
영어 2음절 차용어의 음절수 예측 알고리즘

An Algorithm on Predicting Syllable Numbers of English Disyllabic Loanwords in Korean

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요약

본 논문에서는 영어 2음절 단어가 한국어에 차용될 때 어떻게 음절수가 변화하는지 살펴보고 있다. 일반적으로 영어 2음절 단어는 여분의 음절이 더해져서 차용되는 경향이 강하므로, 본 논문에서는 음절수가 증가하는 경향을 분석하여 음절수를 증가시키는 조건을 밝힐 뿐 만 아니라 음절수 증가 알고리즘을 찾아내는 것을 목표로 한다. 구체적으로 영어 2음절 차용어의 음절수를 증가시키는 요인으로는, 첫째 단어에 이중 모음이 있거나, 둘째 특정한 형태의 자음군이 있거나, 셋째 단어에서 마지막 자음과 그 앞의 모음의 특성에 따라서 어말 모음이 삽입되는 경우에 음절수가 증가한다. 이러한 요인에 근거하여 2음절 차용어의 음절수 예측 알고리즘을 4가지 규칙으로 제시하고 그 적용과정의 예를 들고 있다.

■ 중심어 : | 영어2음절차용어 | 음절수예측 | 이중모음 | 강세모음 | 자음군 | 어말모음삽입 |

Abstract

When English disyllabic words are borrowed into the Korean language, the loanwords tend to have extra syllables. The purpose of this paper is to find the syllable increase conditions in loanword adaptation and further to provide an algorithm to predict the syllable numbers of English disyllabic loanwords. There are three syllable augmentation conditions. The presence of diphthongs and the existence of consonant clusters guarantee the increase of the syllable numbers in the English loanwords. Further, the quality of the final consonant (and the preceding vowel) sometimes trigger the increase of the syllable numbers. Based on the conditions, an algorithm composed of 4 rules are proposed in order to predict the number of syllables in English disyllabic loanwords.

■ Keyword : | English Disyllabic Loanwords | Syllable Number Rediction | Diphthongs | Stressed Vowels | Consonant Clusters | Final Vowel Insertion |

I. Introduction

Words can be adopted from another language and

naturalized. The Korean language has borrowed many words from English. The borrowed English words are called loanwords and they are at least

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partly adapted to the Korean sound system in the nativization process. There have been many studies on English loanwords in the Korean language (Lee 1995 [6], Kang 1996 [4], Oh 1996 [8] among others). Previous studies investigate how English sound per se are adapted in Korean. However, this paper narrows down the scope of the paper so as to focus on the issue of how English disyllabic words are syllabified in the adaptation process. As far as syllabification concerns, there is no known studies that particularly deal with the syllable number algorithm in English disyllabic loanwords.

In the adaptation process the transformation of illegal forms takes place in conformity with the Korean language. As a result, English words in the source language and loanwords in Korean are commonly observed to mismatch. In particular, the syllable number of the source language tends to be different from that of the recipient language, thus requiring repairs. For example, the English monosyllabic word *strike* is realized as containing five syllables [si.t^hi.ra.i.k^hi]. This is mainly because Korean does not allow consonant sequences in a row. In order to conform to Korean, the most unmarked vowel [i] in Korean is inserted twice among the triconsonantal sequences [str]. In addition, the English diphthong [ay] is realized as two separate vowels [a] and [i] because Korean do not have an offglide diphthong such as [ey], [aw], and [oy]. Further, English final [k] emerges with the inserted vowel [i], resulting in five syllables. Thus, the syllable number of the loanwords tend to be augmented when they are nativized into the Korean language system.

This paper deals with the issue of syllable number augmentations in loanword adaptation. In specific, the following themes are considered: 1) how English disyllabic loanwords are syllabified in Korean; 2) what are the patterns in the syllable number

disparities between the English target language and the Korean recipient language; 3) whether it is possible to find out an algorithm to predict the number of syllables in English disyllabic loanwords.

II. Syllabification of English disyllabic loanwords

In loanword adaptation, disyllabic English words are often variably realized as more than two syllables. Based on the data in Loanword Dictionary (2004) [7] as well as in the loanword list by the National Academy of the Korean Language (NAKL, 1991) [10] (recited in Kang 2003 [3]), 319 English disyllabic loanwords were collected. The collected data base is posted in the web [11]. Among 319 disyllabic words, 112 words are target-appropriately realized as two syllables, taking up 35% of the corpus (e.g., market, gossip, recall, doctor, bumper, coffee). By contrast, 137 words are syllabified as three syllables, which amount to 43% (e.g., office->o ffi. si, basket-> ba. s i. ket, online->on. la. in). Fifty-five disyllabic words are realized as four syllables and they take up 17% of the database (e.g., project->pi. ro. jec. ti, rewind->re. wa. in. di). There are quite a few words whose syllable numbers increase up to five to six syllables (e.g., display->di. si. pil. le. i, classmate->cil. la. si. me. i. ti); 10 words are syllabified as five syllables (3%) and 5 words are realized as six syllables (2%). The following figure illustrates the change of syllable numbers in English disyllabic loanword adaptation.

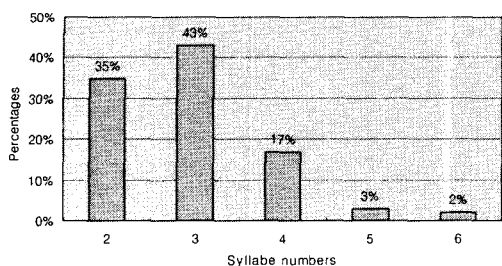


Figure 1. Syllable number changes in English disyllabic loanword adaptation

Figure 1 shows that the predominant syllabification pattern of English disyllabic words is to add one extra syllable, resulting in 3 syllables (43%); however, 35% of the words in the database do not show syllable augmentation patterns, remaining target-appropriately as disyllabic words. In the next section we will consider the reason why syllable augmentation occurs in English loanwords.

III. Syllable increase conditions

When English disyllabic words are adapted to Korean, some of the words are realized target-appropriately in terms of syllable numbers whereas some other words are realized target-inappropriately with extra syllables. The following is the case of target-appropriate realization of syllable numbers of the target words in Korean.

(1) Target-appropriate syllabification ("." denotes a syllable boundary.)

a. The final consonant is a vowel or sonorants like [l, r, m, n].

[li.k^hol] recall [p^hol.də] folder
[me.nyu] menu [næp.k^hin] napkin

b. The final consonant is [p], [t] or [k].

[ka.fi.p] gossip [p^ho.mæt] format
[mæ.ʝik] magic

When the final consonant ends either with a vowel or a sonorous consonant such as [l] and [n], the syllable number does not increase. Likewise, when the final consonant is the voiceless bilabial stop [p], the voiceless alveolar stop [t], or the voiceless velar stop [k], the addition of an extra syllable tends not to happen.

By contrast, the large portion of English disyllabic words are realized as more than two-syllable words in Korean. Let us consider factors to augment extra syllable numbers. First, the presence of diphthongs in the target words guarantees the increase of the syllable numbers of target words in Korean.

(2) The presence of diphthongs

[ti.t^he.il] detail [sa.i.ren] siren
[a.i.dol] idol [no.hau] knowhow

Whenever there is a diphthong like [ey, ay, oy, aw] in a word, the diphthong is realized as being affiliated to two different syllables. Note, however, that words with the diphthong [ow] like *cello* and *sofa* do not syllabified as two syllables but as one syllable.

If a word contains a biconsonantal cluster, one extra syllable is tended to be added.

(3) Initial-cluster or final-cluster

[t^hi.rəm.p^het] trumpet [kil.lo.bəl] global
[ne.t^hi.wə.k^hi] network [p^hi.ro.ʝek.t^hi] project

When there is initial-cluster or final-cluster, there is always an epenthetic vowel in the consonant sequence.

However, the presence of a cluster in word-medial position does not always guarantee the presence of an epenthetic vowel. Depending on sonority of the component consonants, medial clusters can be classified as follows; obstruent-plus-obstruent

sequences, sonorant-plus-sonorant sequences, and obstruent-plus-sonorant sequences. According to Giegerich (1992: 132) [3], the pulses of the air stream in speech are manifested as peaks in sonority, and thus the sonority of a sound can be defined as relative loudness compared to other sounds. As a result, speech sounds are ranked based on their relative sonority where voiceless stops are least sonorous while nasals and liquids are most sonorous among consonants (Selkirk 1984 [9], Clements 1990 [1])

(4) Medial-clusters

a. Vowel insertion

(i) triconsonantal clusters

[p^hamp^hil.let] pamphlet [wə.k^hi.buk] workbook

(ii) obstruent-plus-sonorant sequences

[p^həbillik] public [p^hi.k^hi.nik] picnic

(iii) obstruent-plus-obstruent sequences

[he.di.p^hon] headphone [pə.si.k^het] basket

b. No vowel insertion

(i) sonorant-plus-obstruent sequences

[pəl.βet] velvet [æŋ.k^hə] anchor

(ii) obstruent-plus-obstruent sequences

[k^həp.fjən] caption [pæk.fɪn] vaccine

(iii) sonorant-plus-sonorant sequences

[hel.met] helmet [k^ho.nə] corner

If there is a triconsonantal cluster, there is always vowel epenthesis, as shown in (ai). While vowel insertion occurs in the sequence of obstruent-plus-sonorant, as in (a(ii)), it does not occur in the sequence of sonorant-plus-obstruent, as in (bi). The occurrence of vowel insertion varies in the sequence of obstruent-plus-obstruent. If the first obstruent in the sequence of obstruent-plus-obstruent is either a fricative or a voiced stop, vowel insertion occurs, as in (a(iii)). Otherwise, vowel epenthesis does not occur, as in (b(ii)). The presence of sonorant-plus-sonorant

sequence does not lead to inserting a vowel, as in (b(iii))¹.

When a word contains a singleton obstruent coda other than [p], [t], or [k], an extra vowel is inserted after the final consonant, resulting in final vowel insertion.

(5) A word ends with an singleton obstruent other than

[p], [t], or [k].

[pəl.la.di] ballade

[pə.nə.si] bonus

[mo.t^hi.bi] motive

[me.se.ji] message

Even if a word ends with [p], [t] or [k], final vowel insertion may occur depending on the preceding vowel quality of the coda consonant.

(6) If a word ends with [p], [t], or [k], the vowel in the word is stressed, long, or diphthong.²

[k^ha.se.t^hi] cassette

[yu.ni.k^hi] unique

[li.mo.t^hi] remote

If the preceding vowel is stressed, a final vowel is inserted. Likewise, if the vowel is a diphthong, final vowel insertion occurs.

¹ In the case of the word *porno* a vowel is inserted between the consonants [r] and [n]. However, this can be handled as an exception because the majority of words with the sequence of r-plus-n does not incur vowel insertion. Similarly, vowel insertion occurs in the words such as *corset* and *organ* whereas it does not in the majority of words with the sequence of sonorant-plus-obstruent such as *cursor* and *target*. This may be because the former group of words with unexpected vowel epenthesis does not originate from English, but is borrowed from other sources.

² However, the words like *robot* [lo.bot]/[lo.bot^hi], *merit* [me.rit]/[me.rit^hi], and *carpet* [k^ha.p^het]/[k^ha.p^he.t^hi] have two variants. According to Kang (2003)[5], final vowel insertion is more likely to occur when the final stop is coronal like [t] rather than non-coronal like [p] and [k]. This seems to account for the variation case where a vowel is inserted after [t], although the preceding vowel before [t] is neither stressed nor diphthong. In addition, the coronal fricative [s] attract vowel epenthesis, due to the phonetic fact that it is inherently released, thus being interpreted as an onset (Davis & Cho) [2].

IV. An algorithm

In this section an algorithm to predict syllable numbers of English disyllabic loanwords in Korean is proposed.

(7) An algorithm for syllable increase

- a. If a word contains a diphthong, then add one extra syllable.
- b. If a word contain a biconsonantal initial or final cluster, then add one extra syllable.
- c. If a word contain a medial cluster, subdivide the cluster as follows:
 - i) when the medial cluster is triconsonantal, then add one extra syllable.
 - ii) when the medial cluster is composed of obstruent-plus-sonorant sequences, then add one extra syllable.
 - iii) when the medial cluster is composed of obstruent-plus-obstruent sequences, then add one extra syllable only if the first obstruent is either a fricative or a voiced stop.
- d. Look at the singleton final consonant:
 - i) if the final consonant is an obstruent other than [p], [t], or [k], then add one extra syllable.
 - ii) if the final consonant is [p], [t], or [k] with the preceding vowel long, stressed, or diphthong, then add one extra syllable.

When a word contains a diphthong, vowel insertion always occurs. Likewise, the occurrence of initial or final clusters always insure the insertion of one extra syllable. In the case of medial clusters, vowel insertion occurs only if the conditions (7ci, ii, iii) are met. Similarly, in the case of the singleton final consonant, a vowel is inserted in the relevant environment.

Now let us consider some instances to illustrate how the algorithm applies for the English disyllabic loanwords. The examples are as follows: *picnic* [p^hi.k^hi.nɪk] *instant* [ɪn.stɪ.t^hən.t^hɪ] *handmade* [hæn.di.me.i.di] *classmate* [k^hɪl.læ.si.me.i.t^hɪ]

(8) Algorithm application

Input	Rule7a	Rule7b	Rule7c	Rule7d	Output
handmade	+1	---	+1(i)	+1(i)	+3 total 5

Input	Rule7a	Rule7b	Rule7c	Rule7d	Output
classmate	+1	+1	+1(ii)	+1(ii)	+4 total 6

Input	Rule7a	Rule7b	Rule7c	Rule7d	Output
picnic	---	---	+1(ii)	---	+1 total 3

Input	Rule7a	Rule7b	Rule7c	Rule7d	Output
instant	---	+1	+1(iii)	--	+2 total 4

For example, the word *picnic* does not contain a diphthong. Therefore, Rule (7a) is not relevant here. Similarly, Rule (7b) is not relevant because *picnic* does not have either initial or final clusters. Yet, Rule (7c) applies because *picnic* includes a medial cluster. Specifically, the medial cluster consists of obstruent-plus-sonorant sequences, which results in the application of (7cii). In a similar vein, the word *handmade* incurs an application of Rule (7a) as it contains the diphthong [ei]. As for Rule (7b), it is not applied because *handmade* does not have either initial or final clusters. Nonetheless, Rule (7c) applies because *handmade* includes a triconsonantal medial cluster. Rule (7di) is relevant here since the singleton final consonant is the voiced stop [d].

V. Conclusions

This paper has shown that the syllable number of English disyllabic loanwords tends to increase when the loanwords are borrowed into the Korean language. Three specific contexts in which syllable number augmentation occurs are revealed as follows: 1) diphthong, 2) the quality of consonant clusters, 3) the quality of the final consonant (and the preceding vowel). The occurrence of diphthong or initial/final consonant clusters in a word guarantees to render extra syllables. However, the presence of medial clusters renders extra syllables only if the condition is met whereby sonority of the consonant cluster plays an crucial role. The quality of the final consonant and the vowel preceding the consonant is also important to attract an extra syllable; the place/manner/voicing of consonants and the stress/length of vowels determine to increase the syllable number of the target.

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