Two Proposals for the I.P.A.

Yoshiki NAGASE

Department of English, Kawasaki Paramedical College
Kurashiki 701-01, Japan.
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Abstract

In the following paper, I try to make two proposals for the I.P.A. (International Phonetic Alphabet). The first one is concerned with the defective gap in the I.P.A. chart-that is a semivowel in the velar place. The second proposal is made to remedy the descriptive falsity of the I.P.A., namely the incorrect characterization of the Japanese syllabic nasal.

1. The missing link

1-1 There are three sounds which are traditionally considered to be semi-vowels in general phonetics. First [j] which corresponds to the vowel [i], secondly [w] which corresponds to the vowel [u], and lastly [ɥ] which corresponds to the vowel [y] (e.g. French lui [lɥi]). However we have to stop to think if anything is missing. There are *four* kinds of high vowels. On the other hand there are only *three* kinds of semivowels recognized in the IPA chart.

bi-labial	palatal	velar
w/ɥ	j(ɥ)	ɸ(w)

You will easily notice what is missing, namely a semivowel in the velar place. Because theoretically there are *four* high vowels, consequently there must be *four* semivowels corresponding to the four high vowels, [j] for cardinal 1, [w] for cardinal 8, [ɥ] for cardinal 9 and *one* for cardinal 18. I will use the symbol [ω] for the last one.

	−back		back	
	+round	−round	+round	−round
vowel	y	i	u	ɯ
semi-vowel	ɥ	j	w	ω

The following is a comparison of the semivowel systems in English, French and Japanese.

English	ɸ	j	w	ɸ
French	ɥ	j	w	ɸ
Japanese	ɸ	j	ɸ	ω

1-2 Putting aside the French [ɥ] which have no direct relation to the comparison of Japanese and English, compare the semivowels in the above table. There is no difference in the front semivowel, but as for the back semivowels, the lip positions in Englith and Japanese are the opposite to each other. Compare pictures and spectrograms of Japanese [ω] and English [w] in appendix.

1-3 The distribution of the semivowel /w/ in the Japanese wa-line is as follows:

わ	ゐ	う	ゑ	を
wa	?i	?ɯ	?e	?o

As the Japanese /w/ appears only before the vowel /a/, Japanese speakers of English tend to drop /w/ before other vowels. This tendency may be expressed as the following surface phonetic constraint:

$$/w/ \longrightarrow \phi \qquad / \_\_ \begin{pmatrix} V \\ -low \end{pmatrix}$$

In Japanese, this constraint is valid only for the nativization of English loan words, although some linguists postulate the above as a synchronic rule. However in the synchronic phonology of present-day Japanese, the above rule cannot be considered a living and productive rule. The living rule is the inverse of the above:

$$\phi \longrightarrow /w/ \qquad / \_\_\_ \ a$$

(For detailed discussion, see Nagase (1977).)

Next let's turn to the ya-line. The distribution of /j/ is as follows:

や	い	ゆ	え	よ
ja	?i	jɯ	?e	jo

/j/ does not appear before the front vowels /i/ and /e/. Therefore, the Japanese /j/, unlike /w/, has the following P-rule which deletes /j/ before the [-back] vowels.

$$/j/ \longrightarrow \phi \qquad / \_\_ \begin{pmatrix} V \\ -back \end{pmatrix}$$

1-4 Summing up, there are two differences in semivowels between Japanese and English. First, there is the contrast in lip position for /w/. Secondly, there is the different distribution of semi-vowels. The first difficulty for learners will be solved by telling them to round their lips. The second will not be a serious problem when the following vowels are heterorganic to the preceding semivowels. For example, even though /wo/, /wi/ or /we/ do not exist in the Japanese syllabary, it is easy to first prononuce the vowel /u/ and then move to the vowels /o/, /i/ and /e/ until you have the glide /w/ between the the two. Next weaken the initial vowel /u/ until it loses the syllabicity. That is:

uo —— $u^{w}o$ —— $u^{w}o$ —— wo

ue —— $u^{w}e$ —— $u^{w}e$ —— we

ui —— $u^{w}i$ —— $u^{w}i$ —— wi

In the same way, you can introduce the semivowel /j/ with little difficulty:

ie —— $i^{j}e$ —— $i^{j}e$ —— je

However when these semivowels are followed by the homorganic vowels such as [u], [i], the above method does not work and it is very difficult for a Japanese to produce these sequences. Famous (or notorious?) examples are the pronunciation of 'woman' and 'yield'. Japanese pronounce them as [ɯ:maN] and [i:ld]. Thus as for the latter, the Japanese cannot distinguish it from 'eeled'. In order to correct the above mistakes, you have to round your lips until you produce a slight friction and then move to the following vowels. As for [j], bring your tongue a little closer to the palatal region than the vowel [i] until it causes a slight friction.

2. Nasal consonants

2-1 Little phonetic differences have been observed in the syllable-initial position between Japanese and English (in both languages [ŋ] cannot appear in the word-initial position). However when they appear syllable-finally, many differeces come out. For example when they appear in the word-final position, in English each [m], [n] [ŋ] has an independent status, whereas in Japanese they are realized as what we call the mora-nasal /N/ as a whole and the place of articulation is generally uvular. However the Japanese uvular nasal has no release at all ([N̚]), so for example the word /saN/ is pronounced as [sa$^{\tilde{a}}$N̚]. But because of its lack

of release, the final [N̄] can hardly be heard and it gives the auditory impression of being broken off immediately after the [ã] which anticipated the nasality of the following [N̄] (as if it were [sa ã]). Therefore there are some phoneticians who maintain that the final [N̄] is a nasalized vowel as their ears cannot catch the sound of the unreleased uvular nasal. There is a clear difference between the syllable-final nasalized vowel (as in French) and the small nasalized vowel [ṽ] followed by an unreleased uvular nasal[N̄] (that of Japanese) which nasalized the preceding vowel and itself is hardly audible. (Similar is the case of unreleased stops (as in Thai) which can hardly be distinguished by the non-native speaker even if he is a phonetician unless he looks at the speaker's articulation.)[1)]

2-2 I.P.A.'s falsehood

According to the IPA chart and statement of principles, the International Phonetic Association recognizes the Japanese syllabic nasal as a phonetic sign. The principles say:

> ɳ is syllabic. Finally it is pronounced in various ways indiscriminately, the most usual values being ɒ̃, õ̰, ũ or ỹ: vowels preceding it are generally nasalized.[2)]

The above quotation clearly shows that ɳ has not a phonetic function but a phonemic one. Though it would be excusable to take it as a *phonemic* sign (for the phonological setting of the Japanese syllabic-nasal ɳ is not without problems), this IPA's treatment of it as a *phonetic* sign is out of the question. As Hattori pointed out (1951)[3)], this is almost equal to abandoning the phonetic analysis.

2-3 Weakening in intervocalic position.

When /N/ is followed by vowels (the following syllable beginning with a vowel), /N/ is realized not as a stop but as a weakened continuant, because the approximation between the uvular and the back of the tongue results in the air being expired through both nasal cavity and mouth cavity, so that the sound thus produced has the nature of a nasal vowel. The place of articulation of the nasal vowel is assimilated to the following vowel. This will be expressed as:

$$\begin{pmatrix} C \\ +\text{nasal} \end{pmatrix} \longrightarrow \begin{pmatrix} V \\ +\text{nasal} \\ \alpha\ \text{place} \end{pmatrix} / \quad \_\_ \quad \$ \begin{pmatrix} V \\ \alpha\ \text{place} \end{pmatrix}$$

However the above rule does not attain the status of a true generalization of the process, because the process is actually the operation of two processes. One

is segment weakening in intervocalic position (like voiced stops in relation to fricatives). The other is the assimilation rule in the place of articulation. Therefore I reject the above as only an *ad hoc* rule and regard the process as the application of the following two rules:

$$\textit{reduction} \quad \begin{pmatrix} C \\ +\text{voi} \\ -\text{coro} \\ \langle +\text{nasal} \rangle \end{pmatrix} \longrightarrow [+\text{cont}] \;/\; V \_\_\_ \langle \$ \rangle V$$

$$\textit{assimilation} \quad \left\{ \left\langle \begin{bmatrix} C \\ V \\ +\text{nasal} \end{bmatrix} \right\rangle \right\} \longrightarrow [\alpha \text{ place}] \;/\; \_\_\_\_\_ \langle \$ \rangle [\alpha \text{ place}]$$

Sequential application of the above two rules will yield the required form.

2-4 The first rule for the neutralization of word-final nasals is empirically justified if we look at examples of loan word adjustment when English words are Japanized. The following examples attest the presence of the nasal neutralization rule:

pen [pen] ⟶ peN̄
comfortable [kʌ́nfətəbl] ⟶ [kaN̄ ϕ otaburɯ]
pingpong [piŋpoŋ] ⟶ [pim poN̄]

In the case of the word-final [ŋ], it is rarely realized as an unreleased velar nasal [N̄]. In most of cases [g] is inserted after [ŋ] and the vowel [ɯ] is added to it. This type of adaptation is seen, for example, in the case of the English word 'gang.' It is realized in Japanese not as [gaN̄] but as [gaŋgɯ]. Therefore Japanese have the following rule:

$$\phi \longrightarrow g \;/\; ŋ \;\$ \;\_\_\_$$

So it's hardly possible for a Japanese to distinguish a pair like the following:

longer [lɔŋə] (person who longs for)
longer [lɔŋgə] (the comparative degree)

2-5 Pedagogical points.

As shown above on the neutralization rule of word-final nasals, Japanese cannot tell the differences among word final m, n and ŋ. So what teachers should keep in mind is the difference in the places of articulation——m-bilabial, n-alveolar, and ŋ-velar. Next, in order to prevent the neutralization rule from being applied, insert the vowel [ɯ] after each nasal consciously ([mɯ], [nɯ] and[ŋɯ]) until students articulate each nasal at the proper place. Then the vowel [ɯ] can be

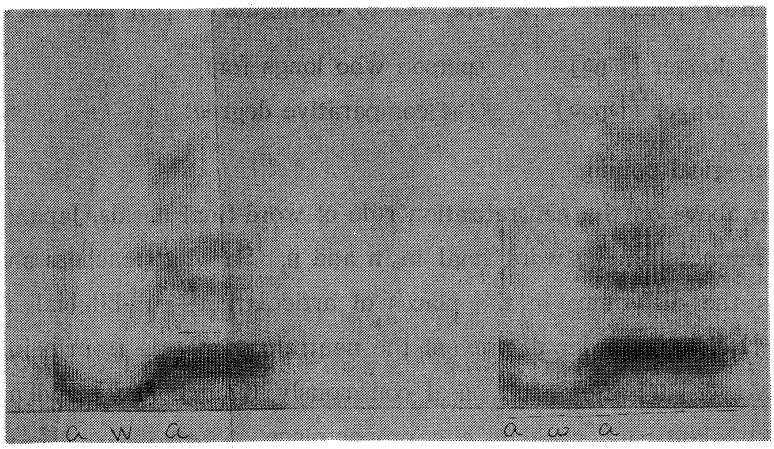
weakened later. In English these word-final nasals are usually released, whereas Japanese speakers, even when their articulation is right, tend to get rid of the release (producing only the closure and the hold). It is hardly possible for the ear to catch the differences among [m̚], [n̚], and [ŋ̚]. As a first approximation, it would be better to teach students always to pronounce them with a release.

2-6 The small difference between the Japanese and English word-initial nasals which we have put to one side in section 1 is that of the palatalization of /n/ before /j/ and /i/. Like other lines of the syllabary, the na-line has also a yo-on (palatalized sounds) series. Palatalization occurs in English, too. However there is a clear difference between the two languages on this point. As we have seen before, English palatalized phonemes [ʃ, ʒ, tʃ, dʒ] are all palato-alveolar. On the other hand the Japanese equivalents are all alveolo-palatal [ɕ, ʑ, tɕ, dʑ]. Similar is the case of [n] before [i] and [j]. In English [n] before [i] and [j] will be expressed in more exact transcription as [ȵ], whereas quite a few Japanese pronounce the so-called 'yo-on' with true palatal sound (i.e. [ɲ]). This is due to the unity and independence of each mora as with other morae. What we have to remember is not to substitute the Japanese [ɲ] for the English [nj] and [ȵ]. This is also a difference in the place of articulation, coronal for English and non-coronal for Japanese.

Appendix.

1. Spectrograms of English /w/ and Japanese /w/.
   1. English /w/
   2. Japanese /w/

   Notice the characteristic difference seen in the on-glide to the second *a*.



2. Lip forms of Japanese /w/ and English /w/.

Front view Side view

aωa

aωa

awa

awa

Note the contrasts in lip forms.

Notes

1. For this original view, see K. Sakuma (1929). He called it 'nyubi-on', just like 'nyuha-on' referring to unreleased stops (pp.192-170). There he used the symbol [ɲ] for it, saying that there is no proper symbol in the IPA chart which can characterize the Japanese mora nasal. But I believe the IPA symbol [N] (uvular nasal) with the diacritic ˺ (meaning unreleased) do the same job in the word-final position.

$$\begin{bmatrix} C \\ +\text{Nasal} \end{bmatrix} \longrightarrow \underline{N} \; / \; \text{——} \; \#$$

2. *The Principles of the International Phonetic Association* (London: International Phonetic Association, 1944) p. 44
3. Hattori, S., *Onseigaku*, (Tokyo: Iwanami, 1951,) p. 128