

Notes on English Loanwords in Japanese:

Major Sound Transformations

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The current paper discusses major sound transformations that English words undergo when they are borrowed as loanwords into Japanese. Since English sounds outnumber Japanese sounds, sound substitutions frequently occur. As a means of breaking consonant clusters in English, vowel insertion is widely observed. These transformations are highly rigid and predictable, as evidenced by nonce borrowing data (i.e., borrowing only at that time for that particular speaker). It is suggested that presenting some of the common transformations as rules to English speakers learning Japanese might be beneficial. The paper offers a sample handout that can be used for American students who have mastered the *Katakana* syllabary.

Keywords: English loanwords, Japanese, sound transformations

Introduction

One of the Japanese writing systems, namely *Katakana*, is mainly used for representing loanwords. It is not very surprising these days for one to see advertisements in Japan which mostly consist of *Katakana*. The abundance of *Katakana* implies that people in Japan have been adopting more and more words of foreign origin. Given the worldwide influence of English on other languages, it is not hard to imagine that English is one of the major source languages for loanwords used in Japan. The Japanese National Language Research Institute reported in 1964 that 80.8% of the Western loanwords used in Japan were from English (Takashi, 1992¹⁾). Furthermore, according to Huynh (2013)²⁾, 20,000 words of foreign origin entered the Japanese language between 1991 and 2010, and most of them are English loanwords. Earlier loanwords were often imported with new products and concepts simply because these new things did not have appropriate names. However, as Takashi (1992) and Smith (1974)³⁾ indicate, English loanwords today do not merely fill lexical gaps, but often play a role of attracting people's attention. More and more loanwords are appearing in pop culture, and people in Japan appreciate positive images that they convey, such as newness, coolness, sophistication, and so on. One obvious fact about English loanwords is that they are

not usually pronounced as they are in English. The sounds of the words undergo certain transformations in order to fit Japanese phonology and phonotactics, which can be a stumbling block to English speakers learning Japanese. Learners often fail to take advantage of being native speakers of the source language. However, the transformations are highly predictable. It is hoped that with the knowledge of the basic rules, native speakers will recognize the words faster, represent them in *Katakana* better, and build their vocabulary more.

The purpose of this paper is two-fold: To report major sound transformations that take place when English words are borrowed into Japanese, and to present a handout helpful for English speakers learning Japanese who have mastered the *Katakana* syllabary. In order to achieve the first goal, rules reported in previous studies are introduced and strengthened with conversational data taken from two Japanese speakers who have been living in the United States for over three years. To achieve the second, a handout is created so as to capture the rules that explain a large number of instances in an easy-to-follow manner.

Transformations of Consonants

To begin with, consider the following charts that represent English and Japanese consonants based on Tsujimura (1996)⁴⁾.

English							Japanese						
p		t		k			p		t		k		
b		d		g			b		d		g		
*	f θ	s ſ *		h			ɸ	*	*	s ſ ç	h		
	v ð	z ž						*	*	z *			
		*	č						t ^s	č			
		*	j						d ^z	j			
m		n		ŋ	*		m		n		*	n	
	r	l	y	w				f	*	y	w		

Key: (*) = missing sounds in the comparison between the two languages

Figure 1. English and Japanese Consonants

As seen in Figure 1, Japanese lacks labio-dental and interdental fricatives ([f, v, θ, ð]) and has only one liquid, namely the flap [ɾ], instead of the retroflexed [r] and the lateral [l]. These facts are primary concerns when an English word is borrowed into Japanese.

Reasonably, these missing sounds are substituted by the closest sounds that exist in Japanese. Many researchers (Tsujimura, 1996; Hoffer and Honna, 1988⁵; Kay, 1986⁶; Hoffer, Beard, and Honna, 1983⁷; Quackenbush, 1977⁸) discuss the following sound substitutions.

Table 1. Major Consonant Substitutions

Rules	Examples	
	English (Source)	Japanese
1. f → ɸ	fork [fork]	[ɸo:kwa]
2. v → b	vanilla [vənilə]	[banira]
3. θ → s	booth [buθ]	[bu:su]
4. ð → z	leather [leðər]	[feza:]
5. l → r	color [kələr]	[kara:]
6. r (in onset) → ɾ	cream [krim]	[kuri:mwu]
7. r (in coda) → :	color [kələr]	[kara:]

Key: (:) = lengthening of the preceding vowel

There are numerous loanwords that have been established under the rules given in Table 1. The rules are so powerful that even occurrences of nonce borrowing obey them. Nonce borrowing refers to the phenomenon where a particular speaker temporarily uses foreign words at a certain time (Poplack *et al.*, 1988⁹). Observe the following examples taken from casual interactions between two Japanese students who have been studying in the United States for a while.

- (1) konna stressful [suto:resuɸu:tʃu] na...
‘how stressful...’
- (2) friendly [ɸurendori:] kindly de?
‘friendly and kindly?’
- (3) ore wa sugoi nanka argumentative [a:g'yumentati:bui]
ni kaita no ne
‘I wrote it somewhat argumentatively’
- (4) ‘liability only’ [faiabi:fiti on:f:] tte yuu itiban yasui

hoken ni haitte te,
‘I had “liability only”–the cheapest one and...’
(5) “full coverage” [ɸu:lufu kabarejjii] ni haitteta baai
wa,
‘in case you had “full coverage,”...’

All of the words with phonetic descriptions in examples (1) to (5) have not yet obtained the status of loanwords since they are not commonly used as Japanese in Japanese society. Rather, the words are borrowed by the bilingual speakers for the nonce. Given the fact that the rules are operative to the foreign lexical items which are not even loanwords, one may be assured of the rigidity of the rules.

The rules in Table 1 are sound substitutions. That is, the sounds to the left of the arrows have to undergo

changes because they are not recognizable to Japanese ears. In contrast, in the following rules, the sounds to the left of the arrows do exist in Japanese yet change in

specific environments. The first set of such rules consists of alveolar and glottal alternations as discussed in Tsujimura (1996) and Hoffer and Honna (1988).

Table 2. Alveolar and Glottal Alternations

Rules	Examples	
	English (Source)	Japanese
8. t → t ^s / __ w	two [tu]	[t ^s w:]
9. t → č / __ i	team [tim]	[či:mw]
10. s → š / __ i	see-trough [siθru]	[ši:suruw]
11. z → j / __ i	zigzag [zigæg]	[jiguzagw]
12. h → φ / __ w	hood [hud]	[Φw:do]
13. h → ç / __ i	hippie [hipri]	[çippi:]

Loanwords as well as native Japanese words are subject to the rules described in Table 2, and therefore, in Japanese the sequences [tw], [ti], [si], [zi], [hw], and [hi] are not allowed. However, rather exceptionally, some loanwords do not undergo these changes and

remain closer to the pronunciations of the source words. These pronunciations are usually perceived as more innovative than the counterparts that go through the changes. The following are some of the examples from Quackenbush (1977).

Table 3. Innovative and Conservative Pronunciations

Source Words	Innovative	Conservative
two [tu]	[tu:]	[t ^s w:]
team [tim]	[ti:mw]	[či:mw]
sea [si]	[si:]	[ši]
zipper [zipə]	[zippa:]	[jippa:]

The second set of rules that require specific environments is concerned with consonant gemination. Geminates are lengthened consonants and appear in

various environments. The following table summarizes gemination rules from Koo and Homma (1989)¹⁰) and Quackenbush (1977).

Table 4. Consonant Gemination

Rules	Examples	
	English (Source)	Japanese
14. C _i [+obs, -cont] → C _i C _i / V[+short] __ #	pocket [pakɪt] necklace [neklɪs]	[poketto] [nekkuressu]
15. C _i [+obs] → C _i C _i / __ {n, l, s}	lesson [lesn] couple [kʌpl] box [baks]	[ressun] [kappuru] [bokkusu]
16. š → šš / __ #	rush [raš]	[raššu]

Keys: (obs) = obstruent; (cont) = continuant; ([+obs, -cont]) = stops and affricates; (C) = consonant; (V) = vowel; (C_iC_i) = the sequence of the same consonant; (#) = morpheme boundary

Regarding rule 14, it should be noted that “CG (consonant gemination) is less regular and less frequent in its occurrence if the consonant is voiced; it fluctuates between the voiced doublet and the voiceless doublet” (Koo and Homma, 1989, p.129). Since Japanese does not allow for voiced geminates, the morpheme or word final voiced stops and affricates tend to be devoiced as in [bettto] from the English source word *bed* [bed] even though [beddo] might be heard from time to time.

The phenomenon of consonant gemination is observed in the following nonce borrowing data.

- (6) ima wa “five cents a minute [minitto]” toka tte sagatteru kedo...
‘now we have like “five cents a minute,” and the price is cheaper, but...’
- (7) **push** [puššu] tuyosoo, sooyuuno
‘(he) must be pushy in a case like that’

Examples (6) and (7) follow rules 14 and 16, respectively. The applications of the rules to nonce borrowed words again suggest that the rules are highly rigid and predictable.

The third set of rules is nasal rules. Quackenbush (1977) presents the rules as the following.

Table 5. Nasal Rules

Rules	Examples	
	English (Source)	Japanese
17. [+nasal] → n / __C	lamp [læmp]	[lanpu]
18. [n, ŋ] → [n, ng] / __#	pen [pen] king [kin]	[pen] [kingu]

Rule 17 deals with preconsonantal nasals, and rule 18, word-final nasals. Quackenbush (1977) states that “the preconsonantal nasals /m, n, ŋ/_{E(nglish)} are interpreted as allophones of the mora nasal /N/_{J(apanese)},” and “/m/_E remains as /m/_J while /n/_E is interpreted as /N/_J, and probably owing to the spelling /ŋ/_E becomes /ng/_J” (p.155).

The following nonce borrowing examples also confirm the nasal rules.

- (8) de, sono, anoo, account [akawnto] ga nakunaru to denwa site...
‘and when you run out of minutes in your account, you call the company and...’
- (9) anoo, phon- yasui phone [fo:N] card no yatu de.
‘well, among cheap phone card systems’

- (10) anoo, prepaid calling [ko:ringu] card,
‘well, the prepaid calling card,’

Example (8) shows a preconsonantal instance. The English [n] sound is pronounced here as the Japanese moraic [N] as predicted by rule 17. Examples (9) and (10) are word-final cases, and the pronunciations of the nasals exactly follow rule 18.

Yet another set of rules concerns with glides. Although Japanese has glides [y, w], the distribution of these segments is much more limited than that of English glides: “/w/ occurs only before /a/, and /y/ occurs only before /a, o, u/” (Quackenbush, 1977, p.159). Therefore, when English words with prohibited occurrences of glides in Japanese are borrowed into Japanese, some alternations have to occur. Table 6 summarizes the treatment of glides reported in Quackenbush (1977) and Lovins (1975)¹¹.

Table 6. Treatment of Glides

Rules	Examples	
	English (Source)	Japanese
19. Glide Deletion Rule Glide [ɑ back] → Ø / __ V [ɑ back, -low]	yeast [yist] wool [wu]	[i:suto] [u:ru]
20. Glide Vocalization Rules (i) w → u / __ {i, e, o} (ii) y → i / __ e	wet [wet] yellow [yelou]	[uetto] [iero:]

Key: ([ɑ back]) = the equal position in terms of backness

As shown in Table 6, the glides in the prohibited environments in Japanese are either deleted (rule 19) or become vowels (rule 20).

The last consonant rule to be discussed is palatalization of velars. Quackenbush (1977) states that

“the important feature about /æ/ is that it palatalizes the preceding velar stops /k, g/ before it is interpreted as /a/” (p.161). Based on this observation, the following rule can be established. The examples are from Lovins (1975).

Table 7. Palatalization of Velars

Rule	Examples	
	English (Source)	Japanese
21. C _i [velar stops] → C _i ^y / __ æ	catch [kæč]	[k ^y ačči]
	gallery [gæləri]	[g ^y arari:]

Although the palatalization rule described in Table 7 is widely applied when English words come into Japanese, there are a fair number of words that are not constrained by this rule, some of which are the following (Quackenbush, 1977).

Table 8. Exceptions to the Palatalization Rule

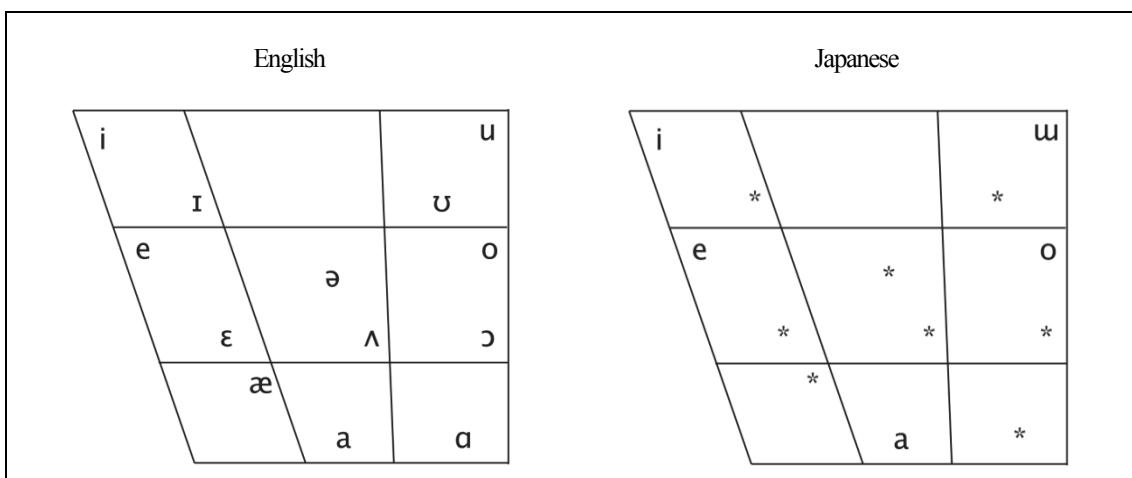
Source Words	Japanese
catalogue [kætəlɒg]	[katarogu]
calendar [kælɪndə]	[karenda:]
camera [kæmərə]	[kamera]
gasoline [gæsəlin]	[gasorin]

Quackenbush does not give any explicit explanations for these rather exceptional examples, but one analysis

is implied: the English vowel [æ] is transformed into the Japanese vowel [a] before the palatalization rule applies. If this is the case, palatalization does not affect the examples in Table 8 since the environment does not meet the condition specified by the rule. There is an inconsistency in ordering the two rules—the vowel substitution and the palatalization rule. For some loanwords, the former applies first whereas for others, the latter applies first. A time period in which words were borrowed into Japanese might be a possible factor.

Transformations of Vowels

Similarly as for consonants, there are differences between Japanese vowels and English vowels. Most notably, English has more vowels than Japanese does, as is illustrated in Figure 2.



Key: (*) = missing sounds in the comparison between the two languages

Figure 2. English and Japanese Vowels

Japanese has a five-vowel system as shown in Figure 2, and each vowel can be lengthened and is realized as a long vowel. Japanese long vowels are presented as [i:, e:, u:, o:, a:]. As for English, besides the 13 vowels presented in Figure 2, there are a number of diphthongs. Diphthongs are defined as vowels that show “a

noticeable change in quality within a single syllable” (O’Grady *et al.*, 1997¹²⁾, p.672).

As is observed in the case of consonants, an English vowel that does not exist in Japanese undergoes a substitution process. Such an English vowel is replaced by one of the short vowels [i, e, u, o, a] or the

long vowels [i:, e:, u:, o:, a:]. Table 9 presents the vowel substitution rules based on Quackenbush (1977)

and Lovins (1975).

Table 9. Vowel Substitutions

Rules	Examples	
	English (Source)	Japanese
22. i → i	gin [jin]	[jin]
23. ε → e	pet [pet]	[petto]
24. æ, ʌ → a	camera [kæmrə] lunch [lʌnč]	[kamera] [raŋči]
25. a, ɔ → o	pot [pət] dog [dəg]	[potto] [doggwu]
26. ɔ → o:	ball [bɔ:l]	[bo:rū]
27. ʊ → u	foot [fʊt]	[fuitto]
28. ə → i, e, o, a	alibi [æləbay] television [teləvɪzən] gasoline [gæsəlin] vanilla [vənilə]	[aribai] [terebi] [gasorin] [banira]

Unlike rules 22 to 27, which convert English sounds into the closest Japanese sounds, in the case of the schwa [ə] appearing in rule 28, “it is the spelling rather than the sound which is the primary determinant for the substitution” (Quackenbush, 1977, p.162). Therefore, [ə] changes to [i], [e], [o], or [a] according to its

orthography as is shown in the examples.

English diphthongs require special treatment when they are realized as Japanese sounds. Table 10 shows how the English diphthongs [iy, ey, uw, ow, ay, aw, ɔy] are changed into Japanese sounds.

Table 10. Treatment of Diphthongs

Rules	Examples	
	English (Source)	Japanese
29. iy → i:	green [grivn]	[guri:N]
30. ey → e:	date [dəvt]	[de:to]
31. ow → o:	boat [bəwt]	[bo:to]
32. uw → u:	boots [buwts]	[bu:t'sui]
33. ay → ai	ice [ays]	[aisui]
34. aw → au	gown [gawn]	[gauN]
35. ɔy → oi	oil [ɔyl]	[oirui]

As Table 10 shows, most of the English tense vowels are realized as long vowels in Japanese (rules 29 to 32). The rest of the diphthongs, [ay, aw, ɔy], are converted into sequences of two Japanese vowels, [ai, au, oi], respectively.

When Japanese speakers pronounce words of foreign origin, they often insert vowels in order to fit Japanese phonotactics. Japanese syllables typically consist of a consonant (C) and a vowel (V), forming a mora. Exceptions to this CV structure are CVCs where

the second C is the moraic [N], such as [kaNbaN] (‘sign’), or the first consonant of a geminate, such as [gakkou] (‘school’) (Lovins, 1975; Quackenbush, 1977; Tsujimura, 1996). English syllables, on the other hand, take a variety of forms. One major characteristic is consonant clusters, and in the following section, vowel insertion is discussed as means of breaking these clusters. English words that contain impossible consonant clusters in Japanese must be modified so as to be pronounceable for Japanese speakers. Tsujimura

(1996) presents the rules related to this phenomenon as in Table 11.

Table 11. Vowel Insertion

Rules	Examples	
	English (Source)	Japanese
36. $\emptyset \rightarrow o / t _ \#$, $d _ C$	hot [ha t] drug [d rʌg]	[hotto] [dɔraggu]
37. $\emptyset \rightarrow i / č _ \#$, $j _ C$	catch [kæč č] dodge ball [dož b ol]	[k ^y ači] [dožibo:rui]
38. $\emptyset \rightarrow u / \text{elsewhere}$	bus [ba u s]	[bas <u>u</u>]

The following nonce borrowing data also confirm the vowel insertion rules in Table 11.

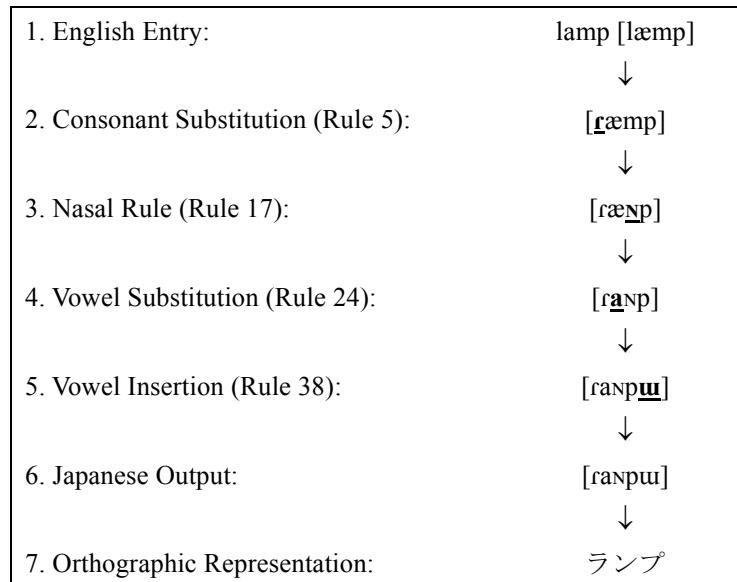
- (11) konna stressful [sutoresuɸuru] na...
‘how stressful...’
- (12) “Hold [ho:rudo] on please” mitai na...
‘like “Hold on please”...’
- (13) ima wa “five cents a minute [minito]” toka tte sagatteru kedo...
‘now, we have like “five cents a minute,” and the price is cheaper, but...’

Vowel insertion is a very strong phenomenon, and it is commonly observed that Japanese speakers insert vowels into English words even when they speak entirely in English.

Encoding and Decoding Processes

This final section demonstrates how English speakers learning Japanese can encode English words into recognizable Japanese words and how they can decode English loanwords used in Japan, using the rules described in the earlier sections ^{note 1}.

Figure 3 is a possible encoding process for the word *lamp*.

Figure 3. Encoding Process for *lamp*

It should be noted that the nasal rule (Rule 17) applies earlier than the rule of vowel insertion (Rule 38). If the rule of vowel insertion occurred first, then the nasal rule

would never apply, resulting in the incorrect output [ramupu], as shown in Figure 4.

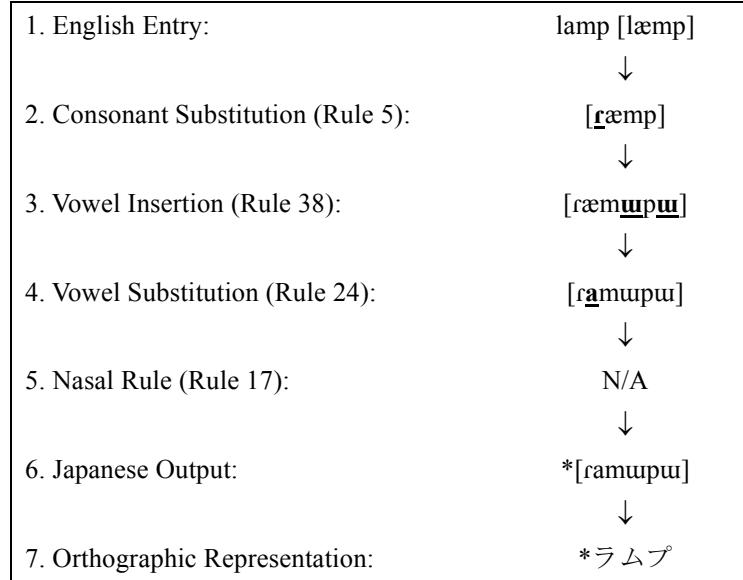


Figure 4. Incorrect Encoding Process for *lamp*

By applying the rules in the correct order, learners can successfully reach the Japanese pronunciation of *lamp*, making themselves better understood in communication with Japanese speakers. Furthermore, after mastering the *Katakana* syllabary, they can write the word correctly. It is important to note that knowing all *Katakana* symbols is not enough to produce the word in writing correctly since the *Katakana* representation should not be based on how native speakers of the source word pronounce the word, but on how borrowers of the word perceive it. Learners can only reach the correct *Katakana* representation for *lamp*, ランブ [ranbu], excluding other possibilities, such as ラムブ [ramupu] or ランペ [ranpe] if they know the appropriate sound transformation rules and ordering of the rules.

Being familiar with the sound transformation rules

is important not only in encoding, but also in decoding *Katakana* words. Suzuki (1987)¹³⁾ claims that there is a difference between writing foreign words in Japanese orthography and presenting loanwords as Japanese. The former puts importance on preserving the pronunciations of original words, and therefore, the outputs would not be Japanese, and native speakers of Japanese would not know what they mean. On the other hand, the primary importance of the latter is to make the words familiar to the Japanese sound system. Most of the existing *Katakana* words in Japan underwent this process, and thus knowing *Katakana* symbols alone does not allow learners to recover the source words. Again, they need to know the sound transformation rules being used. Figure 5 demonstrates a possible decoding process for the word バス [basu].

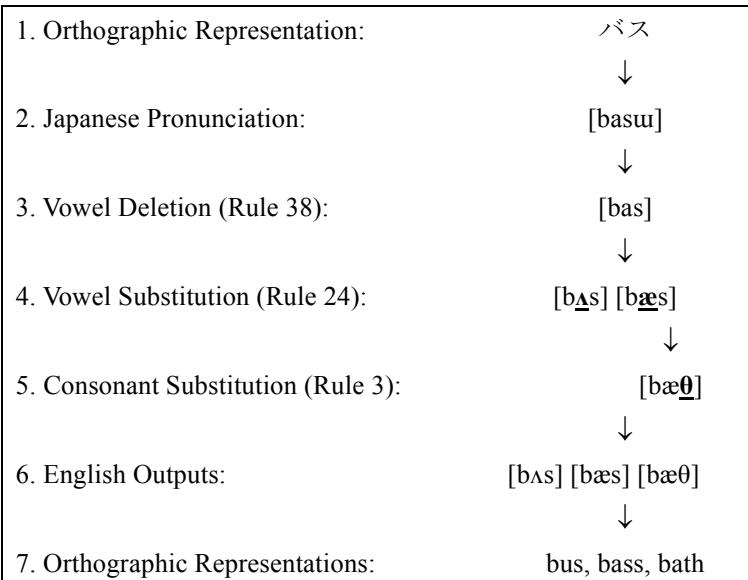


Figure 5. Decoding Process for バス [basu]

As Quackenbush (1977) states, recovering source words is more difficult than encoding English words into Japanese pronunciation due to the fact that English sounds outnumber Japanese sounds. As shown in Figure 5, the Japanese [a] sound can be transformed into either [ʌ] or [æ] in English, and likewise, [s] in Japanese can be interpreted as either [s] or [θ] in English. As a result, a word as simple as [basu] can have the three possible source words, *bus*, *bass*, and *bath*. Naturally, there are *Katakana* words that have even more possible English source words. Therefore, one must be aware of the fact that even with the knowledge of the rules, learners can still make mistakes. However, it should be emphasized that context is a great help in selecting among possible source words. As learners become more exposed to *Katakana* words in context, they can improve their decoding ability and become able to deduce source words more effortlessly.

Conclusions

The sound transformations that have been discussed in this paper are the following:

- a. Consonant substitutions (Table 1)
- b. Alveolar and glottal alterations (Table 2)
- c. Consonant gemination (Table 4)
- d. Nasal rules (Table 5)
- e. Treatment of glides (Table 6)
- f. Palatalization of velars (Table 7)
- g. Vowel substitutions (Table 9)
- h. Treatment of diphthongs (Table 10)
- i. Vowel insertion (Table 11)

These sound transformation rules are by no means exhaustive. That is, they cannot capture all loanwords existing in Japanese, partly because some loanwords have multiple pronunciations caused by dialectal or generational varieties among speakers. However, the rules explain most loanwords as well as nonce borrowed words by bilingual speakers. Since they help learners pronounce English words in a comprehensible way to Japanese speakers and recover the source words when they read *Katakana* words, it may be worthwhile taking some time to teach the rules.

The handout given in the appendix is sample material that can be used for beginning-level American students. The learners are assumed to have mastered the *Katakana* syllabary. In the handout, only selected rules appear. The selection of the rules is based on how widespread and influential they are and on whether or not they are simple enough to grasp. It is meant to serve as a start for learning the underlying mechanism of the sound transformations. Technical terms are minimized so as not to impose on extra burden on the learners. Teachers who use this handout are strongly advised to give a sufficient number of examples when explaining the rules.

Notes

- 1) The current paper introduces ordering of rules so that transformational process can be observed more transparently; however, more recent studies discuss ranking of constraints for optimal outputs (Prince and Smolensky, 2004¹⁴⁾.

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Appendix

Guide for English Loanwords in Japanese

I. Facts about loanwords

When we borrow words from other languages, we normally modify the pronunciations of the words so that they sound more like our own language. For example, the English word *sake*, which was borrowed from Japanese, is pronounced as [saki]. However, if you say this word with this pronunciation to your Japanese friends, they will not understand it, even though the

word comes from Japanese. This is because Japanese speakers pronounce the word differently. The Japanese pronunciation of the word is [sake], where the last syllable [ke] is more like a part of the word cake [keyk]. Modern Japanese borrows quite a large number of words from English, and as English modified the word *sake* [sake] into [saki], Japanese also modifies English words in various ways so that they can be pronounceable in Japanese. The following section describes some of the modification rules that apply to English words when they are borrowed into Japanese.

II. Modification Rules

(1) Some English sounds do not exist in Japanese. Such sounds have to be replaced by the closest sounds that exist in Japanese.

English		Japanese	Notes
v	→	b	
θ (<u>three</u>)	→	s	
ð (<u>father</u>)	→	z	
l	→	r	(water when it is pronounced rapidly)
Vr	→	V:	V = vowel, V: = long vowel
iy (<u>eat</u>)	→	i:	
ey (<u>date</u>)	→	e:	
ow (<u>boat</u>)	→	o:	
uw (<u>boot</u>)	→	u:	

(2) Some of the sequences of English sounds need special treatments when they enter into Japanese.

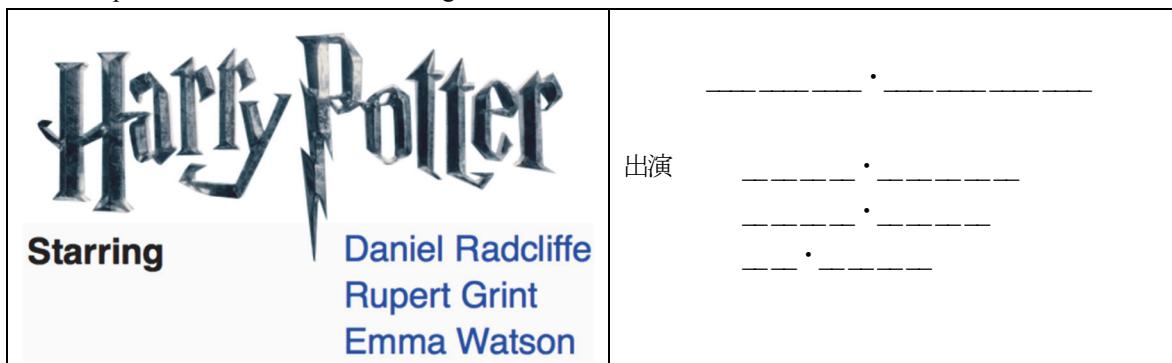
English		Japanese	Notes
si (<u>sea</u>)	→	š (<u>ship</u>)	
unstressed Vk# (<u>picnic</u>)	→	Vkk	# = word final
unstressed Vg#	→	Vgg	
unstressed Vt# (<u>biscuit</u>)	→	Vtt	
unstressed Vd#	→	Vdd	
t#	→	to#	
d#	→	do#	
tC	→	toC	C = consonant
dC	→	doC	
č# (<u>church</u>)	→	či#	
ž# (<u>judge</u>)	→	ži#	
čC	→	čiC	
žC	→	žiC	
C (other than t, d, č, ž)#	→	Cu#	
C (other than t, d, č, ž)C	→	CuC	

III. Exercises

- (1) Using the rules given above, predict the pronunciation of each English loanword. Then, provide *Katakana* for it. The first two items are done for you.

English Source Word	Japanese Pronunciation	Katakana
1. vanilla	banira	バニラ
2. date	de:to	デート
3. bath	_____	---
4. brother	_____	-----
5. seat	_____	-----
6. color	_____	-----
7. east	_____	-----
8. boat	_____	-----
9. cool	_____	-----
10. picnic	_____	-----
11. pocket	_____	-----
12. charge	_____	-----

- (2) Create a Japanese version of the following movie advertisement.



(3) Complete the following bilingual menu. (<http://mos.jp/menu/>)



期間・季節・数量限定メニュー

limited menu



モスライスバーガー



とびきりハンバーグサンドシリーズ

special hamburg sandwiches



ホットドッグ



ハンバーガー



サイドメニュー



ドリンク



スープ



デザート