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Kubozono, Haruo

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Where does Loanword Prosody Come from?: A Case Study of Japanese Loanword Accent*

Haruo Kubozono

Department of Linguistics, Kobe University

Phone/Fax: +81 (0)78-803-5555

E-mail: kubozono@lit.kobe-u.ac.jp

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Abstract:

In this paper we analyze loanword accentuation in Japanese with main focus on its relation with native accentuation. At first glance, loanwords display remarkably different accent patterns from native words, with the former but not the latter favoring the accented pattern over the unaccented one. We present statistical evidence that this impression cannot empirically be supported. Loanwords differ from native words in several phonological structures, notably in the abundance of heavy syllables and epenthetic vowels. If these differences are properly controlled, the two types of words, whether lexically accented or unaccented, exhibit very similar accent patterns and preferences although loanwords still show a stronger tendency towards the accented pattern than native words. This study provides a significant implication for the phonetics vs. phonology controversy in the loanword literature, too. We will demonstrate that perceptual and phonological factors interact with each other in a very interesting way with the first factor determining the overall pitch shape of loanwords, which is then constrained by the prosodic system of the recipient language to yield an appropriate output form.

1. Introduction

How is loanword prosody related to native prosody? Where do the prosodic patterns of loanwords come from? What do loanwords tell us about the prosodic structure of the host language? These are the main questions discussed in this paper. We will tackle these questions by analyzing the accentuation of loanwords in comparison with that of native and Sino-Japanese (SJ) words in Tokyo Japanese.

While loanword phonology is now establishing itself as a major area of research in phonology, it is mainly focused on segmental and syllable structure processes rather than prosodic ones. Among prosodic processes, accentuation is probably studied more than any other processes (see Kenstowicz and Sohn, 2001, for Korean; for Japanese see Kubozono, 1994, 1996, 2002a, 2003; Katayama, 1995, 1998; Shinohara, 2000, 2004; among others). However, little is known about the relationship between loanword and native accentuation, let alone the mechanism of loanword accentuation in general. This is true of loanword accentuation in Japanese, too, which looks quite different from native and SJ accentuation.

In Japanese, content words—whether nouns, verbs or adjectives—fall into two accent classes generally called ‘accented’ and ‘unaccented’. In Tokyo Japanese, accented words involve an abrupt pitch fall, whereas their unaccented counterparts are pronounced with a rather flat pitch, even when they are followed by a particle like the nominative particle /ga/. Some typical examples are given in (1) for each of the three types of lexical words—native, SJ and foreign (loanwords). In accented words, the pitch falls immediately after the accented vowel. Unaccented words are represented without any diacritic throughout this paper although this does not mean that they are ‘unmarked’ or default. Dots indicate syllable boundaries.

(1) a. Accented nouns

(native) í.no.ti ‘life’, ko.kó.ro ‘heart’, o.to.kó ‘man’, na.gá.sa.ki ‘Nagasaki’

(SJ) rón.ri ‘logic’, kyóo.to ‘Kyoto’, ká.ga.ku ‘science’, ga.kú.mon ‘learning’

(loan) á.zi.a ‘Asia’, yoo.róp.pa ‘Europe’, san.do.ít.ti ‘sandwich’

b. Unaccented nouns

(native) ne.zu.mi ‘rat, mouse’, oo.sa.ka ‘Osaka’, hi.ro.si.ma ‘Hiroshima’
 (SJ) sa.ba.ku ‘desert’, ri.soo ‘dream, ideal’, too.kyoo ‘Tokyo’, gak.koo ‘school’
 (loan) a.me.ri.ka ‘America’, su.te.re.o ‘stereo’, ka.ri.fo.ru.ni.a ‘California’

These three types of lexical words display remarkable differences in accentuation. Three-mora nouns, for example, show the differences given in Table 1 with respect to the choice between the two major accent classes. Loanwords clearly favor the accented pattern over the unaccented one. Native words exhibit an entirely opposite tendency by taking the unaccented pattern in most cases. SJ words fall halfway between loanwords and native words with a slight bias towards the unaccented pattern. A statistical test (chi-square) shows that the differences between the three types of words are statistically significant: $p < .0001$. Nouns of other phonological lengths display much the same differences among the three types of words, as we will see later.

Table 1 Word type and accent pattern in trimoraic nouns (N=7,937 words)

Accent pattern \ Word type	Accented	Unaccented
Native (2,220)	29%	71%
SJ (4,939)	49%	51%
Loan (778)	93%	7%

Most loanwords are known to follow the rule known as ‘antepenultimate rule’ in (2) if they are lexically accented (McCawley, 1968). It is exemplified in (3).

(2) Loanword accent rule

Put an accent on the syllable containing the antepenultimate mora, or the third mora from the end of the word.

(3) a. three-mora loanwords

pú.ra.su ‘plus’, gú.ra.su ‘glass’, gú.ri.ru ‘grill’, sí.ru.ku ‘silk’, tó.ri.o ‘trio’, páa.ku

‘park’, pák.ku ‘pack’, dée.ta ‘data’, páa.ma ‘permanent wave’, há.wai ‘Hawaii’,
sé.dan ‘sedan’, pú.rin ‘pudding’, í.ran ‘Iran’, rí.ree ‘relay’

b. four-mora loanwords

su.tó.re.su ‘stress’, bi.tá.min ‘vitamin’, sái.daa ‘cider’, rón.don ‘London’,

c. five-mora or longer loanwords

yoo.róp.pa ‘Europe’, ku.ri.sú.ma.su ‘Christmas’, wa.sín.ton ‘Washington’,
an.dáa.son ‘Anderson’, pai.náp.pu.ru ‘pineapple’, san.do.ít.ti ‘sandwich’,
ba.do.mín.ton ‘badminton’

Given the data in (1), (3) and Table 1, the following questions naturally arise. First, why does loanword accentuation look so different from native accentuation? Namely, why do loanwords favor the accented pattern, while a majority of native words take the unaccented pattern? Second, where does the antepenultimate rule of loanwords come from? Does it have anything to do with any accent rule of native nouns? Or does it represent some universal pattern of accentuation? Third, where does the unaccented pattern in some loanwords come from? Why, for example, do /amerika/ ‘America’ and /sutereo/ ‘stereo’ in (1b) become unaccented? Do they have anything in common with unaccented native words?

The first question has never been studied seriously in the literature of Japanese loanwords. On the contrary, the remarkable accentual difference such as the one in Table 1 led Sibata (1994) to conclude that loanwords are inherently different from native words. Other studies of loanword accentuation have disregarded the basic difference in accentedness between the native and foreign vocabulary.

On the other hand, the second question has attracted some attention in the literature. Sibata (1994) pays attention to the remarkably high proportion of unaccented words in the native vocabulary and claims that the antepenultimate rule is independent of native Japanese accentuation. In contrast, some other studies attempted to see a similarity between the accented sector of native nouns and accented loanwords (Haraguchi, 1991; Shinohara, 2000). Shinohara provides a summary of these studies by saying that the antepenultimate pattern corresponds to accent patterns ‘in marginal sectors of the native

Japanese vocabulary, such as proper names and prosodically derived words' (Shinohara, 2000:91). In this sense, it remained unclear where the loanword accent rule in (2) exactly comes from.

The third question has also been largely disregarded in the literature. Some studies claimed that loanwords become unaccented if they are used very frequently in the language or become very familiar to the language user (Akinaga, 1985; Sibata, 1994). While this view is still popularly adopted in the literature, an entirely different view was expressed by Kubozono (1996). By analyzing the accent pattern of some 700 foreign place names used in Japanese, he claimed that the unaccented pattern tends to emerge in four-mora loanwords ending in a sequence of light syllables. This phonological analysis implies that not only existing words such as /amerika/ and /sutereo/ in (1b) but also nonsense words such as those in (4) will be pronounced as unaccented words.

(4) kan.pa.ra, baa.to.se, a.ro.se.ba, te.bo.re.me

While this prediction seems to square well with native speakers' intuition, it has been unclear whether the phonological generalization proposed by Kubozono can be extended to ordinary loanwords. It also remains unclear why loanwords tend to become unaccented when they fulfill the phonological conditions regarding phonological length and syllable structure, much less how the unaccented pattern in loanwords is related to the same accent pattern in native words.

With this background, this paper proposes to show that loanword accentuation is closely related to native accentuation and indeed reflects it in a rather straightforward manner. As for the antepenultimate rule, it will be argued that loanword accentuation takes the accentuation of native words as a target (section 3). Namely, the rule is not just a rule of loanwords but is a default accent rule of *accented* native nouns as well, whether morphologically simplex or complex. Loanwords simply copy the most productive accent pattern of *accented* native nouns including compounds. Moreover, we will also show that the rule responsible for this default accent pattern resembles the Latin-type accent rule that governs a variety of languages (section 3.3).

As for the seemingly tremendous difference shown in Table 1, we will demonstrate that loanwords are not very different from native words if some phonological factors are properly controlled (section 4). Loanwords differ from native words in both syllable structure and the nature of the vowel: they are rich in heavy syllables and epenthetic vowels. If these phonological differences are removed, loanwords come to exhibit basically the same tendency towards the unaccented pattern as native words although they show a somewhat greater bias towards the accented pattern than their native counterparts. This not only gives statistical support to the phonological generalization proposed by Kubozono (1996), but also provides some hints as to the nature and origin of unaccented nouns in the Japanese lexicon.

The analysis to be presented in this paper also has a close bearing on the phonetics vs. phonology controversy that is found in the literature of loanword phonology as well as in some of the papers included in this volume (see Kenstowicz and Suchato's paper, for example). Opinions are divided regarding the relative importance of phonetic (or perceptual) over phonological factors in loanword adaptations. Some scholars such as Silverman (1992) and Dupoux et al (1999) argue for the relevance of the perceptual factor, while others such as Paradis and LaCharite (1997) emphasize the importance of phonological factors over the phonetic one. None of them, however, seriously claims that only one of the two factors is necessary in loanword phonology. What remains unsolved is which factor is more important than the other in loanword phonology and, more significantly, how exactly the two factors interplay with each other in yielding correct output forms in loanword prosody. This issue will be tackled in section 5, where it is claimed that prosodic patterns of loanwords in Japanese are attributable to two independent factors, perceptual and phonological, which interact with each other in a rather interesting way. More specifically, the perceptual factor determines the overall pitch shape—or accentedness—of loanwords, which is then specified by the default accent rule of native words with respect to the precise location of accent.

The data presented in this paper come from *The NHK Pronunciation and Accent Dictionaries* (1985, 1998) and Sugito (1995), the latter being based on the 1985 version of the former accent dictionary. We principally used the CD-ROM version of the NHK

dictionary (1998), while using Sugito's CD-ROM whenever we needed supplementary data.¹ Therefore, the data cited in this paper come from NHK (1998) unless otherwise stated.

2. Lexical and Prosodic Structure of Japanese

Before going into the main discussion, let us briefly look at the lexical and prosodic structure of Japanese. The three types of morphemes that constitute the Japanese lexicon have different phonological lengths. Morphemes in the native stratum usually vary from one to three moras in phonological length: most four-mora or longer words consist of two or more morphemes, at least etymologically. For example, /hi.ro#si.ma/ 'Hiroshima' consists of two native morphemes, /hi.ro/ 'wide' and /si.ma/ 'island'. In contrast, SJ morphemes, which have been in use for many centuries in Japanese, are at most bimoraic and bisyllabic. Not many of them are free morphemes: rather, they constitute a word as they are combined with each other. For example, /too#kyoo/ 'east, capital; Tokyo' and /nip#pón/ 'sun, origin; Japan' both consist of two morphemes each of which is seldom used in isolation.

While native and SJ morphemes are relatively short, loanwords can be quite long. The English word 'Christmas', for example, is borrowed as a five-syllable, five-mora word in Japanese with three epenthetic vowels: /ku.ri.sú.ma.su/ 'Christmas'. Eighty-four percent of loanwords used in contemporary Japanese are those that have been borrowed from English over the past 100 years or so (Sibata, 1994).

The three types of morphemes or words are written in different types of orthography. Loanwords are generally written in *katakana*, a native mora-based writing system. SJ words are written in *kanji*, or Chinese characters, each of which represents a morpheme. Native words are written either in *kanji* or in *hiragana*, the latter being a second type of native mora-based writing system. Most *kanji* letters hence have multiple pronunciations, one is the Chinese-based pronunciation (*on-yomi*) and the other is the native pronunciation (*kun-yomi*). Among the three different writing systems, *katakana* is used solely for loanwords, which gives a very reliable clue to the native speaker of Japanese as to whether a particular word belongs to the foreign stratum or not.

As already mentioned, all three types of words thus described fall into two major accent groups: accented and unaccented. In statistical terms, unaccented words account for a majority of words in Tokyo Japanese (Hayashi, 1982:331), although it accounts for only 10% of loanwords (Sibata, 1994). In addition to the distinction in terms of accentedness, Tokyo Japanese further shows a contrast in accent locus for accented nouns. Thus, /í.no.ti/ ‘life’, /ko.kó.ro/ ‘life’ and /o.to.kó/ ‘man’ are accented on the initial, second and final moras, respectively. The final accent on /o.to.kó/ is phonetically realized only when the word is followed by some particle: /o.to.kó-ga/ ‘man-NOM’ has a pitch fall between /ko/ and /ga/. These accent patterns exhibit a rather asymmetrical distribution with a certain accent patterns occurring more frequently than others, as we will see shortly. As a result, most minimal pairs of words that contrast in accentuation contrast in accentedness rather than in accent locus. Some examples are given in (5).

- (5) á.me ‘rain’ vs. a.me ‘candy’
 ha.ná ‘flower’ vs. ha.na ‘nose’
 í.on ‘ion’ vs. i.on ‘allophone’
 i.tí.go ‘one word’ vs. i.ti.go ‘strawberry’
 sén.si ‘warrior’ vs. sen.si ‘death in action’
 a.ki.tá.ken ‘Akita Prefecture’ vs. a.ki.ta.ken ‘Akita Dog’

Incidentally, verbs and adjectives exhibit a contrast only in accentedness, and not in accent locus. Accented verbs and adjectives differ from accented nouns in being accented on their penultimate mora, or on the root-final vowel.² On the other hand, unaccented verbs and adjectives are pronounced with a rather flat pitch, just like unaccented nouns. Some examples are given in (6) and (7). It is generally assumed that the accented-unaccented distinction in verbs and adjectives is unpredictable as in nouns, and hence must be specified in the lexicon (Haraguchi, 1991).

(6) a. Accented verbs

yóm-u ‘to read’, hasír-u ‘to run’, sirabé-ru ‘to examine’

b. Accented adjectives

umá-i ‘tasty’, atú-i ‘hot’, miziká-i ‘short’

(7) a. Unaccented verbs

yob-u ‘to call’, asob-u ‘to play’, kurabe-ru ‘to compare’

b. Unaccented adjectives

ama-i ‘sweet’, atu-i ‘thick’, tumeta-i ‘cold’

In Tokyo Japanese, it is well known that accentuation—both accentedness and accent locus—interacts very closely with syllable structure in loanwords (Kubozono, 1996) and SJ words (Ogawa, 2004). Particularly important in this respect is the distinction between heavy (H), i.e., bimoraic syllables and light (L), i.e., monomoraic ones. The first type of syllable either has a complex vowel—a long vowel or a diphthong—or has a short vowel followed by a coda consonant. Trimoraic syllables are disfavored in this language as they are in many other languages (Kubozono, 1995a, 1999).

The three types of words in the Japanese lexicon differ from each other in syllable structure as well as in phonological length. Native words typically consist of a sequence of light syllables, with very few of them involving a heavy syllable: e.g., /hi.ro#si.ma/ ‘Hiroshima’ and /na.gá#sa.ki/ ‘Nagasaki’. On the other hand, many SJ and foreign words contain a heavy syllable: e.g., /too#kyoo/ ‘Tokyo’, /kyóo#to/ ‘Kyoto’, /nip#pón/ ‘Japan’ (SJ words) and /rón.don/ ‘London’, /yoo.róp.pa/ ‘Europe’ (loanwords). Table 2 gives the number of trimoraic words in the three lexical strata for each type of syllable string: heavy-light (HL) bisyllables, light-heavy (LH) bisyllables and a sequence of three light syllables (LLL). As is clear from this table, native words overwhelmingly favor sequences of light syllables, which are not very much preferred by SJ and foreign words. Similar differences are found in words of other phonological lengths. We will discuss the significance of these differences in syllable structure in sections 3 and 4.

Table 2 Word type and syllable structure in trimoraic words (N= 7,937 words)

Syllable structure Word type	LLL	HL	LH	Total
Native	2,084 (94%)	112 (5%)	24 (1%)	2,220 (100%)
Sino-Japanese	1,110 (22%)	2,257 (46%)	1,572 (32%)	4,939 (100%)
Loan	296 (38%)	350 (45%)	132 (17%)	778 (100%)

SJ and loanwords also differ from native words in involving an epenthetic, i.e., non-underlying vowel. Thus, SJ words such as /ga.ku#mon/ ‘learning’ and /bún#ga.ku/ ‘literature’ have an epenthetic vowel /u/, and so do loanwords like /mí.ru.ku/ ‘milk’ and /tée.pu/ ‘tape’. As we will see in section 4, the nature of the vowel—i.e., distinction between underlying and epenthetic vowels—as well as the syllable structure exert a profound effect on accent patterns, which accounts for accentual differences among the three types of words to a considerable extent.

3. Accentuation of Accented Words

3.1. Syllable Structure and Accent Locus

3.1.1. Three-mora nouns

In this section we will consider the accent structure of accented nouns. We will first look at nouns of three-mora length for the following reasons. First, it is difficult to see the effect of the antepenultimate rule in bimoraic nouns, which are invariably initially accented in the foreign stratum. Second, four-mora or longer nouns are not good for analysis either, since most native nouns of this phonological length are morphologically complex, at least etymologically. Since compound nouns are generally subject to the compound accent rule, as we will see in section 3.2, we cannot compare four-mora native words and loanwords on the same grounds.

In contrast, trimoraic nouns do not have these disadvantages. There are numerous

trimoraic loanwords and, moreover, many trimoraic native nouns are monomorphemic. There are quite a few polymorphemic trimoraic native nouns, too, but it is possible to extract the morphological effect without much difficulty. Trimoraic SJ words, which are all morphologically complex, are considered here for the sake of comparison.

3.1.2. Loanwords

As shown in Table 1 above, three-mora loanwords favor the accented pattern over the unaccented one. Table 3 looks at the same data in more detail, by showing the frequency of each accent pattern that *accented* three-mora loanwords exhibit for each syllable structure. The numeral in the parentheses after the syllable structure denotes the number of words that belong to that type of syllable string.

Table 3 Syllable structure and accent pattern in accented three-mora loanwords (N=722words)

Accent pattern Syllable structure	Initial accent	Medial accent	Final accent
LLL (275)	93%	6%	1%
HL (325)	100%	---	0%
LH (122)	89%	---	11%
Total (722)	96%	2%	2%

Trimoraic loanwords clearly prefer an initial accent irrespective of their syllable structure. This is in full accordance with the traditional loanword accent rule in (2). Representative examples are given in (3a) above. Note here that epenthetic vowels do not seem to resist bearing an accent in word-initial position as exemplified in (8), where epenthetic vowels are enclosed in < >.

(8) p<ú>.ra.s<u> ‘plus’, g<ú>.ra.s<u> ‘glass’, t<ó>.ri.o ‘trio’

While antepenultimate accent is preferred by all syllable structures in Table 3, LH

bisyllables permit an accent on the final syllable, a pattern that is virtually disallowed by HL and LLL: a chi-square test shows a statistically significant difference both between LH and HL ($p < .001$) and between LH and LLL ($p < .01$). A closer examination of the data reveals that LH bisyllables permit this final accent pattern when the initial light syllable contains an epenthetic vowel. In fact, almost all the instances showing the LH[́] pattern (where [́] indicates pitch accent on the heavy syllable) have an epenthetic vowel in the initial light syllable, and almost all LH bisyllables with an epenthetic vowel take the final accent (Kubozono, 1996, 2001; Tanaka, 1996). Some examples are given in (9). Stated conversely, LH bisyllables generally take an initial accent if the initial syllable contains an underlying vowel. This is exemplified in (10).

(9) p<u>.rée ‘play’, b<u>.rúu ‘blue’, s<u>.ríi ‘three’, t<u>.ríi ‘tree’, d<o>.róo ‘draw’,
d<o>.rái ‘dry’, s<u>.káii ‘sky’, t<u>.ín ‘twin’

(10) há.wai ‘Hawáii’, sé.dan ‘sedán’, pú.rin ‘púdding’, í.ran ‘Irán’, rí.ree ‘rélay, reláy’

This reveals a very interesting interaction between accent and syllable structure. LH bisyllables generally follow the antepenultimate pattern as shown in (10), but they take an accent on the final heavy syllable if the initial light syllable contains an epenthetic vowel.³ This cannot be attributed solely to the general tendency of epenthetic vowels to avoid bearing an accent (Alderete, 1995; Shinohara, 2000). Epenthetic vowels readily carry an accent if they are followed by light syllables, as we saw in (8) above. Indeed, they resist bearing an accent only when they are followed by a heavy syllable. This suggests that accent displacement in (9) should be attributed to the combination of two factors, one of which avoids putting an accent on epenthetic vowels and the other puts an accent on heavy (vs. light) syllables as formulated in (11) (Prince and Smolensky, 1993). It is only when these two general factors are satisfied that the final accent pattern, i.e., LH[́], is permitted at the cost of violating the Nonfinality constraint (avoidance of a final accent).

(11) Weight-to-Stress principle (WSP)

All heavy syllables are accented (stressed).

Table 3 also shows that the initial accent is especially favored by HL bisyllables: the differences between HL and LH and between HL and LLL are both statistically significant ($p < .001$ by a chi-square test). This, too, may be attributable to the universal principle in (11), although it can also be accounted for by other factors, such as the effect of Nonfinality or the effect of preserving the original stress of the source word. Loanword data alone do not allow us to choose between these competing factors.

3.1.3. SJ nouns

SJ words provide equally interesting data. Table 4 shows the frequency of each accent pattern for each type of syllable string in *accented* trimoraic SJ words. As in Table 3, unaccented nouns are excluded in this table, which explains the relatively small size of the corpus as compared with the one in Table 2.

Table 4 Syllable structure and accent pattern in accented three-mora SJ nouns (N=2,427 words)

Accent pattern Syllable structure	Initial accent	Medial accent	Final accent
LLL (390)	83%	14%	3%
HL (1,763)	99%	---	1%
LH (274)	84%	---	16%
Total (2,427)	95%	2%	3%

As mentioned above, all trimoraic SJ words are morphologically complex, usually consisting of two bound morphemes. If they were subject to the compound accent (CA) rule, they would be expected to attract a CA on the final syllable of their non-final member: $L\acute{L}\#L$, $\acute{L}\#LL$, $H\acute{L}\#L$, $\acute{L}\#H$ (McCawley, 1968; Kubozono 1997). On the other hand, the antepenultimate accent rule in (2) would assign an accent on the initial syllable

in all cases: $\acute{L}L\#L$, $\acute{L}\#LL$, $H\#L$, $\acute{L}\#H$. These two rules make the same prediction for HL bisyllables which, as expected by the two rules, are almost invariably accented on the initial heavy syllable in Table 4: e.g., $/r\acute{o}n\#ri/$ ‘logic’, $/kúu\#ki/$ ‘air’, $/yúu\#ki/$ ‘courage’. On the other hand, the two rules make a different prediction for LLL trisyllables. The CA rule predicts that $\acute{L}LL$ and $L\acute{L}L$ would compete with each other, while the antepenultimate rule only predicts the pattern with an initial accent. The data in Table 4 suggest that both rules are at work: the medial accent pattern exists alongside the initial accent pattern as expected by the CA rule, but it is far less productive than the latter accent pattern, as expected by the antepenultimate accent rule. Hence, the antepenultimacy effect as well as the CA effect is visible in the accentuation of LLL words.

More interesting is the behavior of LH bisyllables in the same table. The two rules in question predict an initial accent, $\acute{L}\#H$: e.g., $/r\acute{i}\#ron/$ ‘theory’. However, about 16% of LH bisyllables favor an accent on the final syllable, a pattern generally disallowed by other syllable structures: e.g., $/ti\#hóo/$ ‘district, local region’, $/sa\#tóo/$ ‘sugar’. The difference between LH and HL is statistically significant ($p<.01$ by a chi-square test) and so is the difference between LH and LLL ($p<.01$). Again, this can be attributed to the effect of syllable weight in (11). Note that unlike loanwords of the same syllable structure, the initial light syllable in SJ words always contains an underlying, i.e., non-epenthetic, vowel. Despite this, the final heavy syllable attracts an accent in 16% of all LH bisyllables.⁴ The Weight-to-Stress principle is thus at work in the accentuation of both loanwords and SJ words.

3.1.4. Native nouns

Let us now look at native words. While three-mora native nouns as a whole prefer the unaccented pattern as we saw in Table 1, they exhibit a considerable variation in accent locus if confined to accented ones. This is shown in Table 5, which sums up the accent patterns of *accented* three-mora native nouns.

Table 5 Syllable structure and accent pattern in accented three-mora native nouns
(N=634 words)

Accent pattern Syllable structure	Initial accent	Medial accent	Final accent
LLL (555)	60%	37%	3%
HL (65)	54%	---	46%
LH (14)	21%	---	79%
Total (634)	59%	33%	9%

The accent pattern predicted by the antepenultimate rule in (2) is favored by LLL and HL native words although to a lesser extent than by their counterparts in SJ and foreign strata. The relatively lower percentage of the initial accent in this table than in Tables 3 and 4 is due largely to the fact that the medial accent is quite popular among native words most of which consist of a sequence of light syllables. Where, then, does this medial accent pattern come from?

One plausible answer is that it is a CA effect. As mentioned in section 3.1.1, a certain portion of trimoraic native nouns is morphologically complex and is potentially subject to the CA rule. Moreover, compound nouns whose final member is monomoraic are generally accented on the penultimate mora by the same CA rule that applies to SJ compounds: i.e., $LL\#L \rightarrow L\acute{L}\#L$ (see the next section for more details about CA). Given these facts, it should come as no surprise if one should find, as in Table 5, a certain percentage of medial accent in LLL native words.

This speculation can be supported by the present study, where we find that 75% of medially accented trimoraic native nouns actually consist of a bimoraic noun followed by a monomoraic one: e.g., /ha.ná#ya/ ‘flower, house; flower shop’, /ha.tá#bi/ ‘flag, day; holiday’. The same data also show that trimoraic compound nouns of this internal structure are different from other types of trimoraic native nouns in exceptionally favoring the medial accent over other accented patterns. Excluding this type of trimoraic compound nouns, about 70% of trimoraic native nouns are accented on their initial mora (See Tanaka, 1998 for similar data). In other words, the accent pattern that is predicted

by the antepenultimate rule in (2) is by far the most productive accent pattern among the three patterns that accented three-mora native nouns can possibly take.

Another point of interest about Table 5 is the dominance of the final accent in LH bisyllables. This accent pattern accounts for 80% of accented LH words although the total number of words belonging to this class is quite small. In contrast, the same accent pattern accounts for only 46% of accented HL words. A chi-square test shows that LH favors the final accent pattern more than the other syllable types: the difference between LH and LLL is statistically significant at $p < .01$ and the difference between LH and HL is nearly significant at $p = .056$. Obviously this is another instance showing the effect of syllable weight on accent, or the effect of the constraint in (11).⁵ This is a feature that native word accentuation shares with the accentuation of loanwords and SJ words on the one hand, and with the accentuation of many languages on the other. This point has been entirely overlooked in previous studies on native accentuation probably because most native words consist of a string of light syllables.

It must be noted here that the effect of the Stress-to-Weight principle in LH native words does not affect the generalization proposed above, i.e., that the initial accent is most dominant in three-mora native nouns. As mentioned above, LLL native words, which should be free from any effect of syllable weight, clearly favor the antepenultimate accent pattern over the other patterns. This suggests that the antepenultimate rule in (2) is responsible for accented three-mora nouns in general, irrespective of the lexical stratum they belong to.

3.2. Antepenultimate Rule and Compound Accent Rule

The next question that must be asked is whether the antepenultimate rule in (2) accounts for the accent patterns of four-mora and longer nouns. As for loanwords, four-mora and longer words generally follow the same rule. Our data show, for example, that over 70% of all *accented* four-mora loanwords are accented according to the antepenultimate rule in (2). A certain number of four-mora loanwords exhibit a different accented pattern, or the so-called ‘pre-antepenultimate pattern’ (section 3.3), and some others take the unaccented pattern (section 4). However, accent patterns other than the

antepenultimate one generally occur in some phonologically predictable contexts, as we will see shortly, and the existence of these patterns does not weaken the generality of the antepenultimate rule.

What about native words? Four-mora and longer native words are morphologically complex and their accentuation is determined basically by the CA rule. Let us briefly describe this rule first and compare its effect with that of the antepenultimate rule later.

In Tokyo Japanese, the accentuation of compound nouns $[N_1N_2]$ is basically determined by the phonological information of N_2 , particularly by its phonological length and original accentuation. The accent, if any, of N_1 plays no role and is actually deleted. Assuming that N_2 is lexically unaccented for the moment, compound nouns are supposed to take the following CA patterns (McCawley, 1968). Unaccented compounds and other lexically marked patterns are excluded here to highlight the default CA patterns.⁶

- (12) a. If N_2 is either monomoraic or bimoraic, a CA falls on the final syllable of N_1 .
 b. If N_2 is three moras long or longer, a CA falls on the initial syllable of N_2 .

The two rules in (12) are exemplified in (13).

- (13) a. $ti.no.mi + ko \rightarrow ti.no.mí-go$ ‘milk drinking, baby; baby at the breast’
 $ku.wa.ga.ta + mu.si \rightarrow ku.wa.ga.tá-mu.si$ ‘stag beetle’
 $tu.ki + ki.zu \rightarrow tu.kí-ki.zu$ ‘to push, bruise; prick or stab’
 b. $nó + ne.zu.mi \rightarrow no-né.zu.mi$ ‘field, mouse; field mouse’
 $sín + yo.ko.ha.ma \rightarrow sin-yó.ko.ha.ma$ ‘New Yokohama (Station)’

A comparison of (13a) and (13b) reveals a crucial similarity between the two rules in (12). Both rules avoid placing an accent on the final syllable (Nonfinality-syllable) and on the final two moras unless the final mora itself constitutes an independent word in compounds (Nonfinality-foot). Moreover, both rules avoid placing an accent on a syllable too far from the right edge of the word (Edgemostness). The Nonfinality effect can be seen clearly from the fact that /no-né.zu.mi/ and /sin-yó.ko.ha.ma/ in (13b) cannot

be accented on the penultimate syllable, i.e., */no-ne.zú.mi/ and */sin-yo.ko.há.ma/, whereas /sin-yo.kó.ha.ma/ can be accepted as a variant accent pattern of /sin-yó.ko.ha.ma/.

Similarly, the Edgemostness effect can be further confirmed by the fact that the rule in (12b) does not apply to compound nouns with a five-mora or longer unaccented N₂. Compounds with this type of N₂ generally become unaccented or, otherwise, bear a CA on the third or fourth mora from the end of the word (Kubozono et al., 1997). This is illustrated in (14), where loanword N₂ is used in the absence of an appropriate non-compound native noun. These exceptional compound patterns, which contrast with the one in (13b), suggest that assigning an accent on the fifth or six mora from the right edge of the word is banned or disfavored in Japanese compounds.⁷

- (14) minami + kariforunia → mi.na.mi-ka.ri.fo.ru.ni.a, mi.na.mi-ka.ri.fo.rú.ni.a,
 *mi.na.mi-ká.ri.fo.ru.ni.a ‘southern California’
 nyúu + karedonia → nyuu-ka.re.do.ni.a, nyuu-ka.re.dó.ni.a,
 *nyuu-ká.re.do.ni.a ‘New Caledonia’

In any case, the two CA rules in (12) have basic features in common. This observation prompted Kubozono (1995b) to propose that the two rules are the two sides of a single coin and can be collapsed into one rule. By using ‘bimoraic foot’ as a key notion and assuming that foot formation is bound by morpheme boundaries, Kubozono (1995b) proposed the following descriptive generalization for the two rules in (12).

- (15) a. Accent the rightmost non-final foot (Nonfinality-foot, Edgemostness).
 b. Within the rightmost, non-final foot, accent the syllable that is closer to the word-internal morpheme boundary (Align-CA).

This analysis not only accounts for the CA patterns in (13) but can also be extended to compound nouns with an accented final member. All we need to do is to add the following principle to (15a,b).

- (15) c. Keep the accent of the final member unless it is on the very final syllable
(Max-accent, Nonfinality-syllable)

By adding (15c), we can now account for the accent pattern of compound nouns in general, irrespective of the accentuation of N₂. Some examples with an accented N₂ are given in (16), where foot structure [] is shown only in relevant places (see Kubozono, 1995b, 1997 for a detailed analysis).

- (16) ten.zyoo + [ka.wá] → ten.[zyóo]-[ga.wa] ‘ceiling, river; raised bed river’
 á.ka + [káí] → [a.ká]-[gai] ‘red, shellfish; arch shell’
 ma.ne.ki + [né.ko] → ma.ne.ki-[né.ko] ‘inviting, cat; a cat with a beckoning paw’
 yá.ma.to + na.[dé.si].ko → ya.ma.to-na.[dé.si].ko ‘Japan, lady; Japanese lady’
 na.tú + ya.su.mí → na.tu-[yá.su].mi ‘summer, holiday; summer holiday’

So much about the basic CA rule in Tokyo Japanese; this is the rule that is responsible for the accentuation of morphologically complex nouns including accented four-mora and longer native nouns. Now, how is this rule related to the antepenultimate rule that governs loanwords in general as well as three-mora native nouns?

A brief comparison of the two rules suggests that they have very similar effects. Recall that the antepenultimate rule places an accent either on the third or fourth mora from the end of the word. Seen conversely, this rule usually avoids putting an accent on the final two moras as well as on the fifth or sixth mora from the end of the word. These features are shared precisely by the CA rule that we saw above: A CA is generally prohibited on the final two moras unless the final mora constitutes an independent word, as shown in (13), whereas it is also prohibited on the fifth or sixth mora from the end of the whole compound expression, as shown in (14).

In fact, most four-mora and longer loanwords that obey the antepenultimate rule are accented in accordance with the principle in (15a). This is illustrated in (17).

- (17) su.[tó.re].su ‘stréss’, [sái].daa ‘cíder’, yoo.[róp].pa ‘Éurope’, ku.ri.[sú.ma].su ‘Chrístmas’, wa.[sín].[ton] ‘Wáshington’, an.[dáa].[son] ‘Ánderson’, pai.[náp].[pu.ru] ‘pínapple’, ba.do.[mín].[ton] ‘bádminton’

There are two major cases that cannot be accounted for by the principle in (15a) in a straightforward manner. These involve a sequence of a light syllable and a heavy one in word-final position, i.e., LLH# and HLH#. The antepenultimate rule assigns an accent on the penultimate light syllable, L[́]LH# (/i.é.men/ ‘Yemen’, /bi.tá.min/ ‘vitamin’) and HL[́]H# (/kan.gá.roo/ ‘kangaroo’, /baa.bé.kyuu/ ‘barbecue’), which would be difficult to explain by (15a) unless a degenerate (i.e., monomoraic) foot—or something equivalent to it—is posited (Kubozono, 2002a). Interestingly, these accent patterns are now being replaced with ‘pre-antepenultimate accent patterns’ (L[́]LH# and HL[́]H#), which will be discussed in detail in the next section.

It is worth referring to Shinohara (2000) here, who claims that the default accent locus of words adapted from French is the ‘head of the rightmost non-final foot’. Loanwords from French exhibit a slightly different accent pattern from those from English,⁸ but it is interesting that they follow the same basic principle in (15a) that underlies compound accentuation in the same language.

The basic identity between loanword accent and CA has led Kubozono (2002b) to propose that the antepenultimate rule in (2) and the CA rule for compound nouns are essentially one and the same rule. The only difference between the two rules is that the antepenultimate rule only consists of the default rule in (15a), whereas the CA rule involves the Align-CA principle in (15b) and the Max-Accent principle in (15c) in addition to the default rule in (15a).⁹ Note that the two principles in (15b,c) vacuously apply to morphologically simplex nouns. What this means is that all nouns, both morphologically simplex and complex, are subject to one and the same set of principles. On the one hand, morphologically complex words are subject to Align-CA and Max-Accent, the two principles that apply to morphologically complex inputs, in addition to the default accent rule. On the other hand, morphologically simplex nouns are free from the effect of the compound-related principles and are hence subject only to the

default rule in (15a). Obviously, this difference arises from the differences in input structure between simplex and compound nouns, and not from the accent system to which they are subject.

This leads us to the conclusion that the antepenultimate accent rule for loanwords is fundamentally similar, if not entirely identical, to the CA rule responsible for the accentuation of accented four-mora and longer native nouns. This reinforces our argument that the antepenultimate rule—or the principle behind it—is responsible for the default accent pattern of accented native nouns. In other words, the antepenultimate pattern observed in loanwords does not simply correspond to accent patterns ‘in marginal sectors of the native Japanese vocabulary, such as proper names and prosodically derived words’ (Shinohara 2000:91). Rather, it reflects the default accent pattern in the core part of the accented native vocabulary. It is true that native nouns permit other accented patterns alongside this default one, but this fact does not negate the generality of the antepenultimate pattern in both the native and foreign strata. In sum, loanword accentuation simply copies and highlights the most productive accent pattern of *accented* native words.

3.3. Antepenultimate Rule and Latin Accent Rule

It is important to point out here that the antepenultimate rule is not an accent rule unique to Tokyo Japanese. It is strikingly similar to the famous Latin-type accent rule.

When reinterpreted in terms of the syllable, the antepenultimate rule in (2) has the effect of placing an accent on the second or third syllable from the end of the word. If we assume a dichotomy of syllables into two types, heavy (H) and light (L), words can be categorized into the eight groups in (18), depending on the syllable weight of their last three syllables. This is actually an exhaustive list of all the possible combinations of heavy and light syllables in word-final position.

- | | | | |
|--------------|---------|---------|---------|
| (18) a. HHH# | b. HHL# | c. LHH# | d. LHL# |
| e. HLH# | f. HLL# | g. LLH# | h. LLL# |

If applied to these eight groups of words in (18), the antepenultimate rule in (2) yields the results in (19), where accent marks are placed on accented syllables.

- | | | | |
|---------------|----------|----------|----------|
| (19) a. HH́H# | b. HH́L# | c. LH́H# | d. LH́L# |
| e. HĹH# | f. HĹL# | g. LĹH# | h. LĹL# |

Let us now compare these results with the effect of the accent rule for Latin and English nouns. This rule, which is sensitive to the weight of the penultimate syllable as in (20) (Hayes, 1995), will yield the results in (21) when applied to the syllable strings in (18).

- (20) Place an accent on the penultimate syllable if this syllable is heavy; if it is light, place an accent on the antepenultimate syllable.

- | | | | |
|---------------|----------|----------|----------|
| (21) a. HH́H# | b. HH́L# | c. LH́H# | d. LH́L# |
| e. HĹH# | f. HĹL# | g. LĹH# | h. LĹL# |

A comparison of (19) and (21) reveals the fundamental similarities between the two rules. In fact, the two rules predict the same accent pattern in six out of the eight syllable strings in (18). They make different predictions in only two contexts, namely, in HLH# (18e) and LLH# (18g). In (18e), the Japanese rule places an accent on the penultimate light syllable as shown in (19e), whereas the Latin/English rule places an accent on the antepenultimate heavy syllable as in (21e). Similarly, the two rules place an accent on the penultimate and antepenultimate syllables in the word type of (18g), as shown in (19g) and (21g), respectively. Interestingly, these are exactly the two cases where the antepenultimate accent rule in (2) and the basic rule of CA in (15a) do not perfectly match, as we saw in the preceding section.

More interestingly, these differences between Japanese and Latin accent rules are now disappearing. Based on an analysis of foreign place names used in Japanese, Kubozono (1994, 1996) pointed out that most loanwords with HLH# and LLH#

structures now tend to be accented on the antepenultimate syllable rather than on the penultimate light syllable: e.g., /á.ma.zon/ ‘Amazon’, /ré.ba.non/ ‘Lebanon’, /mán.da.ree/ ‘Mandalay’, /báa.ku.ree/ ‘Berkeley’. These new patterns, labeled as ‘pre-antepenultimate patterns’ by Katayama (1995), are attested in a number of loanwords including those in (22).

- (22) a. tó.ro.fii ‘tróphy’, sú.ri.raa ‘thriller’, té.ne.sii ‘Tennessee’
 b. máa.ga.rin ‘margarine’, bu.rók.ko.rii ‘brocoli’, fán.ta.zii ‘fantasy’, páa.to.naa ‘partner’, háa.mo.nii ‘harmony’

In fact, it has been confirmed by several independent studies including Katayama (1995), Suzuki (1995), Kubozono (1999, 2002a/b) and Shinohara (2000) that /H́LH#/ and /ĹLH#/ outnumber /H́LH#/ and /ĹLH#/, respectively, in loanwords in general. This has been confirmed by our current study, too, which shows that /#ĹLH#/ and /#H́LH#/ are a few times more popular than /#ĹLH#/ and /#H́LH#/, respectively.¹⁰

Not surprisingly, there are a number of words that fluctuate between the two accent patterns as exemplified in (23). This accent variation has to do with the speaker’s age to a certain extent, with young speakers generally permitting the pre-antepenultimate patterns more often than senior speakers. For example, /á.ma.zon/ and /káa.di.gan/ are dominant among young speakers, whereas /a.má.zon/ and /kaa.dí.gan/ are often permitted in the speech of elderly people.

- (23) a. a.má.zon—á.ma.zon ‘Amazon’, do.rá.gon—dó.ra.gon ‘dragon’,
 e.ne.rú.gii—e.né.ru.gii ‘energy’, re.bá.non—ré.ba.non ‘Lebanon’
 b. kaa.dí.gan—káa.di.gan ‘cardigan’, han.gá.rii—hán.ga.rii ‘Hungary’,
 myuu.zí.syan—myúu.zi.syan ‘musician’, en.dé.baa—én.de.baa ‘(Space Shuttle Endeavor’,
 a.koo.dí.on—a.kóo.di.on ‘accordion’, ran.dé.buu—rán.de.buu ‘rendez-vous’

This kind of age-related variation suggests that the following accent changes have

been in progress in Tokyo Japanese and are actually almost complete now, with the new patterns overwhelming the old ones in statistical terms.

(24) a. LLH# → ŁLH#

b. HLH# → ŁLH#

It must be noted that no comparable accent change is attested in other phonological contexts in (18). It is true that pre-antepenultimate patterns are observed in loanwords with some other syllable compositions, too, but they are not as popular as to outnumber the traditional patterns and often occur in phonologically predictable contexts. For example, five-mora loanwords with the structure #HHL# are divided into two competing accent patterns, #ŁHHL# and #HŁH#, but a closer look at the data reveals that the former pattern characteristically occurs in words with a final epenthetic vowel: e.g. /kón.saa.t<o>/ ‘concert’, /áa.mon.d<o>/ ‘almond’, /áa.ben.t<o>/ ‘Abend (German)’. In contrast, the latter accent pattern is free from such a constraint so that it occurs irrespective of whether the final vowel is epenthetic or non-epenthetic: e.g., /kon.dóo.m<u>/ ‘condom (French)’, /an.kóo.r<u>/ ‘encore (French)’, /kon.kóo.s<u>/ ‘concourse’, /man.hóo.r<u>/ ‘manhole’; /yoo.róp.pa/ ‘Europa (Portuguese)’, /noi.róo.ze/ ‘Neurose (German), /fan.fáa.re/ ‘Fanfare (German)’. This suggests that the antepenultimate accent rule in (2) is still productive except in the two phonological contexts mentioned above, namely, (18e) and (18g).

Given the pre-antepenultimate accent patterns in (22) as default accent patterns for loanwords with the structures LLH# and HLH#, it follows that the loanword accent rule in Japanese is now 100% identical to the Latin-type accent rule. Namely, these two rules make exactly the same predictions in all of the eight phonological contexts in (18). Moreover, this revised version of the antepenultimate rule now makes the same predictions as the default CA rule in (15a), too.

Recall now that the antepenultimate rule in (2) is not just a loanword accent rule but is a default accent rule for *accented* nouns in all lexical strata. This rule crucially resembles the Latin accent rule in (20) on the one hand, and the default CA rule in (15a)

on the other. What this means is that the accent rule of Tokyo Japanese is fundamentally similar to the accent rule of Latin and English as far as accented nouns are concerned. The basic similarity between Japanese and Latin/English accentuation is a highly revealing fact that is worthy of special attention. Since the Latin-type accent rule can be decomposed into some universal principles such as Nonfinality, Edgemostness and Weight-to-Stress (Prince and Smolensky, 1993), the Japanese accent rules—both the antepenultimate rule in (2) and the CA rule—can also be accounted for by these universal principles (see Katayama, 1998; Shinohara, 2000; and Kubozono, 2002a for analyses of loanword accent and Kubozono, 1995, 1997, 2002b for CA) . While it remains an open question how precisely the antepenultimate rule and the CA rule can be generalized in a single framework (see Shinohara 2002 for a challenging analysis), this general nature of Japanese accentuation can be revealed by and only by considering its loanword accentuation seriously, without being distracted by the overwhelmingly large number of unaccented words in the native stratum.

The analysis that has been put forward has several other interesting consequences and implications for Japanese accent. Most seriously, the fact that the antepenultimate accent rule accounts for the most productive accent pattern of accented native nouns implies that nouns showing this accent pattern are not lexically specified with respect to accent location but, rather, that they are specified in the lexicon only with respect to accentedness. On the other hand, accented nouns showing other patterns are lexically marked with accent location. This interpretation seems entirely compatible with the reported accent changes whereby the latter accent patterns, e.g. $L\acute{L}L\#$ or $LL\acute{L}\#$, are being replaced with either the default accented pattern or the unaccented pattern (Akinaga, 2001). These accent changes imply that the accent system of nouns in Tokyo Japanese is now changing into a two-pattern system with only an accented-unaccented distinction, which is basically identical to the accent system of verbs and adjectives of the same dialect (section 1).

4. Unaccented Words

In the preceding section we have seen that the antepenultimate accent rule in (2) is a general accent rule that applies to *accented* Japanese nouns as a whole on the one hand, and is strikingly similar to the accent rule of Latin and English on the other. It follows from this that the native Japanese vocabulary primarily differs from its foreign vocabulary not in accent locus but in having so many ‘unaccented words’. Japanese accent is also crucially different from Latin and English accent in the same respect. In this section we will ask (i) why native and loanwords have such a different accentual preference and (ii) where the unaccented pattern in loanwords comes from. Through a dictionary-based statistical study, we would like to show that the unaccented pattern is not a default accent pattern in Japanese but rather that it emerges in some specific phonological contexts. We will demonstrate that loanwords apparently disfavor this accent pattern not because they are loanwords but because they generally have different phonological structures from native words. In other words, loanwords can become unaccented just like native words if certain phonological conditions are met.

To see this point, let us first consider the results in Table 6 regarding the correlation between word length and the unaccented pattern in loanwords. The data in this table are based on Sugito (1995) which, in turn, is based on the 1985 version of the NHK Dictionary.

Table 6 Word length and the percentage of the unaccented pattern (N=1,863 words, NHK, 1985)

Word length	3 mora	4 mora	5 mora	Average
Unaccentedness ratio	5%	19%	8%	13%

As can be seen from this table, four-mora loanwords show a much higher percentage of the unaccented pattern than their three-mora and five-mora counterparts. An analysis of the revised edition of NHK Accent Dictionary (1998) shows a similar difference, with the unaccentedness ratio for four-mora words going up to 29% (see Table 7 below). This correlation between word length and accent pattern is noteworthy, but it should not be very surprising in light of the fact that native and SJ words exhibit basically the same

tendency (Akinaga, 1985; Tanaka and Kubozono, 1999). This can be confirmed by the data in Sibata (1994), who looked at the differences between loanwords and non-loanwords, i.e., native and SJ words combined. According to this study, 66% of four-mora non-loanwords are unaccented, whereas the same accent pattern only accounts for 53% and 30% of three-mora and five-mora nouns of the same lexical types, respectively. In other words, the correlation between word length and accent pattern in Table 6 is observed in the Japanese lexicon as a whole and not merely in the foreign stratum. Thus, loanwords and native words are sensitive to one and the same length condition with regard to the emergence of the unaccented pattern.

Let us turn to the effects of syllable structure on accent patterns. We saw some data in Table 2 above which show that different syllable structures are favored by different word types. Specifically, sequences of light syllables are particularly popular in native words, whereas heavy syllables are predominantly found in SJ words and loanwords. It is therefore essential to look at possible effects of syllable structure on accent patterns before we make any conclusion as to how loanwords differ from native words in accent patterns.

Analyzing about 700 foreign place names used in Japanese as a source of data, Kubozono (1994, 1996) argued that four-mora loanwords tend to become unaccented when they end in a sequence of light syllables. We conducted a dictionary-based survey to see if this observation can be supported by a larger corpus of data. Table 7 summarizes the results of this survey, which examined the accentual effects of syllable structure in four-mora loanwords.

Table 7 Correlation between syllable structure and accent pattern in four-mora loanwords (N=963 words, NHK, 1998)

Syllable structure	#LLLL#	#HLL#	#LHL#	#LLH#	#HH#	Average
Unaccentedness ratio	54%	45%	24%	19%	7%	29%

The data in this table show that syllable structure exerts a considerable effect on the choice between accented and unaccented patterns in loanwords. Loanwords

consisting of four light syllables, i.e., #LLLL#, show the highest percentage of the unaccented pattern; in fact, a majority of loanwords in this class take the unaccented pattern in preference to the accented one. This is followed by #HLL#, of which nearly a half takes the unaccented pattern. On the other hand, four-mora loanwords consisting of two heavy syllables disfavor the same accent pattern, with only 7% of them becoming unaccented.¹¹ There is a statistically significant difference between #...LL# and #...H# ($p=.02$, by a chi-square test), indicating that syllable structure in word-final position plays a significant role in the choice between accented and unaccented patterns. Syllable structure in word-initial position seems to yield a similar difference although this difference is not statistically significant in our data ($p=.09$). Overall, a sequence of monomoraic syllables tends to give rise to the unaccented pattern, especially when they appear in word-final position. In contrast, heavy syllables exert an opposite effect, giving rise to the accented pattern over the unaccented one.

Kubozono (1996) further suggested that the unaccented pattern is particularly popular if the word-final light syllable does not contain an epenthetic vowel (which is put in < > below). For example, the English words in (25) are borrowed as accented words in Japanese despite the fact that their loanword forms are four moras long and contain a string of light syllables in word-final position.

- (25) s<u>.t<ó>.re.s<u> ‘stress’, á.k<u>.se.s<u> ‘access’, t<o>.rá.b<u>.r<u> ‘trouble’,
 má.i.r<u>.d<o> ‘mild’, só.ri.s<u>.t<o> ‘soloist’, gán.zi.s<u> ‘(River) Ganges’,
 mán.mo.s<u> ‘mammoth’

This irregular behavior of epenthetic vowels, too, has been confirmed by the present study. Table 8 shows the percentage of the unaccented pattern in four-mora loanwords ending in a sequence of light syllables, i.e., #LLLL# and #HLL#. The obtained data clearly reveal an effect of the epenthetic vowel in word-final position. In fact, 90% of loanwords in this phonological class are unaccented if they end in a non-epenthetic, i.e., underlying vowel. Some typical examples are given in (26). The percentage of the unaccented pattern goes down to 32% if an epenthetic vowel, usually <u> or <o>, is

involved in word-final position.¹²

Table 8 Epenthetic vowel and unaccentedness ratio in LLLL and HLL loanwords (N=355 words)

Epenthetic/non-epenthetic	..LL#	..L<L>#	Average
Unaccentedness ratio	90%	32%	50%

- (26) s<u>.te.re.o ‘stereo’, si.na.ri.o ‘scenario’, in.h<u>.re ‘inflation’, a.ri.zo.na ‘Arizona’, i.ta.ri.a ‘Italy’, ho.no.ru.ru ‘Honolulu’, a.to.ri.e ‘atelier’, ma.ka.ro.ni ‘macaroni, a kind of pasta’, u.ku.re.re. ‘ukulele’, he.r<u>.ni.a ‘hernia (Latin)’

We have seen in Tables 7 and 8 that the unaccentedness ratio varies greatly depending on syllable structure and the nature of the word-final vowel. If the phonological conditions in (27) are all met, loanwords become unaccented in nine out of ten cases. This is an extremely high ratio, which is even higher than the average ratio of the unaccented pattern in four-mora native and SJ words (66% according to Sibata, 1994).

- (27) a. four moras long

- b. a sequence of light syllables in word-final position
c. non-epenthetic vowel in word-final position

Why, then, do loanwords tend to take the unaccented pattern if they meet the three phonological conditions in (27)?¹³ This question has already been answered in part. Four-mora loanwords show a higher percentage of the unaccented pattern than their three-mora or five mora counterparts since four-mora nouns in general favor this accent type in Japanese. While it remains unclear why four-mora nouns show this accentual preference, it is clear that loanwords simply follow native words with respect to the correlation between accent pattern and phonological length.

The two conditions in (27b, c) can be explained in the same way. As mentioned in

section 2, native words generally consist of a sequence of light syllables and very few involve a heavy syllable for historical reasons. Those that do usually contain a heavy syllable in word-medial position since this type of syllable was created as a result of a juncture phenomenon when two nouns were combined: e.g., /tui#ta.ti/ ‘the first day of the month’ stems from /tu.ki/ ‘moon’ and /ta.ti/ ‘start’ via consonant deletion. In this sense, typical native words end in a sequence of light syllables rather than a heavy syllable. As for the distinction between epenthetic and non-epenthetic vowels, native words do not contain any epenthetic vowel at all. Thus, (27b) and (27c) represent the most typical phonological structure of native words. Loanwords that satisfy these two phonological conditions do indeed look like native words in phonological configuration and actually take the typical accent pattern that native words exhibit.

This clearly speaks against the conventional view assumed in the literature (e.g., Akinaga, 1985; Sibata, 1994) that loanwords and native words obey different accent rules. As seen in Table 1, loanwords do appear to show rather different accent patterns from native words in favoring the accented pattern over the unaccented one. However, this observation fails to take into account that the two types of words inherently involve different phonological configurations. The data presented in this section clearly indicate that the fact that loanword disfavor the unaccented pattern has much to do with the fact that they are rich in heavy syllables and epenthetic vowels. If we properly remove these factors, loanwords indeed become unaccented just as native words.¹⁴

Given this new analysis, one may go one step further and ask why then heavy syllables and epenthetic vowels in word-final position prevent the word from becoming unaccented. As for epenthetic vowels, they often resist bearing an accent as they do in trimoraic loanwords discussed in section 3.1.2. This is the behavior typically shown by non-syllabic moras, i.e., the second mora of heavy syllables such as the moraic nasal and the second half of long vowels and diphthongs. This resemblance suggests that epenthetic vowels do not constitute an independent syllable although they count as an independent mora. Given this, it will not be so surprising to find that a syllable with an epenthetic vowel in word-final position behaves like a heavy syllable in combination with its preceding light syllable.

That a heavy syllable tends to yield an accented word can probably be related to the fact we saw in section 3.1, namely, that heavy syllables tend to attract an accent in Japanese words just as they do in many other accent/stress languages. Both tendencies point to a strong interaction between accent and syllable structure: a heavy syllable tends to give rise to a lexical accent and, moreover, it attracts the accent to itself if not overridden by any stronger factor (such as Nonfinality).¹⁵ Although these interpretations regarding epenthetic vowels and heavy syllables must be explored in more detail, the whole scenario is at least entirely compatible with the Japanese data that we have seen so far.

5. Interaction of Phonetic and Phonological Factors

5.1. Phonetic Factor

It was pointed out in section 3 that the antepenultimate accent pattern characteristically shown by loanwords is nothing but the most productive accent pattern of *accented* native words. In section 4, we also saw that loanwords can take the unaccented pattern if they are given the same phonological structure as native words. This indicates that loanwords do not seriously differ from native words in their accentual preference. Quite the contrary, loanwords, both accented and unaccented alike, follow the typical accent patterns that are exhibited by native words.

This said, there is some independent evidence to believe that loanwords still show a stronger tendency towards the accented pattern (*vs.* the unaccented one) than the other two types of words. This can be seen, for example, if we look at minimal pairs of words that contrast in accentuation. There are not many segmentally homophonous pairs between a loanword and a native (or SJ) word due to their inherent differences in syllable structure. However, those pairs that exist in the lexicon often contrast in accentuation and, if they do, they contrast between accented (loanwords) and unaccented patterns (native and SJ words).

(28) *sás.si* (loan) ‘metal sash window’ *vs.* *sas.si* (SJ) ‘bound copy’, (native) ‘guess’

í.on (loan) ‘ion’ *vs.* *i.on* (SJ) ‘allophone’

hái.ku (loan) ‘hike’ vs. hai.ku (SJ) ‘*haiku* poetry’
 kée.ki (loan) ‘cake’ vs. kee.ki (SJ) ‘economic climate’
 tá.su.ku (loan) ‘task’ vs. ta.su.ku (native) ‘to help’
 too.ku (loan) ‘talk’ vs. too.ku (native) ‘far’

That loanwords display a stronger tendency to take the accented pattern than the other two types of words can also be understood by the comparison of loanword and SJ accentuation. As mentioned in section 2, SJ words and loanwords differ from native words in having a number of heavy syllables. Moreover, SJ words are rich in epenthetic vowels; many sequences of light syllables in SJ words have an epenthetic vowel as in the second syllable of /ga.kú>#mon/ ‘learning’. This means that SJ words have a phonological configuration that is more similar to loanwords than to native words. Yet, they do not exhibit the same accent preference as loanwords. This can be seen from Table 1 above, where trimoraic SJ words favor the unaccented pattern as much as the accented ones. This will raise the question of why SJ words do not show a marked tendency towards the accented pattern just as do loanwords.

That loanwords show a stronger tendency to take the accented pattern than the other two types of words can be borne out by some statistical data, too. This is illustrated in Tables 9-11, where the relation between word type and accent pattern is shown for the three types of trimoraic words—HL, LH and LLL, respectively.

Table 9 Word type and accent pattern in HL trimoraic words

Accent pattern Word type	Accented	Unaccented
Native (112)	58%	42%
SJ (2,257)	79%	21%
Loan (350)	93%	7%
Total (2,719)	79%	21%

Table 10 Word type and accent pattern in LH trimoraic words

Accent pattern Word type	Accented	Unaccented
Native (24)	59%	41%
SJ (1,572)	18%	82%
Loan (132)	93%	7%
Total (1,728)	24%	76%

Table 11 Word type and accent pattern in LLL trimoraic words

Accent pattern Word type	Accented	Unaccented
Native (2,084)	27%	73%
SJ (1,110)	35%	65%
Loan (296)	93%	7%
Total (5,087)	35%	65%

In these tables we have not controlled the nature of vowel and morphological complexity. #HL# words in Table 9, for example, have a word-final epenthetic vowel in most loanwords (e.g., /t^ho:ku/ ‘talk’) but in none of native and SJ words. The same difference can be pointed out with the light syllable in Table 10. In addition to this, all trimoraic words consist of two morphemes if they belong to the SJ stratum, but not if they belong to the foreign stratum for the reason stated in section 2.

While these two factors cannot be properly controlled as long as we analyze real words, the data in Tables 9-11 still suggest that loanwords favor the accented pattern more than native and SJ words do. For example, the huge difference between native words and loanwords in Table 11 could not possibly be accounted for by the sole fact that many loanwords contain an epenthetic vowel.

Why then are loanwords more likely to be accented than are native and SJ words? One plausible reason for this is that native speakers of Japanese have access to the source

sound of loanwords. Being more or less exposed to English via TV and English education at school, native speakers of Japanese know that English words are pronounced with an abrupt pitch fall when they are pronounced in isolation. When assigning a phonological structure to loanwords, they simply transfer this phonetic feature to loanword forms and process them as ‘accented’ rather than ‘unaccented’ words. For example, English words like ‘Washington’, ‘Christmas’ and ‘badminton’ involve a pitch fall between the accented/stressed syllable and the next. Native speakers of Japanese are sensitive to this phonetic feature and assign a lexical accent to these words in Japanese.

In the framework of Optimality Theory, this means that English pronunciation serves as the input to loanword accentuation and, moreover, is preserved as faithfully as possible by native speakers of Japanese. Native and SJ words do not have such source words available in modern Japanese and, hence, are subject to no bias as to their accentedness.

5.2. Phonological Factor

Having argued for the phonetic (perceptual) factor in loanword accentuation, I must hasten to add that this factor alone cannot sufficiently account for the precise output forms of loanwords in Japanese. As is well known, Japanese has many loanwords that differ in accent locus from their corresponding words in English. According to Sibata (1994), about 30% of loanwords from English do not have the same accent/stress locus as their source words. Tanaka (2004) provides similar data in which 27% of three- to five-mora loanwords from English (550 words out of 2,069) do not preserve the stress position of their source words. Some examples are given in (29).

- (29) pú.ra.su ‘plús’, su.tó.re.su ‘stréss’, ku.ri.sú.ma.su ‘Chrístmas’,
 ri.ba.púu.ru ‘Líverpool’, e.dín.ba.ra ‘Édinburgh’, wa.sín.ton ‘Wáshington’,
 an.dáa.son ‘Ánderson’, ba.do.mín.ton ‘bádminton’

The abundance of these examples indicates that the actual output forms of

loanwords are determined by some factor other than the perceptual one. A closer inspection reveals that the accent locus of these words is determined by the default accent rule for accented nouns in Japanese, namely, the antepenultimate rule in (2). This accent rule is responsible for accent loci in loanwords that are often different from those in their source words.

In sum, the accentuation of loanwords can be attributed to two independent factors. On the one hand, the perceptual factor determines the overall phonological shape of loanword forms, i.e., accentedness, by assigning a lexical accent to most loanwords. On the other hand, the phonological factor determines their precise output forms by allocating the accent onto an appropriate syllable in accordance with the accent rule of the host language. What is important here is that neither the phonetic factor nor the phonological one alone can fully explain loanword accentuation in Japanese. Without the phonetic factor, it would be difficult to explain why most loanwords become accented. Similarly, any analysis that disregards the phonological factor would find it impossible to account for non-English accent loci in Japanese loanwords as illustrated in (29). These two factors combined can successfully account for both the accentedness and accent locus of loanwords in the language.

5.3. Further Evidence from Tokyo Japanese

The idea that both phonetic and phonological factors are at work in Japanese loanword accentuation can be supported by at least two independent pieces of evidence. One piece of evidence is from prosodic word formation in Tokyo Japanese, while the other is from a study of accent changes in the Kagoshima Dialect spoken in the south of Japan.

Compounds in Japanese generally form one prosodic word by unifying their components into one accent/tone unit. In Tokyo Japanese, compound words usually bear one accent, either at the right edge of the left-hand member or at the left edge of the right-hand member (see (13) above). However, personal names do not follow this unification rule. Thus, a sequence of a family name and a given name usually forms two prosodic words, with each element keeping its own lexical accent pattern. This is

illustrated in (30).

- (30) ko.í.zu.mi zyun.í.ti.roo ‘Koizumi Junichiro (Japanese Prime Minister)
yú.ka.wa hí.de.ki ‘Hideki Yukawa’ (a physicist, Nobel Prize winner)’

That personal names do not follow the CA rule may not be so surprising since this type of noun-noun sequence does not generally form a prosodic compound in many languages. In English, for example, a sequence of a given name plus a family name does not take the compound pattern like *bláckbòard*: rather, it follows the phrasal stress rule with each element retaining its lexical stress (Fudge, 1984; Kubozono 1988).

- (31) Bíll Clínton, Géorge Búsh, Márgaret Thátcher, Géorge Wáshington

However, English names are realized in one prosodic word when they are pronounced as loanwords in Japanese. Thus, the names in (31) are pronounced as in (32) in Tokyo Japanese.

- (32) bi.ru-ku.rín.ton, zyoo.zi-bús.syu, maa.ga.ret.to-sát.tyaa, zyoo.zi-wa.sín.ton

This peculiar behavior of foreign personal names has been a mystery in Japanese phonology (Kubozono, 1988), but it can be solved if the pitch shape of English names is taken into consideration. English names like those in (31) keep the stress of each component but, in terms of pitch, they usually involve just one pitch fall when they are pronounced in isolation. The name ‘George Washington’, for example, is pronounced with only one pitch fall, usually between the first and second syllables of ‘Washington’. Native speakers of Japanese seem sensitive to this acoustic cue, or the overall pitch shape of the string of words and, accordingly, process the string as one prosodic word. This output is subsequently constrained by the phonology of Japanese, which assigns an appropriate accent pattern to the output in accordance with its native accent rule: e.g., /zyoo.zi-wa.sín.ton/ ‘George Washington’. This interpretation is capable of explaining a

long-standing mystery of Japanese phonology.

5.4. Additional Evidence from Kagoshima Japanese

Essentially the same interaction of phonetic and phonological factors is observed in accent changes in Kagoshima Japanese, a provincial dialect spoken in the south of Japan. Unlike standard Tokyo Japanese, this dialect permits only two accent patterns, which we call Type A and Type B in this paper. Type A involves a high tone on the penultimate syllable, whereas Type B has a high tone on the final syllable.

Since there is no one-to-one correspondence between this accent distinction and the accented/unaccented distinction in Tokyo Japanese, we find four accentual combinations for all three lexical strata. These are illustrated in Table 12, where capital letters indicate a high-pitched syllable in Kagoshima. Words without an apostrophe are ‘unaccented’ in Tokyo. Each column lists examples of native, SJ and foreign words in that order. Note that unaccented words in Tokyo and Type B words in Kagoshima have different surface pitch patterns: the former is pronounced with a high pitch throughout the word except the very initial mora, whereas the latter involves a rising pitch at the end with only the very final syllable being high-pitched.

Table 12 Accent types in Tokyo and Kagoshima Japanese

Accent Type	Tokyo	Kagoshima	Gloss
(a)	ta.bé.mo.no	ta.be.MO.no	food
	tée.ki	TEE.ki	train pass
	ká.na.da	ka.NA.da	Canada
(b)	ka.e.de	ka.E.de	maple
	o.syo.ku	o.SYO.ku	bribery
	bu.ra.zi.ru	bu.ra.ZI.ru	Brazil
(c)	mó.mi.zi	mo.mi.ZI	autumn leaves
	syóo.tai	syoo.TAI	invitation
	dóo.na.tu	doo.na.TU	donut
(d)	ne.zu.mi	ne.zu.MI	rat
	yu.u.kai	yu.u.KAI	kidnapping
	a.me.ri.ka	a.me.ri.KA	America

Words in (a) are pronounced with an abrupt pitch fall in both Tokyo and Kagoshima Japanese: they are ‘accented’ in Tokyo and belong to Type A in Kagoshima. Those in (b) involve a sudden pitch fall only in Kagoshima Japanese: they are ‘unaccented’ in Tokyo and belong to Type A in Kagoshima. Words in (c) are the reverse of (b): they show an abrupt pitch fall, i.e., ‘accented’ in Tokyo, but not in Kagoshima (Type B). Finally, those in (d) are pronounced without an abrupt pitch fall in either Tokyo (‘unaccented’) or Kagoshima (Type B).

Kubozono (2004) examined accent changes that are in progress among young native speakers of Kagoshima Japanese. Through his fieldwork, he has discovered the following three points. First, teenagers of this dialect show confusion between the two accent patterns—Type A and Type B—in about 25 % of all tested words. Second, the changes are observed in both directions: some words have changed their accent from Type A to Type B, while others have changed in the other direction, i.e., from Type B to Type A. Finally, and most importantly, these changes are not equally distributed across the four classes of words in Table 12. Rather, it is words in (b) and (c) that tend to change their

accent patterns, whereas most words belonging to the other two groups—(a) and (d)—keep their traditional accent pattern. More specifically, over 30% of words belonging to (b) are now pronounced as Type B and over 40% of words belonging to (c) are now pronounced as Type A. These are exemplified in (33) and (34), respectively. Pitch patterns in the parentheses represent those in Tokyo Japanese.

- (33) ka.E.de → ka.e.DE (ka.E.DE)
 o.SYO.ku → o.syo.KU (o.SYO.KU)
 bu.ra.ZI.ru → bu.ra.zi.RU (bu.RA.ZI.RU)

- (34) mo.mi.ZI → mo.MI.zi (MO.mi.zi)
 doo.na.TU → doo.NA.tu (DO.o.na.tu)
 syoo.TAI → SYOO.tai (SYOo.tai)

These changes can be accounted for in a principled way if we assume that young native speakers of Kagoshima Japanese attempt to match Type A and Type B in Kagoshima with accented and unaccented patterns in Tokyo, respectively. In other words, words tend to be produced with a pitch fall (Type A) by young speakers of Kagoshima Japanese if they are produced with a sudden pitch fall in Tokyo. Similarly, words that involve no abrupt pitch fall in Tokyo tend to be pronounced without a pitch fall (Type B) in Kagoshima. This clearly indicates that young native speakers of Kagoshima are influenced by Tokyo Japanese and are actually sensitive to the presence or absence of a pitch fall in standard Tokyo forms. They copy the overall shape of standard Tokyo forms when they pronounce the words in their own dialect.

It must be noted, however, that the outputs of these accent changes are not identical to the pitch patterns of their corresponding words in Tokyo Japanese, which are given in parentheses in (33) and (34) above. Rather, the output forms are clearly determined by the native phonology of Kagoshima Japanese, which permits a high-pitched syllable only on the penultimate or final syllable of words. Stated conversely, young speakers of Kagoshima Japanese do not copy the precise pitch forms of Tokyo Japanese but impose a

pitch pattern that is allowed in their native accent system. In this sense, accent changes now in progress in the Kagoshima dialect are highly constrained by its own accent system.

In sum, accent changes can be attributed to two independent factors. A phonetic or perceptual factor forces the native speaker of Kagoshima Japanese to copy the overall shape of standard Tokyo forms with respect to the presence or absence of a sudden pitch fall. On the other hand, their native prosodic system constrains the actual output forms with the result that only those forms that are permitted by it are finally chosen. These two factors crucially resemble the two factors that are at work in loanword accentuation of Tokyo Japanese. In both cases, a phonetic factor determines the overall prosodic shape of words with reference to the presence or absence of a pitch fall in the target words. In addition, output patterns are constrained by the native accent system so that only those that are productive in the system are allowed to surface. The accent changes in Kagoshima Japanese are certainly different from loanword adaptation in Tokyo in that the former only borrows prosodic shapes, while the latter involves borrowing lexical items together with their prosodic shapes. However, they are governed by the same set of linguistic factors in basically the same way.

5.5 Implication for the Model of Loanword Adaptation

The independent pieces of evidence presented in the preceding subsections reinforce our claim that a perceptual process determines the overall pitch configuration of loanwords, which is then constrained by the native accent system or rule to yield the precise accent pattern that is observed at the output of loanword phonology. This analysis has a significant implication for the controversy regarding phonetic *vs.* phonological factors in loanwords.

One of the most popular models of loanword adaptation is the one proposed by Silverman (1992). He divided loanword phonology into two levels, perceptual and operative. The acoustic signal serves as the input to the Perceptual Level, which is constrained by the native segment and tonal inventories of the recipient language. The output of this is the input to the Operative Level, where perceived segments undergo

‘true phonological operations’ triggered by native phonotactic constraints (Silverman, 1992:297). Take the English words ‘rack and ‘lack’, for example. When borrowed into Japanese, these words are modified by the segmental inventory of the host language and both are changed into [rak]. This is the output form of the Perceptual Level, which further undergoes vowel epenthesis and consonant gemination at the Operative Level to yield [rak.ku].

Although it is originally proposed to account for segmental and syllable structure processes, this model of loanword adaptation is capable of accounting for the essential part of loanword accentuation in Japanese. Specifically, it can account for the fact that both perceptual and phonological factors are at work as well as the fact that the perceptual factor plays a role before the phonological factor. At the Perceptual Level, the overall prosodic shape of the acoustic signal is preserved. This explains why most loanwords in Japanese are adopted as accented words rather than unaccented ones despite the fact that the latter accent pattern is considerably more popular than the former in the native accent system of the recipient language.

This overall prosodic shape can be conceived as the output of the Perceptual Level and the input to the Operative Level. At the latter level, the prosodic configuration involving a pitch fall undergoes native accent rules of the recipient language. These accent rules are equivalent to phonotactic rules in Silverman’s original model: both types of rules yield outputs that are well formed in the native system of the host language. In loanword accentuation in Japanese, this process creates accent patterns that are in conformity with the native accent rule of the language. For example, /pú.ra.su/ ‘plús’ and /wa.sín.ton/ ‘Wáshington’ are produced instead of /pu.rá.su/ and /wá.sin.ton/. Four-mora words like /a.me.ri.ka/ ‘América’ and /si.na.ri.o/ ‘scenário’ are deaccented by a rule responsible for the unaccented pattern.

The basic aspects of loanword accentuation in Japanese can thus be accommodated within Silverman’s (1992) model in a reasonable way. However, one must not disregard an important fact, which is that native speakers of Japanese are only sensitive to the presence or absence of a pitch fall among many prosodic cues. The incoming acoustic signal contains many prosodic features that include not only those relating to a pitch fall

but also those pertaining to a pitch rise. Native speakers of Japanese pick up only the prosodic cue to a pitch fall, while discarding other prosodic cues. The reason for this is clear: pitch fall is the distinctive pitch feature in their native accent system that is used to distinguish between the two major accent types (accented *vs.* unaccented) as well as between different accent locations. In this sense, the distinction between contrastive and non-contrastive pitch features in the native system plays a pivotal role at the Perceptual Level of loanword adaptation. In other words, the perceptual process is not purely phonetic in nature but is constrained by the prosodic system of the recipient language to a certain extent.

In sum, in perceiving the acoustic signal, native speakers of Japanese are sensitive to the prosodic cue that is distinctive in their prosodic system. The basic prosodic configuration thus obtained is then subject to the native accent rules of the host language to yield an output form with an accent on an appropriate position (or an unaccented output in some specific phonological contexts). This interesting interaction between phonetics and phonology is also observed in the prosody of personal foreign names (section 5.3) as well as in accent changes in Kagoshima Japanese (section 5.4), and must be captured in any model of loanword adaptation. Future work should first address the question of whether this interaction of perceptual and phonological factors is observed in loanword prosody across languages.

6. Conclusion

In this paper we have analyzed loanword accentuation in Japanese with main focus on its relation with native word accentuation. At a first glance, loanwords display remarkably different accent patterns from native and SJ words: the former favors the accented pattern whereas the latter two prefer the unaccented pattern. We have presented statistical evidence that this impression cannot empirically be supported. Loanwords differ from native words with respect to several phonological structures, notably in the abundance of heavy syllables and epenthetic vowels. These features, which are not shared by native words, lead loanwords to take the accented pattern in preference to the unaccented one. If these differences are properly removed, the two types of words exhibit

similar accent patterns and preference.

Accented nouns tend to follow the antepenultimate rule in (2), whether they belong to the native, SJ or foreign stratum. In fact, loanwords follow the most productive accent pattern taken by accented native words. Moreover, the antepenultimate rule has effects strikingly similar to those of the CA rule which accounts for the accent patterns of morphologically complex nouns, whether native, SJ or foreign. Secondly, loanwords exhibit a marked tendency towards the unaccented pattern if they are given native-like phonological structures. Thus, most four-mora loanwords become unaccented if they end in a sequence of light syllables and have a non-epenthetic vowel word-finally. In this sense, too, it is not necessary to assume an accent rule specifically for loanwords. Rather, loanwords basically follow the native accent patterns. In sum, the basic prosodic patterns of loanwords come from native prosody.

The analysis put forward in this paper has several interesting consequences and implications for Japanese accent. First of all, the fact that the antepenultimate accent rule accounts for the most productive accent pattern of accented native nouns implies that nouns showing this accent pattern are lexically specified only with respect to accentedness. On the other hand, accented nouns showing other patterns are lexically marked with accent location. This interpretation implies that the accent system of nouns in Tokyo Japanese now is virtually a two-pattern system with only an accented-unaccented distinction, which is basically identical to the accent system of verbs and adjectives of the same dialect. This interpretation is supported, at least in part, by the report that accent patterns with an accent on the final or penultimate mora are being replaced with either the default accented pattern or the unaccented pattern (Akinaga, 2001).

Another important implication is that native accentuation in Japanese reflects and is actually constrained by some universal principles. It was argued in section 3.2 that the antepenultimate rule exerts effects strikingly similar to those of the CAR rule. This in itself is a highly significant point about Japanese phonology, but equally important is the fact that the compound rules basically assign an accent to the rightmost non-final foot. Since this basic location of CA can be explained by the interaction of some universal

constraints, notably Nonfinality and Edgemostness (Kubozono, 1995, 1997), it will follow that the antepenultimate rule can also be analyzed in the same fashion. In addition to this, it was also pointed out in section 3.3 that the antepenultimate rule in Japanese is strikingly similar to the Latin accent rule. Since the Latin rule can also be decomposed into several universal constraints including Nonfinality and Edgemostness (Prince and Smolensky, 1993), the antepenultimate effect of the Japanese rule itself can be attributed to such universal principles. How precisely the antepenultimate rule and the compound accent rule can be generalized in the constraint-based framework is a challenging topic for Japanese phonology (cf. Shinohara, 2002 and Kubozono, 2002b).

Speaking of universal constraints, the role of syllable weight is also worthy of special attention. Specifically, heavy syllables seem to exhibit a tendency to attract an accent much more than light syllables in accented words. In trimoraic words, this produces an asymmetry between heavy-light (HL) and light-heavy (LH) bisyllables, with the latter being more likely to be finally accented than the former. Finally, epenthetic vowels often show somewhat different patterns from underlying vowels by behaving as if they did not constitute an independent syllable.¹⁶ These features, too, more or less represent universal tendencies that are manifested rather clearly in the loanword prosody of Japanese. Stated conversely, this kind of general nature of Japanese accentuation cannot be easily captured by an analysis in which only native words are considered.

Another important implication obtained from the present study is that accent patterns in Japanese are predictable to a considerable extent on the basis of phonological information. One of the long-standing mysteries in Japanese phonology was the presence of numerous ‘unaccented’ words. It has been believed in the literature that the distinction between accented and unaccented words is largely unpredictable and, hence, must be specified in the lexicon for each lexical item. The analysis of loanwords in this paper has shown that this is incorrect. On the contrary, the emergence of the unaccented pattern is highly rule-governed and predictable from phonological information at least as far as loanwords are concerned. A comparable analysis of native and SJ words may well reveal that the accented/unaccented distinction is rule-governed in the whole lexicon of the language. In this sense, too, loanwords can and do provide a significant insight into the

prosodic structure of the host language.

In the final part of this paper, we made a claim for both phonetic and phonological factors behind loanword adaptation. While the analysis proposed in this paper has revealed the fundamental similarities between native and loanword accentuation, the statistical data still suggest that loanwords exhibit a stronger inclination towards the accented pattern (*vs.* the unaccented one) than native words. We proposed that this tendency is attributable to the interaction of two independent factors: one is the perceptual influence of the source words and the other concerns the fact that the presence or absence of an abrupt pitch fall is the distinctive phonetic feature of Japanese accent. Eighty-four percent of loanwords in modern Japanese are English words, which are pronounced with a pitch fall in citation form. Native speakers of Tokyo Japanese pick up this feature among many prosodic cues in the speech signal and generally assign the accented rather than unaccented pattern for loanwords. This perceptual process is already constrained by the prosodic system of the recipient language in the sense that only the distinctive phonetic cue of the language (*i.e.*, pitch fall) is attended to.

This perceptual process cannot explain the full range of loanword accent in Japanese, however. Many loanwords in Japanese are accented on a different syllable from their source words in the donor language, *e.g.*, /pú.ra.su/ ‘plús’ and /wa.sín.ton/ ‘Wáshington’. Moreover, loanwords become unaccented if they fulfill certain phonological conditions. These accent patterns suggest that loanwords further undergo a certain process of nativization, where output forms are severely constrained by the native prosodic system of the recipient language. In the case discussed in this paper, loanwords are usually accented in the default loci where (accented) native words are accented. In addition, some loanwords are deaccented if they have a certain (native-like) phonological configuration. To support this dual model of loanword adaptation, we presented independent evidence from phonological phrasing of foreigners’ names in Tokyo Japanese as well as accentual changes in a regional dialect of Japanese.

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Notes

1. I owe thanks to Misa Fukui, Shinji Ogawa and Shin'ichi Tanaka for preliminary analyses of these digital data.
2. This accent structure might look different from that of accented nouns which, as we will see later, tend to be accented on the antepenultimate mora. However, they can probably be generalized if considered in term of foot structure. Supposing that the foot is not constructed across a morpheme boundary, the penultimate pattern of accented verbs and adjectives and the antepenultimate pattern of nouns can both be attributed to a rule that assigns an accent on the rightmost non-final foot. The accent pattern of accented verbs and adjectives are, in fact, basically the same as compound nouns with a monomoraic second member (see section 3.2).
3. Some may say that all the words in (9) are monosyllabic words in English and keep the original accent of the source words. While this is true, the real question is why the original accent on the heavy syllable is consistently preserved in this particular context, whereas it is not always preserved in the words in (10) .
4. A recent statistical analysis by Ogawa shows that LH bisyllables in the SJ stratum favor the unaccented pattern over the accented one. This creates a marked asymmetry with HL bisyllables, most of which take the initial accent pattern (Ogawa, 2004).
5. This constraint does not exert a visible effect in HL native words. HL words choose

the initial accent at a higher rate than LH words (the difference being nearly significant by a chi-square test: $p=.0565$). However, they do not exhibit a difference from LLL words ($p=.4415$).

6. A certain number of monomoraic and bimoraic morphemes are ‘deaccenting’ morphemes (McCawley, 1968) and yield unaccented compound nouns when they are in compound-final position: e.g., *ne.zu.mi + i.ró* → *ne.zu.mi-iro* ‘rat, color; ash gray’. Moreover, over 70% of four-mora compound nouns consisting of two bimoraic native nouns become unaccented without obeying the CA rule: e.g., *tá.ne + u.si* → *ta.né-u.si* ‘seed, cattle; breeding cattle’ (Kubozono and Fujiura, 2004). However, those that are accented are usually accented on the final syllable of N_1 , as correctly predicted by (12a): e.g., *wa.tá + a.me* → *wa.tá-ame* ‘cotton, candy; candy floss’.
7. Both /*karedonia*/ and /*kariforunia*/ become unaccented due to the pseudo-ending /*ia*/, which often (but not always) creates unaccented words. These unaccented nouns should be clearly distinguished from four-mora unaccented loanwords like /*a.me.ri.ka*/ ‘America’ which will be discussed in section 4: the former is lexically marked, while the latter can be derived by phonological rules.
8. For example, words adapted from French show a variation between $\acute{H}LL\#$ and $\acute{H}\acute{L}L\#$, the latter of which seldom occurs in loanwords from English.
9. It is worth adding that the CA rule that is described here applies to compound nouns in general, not just to those with a native N_2 . See Kubozono (1995, 1997) for details.
10. Note that these pre-antepenultimate patterns are not attested in native and SJ words. Many SJ words have the same syllable structures, but being morphologically complex, they are accented on the penultimate light syllable by the CA rule, or by the principles in (15b,c): e.g., *gá.ku + món* → *ga.kú-mon* ‘learning’, *yoo.ti + én* → *yoo.tí-en* ‘kindergarten’, *ká.ku + rí.ron* → *ka.ku-rí.ron* ‘nuclear theory’, *kú.ro + sa.tóo* → *ku.ro-zá.too* ‘brown sugar’ (Kubozono, 1995, 1997).
11. That syllable structure as well as mora length plays a pivotal role in giving rise to unaccented loanwords has also been corroborated by my recent analysis of so-called alphabetic acronyms such as /*zyee.áa.ru*/ ‘JR, Japan Railways’, /*e.nu.ei.ti.kée*/ ‘NHK, Nihon Hoso Kyokai’ and /*e.su.e.ru*/ ‘SL, steam locomotive’ (Kubozono, 2003).

12. Our data contain 14 four-mora loanwords with the structure /..LL#/ that end in the vowel /i/. Only two instances of these end in an epenthetic vowel <i>, e.g., /bo.r<u>.s<i>.t<i>/ ‘bors(h)ch’, while all others end in a non-epenthetic /i/, e.g., /ma.ka.ro.ni/ ‘macaroni, a kind of pasta’. Interestingly, all these are borrowed as unaccented words. In the absence of a sufficient number of words, it is not clear whether epenthetic <i> behaves differently from epenthetic <u> and <o>.
13. The recent work by Kubozono and Fukui (forthcoming) demonstrates that these three factors are at work in Osaka Japanese, too. Namely, the three phonological factors are responsible for the emergence of the unaccented pattern in loanwords in Osaka Japanese just as they are in Tokyo Japanese.
14. SJ words are also rich in heavy syllables and epenthetic vowels but they do not favor the accented patterns over the unaccented one as much as loanwords do. This difference will be discussed in section 5.1 below.
15. In this analysis, /bi.tá.min/ ‘vitamin’ and /á.ma.zon/ ‘Amazon’, for example, become accented rather than unaccented because of the final heavy syllable, but this heavy syllable itself is not accented to satisfy the Nonfinality constraint.
16. This raises the fundamental question of how epenthetic vowels are stored in the lexicon. This remains an open question for future work.

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