

# Hybrid loans: a study of English loanwords transmitted to Korean via Japanese

Yoonjung Kang · Michael Kenstowicz · Chiyuki Ito

Received: 7 June 2007 / Accepted: 6 July 2008 / Published online: 8 October 2008  
© Springer Science+Business Media B.V. 2008

**Abstract** In this paper we present the results of a study of Japanese-influenced English loanwords in Korean. We identify some 10 phonological indexes that identify the loan's Japanese provenance and examine their relative rate of retention in 287 loan forms that show a mixture of Japanese-style and direct-English-style phonological characteristics. Our chief finding is that certain traits of Japanese-style loanwords are more resistant to change to the direct English style of adaptation that is applied to contemporary loans. We consider two possible explanations for such a hierarchy. First, the resistance hierarchy reflects the relative perceptual saliency of the relevant features (cf. Steriade, 2001). Second, the resistance hierarchy reflects the degree of confidence Korean speakers have about the “correct” direct-English borrowing pattern.

**Keywords** Hybrid loanwords · Google hits · Phonetic similarity · P-map

---

Y. Kang (✉)  
Department of Humanities, University of Toronto Scarborough,  
1265 Military Trail, Scarborough, ON, Canada M1C 1A4  
e-mail: kang@utsc.utoronto.ca

M. Kenstowicz  
Department of Linguistics and Philosophy, MIT,  
77 Massachusetts Ave., Cambridge, MA 01239, USA  
e-mail: kenstow@mit.edu

C. Ito  
Research Institute for Languages and Cultures of Asia and Africa,  
Tokyo University of Foreign Studies, 3-11-1, Asahi-cho, Fuchu-shi,  
Tokyo 183-8534, Japan  
e-mail: chiยุกit@aa.tufs.ac.jp

## 1 Introduction

During the period of massive borrowing from Japanese (1890–1945), many Western words, English in particular, were transmitted to Korean through Japanese. Such “Japanese-style” English loans are marked by various phonological characteristics that are unexpected in loans borrowed directly from English to Korean and are indicative of their Japanese origin (Song 1989; Tranter 1997; Heo and Lee 2005). As a result of increased direct contact with American English and a concerted effort in Korea to eliminate Japanese influence from the Korean language after the liberation of Korea from Japanese occupation, many of these English loans that came through Japanese were subsequently modified or replaced to reflect the direct influence of English. As a result, in Contemporary Korean, there are often multiple loan forms for a single English word, showing varying degrees of Japanese influence.<sup>1</sup> For example, English *meter* has at least three different realizations in Korean: (i) [meda], a borrowing from Japanese [meetaa], (ii) [mit<sup>h</sup>ʌ], a direct loan from English, and (iii) [met<sup>h</sup>a], which is a mixture of the two, where the vowel quality of the Japanese borrowing [meda] is retained but the laryngeal feature of the stop is substituted by that found in the direct English borrowing [mit<sup>h</sup>ʌ].<sup>2</sup>

For this study, we constructed a corpus of over 500 Japanese-influenced loan forms gathered from published sources such as Kim (1997) and The National Institute of the Korean Language (2005) as well as from two native Korean speakers gathered by the third author in Tokyo and in the US. We then examined the distribution of 10 phonological characteristics of Japanese-influenced loans. The results overall show that Japanese traits pertaining to non-epenthetic vowels are more likely to be retained than those pertaining to consonants or epenthetic vowels; among consonantal characteristics, those related to [f] or intervocalic [l] are more likely to be retained than laryngeal characteristics of stops and [s]. We will discuss two hypotheses concerning this differential retention of various Japanese traits: (i) the differential retention rates of Japanese features reflect the perceptual salience of the changes involved, namely, the more perceptually distinctive a given change from the Japanese to the English pattern is, the less likely the change will apply; alternatively, (ii) the differential retention rates reflect Korean speakers’ degree of certainty about “correct” direct English borrowing patterns. In other words, a Japanese characteristic is more readily eliminated in cases where Korean speakers are more certain that it is not a plausible direct English borrowing pattern.

<sup>1</sup> As a reviewer points out, when such variants of an English loan coexist in Korean, the Japanese-colored variants are often felt to be old-fashioned, and in some instances, each variant has a slightly different meaning.

<sup>2</sup> As reviewers point out, /t/ in ‘meter’ is pronounced as a tap [ɾ] in American English, and the phonetically closest match in Korean would be the lax /t/ (realized as [d] with intervocalic voicing) or liquid [ɾ] of Korean. In Contemporary Korean, however, English voiceless stops are consistently adapted as aspirated stops, even when the English input is not aspirated, as in /wat<sup>h</sup>ʌ/ ‘water’ and /sik<sup>h</sup>ʌl/ ‘school’. This mapping has been variously argued to be a case of orthography-based adaptation or a case of phoneme-to-phoneme mapping (cf. Oh 1996; Iverson and Lee 2006; Kenstowicz 2005). Regardless of the exact mechanism under which this mapping occurs, this is the consistent pattern found in Contemporary borrowings from English, which differ from the ones borrowed through Japanese.

The rest of the paper is organized as follows. Section 2 provides an overview of the 10 phonological characteristics that mark Japanese-style loans. Section 3 establishes the hierarchy of retention rates among these Japanese characteristics. Section 4 discusses possible explanations for this hierarchy, and Section 5 concludes the paper.

## 2 Characteristics of Japanese-style loans

In this section, we discuss how certain English sounds are adapted differently in Korean depending on whether the word is borrowed directly from English or indirectly through Japanese. We focus on 10 characteristics that occur most frequently so as to make numerical comparisons more meaningful. We will discuss the traits related to consonants (2.1), epenthetic vowels (2.2), and non-epenthetic vowels (2.3) in turn. (1) provides the phoneme inventories of Japanese (Shibatani 1990) and Korean (Ahn 1998). For Korean, /p t c k/ denote the lenis series and /p\* t\* c\* k\*/ the fortis series of stops/affricates. The lenis series is allophonically voiced to [b d ʒ g] in intersonorant position. The single liquid phoneme is realized as a lateral in the syllable coda and as a flap elsewhere. For Japanese, /t/ and /d/ are affricated before a high vocoid /i/, /j/ and /u/. /s/ and /z/ are palatalized to [ç] and [ʒ] before /i/ and /j/.

(1)	i	u		i	ɨ	u			
	e	o		e	ʌ	o			
	a			ɛ	a				
	p b	t d	k g	p p*	t t*	t <sup>h</sup> k <sup>h</sup>	c c*	c <sup>h</sup> k k*	k <sup>h</sup>
	s z	h			s s*				h
	m	n	ɳ	m	n				ŋ
	w	r	j	w	r/l	j			
	<b>Japanese</b>			<b>Korean</b>					

### 2.1 Japanese traits related to consonants

*Adaptation of English [f]:* In direct English borrowings into Contemporary Korean, English [f] is in general adapted as the aspirated bilabial stop [p<sup>h</sup>], as in *fashion* → [p<sup>h</sup>ɛs\*jʌn], *Ford* → [p<sup>h</sup>oɰi], *coffee* → [k<sup>h</sup>ʌp<sup>h</sup>i], *golf* → [k\*oɰp<sup>h</sup>i], etc. In English borrowings transmitted through Japanese, on the other hand, [f] appears as [h(w)] in Korean, because English [f] is adapted as Japanese [ϕ], an allophone of /h/ and Japanese /h/ is consistently adapted as Korean [h(w)], as shown in (2a) (Lee and Cho 2006).<sup>3</sup> For some English words, there are doublets in the Korean lexicon

<sup>3</sup> For general English-to-Japanese segmental mappings, readers are referred to Shinohara (1997) and Katayama (1998) for recent OT treatments. See Ito et al. (2006) and Kim (2008) for analyses of Japanese loanwords in Korean.

reflecting the two different routes of borrowing. The examples in (2b) illustrate. For example, *muffler* in Korean can be [mahura], a borrowing of Japanese [mahuraa], or [maɾpʰilla].

(2)	English [f]	Japanese /h(w)/([ϕ(w)])	Korean [h(w)]
a.	fry	[ϕ]urai	hurai
	fluke	[ϕ]urokku	hurok* <u>u</u>
	fuse	[ϕ]juuzu	hjuʝi
b.	muffler	ma[ϕ]uraa	mahura ~ maɾpʰilla
	fantasy	[ϕ]wanta[ʒ]ii	hwantʰaʝi ~ pʰantʰaʝi

*Adaptation of English voiceless stops and affricates:* In direct English borrowings, English voiceless stops are in general adapted as Korean aspirated stops, as in *tank* → [tʰɛŋkʰi], *percent* → [pʰɛsɛntʰi], etc. In English borrowing into Japanese, English voiceless stops are adapted as Japanese voiceless stops (sometimes geminated), and Japanese voiceless stops in general map to Korean lenis or fortis stops depending on the context and place of articulation (Ito et al. 2006).<sup>4</sup> Therefore, in English borrowings transmitted via Japanese, English voiceless stops emerge as the lenis or fortis stops of Korean. Again, there are many doublets that reflect these two different routes of transmission, as the examples in (3) illustrate.

(3)	English	Japanese	Korean
	concrete	kɔnkuriito	kɔŋɡurit*o ~ kʰɔŋkʰiritʰi
	tile	tairu	tairu ~ tʰail
	brake	bureeki	purek*i ~ pʰireikʰi
	broach	buroo[tʃ]i	puroc*i ~ purocʰi

*Adaptation of English [s]:* English [s] in non-preconsonantal position is systematically adapted as the Korean fortis fricative [s\*] (Kim 1999), as in *sale* → [s\*eil], *bus* → [p\*ɛs\*i], etc. On the other hand, when English [s] in a comparable position is borrowed through Japanese, it is adapted as the lenis [s] of Korean. The examples in (4) illustrate. Again, we find doublets such as [sɛmen] and [s\*imentʰi] for *cement* in (4b).<sup>5</sup>

<sup>4</sup> According to Kim (2008), the aspirated adaptation of Japanese voiceless stops to Korean is possible in word-medial position while Ito et al. (2006) find such adaptations only in words of English origin. However, Kim and Ito et al. both agree that Japanese voiceless stops are consistently adapted as lenis stops in word-initial position in Korean.

<sup>5</sup> The standard orthography represents all instances of English ‘s’ as lax /s/ and does not reflect the actual pronunciation faithfully. In this paper, the first author’s judgment was used to determine the actual pronunciation.

(4)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
a.	soda	sooda	soda
	sailor suit	seeraa ([ϕ]uku)	sera (pok)
	gasoline	gasorin	kasoriŋ
b.	cement	semento	semen ~ s*iment <sup>hi</sup>

*Adaptation of English [l]:* Korean has a single liquid phoneme, realized as [l] or [r] depending on the context (Ahn 1998). In intervocalic position, English [l] is distinguished from [r] in Korean adaptation as a singleton-geminate contrast, realized as [r] vs. [ll], in accord with native Korean phonotactics (Heo and Lee 2005). Some examples of adaptation of English [l] include *dollar* → [t\*alla]/[t\*allΛ] and *slump* → [sillamp<sup>hi</sup>] Examples of [r] include *camera* → [k<sup>h</sup>amera] and *irony* → [a.i.rani]. In Japanese, on the other hand, English [l] and [r] are both adapted as Japanese [r] and Japanese [r] is systematically adapted as the singleton liquid [r] of Korean. Therefore, English intervocalic [l] emerges as Korean [r] in borrowings that came through Japanese, as the examples in (5) illustrate. Again, we observe doublets as in (5b) that show variation between [r] and [ll] as reflexes of English [l].

(5)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
a.	sailor suit	seeraa ([ϕ]uku)	sera(pok)
	gasoline	gasorin	gasoriŋ
	slab	surabu	sirabi
b.	plastic	purasu[t]ikku	p <sup>hi</sup> irast <sup>hi</sup> ik ~ p <sup>hi</sup> llast <sup>hi</sup> ik
	chocolate	[t]okoreeto	c*ok*oret ~ c <sup>h</sup> ok <sup>h</sup> ollet

## 2.2 Japanese traits related to epenthetic vowels

*Extra epenthetic vowel:* Korean has a less restrictive syllable structure than Japanese and allows an independent [p t k m n ŋ l] in coda position while Japanese does not. Therefore, when English words ending in one of these consonants are borrowed into Japanese, an epenthetic vowel is added. But an epenthetic vowel is unexpected in direct English borrowings into Korean, as the examples in (6) illustrate.<sup>6</sup>

(6)	<u>English</u>	<u>Korean</u>	cf. <u>Japanese</u>
	ham	hem	hamu
	divi[ŋ]	t*aibiŋ	daibiŋgu
	goal	k*ol	gooru
	kick	k <sup>h</sup> ik	kikku
	tip	t <sup>h</sup> ip	[t]ippu
	helmet	helmet	herumetto

<sup>6</sup> Even when not required by the syllable structure, a vowel may be inserted after the final stop in some loanwords borrowed directly from English. See Kang (2003) for details.

Borrowings that entered Korean through Japanese, on the other hand, contain an extra vowel that mirrors the vowel in the Japanese form. The examples in (7) illustrate. Again, these English words have more than one realization in Korean, reflecting the different routes of borrowing.

(7)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
	back	bak <u>ku</u>	p*ak* <u>u</u> ‘rejection’ ~ p*εk ‘connection’
	tile	tair <u>u</u>	t <sup>h</sup> air <u>u</u> ~ t <sup>h</sup> ail
	vinyl	biniir <u>u</u>	pinir <u>u</u> ~ pinil
	panel	paner <u>u</u>	p <sup>h</sup> anner <u>u</u> ~ p <sup>h</sup> annel

*Quality of epenthetic vowel:* In Korean, the default epenthetic vowel is [i] while in Japanese, the default epenthetic vowel is [u]; in Japanese, [o] occurs when the preceding consonant is a coronal stop and [i] occurs after a palatal (e.g., *broach* > J. [buroo[tʃi]) and occasionally after a velar stop (e.g., *cake* > J. [keeki]). As Japanese [u] and [o] are systematically adapted to Korean [u] and [o]<sup>7</sup>, this is another locus of divergence between direct English-to-Korean loans and loans transmitted via Japanese. The examples in (8) illustrate this variation.

(8)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
	catalogue	katarog <u>u</u>	kadarog <u>u</u> ~ k <sup>h</sup> at <sup>h</sup> allogi
	drum	doram <u>u</u>	toram <u>u</u> ~ t̃ir̃am
	brake	bureeki	purek* <u>i</u> ~ p̃ire.ik <sup>h</sup> <u>i</u>
	concrete	konkuriit <u>o</u>	kon̄gurit* <u>o</u> ~ k <sup>h</sup> on̄k <sup>h</sup> irit <sup>h</sup> <u>i</u>

### 2.3 Japanese traits related to non-epenthetic vowels

The mapping of English vowels is another source of divergence between direct English loans and Japanese-mediated English loans. We will discuss four such divergences. In direct English borrowings, English [ʌ] and [ɚ] map to Korean [ʌ] and English [æ] maps to Korean [ε]. On the other hand, all these English vowels are adapted as [a] in Japanese, as shown in (9).

(9)	<u>English</u>	<u>Korean</u>	cf. <u>Japanese</u>
	sh[ʌ]ttle	sjʌt <sup>h</sup> il	[ç]atoru
	zipp[ɚ]	cip <sup>h</sup> ʌ	[z]ippaa
	h[æ]m	hεm	hamu

Japanese [a] straightforwardly maps to Korean [a] and thus in English loans transmitted through Japanese to Korean, English [ʌ ɚ æ] appear as [a]. Again, one often finds doublets with [ʌ] and [ε] reflecting the direct transmission from English and [a] reflecting the Japanese intermediary.

<sup>7</sup> Following a sibilant, Japanese [u] is adapted as Korean [i] (Ito et al. 2006).

(10)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
	ov[ə̃r](coat)	oobaa	oba
	err[ə̃r]	eraa	era ~ er <sub>Δ</sub>
	dr[Δ]m	doramu	toramu ~ tir <sub>Δ</sub> m
	b[æ]ck	bakku	p*ak*u 'rejection' ~ p*ek 'connection'

Japanese-style loans also show a different realization of the English diphthong [ej]. English [ej] is adapted as Korean disyllabic [e.i] in direct loans but as [e] in Japanese-style loans, mirroring the Japanese adaptation of English [ej] as [ee]. Examples are given in (11).

(11)	<u>English</u>	<u>Japanese</u>	<u>Korean</u>
	s[ej]lor suit	seeraa([ϕ]uku)	sera(bok)
	sandp[ej]per	(sando)peepaa	p*ep*a
	c[ej]ke	keeki	k*ek*i ~ k <sup>h</sup> e.ik
	br[ej]ke	bureeki	purek*i ~ p <sub>ire</sub> .ik <sup>h</sup> i

In addition to the 10 Japanese traits reviewed in this section, which we will examine quantitatively in the next section, there are other phonological indications of Japanese influence. English coronal stops before high vowels tend to be affricated in English loans in Japanese, which is unexpected in direct English borrowings to Korean. For example, *nicotine* is variably realized as [nik<sup>h</sup>o<sup>h</sup>in], mirroring the affrication in Japanese [nikot<sup>h</sup>in] or as [nik<sup>h</sup>o<sup>h</sup>in]. Another difference is found in the adaptation of word-final [n]. Korean allows a place contrast in nasal codas, and so English [n] is straightforwardly adapted as [n]. Japanese, on the other hand, does not permit place contrasts in coda nasals, and so English word-final [n] is adapted as the placeless nasal, which is realized as homorganic to a following consonant and as a velar or uvular nasal before pause, which we represent as [N]. Japanese word-final [N] is frequently adapted as [ŋ] in Korean, as in J. [oden<sub>N</sub>] → K. [odenŋ] 'name of a traditional dish', J. [udon<sub>N</sub>] → K. [udonŋ] 'noodle', and J. [kobun<sub>N</sub>] → K. [k\*obunŋ] 'adherent'. As a result, [ŋ] is attested for English word-final [n] in Japanese-mediated loans but not in direct borrowings from English into Korean. For example, *apron* can be [ep<sup>h</sup>ironŋ] (cf. J. [epuron<sub>N</sub>]) or [eip<sup>h</sup>ir<sub>Δ</sub>n] and *cushion* can be [k<sup>h</sup>us\*joŋ] (cf. J. [kuççon<sub>N</sub>]) or [k<sup>h</sup>us\*j<sub>Δ</sub>n] in Korean.

Another phonological characteristic that is related to Japanese influence is the orthography-based adaptation of English vowels, particularly schwa. Japanese lacks central vowels, and perhaps for this reason English schwa is adapted orthographically, the peripheral Japanese vowels likely being more or less equidistant from schwa in the Japanese speaker's perception. In Korean, such an orthography-based adaptation of schwa, while frequent, is also accompanied by adaptations with [Δ], a central vowel that is the phonetically closest approximation to English schwa in the Korean inventory. For example, *apron* can be [ep<sup>h</sup>ironŋ] (cf. J. [epuron<sub>N</sub>]) or [eip<sup>h</sup>ir<sub>Δ</sub>n] and *cardigan* can be [kadigan<sub>Δ</sub>]/[k<sup>h</sup>adigan<sub>Δ</sub>] (cf. J. [kaadigan<sub>Δ</sub>]) or [k<sup>h</sup>adig<sub>Δ</sub>n] in Korean. Although orthography-based adaptation of English schwa cannot necessarily be solely attributed to Japanese influence, other things being equal, it is expected to occur at a higher rate in English loans borrowed through Japanese than in direct English

borrowings. With this background, we now turn to present the finding that certain Japanese traits are more resistant to the pressure of de-japanization than others.

### 3 Differential retention of Japanese traits

When English loanwords transmitted to Korean via Japanese contain more than one potential Japanese trait, there are often *hybrid* forms that have shed some Japanese traits but retain others. As we will demonstrate below, in such hybrid forms, not all Japanese traits are equally likely to be replaced.

(12) Rate of retention for various Japanese traits in hybrid English-Japanese loans

		Percentage of Japanese-influenced forms
Consonantal (Laryngeal)	laryngeal feature of [t p k tʃ]	8% (N=274)
	laryngeal feature of [s]	12% (N=42)
Epenthetic Vowels	extra epenthetic vowel <sup>8</sup>	14% (N=72)
	epenthetic vowel quality <sup>9</sup>	39% (N=57)
Consonantal (others)	[f] as [p <sup>h</sup> ] or [h(w)]	45% (N=22)
	[l] as [r] or [ll]	60% (N=60)
Non-epenthetic Vowels	[ej] as [e] or [ei]	67% (N=21)
	[æ] as [a] or [ɛ]	82% (N=60)
	[ɔ̃] as [a] or [ʌ]	85% (N=88)
	[ʌ] as [a] or [ʌ]	96% (N=26)

To quantify the relative degree of resistance of the various Japanese traits to mutate to the direct English style, from our corpus we identified 287 hybrid forms that retain some Japanese traits but have lost others. We then calculated the rate by which a given Japanese characteristic is retained among those forms that contain the relevant phonological structures. The loan forms that retain all Japanese traits or those that do not contain any Japanese traits (direct English borrowings) are not included in this calculation. The retention rates of the 10 Japanese traits discussed in the previous section are listed in the table (12) from the lowest to the highest. For example, out of 274 instances of English voiceless stops and affricate in these 287 hybrid loans, only

<sup>8</sup> For English words with word-final post-vocalic stops, epenthesis applies variably even in direct English loans depending on various phonological factors (Kang 2003). To avoid the issue of what counts as the “correct” direct English mapping for these cases, here we only included the cases of epenthesis after [l m n ŋ] where epenthesis is completely unexpected in direct English borrowing.

<sup>9</sup> There is variability in the realization of the epenthetic vowel following a labial consonant ([i] or [u]) in the direct English borrowing, although orthography does not reflect the variation, always representing the vowel as [i]. The rate given in (12) is calculated assuming that all such epenthetic vowels are in fact pronounced as [u], at least variably. The rate remains similar at 40% (26 out of 89) if we make the opposite assumption—i.e., all such vowels are pronounced as [i].

23 (8%) are realized as lenis or fortis. The rest are realized as aspirated, showing that in most of these hybrid forms the laryngeal feature of voiceless plosives has been de-japanized.<sup>10</sup> From the table, we notice a striking generalization that the traits related to the non-epenthetic English vowels—the bottom four in the table—are more resistant than the traits related to the consonantal adaptations or epenthetic vowels. Among consonantal characteristics, the Japanese adaptation patterns for [f] and [l] are more resistant than other consonantal characteristics. So, we can establish the hierarchy of resistance in (13) among different types of Japanese traits in (12). The Japanese traits related to non-epenthetic vowels are the most resistant while those pertaining to [f] and [l] occupy an intermediate position in the hierarchy; those related to epenthetic vowels and laryngeal features are the least resistant.

- (13) Resistance hierarchy of Japanese traits in hybrid loans  
 Non-epenthetic vowels(VQ) > [l](L), [f](F) > Epenthetic vowels(EV),  
 Laryngeal features(Lar)

This hierarchy also holds true as an implicational relation among variations found in individual loanwords. In other words, in a given hybrid form, a Japanese feature higher in the hierarchy is lost only when the ones lower in the hierarchy in (13) are also lost.

To return to the example of *meter*, in addition to the Japanese-style [meda] and English-style [mit<sup>h</sup>ʌ], a third variant, [met<sup>h</sup>a] is found. This hybrid retains the vocalic features of the Japanese-style [meda] but shows the laryngeal feature of the English-style [mit<sup>h</sup>ʌ]. Interestingly, the other logically possible variant \*[midʌ], which retains the laryngeal feature of the Japanese-style loan but follows the English-style loan in vowel quality, is not attested. Table (14) summarizes this implicational relationship. In this example, the vowel quality of the Japanese-style loan is more resistant to change than the laryngeal feature of stops and thus conforms to the hierarchy in (13).

- (14) Variants for ‘meter’

	attested	Non-epenthetic Vowel Quality (VQ)	Laryngeal feature (Lar)
meda	Yes	Japanese-style	Japanese-style
met <sup>h</sup> a	Yes	Japanese-style	English-style
<b>*midʌ</b>	<b>No</b>	<b>English-style</b>	<b>Japanese-style</b>
mit <sup>h</sup> ʌ	Yes	English-style	English-style

The loan *catalogue* presents a more complex case. The word contains four different traits that can differ according to the source of borrowing: adaptation of the

<sup>10</sup> If we calculate the retention rate of Japanese-style adaptation in word-initial voiceless stops only, the rate is still fairly low at 13% (14 out of 104). So, regardless of the assumption about the “regular” Japanese-to-Korean mapping for voiceless stops mentioned in footnote 4, the generalization still holds that the Japanese laryngeal adaptation pattern is among the most likely to be lost.

original English vowels [æ] and schwa (VQ), adaptation of the intervocalic liquid (L), quality of the epenthetic vowel (EV), and laryngeal adaptation of the English voiceless stops (Lar). The differences between the Japanese-style and direct English-style borrowings with respect to these four phonological traits are summarized in table (15).

(15) ‘catalogue’ [kætəlog]

	VQ (input [æ] [ə])	L (input: [l])	EV	Lar (input: [k] [t])
kadarogu (Japanese style)	[a]	[r]	[u]	[k] [d] (</t/)
k <sup>h</sup> et <sup>h</sup> allogi (English style)	[ɛ]; [ʌ]	[ll]	[i]	[k <sup>h</sup> ] [t <sup>h</sup> ]

We conducted a Google search to examine the attested combinations of the various Japanese traits for this word. The results, summarized in (16), show that not all of the 16 logically possible renditions of *catalogue* are attested.

		VQ	L	EV	Lar		
Number of Japanese features retained	4	a. katarogu	J	J	J	J	21
	3	b. k <sup>h</sup> at <sup>h</sup> arogu	J	J	J	E	46
		c. katarogi	J	J	E	J	38
		d. kadallogu	J	E	J	J	0
		e. keɔarogu	E	J	J	J	0
		f. k <sup>h</sup> at <sup>h</sup> arogi	J	J	E	E	285000
	2	g. k <sup>h</sup> at <sup>h</sup> allogu	J	E	J	E	13
		h. kadallogi	J	E	E	J	14
		i. k <sup>h</sup> et <sup>h</sup> arogu	E	J	J	E	0
		j. keɔarogi	E	J	E	J	0
		k. keɔallogu	E	E	J	J	0
		1	l. k <sup>h</sup> at <sup>h</sup> allogi	J	E	E	E
	m. k <sup>h</sup> et <sup>h</sup> arogi		E	J	E	E	3
	n. k <sup>h</sup> et <sup>h</sup> allogu		E	E	J	E	5
	o. keɔallogi		E	E	E	J	0
	0	p. k <sup>h</sup> et <sup>h</sup> allogi	E	E	E	E	1230

The cells with dark shading are unattested, and those with lighter shading are attested but in very low frequency. The first and the last entries, [katarogu] (16a) and [k<sup>h</sup>et<sup>h</sup>allogi] (16p) respectively, are the two straightforward cases where the four traits follow either the Japanese pattern or the English pattern uniformly. Both are attested in our Google search, the latter much more so, presumably reflecting a bias towards the direct English borrowing in recent usage. When we consider forms

where only one of the characteristics show the English pattern while others retain the Japanese traits (16b–e), the single trait that shifts over to the English pattern is either the laryngeal feature of the stop, [k<sup>h</sup>at<sup>h</sup>arogu] (16b), or the epenthetic vowel quality, [kadarogi] (16c), but never the adaptation of intervocalic ‘l’, \*[kadallogu] (16d), or the quality of the non-epenthetic English vowel, \*[kɛdɔrogu] (16e). These contingencies suggest an implicational hierarchy of VQ, L > EV, Lar, which is consistent with the hierarchy proposed in (13).

(16) Google search for variants of *catalogue* (January 5, 2007)<sup>11</sup>

When we examine those forms where two of the Japanese traits are eliminated (16f–k), by far the most common is the form where the epenthetic vowel quality and the laryngeal feature of the stops shift to the English pattern, [k<sup>h</sup>at<sup>h</sup>arogi] (16f). This case reconfirms the hierarchy of VQ, L > EV, Lar.

When three of the four traits adopt the English pattern and only one Japanese trait is retained (16l–o), the form that retains the non-epenthetic vowel quality of the Japanese-style loan is by far the most well represented: (16l) [k<sup>h</sup>at<sup>h</sup>allogi]. All the other possibilities (16m–o) are virtually unattested. This asymmetry demonstrates that the non-epenthetic vowel quality feature is more resistant than all other features: VQ > L, EV, Lar. Altogether, the implicational hierarchy in (17) can be established based on the variants for *catalogue*, and this is identical to the resistance hierarchy in the hybrid corpus in (13).

(17) Resistance hierarchy of Japanese traits in *catalogue*  
 Non-epenthetic vowels (VQ) > [l] (L) > Epenthetic vowels (EV), Laryngeal features (Lar)

We now turn to consider the source of this retention hierarchy.

## 4 Source of the hierarchy

A question arises as to the origin of the Resistance Hierarchy observed in the hybrid loan data. Why are the non-epenthetic vowel quality traits of Japanese-influenced loans more resistant to change than the ones related to consonants or epenthetic vowels? Also, why are some consonantal features (F, L) more resistant than others (Lar)? We will consider two possibilities in this section.

### 4.1 Similarity

The first possibility is that the shift from the Japanese to the English pattern is more likely when the Japanese-style loan forms and their direct English-style counterparts are highly similar while the shift is less likely when the change is more drastic. In other words, the change of a stop’s laryngeal feature in loan forms such as [tairu] > [t<sup>h</sup>ail] ‘tile’ (Lar) or the deletion of an extra vowel in loan forms such as [piniru] >

<sup>11</sup> The variants where the two voiceless stops vary independently are attested in high frequency with [k<sup>h</sup>...t...] forms outnumbering [k...t<sup>h</sup>...] forms in general.

[pinil\_] ‘vinyl’ (EV) is judged less egregious and hence more tolerable than the gemination of the liquid phoneme in [k<sup>h</sup>i<sub>r</sub>o] > [k<sup>h</sup>i<sub>l</sub>lo] ‘kilo’ (L) or the change of [a] to [ʌ] in loan forms such as [er<sub>a</sub>] > [er<sub>ʌ</sub>] ‘error’ (VQ).

This raises the question of how we can measure the relative similarity of pairs of sound sequences that are distinguished by such divergent structural contrasts, ranging from a contrast in a single feature as in [tairu] vs. [t<sup>h</sup>ail] ‘tile’ or [er<sub>a</sub>] vs. [er<sub>ʌ</sub>] ‘error’ to a contrast between a segment and zero [pinir<sub>u</sub>] vs. [pinil\_] ‘vinyl’ and to a contrast between a singleton and a geminate as in [kiro] vs. [killo] ‘kilo’, among others. A theory of similarity that resorts to distinctive features alone (Clements 2001; Frisch et al. 2004; Herd 2005) is ill-equipped to describe this type of similarity hierarchy. Steriade’s (2001) P-map theory can potentially accommodate the type of similarity hierarchy being entertained here as this theory allows for statements about relative similarity that arise from fine-grained phonetic differences that are sensitive to segmental context and subphonemic phonetic details. Let’s examine how the hypothesized similarity hierarchy can be spelled out in terms of the P-map proposal.

To formulate this hypothesis in Optimality Theoretic terms, the pressure to shift away from the Japanese-style loans to the English-style loans can be modeled as a cover constraint OO-faith (English), a type of faithfulness constraint that pressures the output form to be as similar to the “ideal” direct English loan as possible. Counterbalancing this force is a series of Input-to-Output faithfulness constraints that require the existing loan forms (i.e., the Japanese style forms) to be maintained as they are. These IO-faithfulness constraints are organized into an internal hierarchy that reflects perceptual salience; an input–output pairing that is too distinct is penalized more severely than one whose divergence is less noticeable. This hypothesized analysis and the resistance hierarchy in (12) lead us to the relative similarity hierarchy in (18a) and the corresponding IO-faithfulness constraint hierarchy in (18b).

(18)	<b>a. Perceptual similarity</b>	<b>b. IO-faithfulness constraints</b>
less similar	i. [a] vs. [ʌ] e.g., [er <sub>a</sub> ] vs. [er <sub>ʌ</sub> ] ‘error’	IO-faith ([a] ↔ [ʌ]) ranked higher
	ii. [a] vs. [ɛ] e.g., [p*ak*u] vs. [p*ɛk] ‘back’	IO-faith ([a] ↔ [ɛ])
	iii. [e] vs. [ei] e.g., [k*ɛk*i] vs. [k <sup>h</sup> ɛik] ‘cake’	IO-faith ([e] ↔ [ei])
	iv. [r] vs. [ll] e.g., [k <sup>h</sup> i <sub>r</sub> o] vs. [k <sup>h</sup> i <sub>l</sub> o] ‘kilo’	IO-faith ([r] ↔ [ll])
	v. [p <sup>h</sup> ] vs. [hw] e.g., [mah <sub>u</sub> ra] vs. [ma <sub>p</sub> <sup>h</sup> ill <sub>ʌ</sub> ] ‘muffler’	IO-faith ([p <sup>h</sup> ] ↔ [hw])
	vi. [u] vs. [i] e.g., [kadarogu] ~ [k <sup>h</sup> at <sup>h</sup> allo <sub>g</sub> ] ‘catalogue’	IO-faith ([u] ↔ [i])
	vii. [u] vs. ∅ e.g., [pinir <sub>u</sub> ] vs. [pinil_] ‘vinyl’	IO-faith ([u] ↔ ∅)
more similar	viii. [s] vs. [s*] e.g., [s <sub>e</sub> men] vs. [s*iment <sup>h</sup> i] ‘cement’	IO-faith ([s] ↔ [s*]) ranked lower
	ix. [t] vs. [t <sup>h</sup> ] e.g., [tairu] vs. [t <sup>h</sup> ail] ‘tile’	IO-faith ([t] ↔ [t <sup>h</sup> ])

The variation in the corpus can be modeled by assuming that the ranking of the OO-faith (English) constraint is in flux with respect to these IO-faithfulness

constraints. For example, the three variants of ‘meter’ result from the three different ranking possibilities between OO-faith (English) and the two relevant IO-faithfulness constraints, as summarized in (19).

(19) The three variants of ‘meter’ and the ranking of P-map constraints

Input: [meda] (=the original Japanese-style loan form)

Base for OO-Faith: [mit<sup>h</sup>Λ] (=the English-style loan form)

a. [meda]:IO-faith ([a] ↔ [Λ]) >> IO-faith ([t] ↔ [t<sup>h</sup>]) >> OO-faith (English)

b. [met<sup>h</sup>a]:IO-faith ([a] ↔ [Λ]) >> OO-faith (English) >> IO-faith ([t] ↔ [t<sup>h</sup>])

c. [mit<sup>h</sup>Λ]:OO-faith (English) >> IO-faith ([a] ↔ [Λ]) >> IO-faith ([t] ↔ [t<sup>h</sup>])

Attributing the resistance hierarchy of Japanese characteristics in hybrid loans to perceptual salience is admittedly speculative and needs to be tested through experimentation. Here, we will discuss some evidence from other sources that bear on the validity of aspects of this hierarchy.

First of all, the high tolerance for changes in epenthetic vowel-related features (18vi–vii) seems to have a plausible phonetic basis. The epenthetic vowel-related alternations involve high vowels [u] and [i], which are generally short and frequently subject to devoicing and deletion in casual speech in Korean (Kim-Renaud 1987; Jun et al. 1997).

Second, the high alterability of laryngeal features found in our data converges with another very interesting emergent phonological pattern, studied by Oh (2007). In Korea, businesses often choose a telephone number that sounds similar to a particular message they want to convey to make the telephone number easy to remember. For example, a courier service may choose ‘8585’ which is pronounced as [p<sup>h</sup>aro p<sup>h</sup>aro] invoking the word [paro paro] ‘right away’. Importantly, the range of allowed phonological divergence between the actual number and the intended message is systematically constrained, presumably reflecting the perceptual salience hierarchy along the lines of Steriade’s (2001) P-map. Relevant to our discussion, Oh (2007) finds that the corresponding syllables cannot differ in onset, vowel and coda at the same time. The only exception is when the change in the onset involves a laryngeal feature. For example, [c<sup>h</sup>ilp<sup>h</sup>al c<sup>h</sup>ilp<sup>h</sup>al] ‘7878’ can correspond to [cokp\*al cokp\*al] ‘roasted pig feet’. Here, [c<sup>h</sup>il] corresponds to [cok] although they are different both in their onset and rhyme shape. This pattern is allowed only when the onset consonants differ in just their laryngeal feature specifications. This indicates that Korean speakers consider a change in laryngeal features as relatively non-salient. In Oh’s data, correspondence of [p<sup>h</sup>] and [h(w)] is unattested. Correspondence of [r] and [ll] is frequently found (e.g., [p<sup>h</sup>ari p<sup>h</sup>ari] ‘8282’ can be [p\*alli p\*alli] ‘quickly’) but not when the rest of the syllable (both vowel and the coda) also differs, unlike the laryngeal feature which can differ even when the rest of the syllable is not identical. Similarly, a change in vowel quality is frequently found (e.g., [p<sup>h</sup>aro c<sup>h</sup>ilp<sup>h</sup>al] ‘8578’ as [paro c<sup>h</sup>ulbal] ‘depart right away’), but it is possible only when the onset is identical or differs only in the laryngeal feature. Oh’s result is in line with our finding that a change in a single laryngeal feature (18viii–ix) is more easily tolerated than a change in consonantal length ([r] ~ [ll]), a change in manner feature of a consonant ([hw] ~ [p<sup>h</sup>]) or a change in vowel quality. Similarly, in

Japanese half-rhymes, a difference in a laryngeal feature, [voice], is considered less salient than that in a manner feature, [cont] (Kawahara 2007, p. 31). Shinohara (2004) makes a similar observation concerning Japanese puns. Clements's (2001) feature hierarchy also ranks [voice] toward the bottom of the hierarchy (See Herd (2005) for the application of Clements's feature hierarchy to the priority of featural maintenance in loanword adaptation).

As for the relative saliency of vocalic vs. consonantal features, there are a few cases in the loanword literature that bear on this question. When the native phonotactic requirements make it impossible to maintain both the vocalic and consonantal features of the input loan structure, a choice is made as to which aspect of the input should be preserved, and different choices seem to be made depending on the consonantal feature in question. When the consonantal feature at stake is a perceptually vulnerable consonantal place feature, the vocalic feature is maintained (Shinohara 1997; Kenstowicz 2007; Hsieh et al. 2005). For example, in Mandarin, the front vs. back specification of nonhigh vowels is determined by the coda glide or nasal (cf. Duanmu 2000). In particular, back variants appear before the velar nasal and front variants before the coronal nasal. Hsieh et al. (2005) find that in the adaptation of English loans that contain a combination of vowel and nasal coda that is illegal in Mandarin (back vowel + [n] or front vowel + [ŋ]), it is the backness of the vowel (an allophonic feature in Mandarin) that is preserved at the expense of the place specification of the coda nasal consonant (a distinctive feature in Mandarin). The place contrast of the coda nasal is notable for its low saliency that makes it more prone to assimilation and neutralization cross-linguistically (Jun 1995). Yip's (2006) study of the adaptation of English [æ] to Cantonese, on the other hand, shows that when native phonotactics prevents a faithful mapping of vowel and coda sequences, a major class feature [±son] or [±nasal] of the consonant is maintained at the expense of change in vowel quality. For example, Cantonese phonotactic restrictions disallow \*[tɬɛ:k] for 'Jack', which most faithfully preserves the vowel quality and the coda consonant. The word is adapted as [tsik] not as [tɬɛ:ŋ], which would have been a fine syllable in Cantonese (Moirá Yip, p.c.). There is no case that we are aware of where a laryngeal feature, continuancy or length of the consonants is pitted against vowel quality. The prediction of the current approach is that in such cases, the vowel quality should be preserved at the expense of consonantal features.

To summarize this section, we considered the possibility that the retention hierarchy of Japanese characteristics is motivated by the perceptual saliency of the change involved. Certain aspects of the hierarchy seem to be supported by independent evidence although we await a more systematic experimental study (such as similarity judgments) to directly test the validity of this proposal.

#### 4.2 Degree of confidence in the direct English-to-Korean mapping

The second explanation we consider is that certain Japanese traits are highly resistant to substitution because they are not readily identified as "Japanese traits" and can reasonably pass as direct borrowings from English, due to potential variability inherent in direct English-to-Korean mappings. In other words, as Donca Steriade (p.c.) suggests, the Resistance Hierarchy might indicate the relative degree

of confidence Korean native speakers have concerning the adaptations that operate in the direct-English style. The less certain the speakers are about the English-style sound substitution, the more reluctant they are to change the loan from the original Japanese style.

Such an analysis presupposes that Korean speakers have specific knowledge about the phonological characteristics of the “Japanese-style” and “English-style” loanwords and the mappings between them rather than shifting to the English-style loan forms as a result of passively carrying out direct adaptation of the English input. The evidence that supports such an assumption comes from (i) dejapanization of Japanese-made English loans and (ii) overapplication of dejapanization processes.

There are a number of Japanese-made English words that entered Korean and they also show a similar mutation toward direct English borrowing style although these Japanese-made English words do not have an actual direct English counterpart. In other words, Korean speakers seem to create new renditions of these Japanese-made English words based on their knowledge of what the direct English borrowings should be.<sup>12</sup>

(20) Japanese	Korean (J. style > Dejapanized)	Construed English input
rijakaa	rijak*a > rijak <sup>h</sup> a ~ riak <sup>h</sup> a	‘rear car’ (=handcart)
wai[ç]a[ts]u	waisjas*i > waisj <sup>h</sup> Δ <sup>h</sup> i	‘white (-collared) shirt’
suten	siden <sup>h</sup> > sit <sup>h</sup> eŋ ~ sit <sup>h</sup> en	‘stain(less steel)’
in[Φ]ure	<i>not available</i> > inp <sup>h</sup> ire ~ inp <sup>h</sup> ille	‘infla(tion)’

Also, there are several cases in our corpus where dejapanization processes seem to have overapplied. For example, *radar* [rejd̥aɾ] is realized as [reida] in Korean, where the final [a] is expected regardless of the routes of the borrowing. Interestingly, also found is [reidΔ], in which the final [a] is unexpectedly replaced with [Δ]. This is presumably due to an overapplication of a very common dejapanizing process that changes word-final [a] to [Δ] in English words ending in [ər] (e.g., *error* [eɾa] ~ [eɾΔ]). The word *block* presents a similar hypercorrection. It is attested as [p̥il̥lɔk] but more commonly used as [p̥il̥lΔk], which seems to be due to an overapplication of the [o] to [Δ] change found in English schwa spelled with ‘o’ (e.g., *apron* [ep<sup>h</sup>iroŋ] ~ [eip<sup>h</sup>irΔn], etc.).

Returning to our hierarchy for vowel-related features in (12), the claim of the confidence-based analysis is that while Korean speakers are relatively more certain about the form and distribution of epenthetic vowels in direct English loans, they are fairly uncertain about how English non-epenthetic vowels should be adapted in Korean and, as a result, they are less likely to anglicize this latter aspect of the Japanese-style loans with much confidence.

Among consonant-related features in the hierarchy, the claim is that Korean speakers are fairly confident about the laryngeal adaptation of voiceless stops and

<sup>12</sup> A reviewer points out that the German word *Arbeit* is borrowed into Korean through Japanese ([arubaito]), but the epenthetic vowels change to i in the Korean form ([aribait<sup>h</sup>i]). These shifts are not limited to English loans, and the whole variation can be more adequately viewed as one of dejapanization.

[s] of English while they are less so about [f] and intervocalic [l] features in direct English borrowing. While the standard mapping of English [f] to Korean is [p<sup>h</sup>], [hw] is a reasonable possibility in direct English mapping as well, as this form preserves the manner feature ([+continuant]) as well as the place feature ([Labial]) of the English input (Lee and Cho 2006). Similarly, for intervocalic [l], the geminate adaptation maintains the [+lateral] feature of the English input at the expense of faithful mapping of the segmental duration (Oh and Steriade 2004). So, the [l] → [r] mapping is preferable in terms of preservation of segmental duration in a direct English to Korean mapping.

To summarize, it is plausible that the Japanese traits that have a reasonable (re)interpretation as direct English borrowings tend to be less likely to succumb to the pressure for de-japanization than those Japanese traits that are clearly perceived as “Japanese-style”. One way to test this hypothesis is to directly elicit speakers’ judgment about “Japanese-ness” of loanforms containing the different “Japanese-style” characteristics we identified.

## 5 Summary and conclusions

In this paper we have presented the major results of a study of over 500 Japanese-influenced English loanwords in Korean. We identified some 10 phonological indexes that identify the loan’s Japanese provenance and examined their relative rate of retention in 287 hybrid loan forms—i.e., those forms that show a mixture of Japanese-style and direct-English-style phonological characteristics. Our chief finding is that certain traits of Japanese-style loanwords are more resistant to change to the direct English style of adaptation that is applied to contemporary loans. The hierarchy roughly corresponds to consonantal vs. vocalic features with the presence and quality of epenthetic vowels and the adaptation of [l] and [f] occupying overlapping intermediate regions of the hierarchy. We considered two possible explanations for such a hierarchy. First, the resistance hierarchy reflects the relative perceptual saliency of the relevant features in accord with the idea of Steriade (2001) that the more noticeable a change is, the more likely it is to be resisted. The second possibility we considered is that the resistance hierarchy reflects the degree of confidence Korean speakers have about the “correct” direct-English borrowing pattern such that the more certain they are about the direct-English sound substitution, the more likely they are to replace the relevant Japanese-style forms. Both proposals remain speculative at this point and await further support from psycholinguistic experimentation.

**Acknowledgements** We would like to thank two Korean speakers for sharing their knowledge of Korean. We also would like to thank Adam Albright, Edward Flemming, Bill Idsardi, Jongho Jun, Mira Oh, Donca Steriade, Keren Rice, Jie Zhang, two reviewers and the audiences at the MOT phonology workshop held at University of Ottawa in 2007, the Second Workshop on East Asian Linguistics held at the University of Toronto in 2007, the 4th International Conference on Phonology and Morphology held at Hanyang University in 2007, the MIT Phonology Circle and the 15th Manchester Phonology Meeting for their comments.

## References

- Ahn, Sang-Cheol. 1998. *An introduction to Korean phonology*. Seoul: Hanshin.
- Clements, G.N. 2001. Representational economy in constraint-based phonology. In *Distinctive feature theory*, ed. T. Alan Hall, 71–146. Berlin: Mouton de Gruyter.
- Duanmu, San. 2000. *The phonology of standard Chinese*. Oxford: Oxford University Press.
- Frisch, Stefan A., Janet B. Pierrehumbert, and Michael B. Broe. 2004. Similarity avoidance and the OCP. *Natural Language and Linguistic Theory* 22: 179–228.
- Heo, Young-Hyon, and Ahrong Lee. 2005. Extraphonological regularities in the Korean adaptation of foreign liquids. In *LSO Working Papers in Linguistics 5: Proceedings of WIGL 2005*, 80–92. Madison: University of Wisconsin-Madison.
- Herd, Jonathan. 2005. Loanword adaptation and the evaluation of similarity. In *Toronto Working Papers in Linguistics 24: Special issue on similarity in phonology*, ed. Chiara Frigeni, Manami Hirayama, and Sara Mackenzie, 65–116.
- Hsieh, Feng-fan, Michael Kenstowicz, and Xiaomin, Mou. 2005. Mandarin adaptations of coda nasals in English loanwords. Unpublished Manuscript, MIT.
- Ito, Chiyuki, Yoonjung Kang, and Michael Kenstowicz. 2006. The adaptation of Japanese loanwords into Korean. In *Studies in loanword phonology, MIT Working Papers in Linguistics*, Vol. 52, ed. Feng-fan Hsieh and Michael Kenstowicz, 139–164.
- Iverson, Gregory, and Ahrong Lee. 2006. Perception of contrast in Korean loanword adaptation. *Korean Linguistics* 13: 49–87.
- Jun, Jongho. 1995. Perceptual and articulatory factors in place assimilation: An optimality theoretic approach. Dissertation, University of California, Los Angeles.
- Jun, Sun-Ah, Mary E. Beckman, Seiji Niimi, and M. Tiede. 1997. Electromyographic evidence for a gestural-overlap analysis of vowel devoicing in Korean. *Journal of Speech Sciences* 1: 153–200.
- Kang, Yoonjung. 2003. Perceptual similarity in loanword adaptation: English postvocalic word-final stops in Korean. *Phonology* 20: 219–273.
- Katayama, Motoko. 1998. Optimality theory and Japanese loanword phonology. Dissertation, University of California, Santa Cruz.
- Kawahara, Shigeto. 2007. Half rhymes in Japanese rap lyrics and knowledge of similarity. *Journal of East Asian Linguistics* 16: 113–144.
- Kenstowicz, Michael. 2007. Salience and similarity in loanword adaptation: A case study from Fijian. *Language Sciences* 29: 316–340.
- Kenstowicz, Michael. 2005. The phonetics and phonology of Korean loanword adaptation. In *ECKL 1: Proceedings of the First European Conference on Korean linguistics*, ed. S.-J. Rhee, 17–32. Seoul: Hankook Publishing.
- Kim, Hyunsoon. 2008. Loanword adaptation between Japanese and Korean: Evidence for L1 feature-driven perception. *Journal of East Asian Linguistics*. doi:10.1007/s10831-008-9034-8.
- Kim, Min-Swu. 1997. *Wulimal Ewen Sacen* [Korean Etymological Dictionary]. Seoul: Thyahaksa.
- Kim, Soohee. 1999. Subphonemic duration differences in English [s] and few-to many borrowings from English to Korean. Dissertation, University of Washington.
- Kim-Renaud, Young-Key. 1987. Fast speech, casual speech and restructuring. *Harvard Studies in Korean Linguistics* 2: 341–359.
- Lee, Shinsook, and Mi-Hui Cho. 2006. A constraint-conjunction approach to English /f/ adaptations in Korean. *Harvard Studies in Korean Linguistics* 11: 237–249.
- National Institute of the Korean Language. 2005. *Ilpone Thu Yonge Swunhwa Calyocip* [List of Japanese-style words]. [http://www.korean.go.kr/08\\_new/include/Download.jsp?path=openPds&sub=1&idx=91](http://www.korean.go.kr/08_new/include/Download.jsp?path=openPds&sub=1&idx=91).
- Oh, Mira. 1996. Linguistic input to loanword phonology. *Studies in Phonetics, Phonology and Morphology* 2: 117–126.
- Oh, Mira. 2007. Perceptual similarity in telephone numbers [In Korean]. *Korean Journal of Linguistics* 32: 471–494.
- Oh, Mira, and Donca Steriade. 2005. Poster on Korean loan adaptation at conference *From Sound to Sense: 50+ Years of Discoveries in Speech Communication*. June 11–13, MIT.
- Shibatani, Masayoshi. 1990. *The languages of Japan*. Cambridge: Cambridge University Press.
- Shinohara, Shigeiko. 1997. Analyse phonologique de l'adaptation japonaise de mots étrangers. Dissertation, Université de Paris III.
- Shinohara, Shigeiko. 2004. A note on the Japanese pun *dajare*: Two sources of phonological similarity. Unpublished Manuscript, Laboratoire de Psycholinguistique Experimentale, Paris.

- Song, Min. 1989. Hankwukenayuy Ilponcek Woylaye Muncey [The issue of Japanese words in Korean]. *Ilponhakpo* 23: 3–23.
- Steriade, Donca. 2001. The phonology of perceptibility effects: The P-Map and its consequences for constraint organization. Unpublished Manuscript, University of California, Los Angeles.
- Tranter, Nicolas. 1997. Hybrid Anglo-Japanese loans in Korean. *Linguistics* 35: 133–166.
- Yip, Moira. 2006. The symbiosis between perception and grammar in loanword phonology. *Lingua* 116: 950–975.