

A TENTATIVE CLASSIFICATION OF PRONUNCIATION ERRORS IN ENGLISH AS A FOREIGN LANGUAGE

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I. Introduction

1.1 In his "General Introduction" to the Contrastive Structure Series, Charles A. Ferguson, General Editor, affirms that a careful contrastive analysis of the native language and the target language offers an excellent basis for the preparation of instructional materials.⁽¹⁾ It is true that years of teaching experience tell the foreign language teacher where the difficulties lie, and how to overcome the trouble spots in the target language, but a systematic analysis will serve as a framework for locating the learning problems, the reason why such problems occur, and their possible remedies. There are some contrastive studies of English and Japanese already published and more refined analysis will be published in the future, as linguistic science develops.⁽²⁾

(1) William G. Moulton, *The Sounds of English and German*, (The University of Chicago Press, 1965), p. v.

(2) Minoru Toyota lists Edward Gauntlet, *The Elements of Japanese and English Phonetics for the Use of Japanese Teachers of English*, (Saneido, 1905); and William B. Pettus: *Phonetics: A Comparison of English and Japanese*, (Kyobun-Kan, 1914), which may be the earliest works of this kind, in his *Nichi-Eigo Hikaku Onseigaku* (Comparative Phonetics of Japanese and English), (Kenkyusha, 1944). Others are listed in the "Selected Bibliography" at the end of this article.

1.2 The ultimate purpose of the present study is to classify predictable pronunciation errors or substitutions of the English segmental phonemes and their allophones by the Japanese learner of English. The classification of those errors or substitutions are modelled after that of Moulton: (1) phonemic errors, (2) phonetic errors, (3) allophonic errors, and (4) distributional errors.⁽³⁾

1.3 Before we proceed to our main task, an interpretation of the segmental phonemes of English and Japanese with their respective allophones is in order. Ideally, a dialect of English should be compared with a dialect of Japanese. In this article, we generally follow the analysis of American English by Ota, and that of Japanese by Hattori, with some modifications.⁽⁴⁾

II. Interpretation of English and Japanese Vowel Phonemes

2.1 In English there are seven vowel phonemes: /i, e, æ, ə, a, u, o/, as against five vowel phonemes: /i, e, a, u, o/ in Japanese. Chart I reveals that (1) in Japanese /æ, ə/ do not occur; (2) the English back vowels are relatively lower and more backward than those of Japanese; (3) in English, only the back vowels /u, o/ are rounded, whereas in Japanese, all the vowels are unrounded; and (4) in Japanese,

(3) William G. Moulton, "Toward a Classification of Pronunciation Errors," *Modern Language Journal*, Vol. XLVI, No. 3, pp. 101-109.

(4) Akira Ota, *Beigo Onsoron* (The Phonemics of American English). (Kenkyusha, 1959); "Nichi-eigo no Ontaikei no Hikaku," (Comparison of the Sound Systems of Japanese and English), in *Gendai Eigo Kyoiku Koza* (Modern English Teaching Series). (Kenkyusha, 1965).

Shiro Hattori, *Gengogaku no Hoohoo* (Methods in Linguistics). (Iwanami-shoten, 1960).

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/i/, /a/, /u/, and /o/ have a devoiced vowel respectively, whereas in English, such allophones do not occur. Therefore, these differences in the vowel systems cause troubles in learning English.

Chart I. A Parallel Description of English and Japanese⁽⁵⁾
Vowel Phonemes & Their Allophones

English	Japanese
/i/:[i] Voiced, unrounded, lower high-front, lax. e.g. <i>it, bit</i>	/i/:[i] Voiced, unrounded, high-front, tense. e.g. <i>ito, biyooiin</i> : _i [i] In environment of unaccented Cvl — Cvl & Cvl — #. e.g. <i>kita, sansenti</i>
/e/:[e] Voiced, unrounded, lower mid-front, lax e.g. <i>any, bet</i>	/e/:[e] Voiced, unrounded, mid-front, tense. e.g. <i>eda, denki, kome</i>
/æ/:[æ] Voiced, unrounded, low-front, tense. e.g. <i>act, bat</i>	
/ə/:[ə] Voiced, unrounded, mid-central, lax. e.g. <i>above, but, the</i>	
/a/:[a] Voiced, unrounded, low-back, lax. e.g. <i>oven, not</i>	/a/:[a] Voiced, unrounded, low-central, tense. e.g. <i>atama, tabi, mada</i> : _a [a] In environment of unaccented Cvl — Cvl & Cvl — #. e.g. <i>taki, komattia</i>

(5) The following diacritical marks and abbreviations are used: //: phoneme, []: allophone, [◌]: devoiced, V: vowel, S: Semi-vowel, C: consonant, vl: voiceless, —#: before pause. Romanized Japanese is that of the *Kunren-shi* (Official System).

<u>/u/</u> : [ɯ] Voiced, rounded, lower high-back, lax. e.g. <i>book</i>	<u>/u/</u> : [u] Voiced, unrounded, high-back, tense. e.g. <i>usiro, kazu</i> : <u>[ɯ]</u> In environment of unaccented Cvl — Cvl & Cvl — #. e.g. <i>kusi, simasu</i>
<u>/o/</u> : [ɔ] Voiced, rounded, higher, low-back, lax. e.g. <i>caught, saw</i>	<u>/o/</u> : [o] Voiced, unrounded, mid-back, tense. e.g. <i>otoko, doro, shio</i> : <u>[ɔ]</u> In environment of unaccented Cvl — Cvl & Cvl — #. e.g. <i>toku, tiso</i>

2.2 English has diphthongs (/VS/), whereas Japanese has diphthongs (/SV/). An English diphthong is a blend of two elements, the first one is a vowel (/V/) and the second one an off-glide, or a semi-vowel (/S/); and the semi-vowels /y/, /w/ and /r/, with all the vowels can be combined to form a diphthong. A Japanese diphthong, on the other hand, is a blend of two elements, the first one is an on-glide, or a semivowel (/S/) and the second one a vowel. Their distributions are very limited: /y/ and /w/ are the only semi-vowel, and the vowels are /a, u, o/. Another limitation is that /t/ and /d/ never occur before /y/, but /čya/ and /zya/ instead. (See Chart II.)

Chart II. **A List of Japanese Diphthongs**⁽⁶⁾

<u>/ya</u> <u>yu</u> <u>yo</u> <u>wa</u> kya kyū kyo	<u>/gya</u> <u>gyu</u> <u>gyo</u>
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(6) The list follows that of Hattori, *Gengogaku No Hoho* (Method in Linguistics), (Iwanami, 1960³), p. 362. /ɲya, ɲyu, ɲyo/ are taken out since in the author's dialect /ɲ/ is non-phonemic, and /j/ in the book is transcribed as /y/ in this article.

pya	pyu	pyo	bya	byu	byo
nya	nyu	nyo	mya	myu	myo
rya	ryu	ryo	hya	hyu	hyo
sya	syu	syo	zya	zyu	zyo /
čya	čyu	čyo /			

In Chart III are shown some English diphthongs, in which the first elements are vowels comparable to Japanese vowels. Please note here that /VS/ tends to be rendered as /VV/ by the Japanese learner of English.

Chart III. A Description of English Diphthongs

English Diphthong	Possible Substitution
/iy/ : [i _̥ i] ⁽⁷⁾ Voiced higher high-front slightly tense vowel plus / y /. e.g. <i>eat, meet, key</i>	[ii] ([i] is a voiced high-front tense vowel.)
/ey/ : [e _̥ i] Voiced higher mid-front slightly tense vowel plus / y /. e.g. <i>eight, bay, mate</i>	[ei] ([e] is a voiced mid-front tense vowel.)
/ay/ : [a _̥ i] Voiced low-central slightly tense vowel plus / y /. e.g. <i>iron, buy, might</i>	[ai] ([a] is a voiced low-central tense vowel.)
/uw/ : [u _̥ u] Voiced higher high-back slightly tense vowel plus / w /. e.g. <i>ooze, boot, do</i>	[uu] ([u] is a voiced high-back tense vowel.)
/ow/ : [o _̥ u] Voiced mid-back slightly tense vowel plus / w /. e.g. <i>oat, coat, low</i>	[ou] ([o] is a voiced mid-back tense vowel.)

(7) ̥ in [i_̥i] indicates an off-glide.

2.3 To summarize the above discussion, the following chart will serve to show the relative tongue position of the vowels and diphthongs of English and the vowels of Japanese. (See Chart IV.)

Chart IV. **A Comparative Description of English Vowels and Diphthongs, and Japanese Vowels.**

	Front	Central	Back
High	/iy/ (English) /i/ (Japanese) /i/ (E)		/uw/ (E) /u/ (J) /u/ (E)
Mid	/ey/ (E) /e/ (J) /e/ (E)	/ə/ (E)	/ow/ (E) /o/ (J)
Low	/æ/ (E)	/ay/ (E)	/o/ (E) /a/ (J) /a/ (E)

III. Interpretation of English and Japanese Consonant Phonemes

3.1 English and Japanese consonants differ in the number and articulation. The following inventory according to the manner of articulation reveals the differences. (See Chart V.)

Chart V. **A Comparative List of English and Japanese Consonant Phonemes**

Manner of Articulation	Consonant Phonemes
Stops	English: /p/, /b/, /t/, /d/, /k/, /g/ Japanese: /p/, /b/, /t/, /d/, /k/, /g/
Fricatives	English: /s/, /z/, /h/, /f/, /v/, /θ/, /ð/, /ʃ/, /ʒ/ Japanese: /s/, /z/, /h/

Affricates :	English : /č /, /j / Japanese : /č / ⁽⁸⁾ —
Nasals :	English : /m /, /n /, /ŋ / Japanese : /m /, /n / —
Lateral :	English : /l / Japanese : —
Retroflex :	English : /r / Japanese : —
Flap :	English : — Japanese : /r /
Semi-vowels :	English : /w /, /y /, /r / Japanese : /w /, /y /, —
Morae :	English : — — Japanese : /N /, /Q /

3.2 From the above chart, it can easily be concluded that (1) Japanese lacks fricatives /f /, /v /, /θ /, /ð /, /š /, /ž /, an affricate /j /, a nasal /ŋ /, a lateral /l / and a semi-vowel /r /; (2) the Japanese flap /r / is different in the manner of articulation from the English /r /; and (3) the Japanese morae /N / ('syllabic nasal') and /Q / ('choked sound') are unmatched in the English consonant phonemes. The Japanese learner of English has difficulties in mastering sounds in (1) and (2), and in a minor degree, his linguistic habit could be transferred into English in (3).

3.3 When we examine the positions of articulation, we notice the

(8) The usual transcription is /c /, but /č /:[ts, tɕ] is used in contrast with the English /č /:[tʃ]. See Mieko Shimizu Han, *Japanese Phonology*, (Kenkyusha, 1962), p. 52.

following differences in Chart VI.

Chart VI. A Comparative Description of Articulation Differences

English		Japanese	
/s/	alveolar grooved	/s/	alveolar fricate
/z/	fricative	/z/	or sometimes affricate
/č/	alveopalatal affricate	/č/	prepalatal affricate
/r/	post-alveolar retroflex	/r/	alveolar flap [r]
/w/	rounded bilabial semi-vowel	/w/	unround bilabial semi-vowel

Minor differences in such phonemes as English / k / and Japanese / k / are omitted from the above chart, because they may not constitute a 'foreign accent' or a 'foreignism.' Their allophones are discussed elsewhere.

3.4 The non-phonemic features of consonants should be compared as a next step.⁽⁹⁾ The distribution of allophones in English is much wider than that of Japanese. The unawareness of such non-phonemic features might cause mishearing or might give an impression of a 'foreign accent.'

3.4.1 Aspiration

The English / p /, / t /, / k / have aspirated allophones [p^h], [t^h], [k^h], which are much strongly aspirated than the Japanese counterparts. These allophones occur in syllable initial position or as the first

(9) Though there are almost limitless varieties of features, only prominent features are discussed. For more details, See Arthur J. Bronstein, *The Pronunciation of American English*, (Appleton-Century-Crofts, Inc., 1960); Charles K. Thomas, *An Introduction to the Phonetics of American English*, 2nd Ed, (Ronald, 1958).

member of a consonant cluster. e.g. *pen, tan, cool; pray, tray, clay*. But those /p/, /t/, /k/ are not aspirated if they are the second member of a consonant cluster. They are symbolized as [p], [t], [k]. e.g. *spin, stink, skin*.

3.4.2 Release.

The same /p/, /t/, /k/ have another type of allophones, that is, unaspirated ones, [p⁻], [t⁻], [k⁻]. They occur before another stop consonant and before pause. e.g. *apt, at ten, act; top, cot, rock*. Before pause, [p^h], [p], [p⁻]; [t^h], [t], [t⁻]; [k^h], [k], [k⁻] are free variation.

3.4.3 Nasal Release.

The English /p/, /b/, /t/, /d/, /k/, /g/, /s/, /z/ are released nasally, that is, through the nose, not through the usual oral cavity, when they occur before syllabic nasals. e.g. *keep 'em* [kiɪpm̩]
 button [bət̩n̩] ribbon [rɪb̩n̩] sudden [səd̩n̩]
 reckon [rɛk̩n̩] wagon [wag̩n̩] listen [lɪs̩n̩]
 reason [riːz̩n̩]

Japanese, on the other hand, has allophones of /N/, whose sounds are similar to the English syllabic nasals. They occur before consonants or before pause.

The allophone [ɱ] occurs before /p/, /b/, /m/.

e.g. /siNboku/ [sim̩boku] /roNpyo/ [rom̩pyo]
 /saNmai/ [sam̩mai]

The allophones [ɲ] or [ɳ] occurs before other consonants than /p/, /b/, /m/ and before pause.⁽¹⁰⁾

(10) [ɲ] is a free variation with [n] in the author's dialect.

- e.g. Before /t/ as in /hoNtaku/ [hoŋtaku]
 Before /d/ as in /siNdai/ [siŋdai]
 Before /k/ as in /saNko/ [saŋkɔ]
 Before /g/ as in /saNgyo/ [saŋgyo]
 Before /s/ as in /haNsi/ [haŋɕi]
 Before /z/ as in /haNzaču/ [haŋzatsɯ]
 Before /n/ as in /hoNniN/ [hoŋniŋ]
 Before /h/ as in /siNhaNniN/ [siŋhaŋniŋ]
 Before /r/ as in /hoNryo/ [hoŋryɔ]
 Before /w/ as in /daNwa/ [daŋwa]
 Before /y/ as in /siNyaku/ [ɕiŋyaku]
 Before /i/ as in /koNiN/ [koŋiŋ]
 Before /e/ as in /hoNei/ [hoŋei]
 Before /a/ as in /reNai/ [reŋai]
 Before /u/ as in /siNuči/ [ɕiŋutɕi]
 Before /o/ as in /keNon/ [keŋoŋ]
 Before pause as in /Sato-saN/ [satɔsaŋ]

3.4.4 Lateral Release.

The English /t/, /d/, /k/ and /g/, influenced by the lateral consonant /l/, are released nasally. e.g. mental [mentɿ], meddle [medɿ], pickle [pikɿ], giggle [gigɿ]

3.4.5 Devoicing.

The on-glide and off-glide of voiced stops and fricatives are devoiced, and symbolized as [ᵇb, bᵇ, ᵈd, dᵈ, ᵑg, gᵑ, ᵝv, vᵝ, ᵞð, ðᵞ, ˥z, z˥, ˥ʒ, ʒ˥] e.g. *bag, tub, dog, get, tag, vale, valve, that, breathe, zig, bags, rouge.*

The retroflex /r/ is devoiced after /p/, /t/, and /k/ as in *pray*

[pɹeɪ], *tray* [tɹeɪ], *cream* [kɹiɪm], but not in *spray* [spreɪ], *stray* [streɪ], or *scream* [skriɪm].

The semi-vowel /w/ is devoiced after /h/ as in *what*.

3.4.6 Voicing.

The Stop /t/ in English loses its voiceless quality,

- (a) between a stressed vowel and an unstressed vowel as in *butter* [bʌtər], *get at* [gɛtət];
- (b) before a syllabic /l/ as in *little* [lɪtəl], *battle* [bætəl];
- (c) between a non-syllabic /l/ and an unstressed vowel as in *malted* [mɔltɪd], *consulted* [kənsəltɪd];
- (d) between /n/ and an unstressed vowel as in *twenty* [twɛntɪ], *want to* [wántə];
- (e) between unstressed vowels as in *it is ...* [ɪtɪz], *at another* [ətənəðər⁽¹⁾].

3.4.7 Dentatization.

The alveolar stops /t/ and /d/, the alveolar nasal /n/ have another allophone, which is a dentalized stop. They occur before the dental fricatives /θ/ and /ð/. e.g. *lighth* [eɪtθ], *at the ...* [ətðə], and they ... [ənðeɪ], *breadth* [brɛdθ], *month* [mɛnθ], and then [ənðən].

3.4.8 Labiodentalization

The bilabial nasal /m/ has an allophone, which is a labiodentalized nasal. It occurs before the bilabial fricatives /f/ and /v/. e.g. *triumph* [traɪəmf], *circumvent* [sɜrkəmɤnt].

(1) Bronstein, *Op cit.* p. 74.

In the articulation of the alveolar nasal /n/, /n/ may be realized as [ŋ] as in *infant* [ɪnfænt], *invoice* [ɪnvɔɪs].

3.4.9 Lengthening

Lengthening of sounds is not phonemic in American English, but failure in lengthening may distort the pronunciation. For example, *dog* with a very short [ɔ] may sound like [dɒk]. It is generally stated that a vowel in English is longer before a voiced consonant than before a voiceless consonant; and that a vowel in a diphthong in word final position is longer than a vowel before a voiced consonant. e.g. *sit*, *seat*, *see*.

3.5 A parallel description of English and Japanese consonant phonemes is given in Chart VII. Included are the allophones with their environment, to clarify the allophonic differences.

Chart VII. A Parallel Description of English and Japanese
(12)
Consonant Phonemes.

/ Phoneme /: [Allophone]	Environment Example	/ Phoneme /: [Allophone]	Environment & Example
/p/:[p ^h]	# — V and # — C e.g. <i>pat</i> , <i>plate</i>	/p/:[p]	# — e.g. <i>parapara</i> ... — ... e.g. <i>rappa</i>
[p ⁻]	— C-stop and — # e.g. <i>napkin</i> , <i>cap</i>		
[p]	Elsewhere e.g. <i>speak</i>		
/b/:[b ^h]	# — e.g. <i>bag</i>	/b/:[b]	# — e.g. <i>boku</i>
[b ^h]	— # e.g. <i>knob</i>		... — ... e.g. <i>kibo</i>
[b]	Elsewhere e.g. <i>table</i>		

(12) # — V indicates that it occurs after pause and before a vowel.

... — ... indicates that it occurs medially.

— C-stop indicates that it occurs before a stop consonant.

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<p>/t/:[t^h]</p> <p>[t⁻]</p> <p>[t̚]</p>	<p># — V and # — CV e.g. <i>take, tray</i></p> <p>— C-stop and — # e.g. <i>Metcalf, put</i></p> <p>Ṽ — V, — , /l/ — Ṽ, /n/ — Ṽ, and Ṽ — Ṽ</p>	<p>/t/:[t]</p>	<p># — e.g. <i>toti</i> ... — ... e.g. <i>makoto</i></p>
<p>/d/:[d^h]</p> <p>[d^h]</p> <p>[d̚]</p> <p>[d]</p>	<p># — e.g. <i>dog</i></p> <p>— # e.g. <i>bud</i></p> <p>— /θ/, /ð/ e.g. <i>breadth, and then</i></p> <p>Elsewhere e.g. <i>bundle</i></p>	<p>/d/:[d]</p>	<p># — e.g. <i>denwa</i> ... — ... e.g. <i>kodomo</i></p>
<p>/k/:[k^h]</p> <p>[k⁻]</p> <p>[k]</p>	<p># — V e.g. <i>kick</i> — CV e.g. <i>cream</i></p> <p>— C-stop e.g. <i>bookcase</i></p> <p>Elsewhere e.g. <i>baking</i></p>	<p>/k/:[k]</p>	<p># — e.g. <i>kodomo</i> ... — ... e.g. <i>iki</i></p>
<p>/g/:[g^h]</p> <p>[g^h]</p> <p>[g]</p>	<p># — e.g. <i>gag</i></p> <p>— # e.g. <i>big</i></p> <p>Elsewhere e.g. <i>beggar</i></p>	<p>/g/:[g] or [ŋ]</p>	<p># — e.g. <i>goban</i> ... — ... e.g. <i>kagoya</i></p>
<p>/tʃ/:[tʃ]</p>	<p># — e.g. <i>church</i> ... — ... e.g. <i>kitchen</i> — # e.g. <i>birch</i></p>	<p>/tʃ/:[tʃ] [ts]</p>	<p>— /i/ e.g. <i>tiisai, mati</i> — /u/ e.g. <i>tuki, nimotu</i></p>
<p>/f/:[f]</p>	<p># — e.g. <i>fife</i> ... — ... e.g. <i>fifth</i> — # e.g. <i>knife</i></p>		
<p>/v/:[v^h]</p> <p>[v^h]</p> <p>[v]</p>	<p># — e.g. <i>valve</i></p> <p>— # e.g. <i>have</i></p> <p>Elsewhere e.g. <i>wives</i></p>		
<p>/θ/:[θ]</p>	<p># — e.g. <i>thin</i></p>		

	... — ... e.g. <i>pathway</i> — # e.g. <i>youth</i>		
/ð/:[ð̥ð] [ð̥̥] [ð̥]	# — e.g. <i>then</i> — # e.g. <i>breathe</i> Elsewhere e.g. <i>bathing</i>		
/s/:[s]	# — e.g. <i>sit</i> ... — ... e.g. <i>missing</i> — # e.g. <i>bus</i>	/s/:[s] [ç]	— /e, a, o, u/ e.g. <i>sensei, san, sosen, sumi</i> — /i/ e.g. <i>sinsen</i>
/z/:[z̥z] [z̥̥] [z]	# — e.g. <i>zebra</i> — # e.g. <i>buzz</i> Elsewhere e.g. <i>cousin</i>	/z/:[z̥] or [d̥z] [z̥] or [d̥z̥]	— /e, a, o, u/ e.g. <i>zembu, zaisei, zoori, mizu</i> — /i/ e.g. <i>ziman</i>
/r/:[r̥] [r]	# /t, d, p, k/ — V e.g. <i>tree, dream, pray, clean</i> Elsewhere e.g. <i>scream, right</i>	/r/:[r̥]	# — e.g. <i>rasen</i> ... — ... e.g. <i>korera</i>
/h/:[h̥] [h̥̥]	# — e.g. <i>happy</i> ... — ... e.g. <i>behave</i>	/h/:[h̥] [Φ] [ç]	— /e, a, o/ e.g. <i>henzin, hannin, homare</i> — /u/ e.g. <i>husigi</i> — /i/ e.g. <i>higeki</i>
/ʃ/:[ʃ̥]	# — e.g. <i>shell</i> ... — ... e.g. <i>washer</i> — # e.g. <i>bush</i>		
/ʒ/:[ʒ̥̥] [ʒ̥̥̥]	— # e.g. <i>prestige</i> ... — ... e.g. <i>measure</i>		
/m/:[m̥]	/p, b/ — e.g. <i>album, keep'em</i>	/m/:[m̥]	# — e.g. <i>matti</i> ... — ... e.g. <i>someru</i>

[ŋ]	— / f, v / e.g. <i>comfort</i> , <i>converse</i>		
[m]	Elsewhere e.g. <i>machine</i>		
/n/:[ɲ]	/t, d/ — e.g. <i>button</i> , <i>sudden</i>	/n/:[n]	# — e.g. <i>nami</i> ... — ... e.g. <i>konami</i>
[ɲ]	— / θ, ð / e.g. <i>tenth</i> , <i>at the</i>		
[n]	Elsewhere e.g. <i>name</i>		
/ŋ/:[ŋ]	... — ... e.g. <i>king</i> ... # e.g. <i>being</i>		
/l/:[ɭ]	/t, d, n/ — e.g. <i>littie, bundle, tunnel</i>		
/w/:[ʍ]	/h/ — e.g. <i>what</i> # — e.g. <i>water</i> ... — ... e.g. <i>away</i>	/w/:[w]	# ... e.g. <i>waka</i> ... — ... e.g. <i>kuwa</i>
/y/:[y]	# — e.g. <i>yeast</i> ... — ... e.g. <i>beyond</i>	/y/:[y]	# — e.g. <i>yomiya</i> ... — ... e.g. <i>koyomi</i>

IV. Distribution of Phonemes

4.1 The favorite canonical shape or syllable structure in Japanese is /C(S)V(M)/, in which S(semi-vowel) and M(mora) are optional, and S is either /w/ or /y/, M being either /N/ or /Q⁽¹³⁾/. In English, on the other hand, the favorite canonical shape is /CV(S)C/, in which S

(13) In Hattari (1960³), p. 360, /CV/, /CVV/, /CVN/, /CVQ/, /CSV/, /CSVV/, /CSVN/, /CSVQ/ are the Japanese syllable structures. /VV/ is considered a sequence of two same vowels. If these two are different, it is transcribed as /V'V/, Cf. /kaado/ and /ka'o/.

is an optional semi-vowel. In other words, CV sequences in Japanese never take a final consonant except /N/ and /Q/, whereas English has CVC sequences with a final consonant.⁽¹⁴⁾

4.2 Another feature in the English structure is that it can have a cluster of as many as three initial consonants before a vowel, and a cluster of as many as four final consonants after a vowel or a semi-vowel. Only one consonant can occur in the initial position in Japanese, which poses a great deal of trouble for the Japanese learner of English.

V. Classification of Pronunciation Errors

5.0 From the foregoing inventory of English and Japanese phonemes, allophones and their distribution, we can presume the differences between the two languages, which may lead to mispronunciation and mishearing. Such differences result in distortion, substitution, addition, or omission of sounds on production level, and confusion, embarrassment or laughter on recognition level. Those phenomena are generally called a 'foreign accent' or a 'foreignism.' In this chapter, predictable errors or possible substitutions will be classified as described below.⁽¹⁵⁾

5.0 A. Phonemic errors.

Phonemic errors are predictable if English has phonemes which are unmatched in Japanese.

(14) For a quantitative study of the English canonical shape, see A. Hood Roberts, *A Statistical Linguistic Analysis of American English*, (Mouton, 1965), pp. 48-51.

(15) There are some overlaps in entries. For example ɟ [ši] is treated both in allophonic errors and in distributional errors.

B. Phonetic Errors.

Phonetic errors are predictable if both English and Japanese have comparable phonemes, but with phonetically different allophones.

C. Allophonic errors.

Allophonic errors are predictable if the corresponding phonemes in English and Japanese share partially similar, yet partially different allophonic features.

D. Distributional Errors.

Errors in distribution are predictable if the corresponding phonemes are differently distributed in both languages.

5.1 Phonemic Errors.

The Japanese learner of English may use the wrong phoneme with somewhat similar manner of articulation for the vowels and consonants in English.

Type 1 J / O : A / ⁽¹⁶⁾ E

English has phonemes which are unmatched in the phonemic system of Japanese. (See Chart VIII.)

Chart VIII. **A List of English Phonemes Non-existent in Japanese.**

English Phonemes	Possible Substitutions	Minimal pairs, where possible
/æ/	/a/	<i>hat-hot</i>
/ə/	/a/	<i>hut-hot</i>
/f/	/h/	<i>food, hood ; fail-hale</i>
/v/	/b/	<i>vale-bail</i>
/θ/	/s/	<i>thin-sin</i>
/ð/	/z/	<i>then-zen</i>
/l/	/r/	<i>light-right</i>

(16) For example, J / / : / / E reads that Japanese phoneme versus English phoneme.

Type 2 $J/A:O/E$

English lacks phonemes which occur in the phonemic system of Japanese. This type seems not to affect the Japanese learner of English, but it is possible for him to distort some phonemes. Such distortion may arise partly because the orthographic representation of English is different from that of Japanese, as in doubling of letters, e.g. *hitting*. Some other examples are found in chart VIII.

Chart VIII. **A List of Orthographic Representation Differently Interpreted in Japanese.**

English	Possible Distortion	Example
-pp-	/-Qp / [-pp-]	<i>happen</i>
-tt-	/-Qt / [-tt-]	<i>batting</i>
-dd-	/-Qd / [-dd-]	<i>added</i>
-nn-	/-Nn- / [-n n-]	<i>running</i>
-mm-	/-Nm- / [-m m]	<i>summer</i>
-ng-	/-Ng- / [-n g]	<i>bring, bringing</i>

Type 3 $J[A \sim B]:/A/ \neq /B/E$

In Japanese, [A] and [B] are in complimentary distribution and, therefore, they are allophones of a phoneme. In English, however, these two phones are in contrastive distribution and, therefore, are different phonemes, /A/ and /B/. (See Chart IX.)

Chart IX. **A Comparative List of Allophones of Phonemes in Japanese as against Comparable Phonemes in English.**

Japanese	English	Mininal Pairs
/s/: [s]; [c]	/s/, /š/ [ʃ]	<i>sin-shin</i>
/z/: [dz~z]	/dz/, /z/	<i>roads-rose</i>
[dʌ, z]	/j/ [dʒ], /ž/ [ʒ]	<i>pledger-pleasure</i>
/g/: [g~ŋ]	/g/, /ŋ/	<i>hung-hug</i>

5.2 Phonetic Errors.

Type 4 J / A' / : / A / E

No Phones in Japanese have comparable counterparts in English which have exactly the same articulatory features. In the present article, we have seen the difference in the vowels of the two languages. In J [ɕ] vs. [ʃ]_E, J [tɕ] vs. [tʃ]_E, J [ɸɰ] vs. [dʒ]_E, J [z] vs. [ʒ]_E, and J [ɾ] vs. [r]_E, as symbolized in the foregoing chapters, indicate their differences. There are some others whose transcription does not indicate particular differences. (See Chart X.)

Chart X. A List of Phonetic Differences.

English	Possible Substitution in Japanese
[i], [e]	[i], [e] higher
[a], [u], [ɔ]	[a], [u], [o] more forward
[u], [ɔ], [w] lip-rounding	[u], [o], [w] no lip-rounding
[s], [z]	[s], [z] the tongue higher or toward dental
[ʃ], [tʃ], [dʒ], [ʒ] palato-alveolar	[ɕ], [tɕ], [dɰ], [z] alveolar-palatal or palatalized
[ɾ] post-alveolar retroflex	[ɾ] alveolar flap

When the Japanese student of English fails to observe the above cited differences, it will often give an impression of a 'foreign accent' or at the worst, it will cause incomprehensibility.

5.3 Allophonic Errors.

The Japanese learner of English tends to transfer his allophonic habits into English.

Type 5 J [A], [A'] : [A] E

Japanese overdifferentiates the English phonemes.

Chart XI. A Comparative List of Allophonic Differences — 1.

Japanese	English	Example
[n], [ɲ]	[n]	<i>knee</i>
[s], [ɕ]	[s]	<i>sin</i>
[g], [ŋ]	[g]	<i>bygone</i>

Type 6 J[A], [A']:[A'']_E

The allophones of a phoneme are different from the allophone of the corresponding phoneme in English.

Chart XII. A Comparative List of Allophonic Differences — 2.

Japanese	English	Example
[i], [i̥]	[ɪ]	<i>happy</i>
[a], [ḁ]	[ɑ]	<i>hot</i>
[ɯ], [ɯ̥]	[ʊ]	<i>put</i>
[o], [o̥]	[ɔ]	<i>caught</i>
[(d)z], [(d)z̥]	[z]	<i>zebra</i>
[ts], [tɕ]	[tʃ]	<i>lecture</i>
[ɕ], [Φ]	[h]	<i>hip, full</i>

Type 7 J[A]:[A], [A'], ([A''])_E

Japanese underdifferentiates the English phonemes. In other words, the Japanese learner of English tends to disregard the allophonic habits of English. As the result, this type is “by far the most difficult one to overcome.”⁽¹⁷⁾

Chart XIII. A Comparative List of Allophonic Differences — 3.

Japanese	English
[p], [t], [k]	[p], [t], [k] [p ^h], [t ^h], [k ^h] [p ⁻], [t ⁻], [k ⁻]

(17) Robert Lado, *Linguistics across Cultures*. (University of Michigan, 1957), p. 15.

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[t]	[t] [t̥]
[t], [d], [n]	[t] [d] [n] [t̥], [d̥], [n̥]
[d], [b], [g], [z]	[d], [b], [g], [z] [d̥d], [d̥b], [d̥g], [d̥z] [d̥b], [b̥b], [g̥g], [z̥z]
[m], [n]	[m], [n] [m̥], [n̥] [m̥]
[w]	[w] [ʍ]

Type 8 $J[A]:[A'], [A'']_E$

The allophone of a phoneme in Japanese is phonetically different from the allophones of the corresponding phoneme in English. This type also poses a great difficulty to overcome as Type 7 does.

Chart XIV. **A Comparative List of Allophonic Differences — 4.**

Japanese	English
[dz~z]	[z], [dʒ], [ʒ]
[d̥z~z̥]	[z̥], [d̥ʒ], [ʒ̥] [z̥z̥], [d̥ʒ̥], [ʒ̥ʒ̥]
[r]	[r] [ɾ]

5.4 Distributional Errors.

The Japanese student of English will make distributional errors if English has unmatched distribution of phonemes.

Type 9 $J/A/:/-A/E$

Both languages share comparable phoneme /A/, but /A/ in Japanese does not occur in /-A/ in English. Therefore, the Japanese student of English tends to add a vowel to /A/.

Chart XV. **A Comparative List of Phoneme Distribution — 1.**

English	Japanese	Example
/-t/, /-d/	/-to/:[t _o], /-do/:[d _o]	<i>pet, food</i>
/-č/, /-j/ /-k/	/-či/:[č _i], /-zi/:[z _i], /-ki/:[k _i]	<i>church, judge, cake</i>
/-p, -b, -k, -g, -s, -z, -v, -š, -ž, -l, -m/	add /u/:[u]	<i>top, tub, kick, bag, miss,</i>

Type 10 $J/A'B\sim AB'\sim CA/:/AB/E$

Both languages share comparable phonemes /A/ and /B/, but the sequence /AB/ does not occur in Japanese. Instead, either element of /AB/ will be replaced for (a) an allophone, (b) another phoneme, and (c) a third element will be added. (See Chart XVI.)

Chart XVI. **A Comparative List of Phoneme Distribution — 2.**

English	Possible Substitution	Example
(a) /si/	/si/:[ç _i]	<i>sip, ship</i>
/hi/, /hy-/	/hi/:[ç _i]; /hy-/:[çy-]	<i>hip, human</i>
/hu/	/hu/:[Φu]	<i>who'd, food</i>
(b) /iy/, /ey/	/ii/, /ei~ee/	<i>eat, eight</i>
/ay/, /oy/	/ai/, /oi/	<i>high, boil</i>
/ir/, /er/	/la/, /ea/	<i>pier, pair</i>
/ər/, /ar/	/aa/, /aa/	<i>fur, far</i>
/or/, /ur/	/oa/, /ua/	<i>for, poor</i>
/ti/, /tu/	/či/, /ču/	<i>tip, chip; two, chew</i>
/di/, /zi/, /du/	/ji/, /ji/, /zu/	<i>dip, zip; do, zoo</i>

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/ yi /, / ye /	/ ii /, / ie /	<i>yeast, east, yes</i>
/ ya /, / yu /, / yo /	/ ia /, / iu /, / io /	
/ wi /, / we /	/ ui /, / we /	
/ wa /, / wu /, / wo /	/ ua /, / uu /, / uo /	
(c) / CV- /	/ CyV- /	<i>cap</i> <i>gap</i> <i>shatter, shopping,</i> <i>shut</i> <i>chap, charge</i> <i>jack, job, jerk</i> <i>leisure, pleasure</i>
/ kæ- /	/ kya- /	
/ gæ- /	/ gya- /	
/ šæ- /, / ša- /,	/ sya- /	
/ šə- /		
/ čæ- /, / ča- /	/ čya- /	
/ jæ- /, / ja- /,	/ žya- /	
/ jə /		
/ žə- /	/ žya /	

Type 11 J / O : X / E

The corresponding consonant phonemes occur in both languages, but consonant clusters do not occur in Japanese. Therefore, the Japanese student of English tends to transfer his linguistic habits of / CV / into that of English / CVC /. (See Chart XVII.)

Chart XVII. **A List of Consonant Clusters—2.**

English	Possible Substitution	Example
(a) Initial Clusters CCV- CCCV-	CVCV- CVCVCV-	<i>play, tray</i> <i>spray</i>
(b) Final Clusters -CC	-C -CVCV	<i>roads</i> <i>test</i>
	-NCV	<i>second</i>
-CÇ	-CVCV	<i>battle</i>
	-CVN	<i>sudden</i>
-CCC	-CVCV	<i>holds</i>
	-CVCVCV	<i>bulbs</i>
	-CVNCV	<i>filmed</i>

-CÇC	-NCVCV	<i>attempt</i>
-CCÇ	-NCV	<i>lends</i>
-CCCC	-CVNCV	<i>wouldn't</i>
	-NCVN	<i>mountain</i>
	-CVCVCV	<i>attempts</i>
	-CVCVCVCV	<i>sixths</i>
	-NCVCVCV	<i>glimpsed</i>
(c) medial clusters		
-VCV-	-VQCV-	<i>hitting</i>
-VCCV-	-VCVCV-	<i>hillside</i>
	-VNCV	<i>hinterland</i>
-VCCV-	-VCVCV	<i>lightening</i>
-VCCCV-	-VNCVCV	<i>increase</i>

VI. Conclusion

6.0 In the foregoing chapter, we have examined the possible errors made by the Japanese student of English under four categories, which are summarized in Chart XVIII.

Chart XVIII. A List of Types of Pronunciation Errors.

Categories	Types	Example	
		Japanese	English
Phonemic Errors	Type 1. J / O / : / A / E		/ bæt /
	Type 2. J / A / : / O / E	/ kiQt o /	/ kit /
	Type 3. J [A], [B] : / A / , / B / E	/ šin /	/ sin /
Phonetic Errors	Type 4. J / A' / : / A / E	/ riQpa /	/ rip /
Allophonic Errors	Type 5. J [A], [A'] : [A] E		/ pit / , / tip / , / spit /
	Type 6. J [A], [A'] : [A''] E		
	Type 7. J [A] : [A], [A'], ([A'']) E		
	Type 8. J [A] : [A'], [A''] E		

Distributional Errors	Type 9. J [A] : [-A] _E	/ koto /	/ kot /
	Type 10. J / A'B /, / AB' /:		/ yist /,
	/ AB / _E		/ iyst /
	Type 11. J / O / : / X / _E		/ tekst /

6.1 Further considerations should be made on the levels of recognition and production. For example, *eat* [iyt] is recognized rather easily, but the pronunciation may be rendered as [iit] or [iito]. Another example is that in *cat* [kæth] and *cats* [kæts], both may be recognized as the same, but their pronunciation may be either [kæt] and [kæts], or [kæto] and [kætsu].

6.2 Based on the above classification, we should further consider the hierarchy of difficulty, functional load, potential mishearing, pattern congruity. These will be determined by actually testing the predictions of errors, whose results, in turn, may help us to refine our classification.⁽¹⁸⁾

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