

# Morphological and Phonetic Influence on Loanword Adaptation: Adaptation of English Plural Suffix into Japanese

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## | 국문초록 |

외래어 차용과정에 관한 기존의 연구를 살펴보면 크게 음성학적 접근법과 음운론적 접근법으로 나뉘는 데, 전자는 근원어의 물리적인 소리와 청자의 모국어 음운규칙 사이의 지각적 유사성을 중심으로 외래어 차용과정을 설명하며(Silverman, 1992) 후자는 근원어의 음성적 신호정보보다는 음운적 특징과 자질이 차용과정에서도 유지된다고 주장한다(LaCharité & Paradis, 2005). 이에 반해 Oh and Kim(2012)은 코퍼스 데이터를 사용해 한국어에 차용된 영어 외래어 중 영어 복수형의 차용 형태를 분석하여 외래어 차용과정에 음성적 정보와 더불어 형태적 정보의 영향이 있음을 주장한다. 본 연구는 외래어 차용과정에 형태적 정보가 미치는 역할의 보편성을 확인하고자 Oh and

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Kim(2012)의 연구를 일본어에 확장시켜 일본에서 출판된 외래어사전 (*Concise Dictionary of Katakana Words*, 2010) 분석을 토대로 영어 복수형 ‘-s’의 차용과정을 살펴보았다.

본 연구의 코퍼스 데이터 분석결과는 다음과 같다. 첫째, 비형태소적 /z, s/는 모음삽입을 통해 차용되는 비율이 더 높았으며 복수형 접미사로서 형태소적 정보를 지닌 /z, s/는 상대적으로 삭제되는 경우가 더 많은 것으로 나타났다. 이는 외래어 차용과정에 있어서 형태적 정보의 중요성을 다룬 Oh and Kim(2012)의 주장을 재확인하게 된 결과이며 일본어의 외래어 차용과정에 있어서 형태적 정보가 중요한 영향을 미친다는 사실이 확인되었다. 둘째, 영어 복수형 ‘s’의 세 가지 이음이 일본어로 차용될 때 각 이음의 음성신호에 따라 다양한 대응 패턴으로 차용된다는 것을 알 수 있었다. 이는 일본어 화자들이 영어 소리의 물리적 차이를 인지하고 이에 따라 일본어의 가장 유사하는 소리로 차용함으로써 외래어 차용에 있어 음운론적 접근법보다 음성학적 접근법을 선호한다는 것을 의미하는 결과라고 할 수 있겠다.

결론적으로 이번 연구의 결과를 통해 외래어 차용과정을 설명하는데 음성적 정보뿐만 아니라 형태적 정보도 고려할 필요가 있으며 음성적 접근법이 음운적 접근법 보다 더 우세하다는 점을 확인할 수 있었다.

주제어: 외래어 차용, 영어 복수형 ‘-s’, 이형태, 형태적 정보, 음운적 접근법.

## I. Introduction

Loanword can be defined as a word which is borrowed from another language into borrower's native language (Campbell, 2004). Japanese has borrowed words from other languages to create a great lexical expansion and Japanese language includes thousands of words which root from foreign origins. In the recent years, English has gained the position of an international

language and English loanwords have become an integral part of daily vocabulary in Japanese language.

It is a well-known fact that individual languages exhibit a unique phonological system. Loanword adaptation process may involve adjustment of the phonological rules of the source language and borrowing language in case of conflict. In general, a borrowed word shows difference from its source word in terms of the syllable structure, accent patterns and constituent sound features to comply with the phonological constraints of the speaker's native language. Phonetic approach and phonological approach are the two prevalent approach in loanword adaptation process. Silverman (1992) argues that loanword adaptation processes are ascribable to perceptual similarity between L1 (borrowing language) and L2 (source language) sounds which are motivated by L1 phonotactics. On the other hand, LaCharité and Paradis (2005) claim that phonetic approximation plays only a limited role and loanword adaptation is mainly motivated by the preservation of L2 sound category. In other words, allophonic variants are not considered in the phonological accounts.

However, loanword adaptation process is far more complicated than the dichotomy of phonetic versus phonological approach. It involves multiple factors in the adaptation process. Oh and Kim (2012) proved that morphological structure also plays an important role in loanword adaptation based on the analysis of Korean corpus data and argued that non-morphemic /z, s/ versus morphemic /z, s/ in English are differently adapted into Korean.

Based on the points of previous research, this study aims to examine the interaction between morphology and phonology in English loanword adaptation into Japanese, using corpus-based

analysis. To be more specific, the following questions in (1) will be examined in order to understand the process of loanword adaptation.

(1) a. How is loanword adaptation from English into Japanese influenced by morphological knowledge of a source word?

b. Which is more important trigger in loan adaptation of English plural suffix into Japanese, phonetic cues or phonological factors?

c. How do loanword adaptation patterns differ by each period?

Firstly, the effects of morphological information on loanword adaptation in Japanese will be investigated as an expansion of the loanword adaptation study of English plural suffix into Korean by Oh and Kim (2012). Secondly, allomorphs of English plural suffix and their adaptation pattern in Japanese will be observed and statistical analysis will be conducted to explore whether loanword adaptation is triggered by phonetic signal or phonological aspects. Thirdly, the rate of vowel epenthesis and consonant deletion in each period will be investigated in order to understand the diachronic change in plural suffix adaptation.

This paper is organized as follows. In section 2, adaptation patterns of English /z/ and /s/ in Japanese and a brief discussion on allomorphs of English plural suffix will be provided. In section 3, data analysis procedure and results will be shown. In section 4, concluding remarks and implications for the future research will be presented.

## II. Adaptation Patterns of English /z/ and /s/ in Word-final Position

### 1. Non-morphemic English /z/ and /s/

A significant number of English words end with /z/ or /s/ sounds in the word-final position. However, consonant in coda position is unacceptable in Japanese due to its phonotactic constraints which only allows open syllable structure. Therefore the default epenthetic vowel /u/ is inserted to fix this illicit syllable structure. Examples of adapted forms for English words ending with non-morphemic /z/ and /s/ are shown in (2).

(2) Adaptation patterns of non-morphemic /z/ and /s/ in Japanese

'race'	/reɪs/	→ [re.e.su]	*[re.e.]
'service'	/sɜːrvɪs/	→ [sa.a.bi.su]	*[sa.a.bi.]
'jazz'	/dʒæz/	→ [zya.zu]	*[zya.]
'size'	/saɪz/	→ [sa.i.zu]	*[sa.i.]
'waltz'	/wɔːltz/ <sup>1)</sup>	→ [wa.ru.tsu]	*[wa.ru.to]
'quartz'	/kwɔːrts/	→ [ku.o.o.tsu]	*[ku.o.o.to]

As the examples show, non-morphemic /z/ and /s/ are rarely deleted and usually adapted to the closest sound in the recipient language followed by the default epenthetic vowel /u/.

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1) /ts/ is treated as two phonemes in English, Ladefoged, 2006.

## 2. Morphemic English /z/ and /s/

Regardless of the internal morphological construct of the original English word (i.e., morphemic and non-morphemic), consonants in coda position requires an epenthetic vowel to satisfy the syllable structure condition when they are rescued and adapted in Japanese. Similar to non-morphemic /z/ and /s/, morphemic /z/ and /s/ are followed by epenthetic vowel /u/ to fulfill syllable structure of Japanese in the adaptation process. Examples of adapted forms for morphemic /z/ and /s/ are as shown in (3).

(3) Adaptation patterns of morphemic /z/ and /s/ in Japanese

[s] 'mechanics'	/mɪkæniːks/	→	[me.ka.ni.ku.su]
'cuffs'	/kʌfs/	→	[ka.ɸu.su]
[z] 'beans'	/ˈbɪnz/	→	[bi.i.N.zu]
'others'	/ʌðərz/	→	[a.za.a.zu]
[ɪz] 'menses'	/ˈmɛnsɪz/	→	[me.N.si.i.zu]

As can be seen in the examples (3), in addition to [z] and [s], [ɪz] is also recognized as one of the allomorphs of English plural suffix /z/ and /s/.

## 3. Allomorphs of English Plural Suffix

In English, allomorphs of plural suffix are determined by the final segment of preceding word-stem. Voicing agreement of suffix and the preceding sound is required as shown in (4).

(4) Allomorphs of English plural suffix (Katamba, 1989)

A. post-voiceless consonant: [z]		B. post-voiced consonant: [s]		C. post-sibilant consonant: [iz]	
Singular	Plural	Singular	Plural	Singular	Plural
dog	dogs	dock	docks	witch	witches
bid	bids	bit	bits	nose	noses
rib	ribs	tip	tips	marsh	marshes
love	loves	giraffe	giraffes	badge	badges
sea	seas	moth	moths	bus	buses

As the examples shown in (4), the three allomorphs of English plural suffix appear in the surface form in systematical manner. In addition to [z], [s] and [iz], more variants of English plural suffix emerge when stem-final consonants are /d, t/. Plural suffix '-s' combined with these sounds create [dz] and [ts]. Examples of these variants and their adaptation patterns in Japanese are given in (5).

(5) Adaptation patterns of allomorphs of English plural suffix in Japanese

[dz]	'goods' /gʊdz/	→	[guz.zu]
	'sounds' /saʊndz/	→	[sa.u.N.zu]
[ts]	'sweets' /swits/	→	[su.i.i.tsu]
	'plants' /plænts/	→	[pu.ra.N.tsu]

Despite the fact that [dz] and [ts] consist of phonologically two separate phonemes, Japanese speakers adapt both consonant sequences as a single sound in loanword adaptation as 'goods' and 'sweets' in the examples in (5). Given that Japanese listeners perceive these two allomorphs as a single sound, the phonetic approach is more preferred to the phonological approach. If Japanese speakers perform loanword

adaptation based on the phonological approach, the expected outcome of the input sound [dz] and [ts] are [dozu] and [tosu], respectively. Therefore, [dz] and [ts] are also included into consideration as separate allomorphs in the current study.

Although the condition in which various allomorphs of plural suffix in English appear seems clear, its adaptation pattern to Japanese can be baffling. Examples from previous studies on various types of adaptation patterns are stated in (6).

(6) Various adaptation patterns of English plural suffix into Japanese (Itô & Mester, 2008)

a. Non-faithful voicing of a source word in English  
 'Tigers'                      /taɪgərz/                      →    [taigaasu]

b. Vowel epenthesis  
 'donuts'                      /dɒnəts/                      →    [doonattsu]  
 'shoes'                      /ʃuːz/                      →    [ʃuuzu]

c. Consonant deletion  
 'slippers'                      /slɪpərz/                      →    [surippaa]  
 'corn flakes'                      /kɔrn flɛks/                      →    [koon fureeku]

d. Adaptation of the same stem: Affixed form versus in isolation

stem +plural suffix	isolated stem
[kyattsu] 'Cats' (title of musical)	[kyatto fuudo] 'cat food'
[handzu appu] 'hands up'	[hando kuriimu] 'hand cream'

Examples in (6) show the complex patterns of English plural suffix adaptation into Japanese. In English, voicing agreement



is required between the plural suffix and preceding stem-final segment. However, the borrowed form of the plural morpheme in (6a) ignores this phonological rule and plural suffix is adapted as voiceless /s/. Also the adaptation patterns of plural suffixes are arbitrary. As shown in (6b), they are rescued with an epenthetic vowel insertion whereas in other cases, they are simply deleted as the examples in (6c). A possible account to explain these phenomena are to consider individual stem-noun differences. However, this hypothesis is quickly proven wrong as the examples in (6d) are counter evidentiary. The adapted forms are less likely to project the entire phonological and morphological changes in all cases. Researches revealed that such phenomena commonly occur in cross-linguistic interactions (Itô & Mester, 2008; Campbell, 2004: 62-84). However, only a small number of previous studies have provided the statistical results which encompasses general adaptation patterns using systematic analysis so far. Therefore the current study is to provide the general pattern loanword adaptation in Japanese through investigating adaptation pattern of English plural suffix in Japanese by collecting corpus data and analyze it using quantitative method and statistical analysis.

### III. A Corpus Study of English Plural Suffix into Japanese

#### 1. Corpus Data

##### 1) Data Source

Data for this paper are collected from a loanword dictionary published in Japan; 4th Edition of *Concise Dictionary of*

*Katakana Words* published by *Sanseido* in 2010. This 4th edition is the latest version of loanword dictionary with 56,300 words which marks the largest number of lexical entries among loanword dictionaries in Japan at present. This dictionary provides borrowed form (L1) written in Japanese orthography, original source form (L2) written English orthography, word origin, meanings and period that the word came into Japanese vocabulary. Based on this information provided in the dictionary, loanwords of English origin were collected separately on a Microsoft Windows 2010 Excel spreadsheet with relevant information labelled individually for data organization for this study.

## 2) Size of Corpus Data

The word lists for the analysis include not only single words as in 'reference' and 'oats' but also compound words (also phrases) which consist of two or more words as in 'lemon juice'. Some of these words include two target words (i.e., ice ax, sales tax, Stars and Stripes) in one. In addition, some target words appear repeatedly as a combination with different word in the entry (i.e., choice, fielder's choice, multiple-choice system, cacao beans, cocoa beans, chili beans).

Table 1. The Size of Data Entry

Source	English plural suffix	Non-morphemic word-final /z, s/	Total
Type	516	1,226	1,742
Token	1,165	3,636	4,801

The numbers presented in Table 1 include the number of total entries excluding overlapped entries. However, some of the

same tokens are counted as different entries in each category if a part of the source word is composed of morphemic component and the other part of the source word is composed of non-morphemic component (i.e., grass roots, loose boots).

The numbers of entries in terms of type and token which are categorized by each period are presented in Table 2. Collected data are labelled with classification of six historical periods according to the records on the dictionary. Entries without information on specific period were marked as non-specified period. Each historical period corresponds to the time-frame of the Emperor's reign. In Japan, a name of imperial era changes when a new emperor ascends the throne. However, the dictionary specified *Showa*, one of the historically important imperial era, from 1927 to 1945 based on pre and post *World War Two* although it lasted until 1988. Years also overlapped among Edo, *Meiji* and *Taisho* era because of the timing of replacement of new emperor. However such marginal difference in the period specification is less relevant to current research therefore disregarded. Words with no specific introduction timeline mainly include proper nouns.

Table 2. The Size of Data for Historical Scales

Period (Year)	Token	Type
Edo(1603~1868)	5	5
Meiji(1868~1912)	63	52
Taisho(1912~1926)	28	25
Showa(1927~1945)	125	88
Present(1946~)	905	399
No indicatedspecific year	42	36

### 3) Data Evaluation

The vowel epenthesis or consonant deletion rate was calculated using a point system. First, if the target sound /z/ or /s/ is preserved followed by an epenthetic vowel, the entry is marked with Y (Yes) in the adaptation pattern category and if the target sound /z/ or /s/ is deleted, then it is marked with N (No) on the Excel spreadsheet. Second, one (1) point is assigned to "Yes" and zero (0) point is assigned to "No". When the one type is repeatedly appeared a number of different tokens, average points of the total score was employed. Table 3 shows an example of how the scores of reappearing tokens of a type is calculated.

Table 3. Example of Score Calculation

Type	Token	Adapted form	Y/N	Score	Average
star	Stars and Stripes	[sutaazu ando sutoraipusu]	Y	1	0.667
	Seven Stars	[sebuN staa]	N	0	
	Bay Stars	[bei sutaazu]	Y	1	

In Table 3, three entries (3 tokens) which include the word 'star' (1 type) are available. The morphemic /z/ of 'stars' is deleted in 'Seven Stars' therefore zero point is assigned. In case of 'Stars and Stripes' and 'Bay Stars', morphemic /z/ of 'stars' is accepted followed by an epenthetic vowel and in this case, each entry earns one point. The sum of total scores of type 'star' is two points and when divided by 3, the average score of '0.667' is marked as the final score.

2. Results of the Analysis

1) Rate of Adaptation Patterns for English /z, s/ in Word-final position

There are two alternative choices for loanword adaptation of /z/ and /s/ in word-final position, such as accepting the consonant along with an epenthetic vowel, or deleting the consonant<sup>2)</sup>. The results of data analysis in adaptation patterns for both non-morphemic /z, s/ and morphemic /z, s/ are given in Figure 1. This result includes all allomorphs of the target sound which are [z], [s], [ts], [dz] and [ɪz]. The choices of adaptation patterns are found remarkably contrastive depending on the difference of morphological status.

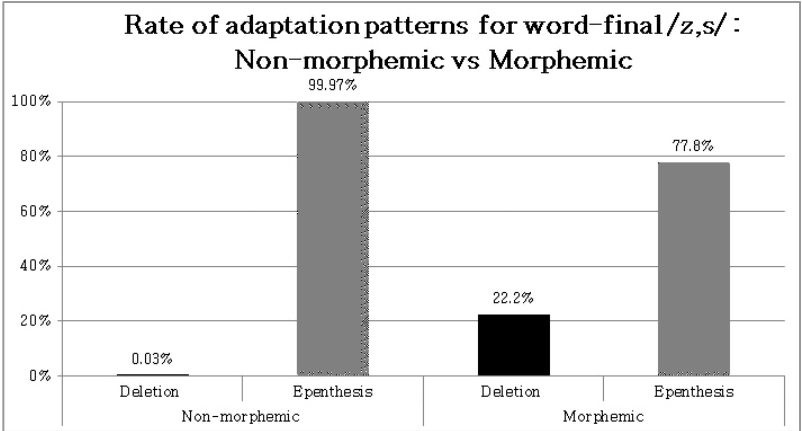


Figure 1. Rate of Vowel Epenthesis and Consonant Deletion of Word-final /z, s/

Non-morphemic /z/ and /s/ are rarely deleted when adapted to

2) When the second segment from the word-final is also a consonant excepting for nasal /N/, epenthetic vowel is required after the deletion of the final consonant.

Japanese. Word-final /z/ and /s/ are accepted with an epenthetic vowel in almost all cases without exception (99.97%). On the other hand, only 77.8% of morphemic /z/ and /s/ are adapted with a vowel epenthesis. Based on these results, morphological information performs a role in the triggering the different adaptation patterns. Non-morphemic /z, s/ was more likely to be adapted than English plural suffix /z, s/. In order to find whether this difference between non-morphemic /z/ and /s/ versus morphemic /z/ and /s/, a chi-square test was performed. The difference in the morphological information variable on loanword adaptation was found significant as shown in Table 4.

Table 4. Results of Chi-square Test for Difference of Adaptation Patterns

Patterns	Results of Chi-square Test
Vowel epenthesis	$\chi^2=1682.401$ , $df=1$ , $p=0.000^*$
Consonant deletion	$\chi^2=264.015$ , $df=1$ , $p=0.000^*$

## 2) Rate of Vowel Epenthesis in Adaptation of English Plural Suffix

There are three allomorphs commonly known as variants of English plural suffix. They follow the voicing agreement rule of preceeding segment in the stem-final position. Plural suffix is pronounced as voiced [z] when stem-final segment is a voiced sound while it is realized as [s] when preceeded by a voiceless stem-final segment. [ɪz] is another variation of the plural suffix when the stem-final sound is a sibilant consonant. Previous study by Oh and Kim (2012) divides allomorphs of English plural suffix into five types. They point out that sounds like 'cats' [ts], 'cads' [dz] are recognized and adapted as alveolar affricates after the stem-final alveolar stops by Korean speakers even though they are not the single phoneme but the

combination of two individual phonemes (Ladefoged, 2006). Similarly, Japanese speakers treat these two sounds [ts] and [dz] as single phonemes, [tsu] and [zu], followed by an epenthetic vowel, respectively. Such tendency is related to the view that the adaptation process is motivated by phonetic sound mapping. If Japanese speakers respect phonological features of [ts] and [dz] as combination of two separate phonemes, those are expected to be adapted into \*[tosu] and \*[dozu] in Japanese. Consequently, current study also analyze the data based on the distinction of five allomorphs (i.e., [s], [z], [iz], [ts] and [dz]) of English plural suffix to confirm the impact of allophonic variations in the source word for Japanese speakers in loanword adaptation. Figure 2 shows how the percentage of vowel epenthesis differs for each allomorphs of English plural suffix in loanword adaptation to Japanese.

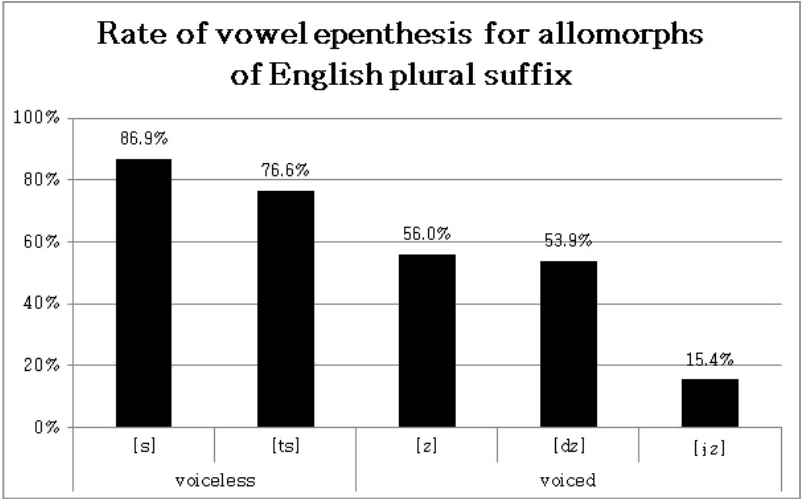


Figure 2. Rate of Vowel Epenthesis for Allomorphs of English Plural suffix

According to the results of data analysis, voiceless sounds in coda position are adapted followed by epenthetic vowel more

frequently with an average of 81.75%. Voiced variants on the other hand recorded average of 41.76% adaptation rate. This is half the average adaptation rate compared to their voiceless counterparts. In particular, allomorph [iz] among the voiced allomorphs is least likely to be adapted with an epenthetic vowel at an extremely low rate of 15.4% which is less than half of the average adaptation rate in the voiced allomorph group.

### 3) Sound Mapping of Allomorphs of English Plural Suffix into Japanese

Each of the five allomorphs of English plural suffix has different sound mapping patterns when they are adapted or deleted to Japanese as loanwords. As reported in section 3.2.2, the rate of adaptation with vowel epenthesis does not only vary between the voiced and voiceless groups of allomorphs but also varies among individual allomorphs. Therefore, it is important to carefully examine how various phonetic realizations of English plural suffix are mapped into Japanese language in the adaptation process to gain deeper understanding of detailed information on the loanword adaptation pattern.

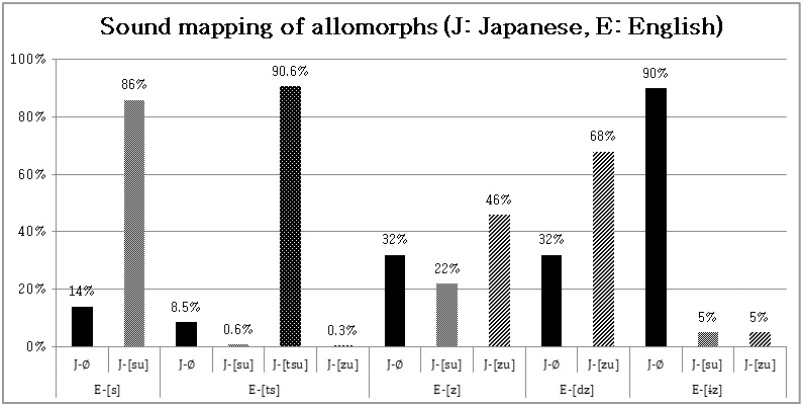


Figure 3. Various Sound Mapping of Allomorphs



Figure 3 shows the various sound mapping patterns of each allomorph and its rate in percentage. Voiceless allomorphs [s] and [ts] are adapted into [su] and [tsu] at a relatively higher rate. The allomorph [ts] is phonologically a sequence of two distinctive phonemes. However, it is considered as a single sound and mainly adapted to [tsu] (90.6%) followed by an epenthetic vowel. Likewise, [dz] is also treated as a single sound and relatively large percentage of them are adapted to [zu] along with an epenthetic vowel (68%). In addition, words like 'kids', 'woods', 'goods' are adapted to [kizzu], [uzzu], [guzzu], respectively. This pattern supports the idea that [dz] is treated as a single sound because in Japanese, phonotactic constraints allow consonant gemination to occur when an obstruent in word-final position is preceded by a stressed lax vowel. Voiced allomorph [z] is expected to be adapted to [zu] in general. However, according to the analysis of the current study, Japanese counterpart of English plural suffix variant [z] is not limited to [zu] which takes up 46% of [z] adaptation. 22% of [z] adaptation is represented with voiceless sound [su] in Japanese. The allomorph [ɪz] is alternating between [zu] and [su] in a similar rate of 5%. However, the number of cases for the epenthesis is far less than that of deletion (90%) for this allomorph as it is highly likely to be deleted during the adaptation process into Japanese. Based on these results, it seems that the phonetic approximation has a crucial role in adaptation of English plural suffix into Japanese. Borrowers are sensitive to allophonic variations of English plural suffix and able to match the closest sound in their native phoneme inventories based on perceptual judgements.

#### 4) Diachronic Shift in Adaptation Patterns

Some of the previous studies have reported diachronic changes of borrowed form in loanword adaptation. Otaki (2011)

presents examples of diachronic change in epenthetic vowel selections in Japanese loanword phonology as given in (7).

(7) Diachronic change in epenthetic vowel selections (Otaki, 2011)

Source word	Old adapted form	New adapted form
brush	/burasi/	/buraʃʃu/
plush	/purasi/	/puraʃʃu/
radish	/radesi/	/radiʃʃu/
sash	/sassi/	-----

Oh and Kim (2012) also reported that the rate of consonant deletion of morphemic /z, s/ is increasing over time (NIKL 1991: 9%, Bae 2002: 36%, Google Search 2010: 52%). In continuation of these previous findings, Figure 4 shows how adaptation patterns for English plural suffix has been changing throughout time in Japanese.

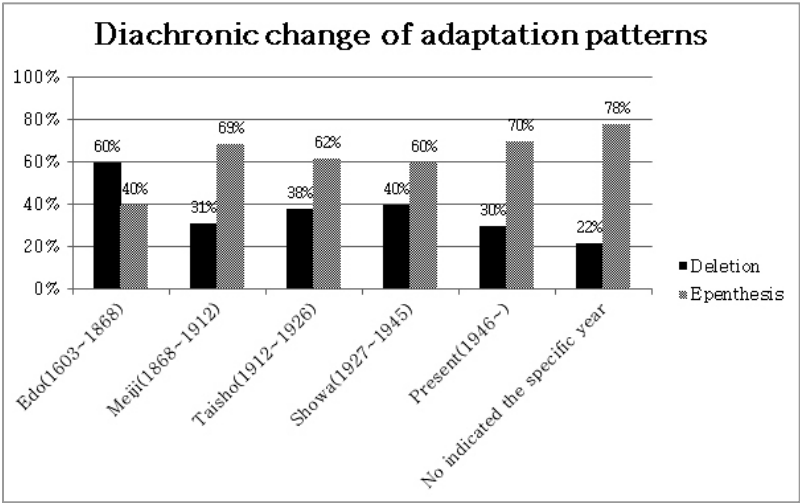


Figure 4. Diachronic Change of Adaptation Patterns

During the *Edo* era, deletion was more common than

epenthesis in loanword adaptation by 60% to 40%. Starting on the *Meiji* era until the Showa era, the percentage of vowel epenthesis is slightly decreasing towards recent times, whereas consonant deletion is showing the opposite tendency. However, the pattern discontinued in the time-frame marked as present which showed decrease in deletion by 10% from the previous era and increase of adaptation by the same amount. This tendency change may be affected by the fact that present era specified by the dictionary encompasses comparatively longer period of time than other eras.

Overall, the vowel epenthesis is a slightly increasing trend in recent times, in contrast, consonant deletion shows opposite tendency. Words classified into non-categorized are mostly proper nouns: the name of sports teams, cities and nations. Non-categorized words as a specific year are adapted with epenthetic vowel at a higher rate than others.

#### IV. Conclusion

This study investigated the morphological effects on loanword adaptation and overall adaptation patterns of the English plural suffix into Japanese by using corpus data from a loanword dictionary, 4th Edition of *Concise Dictionary of Katakana Words* published in Japan in 2010. The results show a number of findings and possible implications.

Firstly, morphological information of a source word plays a part in judgement with respect to the choice between sound mapping versus deletion of the word-final segment /z, s/. Furthermore, the results of current study support Oh and Kim's (2012) study of English plural suffix adaptation into

Korean. Morphological information of source language influences loanword adaptation in both Japanese and in Korean. Although loanword adaptation has been mainly discussed under the two major branches of phonetic versus phonological approach in most of the previous studies, this analysis proves that the process of loanword adaptation should be considered with multi-dimensional approaches. A significant difference in choices between adaptation and deletion was found for the variable of morphological information in the statistical analysis of the data. Non-morphemic /z, s/ in a word-final position was hardly deleted, while morphemic final segment /z, s/ such as English plural suffix was more likely to be deleted.

Secondly, voiceless allomorphs [s, ts] are twice as likely to be adapted with an epenthetic vowel than voiced allomorphs [z, dz, iz]. Among the voiced allomorphs, [iz] was particularly distinguished at the remarkably low rate of vowel epenthesis. This result proves that the phonetic salience is still another important cue in decision making for adaptation versus deletion in loanword adaptation.

Thirdly, examination of diachronic difference of morphemic final segment adaptation reveals that the rate of vowel epenthesis is a slightly increasing trend in recent years. This result provides an evidence that Japanese speakers prefer faithful sound mapping in the process of English plural suffix adaptation. However, comparison of diachronic data based on a shorter time-frame in the recent fifty years is necessary in the future to better analyze the continuation of this tendency.

In addition, the following matters should be taken more into consideration for future research. In this study, general frequency of source word usage by Japanese speakers was not considered. Data for this study included words in technical terms such as medical

and scientific jargon which may not be familiar to all Japanese speakers. Therefore, frequency based-follow up studies may help reveal adaptation patterns more similar to natural language.

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<Abstract>

# Morphological and Phonetic Influence on Loanword Adaptation: Adaptation of English Plural Suffix into Japanese

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A number of previous studies on loanword adaptation discuss two major approaches, such as 'Perceptual sound mapping' (Silverman 1992) and 'phonological feature preservation' (LaCharité & Paradis, 2005). However, Oh and Kim (2012) argue that morphological information should also be considered as a factor in loanword adaptation based on quantitative analysis of English plural suffix adaptation into Korean. This paper aims to explore the influence of morphological information in loanword adaptation in Japanese by investigating English plural suffix adaptation into Japanese based on corpus data collected from a loanword dictionary (Concise Dictionary of Katakana Words, 2010) published in Japan. The results of this study show significantly different patterns in adapting non-morphemic /z, s/ and morphemic /z, s/ from English into Japanese. Furthermore, the sound mapping also reveals different patterns of matching Japanese sound for allomorphs of English plural suffix. Each variant of English plural suffix is differently adapted when borrowed into Japanese depending on its phonetic realization.

Key Words: loanword adaptation, English plural suffix, allomorphs, morphological information, phonetic approach.

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