
영어 단음절 차용어의 음절수 예측을 위한 알고리즘

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

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요약

영어 단음절 차용어가 한국어에 적용될 때 여분의 음절이 더해져서 음절수가 증가하는 경향이 있다. 본 논문에서는 음절수를 증가시키는 구체적인 조건을 밝힐 뿐만 아니라, 음절수를 예측하는 알고리즘을 제안하는 것을 목적으로 한다. 음절수를 증가시키는 요인은 3가지가 있는데, 우선 단어에 이중 모음이나 자음군이 있으면 음절수가 증가한다. 세 번째 요인으로는, 단어에서 마지막 자음의 특성에 따라서 어말 모음이 삽입될 수 있다. 이 세 가지 요인에 근거하여 단음절 차용어의 음절수 예측 알고리즘을 3가지 규칙으로 제시하고 그 구체적인 적용과정을 데이터를 통해서 보여주고 있다.

■ 중심어 : | 영어 단음절 차용어 | 음절수 예측 | 이중모음 | 장모음 | 자음군 | 어말 모음 삽입 |

Abstract

When English monosyllabic words are adapted to the Korean language, the loanwords tend to carry extra syllables. The purpose of this paper is to find the syllable augmentation conditions in loanword adaptation and further to provide an algorithm to predict the syllable numbers of English monosyllabic loanwords. Three syllable augmentation conditions are found as follows: 1) the existence of diphthong, 2) the existence of consonant clusters, and 3) the quality of the final consonant (and the preceding vowel). Based on these three conditions, an algorithm to predict the syllable number of English monosyllabic loanwords are proposed as three rules applied iteratively with ordering. In addition, the applications of the algorithm to data are given.

■ Keyword : | English Monosyllabic Loanwords | Syllable Number Prediction | Diphthong | Long Vowel | Consonant Clusters | Final Vowel Insertion |

I. Introduction

The Korean language has borrowed many words from English. The borrowed English words are

called loanwords and they are at least partly adapted to the Korean sound system in the nativization process. Consequently, 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. That is, the syllable number of the loanwords are frequently augmented when they are nativized into the Korean system. This paper deals with the issue of syllable number augmentations in loanword adaptation. Specifically, the following issues are considered: 1) how English monosyllabic loanwords are syllabified in Korean, 2) what are predominant patterns in the syllable number mismatches between the source language and the recipient language, and 3) whether it is possible to predict the syllable numbers of the loanwords in recipient language.

II. Syllabification of English monosyllabic loanwords

When English words in the source language are syllabified in Korean, the number of syllables tends to be augmented(e.g., lamp->lam.pi).

According to [1], each syllable corresponds to a peak in the flow of pulmonic air. Intuitively, syllables are fairly straightforward entities, but in some cases the number of syllables may vary based on what the listeners perceive. In loanword adaptation, monosyllabic English words are often variably realized as more than one syllable. Namely, monosyllabic words may be realized target-appropriately as one syllable or target-inappropriately as two syllables through five syllables.

Based on the data in Loanword Dictionary[3] as well as in the loanword list by the National Academy of the Korean Language(NAKL)[4]

(recited in[2]), 333 English monosyllabic loanwords were collected. The collected data base is posted in the web page <http://ds.nsu.ac.kr/zboard=pds>. Among 333 monosyllabic words, only 44 words are target-appropriately realized as one syllable, taking up 13% of the corpus(e.g., cup, quick, team, pen, wool, car). By contrast, 189 words are syllabified as two syllables, which amount to 57%(e.g., tent->ten.ti, soup->sou.pi, snack->s.i.nack). Eighty monosyllabic words are realized as three syllables and they take up 24% of the database(e.g., grand->gi.ran.di, cake->ce.i.ki). There are quite a few words whose syllable numbers increase up to four to five syllables(e.g., drive->di.ra.i.vi, strike->si.ti.ra.i.ki); 18 words are syllabified as four syllables(5%) and 2 words are realized as five syllables(1%). Notice, though, that there are no monosyllabic target words that are realized as more than five syllables. The following figure illustrates the change of syllable numbers in English monosyllabic loanword adaptation.

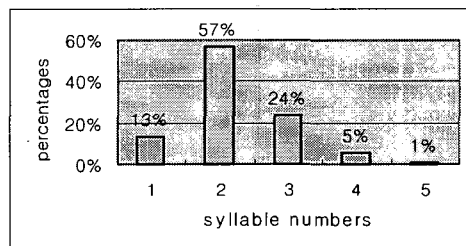


Fig. 1 Syllable number changes in English monosyllabic loanword adaptation

[Fig. 1] shows that the predominant syllabification pattern of English monosyllabic words is to add one extra syllable, resulting in 2 syllables (57%); the next predominant pattern is to add two extra syllables thus becoming total three syllables. In the next section we will consider the

reason why syllable augmentation occurs in English loanwords.

III. Augmentation conditions

When English monosyllabic words are adapted to Korean, some of the words are realized target-appropriately in terms of syllable numbers.

(1) Target-appropriate syllabification

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

[khi] key [ul] wool
[kha] car [phen] pen

- b. The final consonant is [p] or [k].

[khəp] cup [pæk] back

When the final consonant ends either with a vowel or a sonorous consonant, the syllable number does not increase. When the final consonant is the voiceless bilabial stop [p] or the voiceless velar stop [k], the addition of an extra syllable tends not to happen.

The largest portion of English monosyllabic words are realized as two-syllable words in Korean. Some of the data are given below.

(2) Realized as two-syllable words, adding one extra syllable ("." denotes a syllable boundary.)

- a. There is a diphthong in a word.

[ta.un] down [ta.im] time

- b. There is a cluster in a word.

[khi.rim] cream [si.thap] stop
[si.næk] snack

- c. A word ends with an obstruent other than [p] and [k].

[thyu.bi] tube [khi.si] kiss
[thæ.gi] tag

- d. If a word ends with [p] or [k], the vowel in the word is long, diphthong, or [ɛ].

[su.phi] soup [lo.phi] rope
[çhɛ.khi] check

Whenever there is a diphthong like [ei, ai, oi, au] in a word, the diphthong is realized as being affiliated to two different syllables. Note, however, that words with the diphthong [ou] like home and no do not syllabified as two syllables but as one syllable. Also, if a word contains a consonant cluster, one extra syllable is added. When a word contains an obstruent coda other than [p] or [k], an extra vowel is inserted after the final consonant, resulting in final vowel insertion. There are three words (*hot, web, big*) that do not follow this pattern, though. Even if a word ends with [p] or [k], final vowel insertion may happen depending on the preceding vowel quality of the coda [p] or [k]. If the vowel is long like [i:] or [u:], a final vowel is inserted. Likewise, if a vowel is a diphthong, final vowel insertion occurs. There is one more vowel which triggers final vowel insertion. When a word contains the vowel [ɛ] as in the word check, a final vowel is inserted.¹

The realization of monosyllabic words as three-syllable words also takes up a high percentage. The followings are some of the data.

1) The words knock and shock are realized as two syllables with one extra syllable, although the vowel in the words does not satisfy the condition for final vowel insertion. This may be due to the fact that they begin with two letters kn- and sh-, respectively. Double spelling might influence the exceptional behavior.

(3) Realized as three-syllable words, adding two extra syllables

a. A word contains diphthong and satisfies the condition of final vowel insertion.

[the.i.phi] tape [na.i.thi] night [khe.i.khi] cake

b. A word contains an onset consonant cluster and satisfies the condition of final vowel insertion.

[sil.lo.phi] slope [si.wi.thi] sweet

[si.mo.gi] smog

c. A word contains two consonant clusters.

[phi.ron.thi] front [ki.ræn.di] grand

[thi.rəŋ.khi] trunk

d. A word contains an obstruent consonant cluster in coda.

[ke.si.thi] guest [te.si.khi] desk [li.phi.thi] lift

e. A word contains cluster and diphthong

[pi.ra.im] prime [si.kha.i] sky [si.ma.il] smile

For the words in (3a), two extra syllables are added because they contain diphthongs other than [ou] and they satisfy the condition of final vowel insertion.² The words in (3b) get two extra syllables because they have the onset cluster and satisfy the final vowel insertion condition. For example, in the word slope a vowel is inserted in the onset cluster. Also, a final vowel is inserted after the coda consonant [p] because the preceding vowel is long, [ou].³ As in (3c), each cluster adds

2) Note that the word type is realized as both two syllables and three syllables. The addition of one extra syllable, not two syllables is exceptional given that it contains a diphthong and satisfies the condition for final vowel insertion.

3) The words plot, flat, slot, and club are realized as two syllables, although they contain onset clusters and satisfy the condition for final vowel insertion. Since the words uniformly contain the double [ll] in loanword adaptation, the nature of double [ll] might be the reason for the exceptional behavior of adding only one extra syllable. Also, the word group is exceptional in that it has only one extra syllable, although it has an onset cluster and satisfy the final vowel insertion

one epenthetic vowel. So the word like front has two epenthetic vowels since it has onset cluster and coda cluster. Importantly, the word front does not have three epenthetic vowels, although it satisfies the condition of final vowel insertion having the coda [t]. This is because a final vowel is already added due to the occurrence of the final coda cluster-nt. The coda clusters composed of obstruent sequences add two extra syllables, as in the words (3d). For the words in (3e), two extra syllables are added because of diphthong and onset cluster.

Among 333 monosyllabic English loanwords, 18 words are syllabified as four syllables. The causes for syllable number augmentations can be categorized as follows.

(4) Realized as four-syllable words, adding three extra syllables

a. A word contains an onset cluster, diphthong, and satisfies the condition of final vowel insertion.

[ti.ra.i.bi] drive [si.kha.u.thi] scout

[si.the.i.khi] steak

b. A word contains a three-consonant cluster and satisfies the condition of final vowel insertion.

[si.thi.ri.thi] street [si.thi.ro.khi] stroke

c. A word contains a coda cluster with obstruent sequences and an onset cluster.

[ti.ræ.phi.thi] draft

As in (4b), triconsonantal clusters give two more extra syllables, similar to the case of coda clusters with two obstruent sequences. The words in (4c) get one extra syllable from the onset cluster and

condition.

two extra syllables from the coda clusters with two obstruent sequences.

Only a few words are realized as five syllables, as shown below.

(5) Realized as five-syllable words, adding four extra syllables: A word contains a three-consonant cluster and diphthong. Further it satisfies the condition of final vowel insertion.

[si.thi.ra.i.khi] strike [si.thi.re.i.thi] straight

To summarize, the reason why syllable numbers increase can be sorted out as the following 3 factors: 1) the existence of diphthong, 2) the existence of clusters, and 3) the quality of the final consonant (and the preceding vowel). In the next section, an algorithm to predict the syllable numbers in loanword adaptation is proposed.

IV. Algorithm to predict syllable numbers

The following is an algorithm to predict syllable numbers when English words are borrowed into the Korean language.

(6) Algorithm for syllable augmentation

- a. If a word contains a diphthong, then add one extra syllable.
- b. If a word contain a consonant cluster, subdivide the cluster as follows:
 - i) if a word contains a coda cluster with two obstruent sequences or a triconsonantal culster, then add two extra syllables.
 - ii) if a word contains a cluster, then add one extra syllable.

c. Look at the final consonant:

- i) if the final consonant is an obstruent other than [p] or [k], then add one extra syllble.
- ii) if the final consonant is [p] or [k] with the preceding vowel long, diphthong, or [ɛ], then add one extra syllable.

Whenever there is a diphthong, one extra syllable is always added. The occurrence of clusters also guarantees the addition of one extra syllable. Thus, there should be no ordering between (6a) and (6b), but (6c) should be applied after (6a) and (6b). This is because the application of final vowel insertion depending on the final consonant is sometimes blocked if a final vowel is already inserted by the rule (6b), as in the data such as front, guest, and draft. Namely, once a final vowel is inserted by the rule (6b), another final vowel cannot be inserted by the rule (6c) again. Also, notice that the rules are applied iteratively because each cluster factor causes to add extra syllables, when there are more than one clusters in a word.

Some examples of the algorithm applications to the data are illustrated below.

(7) Application of the algorithm

input	Rule (6a)	Rule (6b)	Rule (6c)	Output
cream	not applied	+1(6bii)	not applied	+1 (total 2)

input	Rule (6a)	Rule (6b)	Rule (6c)	Output
front	not applied	+1(6bii) +1(6bii)	blocked	+2 (total 3)

input	Rule (6a)	Rule (6b)	Rule (6c)	Output
smile	+1	+1(6bii)	not applied	+2 (total 3)

input	Rule (6a)	Rule (6b)	Rule (6c)	Output
drive	+1	+1(6bii)	+1(6ci)	+3 (total 4)
input	Rule (6a)	Rule (6b)	Rule (6c)	Output
street	not applied	+2(6bi)	+1(6ci)	+3 (total 4)

V. Conclusions

This paper has shown that the syllable number of English monosyllabic 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) consonant clusters, and 3) the quality of the final consonant (and the preceding vowel). Based on these three factors, an algorithm to predict the syllable numbers of English monosyllabic loanwords has been proposed. The occurrence of diphthong or consonant cluster in a word always gives one or two extra syllables depending on each context. Although the quality of the final consonant in a word meets the condition of adding an extra syllable at the end of a word, it only applies after applying the first and the second factors.

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