwords. For example, an /obstruent+liquid/ sequence in (2d) in the source language does not surface as a consonant sequence in a loanword but as a sequence with an additional vowel between the consonant cluster.

Furthermore, different ways of adaptation for a consonant sequence are selected, depending on what consonant precedes a liquid in the source

² Tense consonants in Korean are represented as [s^ˀ], [p^ˀ], [t^ˀ] and [k^ˀ].

language. The /obstruent+liquid/ sequence in the source language either appears with an inserted vowel between the sequence as in (2d) or is changed into a legitimate consonant sequence as in (2c). The /nasal+liquid/ sequence in (2b), on the other hand, does not show a vowel-inserted loanword form. It is always changed into the legitimate consonant sequence.

This paper consists of 6 sections. Section 2 is concerned with adapted surface forms of /obstruent(nasal)+liquid/ sequences in English. Section 3 considers why different types of adapted forms appear depending on which segment precedes a liquid in a consonant cluster in English. Section 4 examines a liquid that appears as a part of onset. Section 5 is concerned with a word-initial liquid in the source language. The last section concludes the paper. I will show that perception plays an important role in the adaptation of liquids into Korean.

2./Obstruent+liquid/ sequence in the source language

This section will examine English words with an /obstruent(nasal)+liquid/ sequence that are borrowed into Korean. I will show that Uniform Substitution, which substitutes a foreign sound with the most appropriate Korean sound, and Perception play major roles in loanword adaptation.

First, consider examples in (3) where English nasals are uniformly substituted with Korean nasals and English voiceless stops with Korean heavily aspirated stops.

- (3) i. nasal substitution
- | | | | |
|----------|-----------------------|------|-------------------------------------|
| a. dam | [t::m] | gum | [k ^h ɯm] |
| b. dance | [t::ns ^h] | tent | [t ^h ent ^h] |
| c. gang | [k ^h ::ŋ] | tank | [t ^h ::ŋk ^h] |
- ii. obstruent substitution
- | | | | |
|--------------|--|---------|--|
| a. pineapple | [p ^h ain::p ^h] | point | [p ^h oint ^h] |
| b. test | [t ^h es ^h t ^h] | tape | [t ^h eip ^h] |
| c. cola | [k ^h olla] | cream | [k ^h rim] |
| d. style | [s ^h t ^h ail] | sky | [s ^h k ^h ai] |
| e. outline | [aut ^h ain] | Atlanta | [at ^h llant ^h a] |

Note that even if English voiceless stops after /s/ as in (3iib) are non-aspirated, they are still uniformly substituted with heavily aspirated stops. Also the unreleased [t]s in English ‘outline’ and ‘Atlanta’ in (3iie) are adapted as heavily aspirated stop [t^h]s as well, even if Korean listeners never hear the released [t]s in these words. Therefore, Uniform Substitution must play a role in loanword adaptation in Korean.

We have also seen in (2) that English liquids are also uniformly substituted with Korean liquids. Interestingly, however, when segments like nasals and obstruents are followed by a liquid, the final adapted output forms are not sequences of these substituted segments only, as we saw in (2b,

c, d). I suggest that this is due to some highly ranked constraints in Korean phonology such as Syllable Contact law (cf. Vennemann (1988), Davis and Shin (1999), etc.). A slightly modified Syllable Contact Law is given in (4), which says that Korean does not allow a consonant sequence C_1C_2 in which the sonority of C_2 is higher than that of C_1 . Thus, an /obstruent(nasal) + liquid/ sequence is not allowed in Korean since it violates Syllable Contact Law. Rather, different surface forms arise.

(4) Syllable Contact Law

When two syllables are in contact, the coda of the first syllable should be of equal or greater sonority than the onset of the second syllable.

Let us first consider 'hamlet' in (2b) in which an unreleased nasal precedes a lateral. As we said, this sequence is not an allowed consonant sequence in Korean since it violates Syllable Contact Law. There are several ways to avoid this sequence. A default vowel can be inserted between the consonants or one of the consonants can change its features to conform to Korean phonotactics. The repair strategy taken for the /ml/ sequence in 'Hamlet' in (2b) is the latter option: a liquid changes its feature.

How should we explain this fact within the Optimality Theory (cf. Prince and Smolensky 1993, McCarthy and Prince 1995, etc.)? I would like to argue that the critical constraint that influences the loanword form for a foreign word with the /m+l/ sequence is Per-Ident[A] in (5). Per-Ident[A] says that the perceived aperture feature of an output should be identical to that of the input.

(5) Per-Ident[A]

The perceived aperture feature of an output should be identical to that of the input.

Kang (1996) argues that Korean listeners are sensitive to the released/unreleased aperture of a segment and that this is why the released nasal in French given in (6a) (cf. Kim & Kim 2000) is adapted as an onset in Korean but an unreleased nasal in English is adapted as a coda as in (6b). Note that released consonants are allowed only as an onset whereas unreleased consonants are allowed only as coda in Korean.


(6) Loanwords with the final nasal

a. femme(Fr.)	[p ^h amm]	home(Fr.)	[omm]
b. dam(En.)	[t·:m]	time(En.)	[t ^h aim]

Thus, when Korean speakers/listeners listen to a /nasal(m)+liquid/ sequence in 'hamlet,' they perceive that the nasal segment [m] is not released and thus, they want to preserve its aperture. Therefore, if constraints like Per-Ident[A] and SyllCon are ranked highly as in (7), the correct output is

selected for 'hamlet.'


(7) /h : mlit/ → [hem.nit] 'Hamlet'

'hamlet' /h : mlit/	SyllCon	Per-Ident[A]	Substitution[liquid]
a. hem.lit	*!		
b.  hem.nit			*
c. he.m□.□it		*!	

Candidate [hemlit] in (a) violates the fatal constraint SyllCon. Candidate [he.m□.□it] in (c) violates another fatal constraint Per-Ident[A]: An input nasal [m] is in the coda position of English and thus, unreleased. However, /m/ in [he.m□.□it] is released by being syllabified as an onset. Therefore, candidate [hemnit] in (b), which violates the least fatal constraint, is selected as optimal.

For the /obstruent+liquid/ cluster, consider (8), in which the same constraint ranking in (7) namely SyllCon, Per-Ident[A] >> Substitution [t^h] applies. By Uniform Substitution, English /t/ and /l/ are uniformly substituted with Korean /t^h/ and /l/, respectively.

(8) /aut□t/ → [aullet] 'outlet'

outlet /aut□t/	SyllCon	Per-Ident[A]	Substitution[t ^h]
a. a.ut.let	*!		*
b.  a.ul.let			*
c. a.u.t ^h □.□et		*!	

Candidate [a.ut.let] in (a) violates SyllCon since an obstruent precedes a liquid. Candidate [a.u.t^h□.□et] in (c) violates Per-Ident[A] since the unreleased segment [t] in the source language appears as a released segment in the output. The optimal candidate [a.ul.let] in (b) violates Uniform Substitution (Eng/t/ → Kor/t^h/) but since it is ranked lower than the other constraints, candidate [a.ul.let.] is selected as optimal.

Note that another type of an output form for the /obstruent+liquid/ sequence, namely a loanword form like [aut^h□□ain] in (2d) with an inserted vowel between the consonant sequence in the source language, is also selected as optimal for a /t+liquid/ sequence. This optimal form can, then, be selected either due to the different constraint ranking from that in (8) or due to another unknown, highly-ranked constraint C. Let us consider these two possibilities in detail.

Suppose that a different constraint ranking is responsible for another type of an optimal form [aut^h□□ain]. That is, if Sub[t^h] of Uniform Substitution outranks Per-Ident[A] as in (9), the correct output can be selected.

KCS I

(9) /autlain/ → [aut^hain] ‘outline’

outline /autlain/	SyllCon	Sub[t ^h]	Per-Ident[A;t]	Faith[V]
a. a.ut.la.in	*!	*		
b. a.ul.la.in		*!		
c. a.u.t ^h .a.in			*	*

Candidate [a.ut.la.in] in (a) and candidate [a.ul.la.in] in (b) violate SyllCon and Sub[t^h] of Uniform Substitution (English /t/ → /t^h/), respectively and thus, candidate [a.u.t^h.a.in] in (c) is selected as optimal. Therefore, it seems that with the rankings of Per-Ident[A] >> Sub[t^h] and Sub[t^h] >> Per-Ident(A), we can select correct surface forms for /t+l/ sequences in (8) and (9). These conflicting rankings can be understood as derived from constraints of equal ranking (McCarthy and Prince 1995, etc.). Thus, by equally ranking Sub[t^h] and Per-ident[A], the correct optimal forms seem to be selected as in (8) or (9).

However, this solution cannot be maintained. Kang (1996) have shown that an English word with an /obstruent+obstruent/ sequence like ‘pepsi’ is never adapted as [p^hep^hs[’]i]. If Uniform Substitution, namely Sub[p^h], can be ranked higher than Per-Ident[A] as in (9), a word like [p^hep^hsi] should be another optimal loanword form as in (10)³. In (10), ☞ represents an output candidate that is expected by the constraint ranking but is an incorrect output form.

(10) /p^hpsi/ → [p^heps[’]i] ‘pepsi’

‘pepsi’ / p ^h psi /	Sub[p ^h]	Per-Ident[A]
a. ☞ p ^h e.p ^h .s [’] i		*
b. ☞ p ^h ep.s [’] i	*!	

In (10), candidate [p^hep^hs[’]i] should be optimal since it violates a less fatal constraint than [p^hep.s[’]i]. However, the correct form is always a form like [p^heps[’]i] with no inserted vowel. The intuition why English word ‘pepsi’ is adapted as [p^heps[’]i], not [p^hep^hs[’]i] is due to that fact that the second obstruent /p/ in ‘pepsi’ is unreleased. Therefore, Per-Ident(A) should always outrank Sub[p^h]. Thus, the selection of an optimal loanword form [a.u.t^h.a.in] ‘outline’ cannot be attributed to the higher ranking of Substitution over Perception as was shown in (9).

Therefore, I would like to argue that the form [a.u.t^h.a.in] is selected due to another constraint C, which is ranked as highly as Per-Ident[A]. Note that to avoid the illegitimate consonant sequence /t+l/ for ‘outlet’ in (8), the uniformly substituted /t^h/ underwent not only the loss of aspiration but the loss of its obstruent feature and become [l] in [aulet]. That is, the con-

³ There is one example [nep^hk^hin] ‘napkin’ that seems to show the inserted vowel between two obstruents. It might be the case that this loanword form is introduced into Korean through Japan.

straints that are involved in the selection of the optimal forms for /obstruent+liquid/ are Faith([son]&[lat]) and Per-Ident[A] of the preceding obstruent. Consider (11).

(11) /autlain/ → [aut^hain] ‘outline’
/autlet/ → [aulet] ‘outlet’

outline	Faith[l]	Faith([son]&[lat])	Per-Ident[A;t]
a. a.ul.la.in		*!	
b. [☞] a.u.t ^h .ain			*
outlet	Faith[l]	Per-Ident[A;t]	Faith([son]&[lat])
c. [☞] a.ul.let			*
d. a.u.t ^h .let		*!	

Candidate [a.u.t^h.ain] violates Per-Ident[A; t] and candidate [a.ul.let] violates Faith([son]&[lat]). And if these two constraints are equally ranked, both candidates can be selected as optimal. With this equal ranking of Faith([son]&[lat]) and Per-Ident[A; t], not only an optimal output form for ‘outline’ but the correct form for ‘pepsi’ is also selected as in (12)⁴.

(12) /p^hpsi/ → [p^heps’i] ‘pepsi’

‘pepsi’ / p ^h psi /	Per-Ident[A]	Faith([son]&[lat])
a. p ^h e.p ^h .s’i	*!	
b. [☞] p ^h ep.s’i		

The [ɰ]-insertion for [aut^hain] in (11), though, is quite different from the [ɰ]-insertion Kang (1996) argued for words like ‘femme’ or ‘bus,’ which were adapted as [ɰ]-vowel final words like [p^hammɰ] and [pɰs’ɰ]. For these words, Kang (1996) argued that Koreans perceive the final consonant of the original word as [ɰ]-vowel final due to the perception of the released phase of a segment. As soon as a Korean speaker hears the final fricative [s] in ‘bus’ or the released nasal [m] in ‘femme,’ he/she also hears the following vowel. Therefore, [ɰ]-insertion for these cases cannot be assigned to Operative Level (cf. Silverman (1992)). Rather, this type of [ɰ]-insertion

⁴ An anonymous reviewer pointed out that if we allow equal ranking between Faith([son]& [lat]) and Per-Ident[A; t], then candidates in (11a) and (11d) should be chosen as optimal as well. I argue that each lexical item will decide which constraint ranking between Faith ([son]&[lat]) >> Per-Ident[A;t] and Per-Ident[A; t] >> Faith ([son]&[lat]) it will take. Another anonymous reviewer pointed out that unlike ‘outlet,’ which is perceived as one word by Korean listeners/speakers, ‘outline’ may be perceived as the combination of two words, ‘out’ [aut^h] and ‘line’ [Lain], and that this morphological structure influences the adapted form with a default vowel in [aut^hLain]. As the reviewer suggests, the adapted form [aut^hLain] for ‘outline’ can be explained with the constraint ranking, O-O correspondence >> Per-Ident[A; t]. However, as I pointed in (2d), there are words like ‘Atlanta’ which is adapted as [at^hlant^ha] even if there is no way to argue that it is the combination of two words. At this point, it seems that the more recently borrowed item with /t/ sequence takes the constraint ranking Per-Ident[A; t] >> Faith([son]&[lat]).



should be attributed to Perceptual Level.

However, [ɰ]-insertion for ‘outline’ is different. Korean speakers wanted to preserve the obstruent feature of segment [t^h] and thus, inserts [ɰ] after it. Therefore, this type of [ɰ]-insertion may belong to rules in Operative Level.

3. Adaptation of liquid after a nasal

I have shown that Faith[son] constraint can be ranked as high as Per-Ident[A] for ‘outline.’ If so, why can’t [hemɰit] in (13c) be selected as an optimal form with Faith[liquid] equally ranked with Per-Ident[A; m]? Consider (13).

(13) /h.:mlit/ → [hem.nit] ‘Hamlet’

/h.:mlit/	Syllcon	Per-Ident[A; m]	Faith[liquid]
a. hem.lit	*!		
b.  hem.nit			*
c.  he.mɰ.it		*	

Candidate (a) violates an undominated constraint Syllcon and thus, cannot be selected as optimal. Candidate (b) and candidate (c) violate Faith[liquid] and Per-Ident[A; m], respectively, which are equally ranked. Therefore, both [hemnit] and [hemɰit] should be selected as optimal, but only [hemnit] is the optimal candidate. What prevents Faith[liquid] from being equally ranked with Per-Ident[A; m]?

Before we answer this question, note that in Korean loanwords, [ɰ] is inserted only in the right-hand side of the segment that has trouble being faithfully preserved in the output forms by Korean phonotactic rules. For example, [ɰ] is inserted in the right-hand side of [t^h] as in [aut^hɰain] to faithfully preserve [sonorant] and [lat] features of the segment [t] in the source language. That is, Korean loanword phonology adopts a system in which the identity of a trouble segment is preserved by being placed in the perceptually prominent position, namely in the onset position.

In ‘hamlet,’ the troubled segment in perception is [l]. Impressionistically, [l] after a [m] or a [.] sound is perceived as [n] to me and Seo (2001) also shows that Koreans perceive /hemlit/ as [hemnit]. However, a default vowel cannot be inserted into the right-hand side of the troubled segment [l] because it is already in the onset position.

To faithfully preserve the liquid characteristic, a default vowel should be rather inserted in the left-hand side of the liquid. However, this disturbs the perception of the segment aperture of the preceding segment [m] in ‘hamlet,’ not [l] troubled. In other words, the syllabic structure of the previous segment [m] in /m+l/ sequence is disturbed to preserve the segmental features of the following segment.

In contrast, the syllabic structure of the previous segment [t] in English

/t+l/ sequence is sacrificed in a loanword [aut^hain] in order to preserve the segmental features [son] and [lat] of the same segment. It seems then that the non-local insertion of the default vowel in /m+l/ sequence of [hemnit] may be punished more than the local insertion of the default vowel in /t+l/ sequence of [aut^hain] in Korean loanword phonology. I argue therefore that Faith constraints of a segment may be equally ranked with the conflicting constraints applying on the same segment, but not the constraints applying on other segments in Korean loanword phonology. In other words, a constraint that can be equally ranked with Faith[liquid] should be Per-Ident(A; liquid), not Per-Ident(A; nasal). Per-Ident(A; liquid) says that the aperture feature of a liquid should be identical between the input and the output. Consider (14) and (15).

(14) /h::mlit/ → [hem.nit] ‘Hamlet’

/h::mlit/	Per-Ident[A;m]	Per-Ident[A; l]	Faith[liquid]
a. [☞] hem.nit			*
b. he.m□.it	*!		

(15) /h::mlit/ → [hem.nit] ‘Hamlet’

/h::mlit/	Per-Ident[A;m]	Faith[liquid]	Per-Ident[A; l]
a. [☞] hem.nit			*
b. he.m□.it	*!		

With the constraint ranking Faith[liquid] >> Per-Ident(A; liquid) in (14), candidate [hemnit] is selected as optimal. Candidate [he.m□.it] cannot be selected because it violates Per-Ident[A] of /m/, which is ranked higher than Faith[liquid]. With another constraint ranking Per-Ident(A; liquid) >> Faith[liquid] in (15), candidate [hemnit] is again selected as optimal since candidate [hem□it] still violates Per-Ident(A; m).

In this section, I showed why different types of surface forms are derived for [obstruent+liquid] sequences and [nasal+liquid] sequences. Specifically, I argued that Faith[liquid] and Faith([son]&[lat]) can be equally ranked only with Per-Ident[Aperture] of the same segment.

4. Adaptation of liquid as a member of an onset

Perception also plays a role in another kind of /obstruent+liquid/ sequence in Korean loanwords. Though the sequence /t+L/ in (2d, e) shows two types of surface forms, another English /t+L/ sequence in (16) appears only with an inserted vowel between the consonants in loanword forms.

(16) /obstruent+liquid/ as an onset cluster

English	Loanword	forms
a. strike	[s ^h taik]	*[sllaik]
b. stress	[s ^h tesʰ]	*[slllesʰ]
c. metro	[met ^h o]	*[mello]

In fact, this is what is expected with the constraint ranking that we motivated until this point. Consider (17).

(17) [straik] → [s^htaik] ‘strike’

‘strike’ /straik/	Per-Ident[A]	Faith[-son]
a. s ^h taik		
b. sllaik	*!	*

Since /(s)tr/ sequences in (16) are pronounced as onsets in the source language, all of these consonants will be perceived as segments with open aperture (cf. Steriade 1993). Candidate [s^htaik] violates none of the fatal constraints in (17) whereas candidate [sllaik] violates Per-Ident[A] and Faith[son]. Therefore, [s^htaik] is selected as optimal. Per-Ident[A] again plays a major role in the adaptation of a foreign word with an onset cluster.

5. Liquid-initial loanwords

In this section, we consider loanword forms adapted from liquid-initial English words. As is known, a word-initial liquid in recent loanwords is preserved even if native and Sino-Korean words change it to a nasal. I will discuss why this type of difference occurs in this position between recent loanwords and native and Sino-Korean words and how liquid-initial words should be represented in lexicon of native, Sino-Korean and recent loanwords.

As was shown in (1), native and Sino-Korean words do not begin with liquids. It seems that at one stage, Korean language has strengthening effect, which changes a liquid in the word/phrase-initial position into a sonorant stop [n]. This is why liquid-initial morphemes of native and Sino-Korean words appear as [n]-initial in word-initial position.

Recently, a great number of western loanwords with an initial liquid are introduced into Korean. Thus, Korean speakers are extensively exposed to the word-initial liquid and thus, the word-initial liquid seems to have crossed over the threshold of the conscious level of perception. As a result, the word-initial liquid is licensed as an independent segment in Korean phoneme inventory in the word-initial position. Korean speakers now perceive and pronounce a liquid in the word-initial position despite the articulatory difficulty and phonotactic avoidance of word-initial liquid in native and Sino-Korean phonology.

Let us examine how word-initial liquids are preserved in loanwords. In

this paper, I adopt the proposal made in Kang (1999) in which three phases are proposed for loanword phonology shown in (18).

- (18) Three Stages of Loanword adaptation
 Stage 1 Stage 2 Stage 3
 Foreign Words → Output → Lexicalization → Affixation

In the first stage, a foreign word is adapted into Korean. It then enters the lexicon and then undergoes the regular suffixation and prefixation of Korean morphology and phonology.

Consider the correct loanword form for 'lobby.' In the first stage, 'lobby' will be adapted as [Lopi] as in (19) with the constraint ranking, Uniform Substitution and Perception >> *##L. *##L represents a traditionally known Korean constraint that avoids the word-initial liquid, namely Du-□m Law in (20).

- (19) /lobi/ → [Lopi]⁵ 'lobby'

'lobby' /Lopi /	Perception[liquid]	*##L[liquid]
a. [☞] Lopi		*
b. nopi	*!	

- (20) Du-□m Law (*##L)

A word should not begin with a liquid.

In the lexicalization stage, word-initial liquid is lexicalized as word-initial liquid with Faith constraints outranking *##L. Perceived segments are preserved in lexicon as much as possible (cf. Boersma 1999).

- (21) Stage 2: /Lopi/ → [Lopi] 'lobby'

'lobby' /Lopi /	Faith[liquid]	*##L[liquid]
a. [☞] Lopi	*!	
b. nopi		*

With the constraint ranking (21), /Lopi/ is selected as the optimal lexical form. This lexicalized /Lopi/ will then be turned into the third, production stage and will be influenced by the constraint ranking of the production stage.

In the production stage, however, Faith[liquid] is outranked by *##L for native and Sino-Korean words as we can see in (22).

⁵ Liquid in the loanword initial position is represented as [L] since it can surface either as [l] or [ɭ].

(22) Stage 3: /Lo+to.·/ → [no+to.·] ‘labor’ (Sino-Korean)

/Lo+to.·/	*##L(liquid)	Faith[liquid]
a. Lo.to.·	*!	
b. no.to.·		*

Candidate (b), [no.to.·], is an optimal output form for /Lo+to.·/. Therefore, the constraint ranking *##L >> Faith[liquid] should be motivated for native and Sino-Korean nominal stems. However, the same constraint ranking would select an incorrect output if the input is a loanword stem as in (23).

(23) Stage 2: /Lobi/ → [Lopi] ‘lobby’

‘lobby’ /Lopi /	*##L(liquid)	Faith[liquid]
a. Lopi		*
b. nopi	*!	

For the correct output form, it is necessary for loanwords to have the constraint ranking (24).

(24) Stage 2: /Lobi/ → [Lopi] ‘lobby’

‘lobby’ /Lopi /	Faith[liquid]	*##L[liquid]
a. Lopi		*
b. nopi	*!	

Since Faith[liquid] is ranked higher than *##L in (24) for loanwords, [Lopi] is selected as optimal. Faith[liquid] ranked above *##L in lexicalization stage is again mirrored in the production grammar for loanwords.

The question we would like to ask at this point is whether both constraint rankings in (22) and (24) are active in Korean phonology. Note that there is difference between word-initial liquids of Sino-Korean words and those of recent loanwords. The word-initial liquid segment in the input of the recent loanwords is a perceptually real liquid segment but the word-initial liquid segment in the input of Sino-Korean words is the abstract one derived from the morphological correspondence. For example, a Sino-Korean word /Loto.·/ with the word-initial liquid is always heard as [no.to.·], not [Lo.to.·]. The initial liquid of /Lo/ ‘work’ in /Lo+to.·/ is, therefore, derived from its morphological correspondence with /Lo/ in other words like /k□n+Lo/: [k□llo] ‘work’ or /kwa+Lo/: [kwa□o] ‘overwork’ either through formal education or through smart deduction. Note, however, that this morphological correlation between [no] in [no.to.·] and [Lo] in /kwa+Lo/ is acquired in the later stage of language acquisition, if it ever occurs. Also note that sometimes it is not easy to make morphological correlation between morphemes in different Sino-Korean words since Sino-Korean morphemes are opaque in contributing their meanings to the meaning of the

word of which they are a part. Thus, it is questionable whether a Sino-Korean word 'labor' is reconstructed as [Lotoŋ] with liquid-initial for Korean speakers, even after they acquired some formal education.

In contrast, the initial liquid in an English word 'lobby' is actually produced in the source language and consciously perceived by Korean listeners and thus, English 'lobby' must have been stored as a word with liquid-initial for Korean speakers.

Recently, it has been argued that what is stored in lexicon is not the phonemic representation of the morphemes but the actual pronunciations of the words or phrases that are frequently occur as a unit. That is, in Bybee (1988, etc.), it is proposed that the lexicon consists primarily of words, and that even the words that are morphologically complex are stored as a unit. Bybee (2000) also argues that morphological correspondence between the same morphemes in different words is not expressed in the traditional way --- that of being represented with the same phonemes. Thus, the identical phonemic representation for the same morpheme is not necessary to represent morphological correspondence.

Thus, following Bybee (1988, 1995, 1998, 2000) and others, I would like to argue that frequently used words are units that are memorized in lexicon and thus, Sino-Korean words which are frequently used units are memorized as a whole in lexicon. In specific, I suggest that a Sino-Korean word for 'labor,' which is composed of two morphemes /Lo/ and /toŋ/, are in fact stored as [nodon] in lexicon since this is the only pronunciation form Korean speakers hear. Only when do Korean speakers acquire the semantic relationship between /no/ in /nodon/ and /lo/ in /killo/, their semantic correspondence will be constructed. But even if one acquires the knowledge that they are the identical morphemes, their relationship will not be represented with the identical phonemic representations as Bybee (2000) argues.

Thus, it seems that what is active in Korean phonology at present is the constraint ranking Faith[liquid] >> *##L, but not *##L >> Faith[liquid]. If frequently used Sino-Korean nouns which are traditionally represented with liquid-initial are already represented in lexicon as nasal-initial nouns as in /nodon/, as I argued, the reverse constraint ranking *##L >> Faith[liquid] seems to have not many chances to apply. The only chances where *##L >> Faith[liquid] may apply are when a language learner encounters a new noun which he/she recognizes as a Sino-Korean noun composed of two Sino-Korean morphemes (the first of which begins with a liquid). But this may also depend on how much education he/she received.

6. Conclusion

This paper has shown that different phonological repair strategies are adopted for loans that differ from those for natives. I have argued that perceptual factor plays a major role in determining which repair strategy

will be taken for a loanword form. For example, I argued that when Koreans face with unacceptable consonant sequences like /t+l/, Koreans make changes to the preceding segment [t] since it is perceptually less prominent. In contrast, when Koreans face with another unacceptable consonant sequences like /m+l/, it is [l] that undergoes featural changes since in this case it is [l] that is perceptually less prominent.

I have also discussed how liquid-initial foreign words were adapted into Korean. I have argued that the onset clusters in English like /strV/ are adapted as /sVtVrV/ since all the onset consonants are released in English and that released consonants are perceived as /onset+V/ syllable to Koreans. I have also discussed why a liquid-initial English word is adapted into Korean as liquid-initial but why a liquid-initial native/Sino-Korean word is pronounced as nasal-initial. I have suggested that the difference comes from whether the liquid segment in the input is a perceptually real liquid segment as in recent loanwords or the abstract one derived from the morphological correspondence as in Sino-Korean words. Following Bybee (1988, etc.), I argue that words are the units that are stored in lexicon and that words tend not to have variants. Therefore, words that surface as nasal-initial should be represented as nasal-initial rather than liquid-initial. Only when there is perceptual cues, words should be represented as liquid-initial in lexicon. Again, perception is important in loanword adaptation. With further research into loanword adaptation, more support will be drawn for the importance of perception in the language acquisition.

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