

A Study of the Correlation Between Durational Mistakes and Pitch Pattern in English Speaker's Production of Japanese

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<Introduction>

When Japanese language teachers hear students pronouncing Japanese poorly, they tend to correct the mistakes by transcribing them and pointing out the differences as follows:

daigak <u>ku</u>	->	daigaku
subarash <u>i</u>	->	subarash <u>ii</u>

However, corrections such as these do not produce a long term effect unless the fundamental problem is solved, which is the acquisition of Japanese rhythm. The rhythm of a language is ruled by its prosodic features, such as accent pattern, segmentation units and intonation. What is happening in the above example is that the speaker is using English prosody on a Japanese sentence. English listeners use different prosodic parsing strategies, such as syllabic segmentation and feet, and put the stress accent on certain vowels, none of which are appropriate to Japanese prosody. In this paper I will focus on the durational mistakes of the geminate consonant and consider the cause of these mistakes in relation to pitch pattern by examining students' speech data. Before examining the actual data, I will discuss the differences in English and Japanese prosody in terms of their prosodic units and accent pattern. At this stage the discussion will focus on the problems at a word level.

1. Prosodic unit - syllable structure in English and Japanese

The following diagram shows how English speakers respond to the Japanese word "hon".

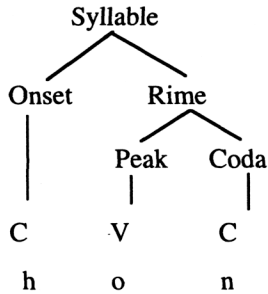


Figure 1: Syllable structure of English as exemplified with the Japanese word /hon/

The major boundary within a syllable comes between onset and rime, and the peak is more closely related to coda than to onset. The basic concept of syllable can be well explained by the Sonority Sequencing Principle (SSP). Sonority is a relative loudness to other sounds with the same length, stress and pitch. (Ladefoged:1982) The scale of the sonority is marked highest in vowels and lowest in obstruents, as follows:

vowels

glides (semi vowels,[y][w])

liquids (r,l)

nasals (m,n,n)

obstruents (fricatives and stops)

Most primitive syllable inventories are CV, VC, V, CVC (C= consonant. V= vowel).

A vowel is usually regarded as a peak of sonority in a syllable, that is the core of a syllable. In most languages of the world vowels are the only possible syllabic nuclear (Trubetzkoy:1969). The following are possible patterns of syllable structure in English:

Table 1: Syllable structure

Word	Structure	Onset	Rime	
			Nucleus	Coda
I	VV		aɪ	
it	VC		ɪ	t
go	CV	g	o	
pit	CVC	p	ɪ	t
grasp	CCVCC	gr	æ	sp
strands	CCCVCC	str	æ	nz

SSP further explains the possible sequence of consonant clusters in Onset and Coda. For example, in the onset and coda of the word, *grasp*, [g] and [p] are less sonorant than [r] and [s] respectively. This means that the sequence of consonants in a syllable is also ruled by a sonority hierarchy, and explains why the consonant clusters, such as "nt" or "ls", in onset position are not possible in English. However, some problems, such as "strands" remain. In the sequence of "str", [s] is higher in the sonority hierarchy than [t] and it violates SSP. A similar case occurs in the plural suffix [s] in "sticks". Giegerich (1992) treats these as appendices and distinguishes them from core syllables. Therefore, if we exclude the appendices as exceptions, a core syllable is associated with a single sonority peak. This sonority cycle also correlates with articulatory action.

For Japanese speakers the syllable structure as shown in Figure 1 is hard to accept for a number of reasons. First, the internal boundary of 'hon' comes between the peak 'o' and coda 'n'. In careful speech 'hon' is pronounced as two units 'ho' and 'n'. This concept is largely based on the fact that in the Japanese orthography Kana, the corresponding patterns are limited to CV, V, CCV (the second consonant is limited to

the glide [j]), N (nasal coda), and Q (geminate consonant). The CV type is the simplest structure of a syllable and is called a mora. Therefore syllabification in Japanese has been widely identified with moraic segmentation by native speakers and some scholars. Kindaichi was one of the scholars who insisted that there is no other syllable structure than the mora in Japanese.

Some empirical research which supports the moraic segmentation is available. Kubozono(1989) found a unique pattern of substitution errors which occurred by splitting the syllable into CV/V or CV/N. They involve the split of complex (ie. long or diphthongal) vowels as well as of geminate consonants:

- a) zju.u -go **pa.a** - se.n - to (15%)
 -> zju.u - go **pa.n** - se.n - to
- b) ko - **ma.t** - te i - ru (be in trouble)
 - . ko - **ma.n** - te i - ru

Otake(1993) conducted a target detection test to investigate the most natural segmentation unit in Japanese. He found that CV targets in CVNVCV words were detected as easily as in CVCVCV words, suggesting that CV (mora) is the segmentation unit of speech in Japanese. On the other hand, the same type of study conducted with French listeners who would use a syllabic segmentation showed the predominance of CV target detection in CVCVCV and CVN in CVNVCV. However, there are some researchers who acknowledged that "hon" is commonly pronounced as one syllable and recognized the existence of both mora and syllable structure in Japanese. Arisaka (1940) called "hon" a phonetic syllable, and the moraic segmentation "ho-n", present in careful speech, they called a phonological syllable. The empirical researches mentioned above also have the possibility that the result can be affected by the orthography in native speaker's perception and the type of mora. Another