Simplified Japanese Phonetic Alphabet as a Tool for Japanese Course Design*
日本語コースの道具としての簡略日本語音声記号

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1. Introduction

This paper addresses two questions in designing a four-year Japanese program:

(1) a. Is explicit instruction on pronunciation effective – and if so, necessary – for task-based, communicative course design?
b. If the answer to (1a) is positive, how can we help Japanese Learners (JL) effectively receive explicit instruction on pronunciation, in terms of course design?

Here, "explicit instruction on pronunciation" may be paraphrased as *teaching how to reduce a foreign accent* or *to acquire a more native-like accent*," which we refer to as *improving learners' phonetic competence* (PC). Under PC we also include proficiency in morphophonemic knowledge of the target language. (1a) is positively answered by such authors as Lord (2005), Kissling (2014) and Sturm (2018), as to be discussed in Section 2. Yet, the same authors also lament the fact that pronunciation instruction has long been neglected in FL classroom and course designs, as noted by Gilakjani (2016). Therefore, it is reasonable to address the question (1b) for the improvement of students' PC. The present paper reports an approach taken by the Japanese program at Huron University College.

The articles that we consult in Section 2 and 3 strongly suggest that pronunciation be taught early and explicitly, and that weaker foreign-accented speech is less burdensome to process for native speakers than one with stronger foreign-accented speech. Focusing on Japanese education, this strongly supports a course design that aids JLs to improve their PC by becoming more conscious about the phonetic properties of Japanese. International Phonetic Alphabet (IPA) is most effective for the purpose, but a full-fledged IPA would be too complex and, thus, impractical for university language courses (Section 4.1). We therefore simplify IPA in order to highlight the most relevant phonetic characteristics of Japanese relative to the course objective (Section 4.2). In Section 4.3, we present some merits for using alphabet-based writing system, in addition to the syllabary (kana) system, in an early stage of the Japanese course design. We will be limiting our discussion to a Japanese program for English-speaking students; obvious adjustments need to be made for programs targeting the students with a different linguistic background.

2. Positive Answers to (1a)

Gilakjani (2016: 1) opens his abstract as follows:

> English Pronunciation instruction is difficult for some reasons. Teachers are left without clear guidelines and are faced with contradictory practices for pronunciation instruction. As a result of these problems, pronunciation instruction is less important and teachers are not very comfortable in teaching pronunciation in their classes.

Gilakjani does not offer any tangible data to back up this statement. Yet, those who advocate the importance of improving FL's pronunciation and other PC share the gist of this statement. For example, Lord (2005) states that

> Although majority of the time in second language (L2) classrooms is spent struggling with vocabulary and grammar, most successful L2 learners, teachers and researchers would nonetheless agree that exemplary and impeccable vocabulary can be obfuscated by what is perceived as a foreign accent.

She further states that "[s]tudents enrolled in the Spanish phonetics class engaged in activities geared toward raising their awareness of L1–L2 phonological differences and were able to make significant improvements between the beginning of the semester and the end of the semester" (p. 565).

Kissling (2014) argues that her research results support the claim that "target-like perception is a precursor to target-like production, in this case in a formal learning context" (p. 26). Having identified the key source of the difficulty for FLs in "their perception of target sounds," she recommends that it be explicitly taught "at the outset of pronunciation instruction, because their initial ability to perceive the target sounds will in part determine how much they learn from such instruction" (pp. 24–25).

Sturm (2018), adapting Lord's work in a longitudinal research context, also positively answers (1a); she states that since "only a few minutes per week of instruction are devoted to pronunciation in most classroom (Olson 2014), a total lack of instruction, or at best incidental instruction in pronunciation, seems to be the norm" (p. 33). Her research result shows that "in the absence of systematic instruction or environmental input, pronunciation is unlike [*sic*] to improve in significant ways over time" (p. 41). In addition, Sturm (2018: 34) cites Miller's (2012) finding that "using either the International Phonetic Alphabet (IPA) or reference words to teach the sounds of French was effective but that students preferred the IPA." She concludes that "learners benefit from instruction in L2 pronunciation, … and that explicit instruction is better than nonsystematic, traditional treatment of L2 pronunciation" (p. 34). Finally, she reports that the "data revealed a general pattern of improvement over the four-semester sequence, although students' progress slowed after the first semester…" (p. 42). This strongly suggest that phonetic teaching should be decisive in the early phase of the course design.

To sum up, explicit instruction to improve PC in the earlier stage of FL instruction is effective and thus desirable, according to the authors sampled above. The instruction should include some symbols (such as IPA), beyond the orthography of the target language, to aid them to become explicitly aware of the phonetic differences

between their native and target language. So, then, why is pronunciation instruction still pushed to the margin? According to Gilakjani (2016), "[m]any learners state that they do not need to learn pronunciation and learning pronunciation is a waste of time. They state that just communication in English is enough and when they are understood, nothing else is important" (p. 3). In what follows, we will see some evidence against this view.

3. Foreign-accented Speech vs. Non-accented Speech

In this section, we briefly review Romero-Rivas, Martin and Costa's (RRMC) (2015, 2016) event related brain potential (ERP) studies. Crudely put, their conclusions suggest that natural (i.e., native-like) pronunciation is less computationally burdensome for native speakers to process than is foreign-accented counterpart. If this is indeed the case, we do not need to choose either PC or linguistic communication.

ERP research is a particular type of electroencephalography (EEG), which records in real time the brain's electrical activity noninvasively measured with numerous electrodes attached to the scalp. According to Friederici (2017:17–18),

> In neurocognitive research, electroencephalography is used to measure brain activity time-locked to a particular stimulus, provided to the individual either auditorily or visual, called *event-related brain potential* (ERP). The ERP is a quantification of electrical activity in the cortex in response to a particular type of stimulus event with high temporal resolution in the order of milliseconds. … Average electrocortical activity appears as waveforms in which so-called ERP components have either positive or negative polarity relative to baseline, have a certain temporal latency in milliseconds after stimulus onset, and have a characteristic but poorly resolved spatial distribution over the scalp. Both the polarity and the time point at which the maximum ERP component occurs, as well as partly its distribution, are the basis for the names of the different ERP components. For example: negativity (N) around 400 ms is called N400, and positivity (P) around 600 ms is called P600.

Roughly speaking, the P200, N400, and P600 components are considered to signal, respectively, phonetic processing, semantic and "semantic-thematic processes," and "syntactic and semantic integration processes" (Friederici 2017: 63). RRMC (2015: 3) describes the N400 component as "sensitive to a range of features such as; (a) sublexical variables, like orthographic similarity to other words in the language, …; (b) lexical variables , such as word frequency, or concrete vs. abstract concepts…; (c) semantic relationships among words…; and (d) cloze probability during sentence comprehension."

Using a set of cloze tests (with stimuli, as in (2), with the words in bold being the target stimuli, serving as the stimulus onset point), RRMC (2015) obtained ERP obtained while native speakers of Spanish listened to native and foreign-accented speakers of Spanish.

(2) Mi desayuno favorito es tostadas con mermelada y **un café/hospital** con mucha leche.
'My favorite breakfast is a [*sic*] toast with marmalade and a **coffee/hospital** with a lot of milk.'

They looked at the "modulation of the P200 and N400 ERP components across two experimental blocks, to clarify whether [the improved comprehension by native speakers of foreign-accented speech after a very brief exposure] takes place at phonetic/acoustic or lexical levels of processing, respectively." Then, they analyzed "the N400 and P600 e□ects during semantic violation processing in the second experimental block," to see "whether further linguistic processes, such as semantic integration and meaning re-analysis, are affected after the exposure" (p. 10).

Among others, two results stand out. First, a "less positive P200 component is observed for foreign-accented speech relative to native speech comprehension." The "extraction of spectral information and other important acoustic features" was shown to be "hampered during foreign-accented speech comprehension" and this persisted "throughout the experimental session" (p. 7). From this RRMC conclude that "at least in the current experimental conditions…, rapid improvements do not occur in extraction of phonetic/acoustic information during foreign accented speech comprehension" (p. 11).

Second, "the amplitude of the N400 component for foreign-accented speech comprehension decreased across the experiment, suggesting the use of a higher level, lexical mechanism." Specifically, (a) "while semantic violations in the critical words elicited an N400 effect followed by a late positively in native speech comprehension; and (b) during foreign-accented speech comprehension, semantic violations only elicited an N400 effect. In other words, "despite a lack of improvement in phonetic discrimination, native listeners experience hangers at lexical-semantic level of processing after brief exposure to foreign accented speech" (p. 1). Further, RRMC reports that a widely distributed positivity [P600] appeared after the N400 effect for semantic violations in the critical words (p. 10). Notably, "this only occurred during native speech comprehension, not during foreign-accented speech comprehension" (p. 10).

This fact is in line with the experimental results reported in RRMC (2016) (with stimuli, as in (3), with the bold words being the target), which shows that "native speech comprehension elicited some sort of meaning re-analysis" detected through the P600 component when semantic violations were present.

(3) He peels a lot of **potatoes**/**bananas**.

"[L]isteners were able to anticipate the sentence's best completion when listening to foreign-accented speakers. In fact, we did not observe significant differences in the lexical anticipation effect… between native and foreign-accented speech comprehension (RRMC 2016: 253)." However, this

> did not facilitate the integration of semantically related words. However, when listening to native speakers, listeners were not only able to anticipate upcoming words, but also other words with overlapping semantic features. … Irrespective of the mechanism behind this effect, what is important for our purposes is the observation of differences in the anticipatory processes associated with native and foreign-accented speech comprehension.

In short, RRMC (2015, 2016) show that "semantic violations uttered by foreign-accented speakers are harder to process, as compared to semantic violations during native speech

comprehension, the most likely cause of which is a "higher demand on lexical processing in the retrieval of the non-expected words" (RRMC 2015: 12).

To sum up, "rapid improvements do not occur in the extraction of phonetic/acoustic information during foreign-accented speech comprehension" (RRMC 2015: 11), and semantic violations uttered by foreign-accented speakers are harder to process [than those by native speakers], most likely because of a "higher demand on lexical processing in the retrieval of the non-expected words*"* (RRMC 2015:13). Assuming that the experimental result matches the actual language use, a FL with a better PC has a communicative advantage over the one with lower PC, because the native speakers will be less burdened to interpret the utterances of the former than the latter, thus the communication will be better facilitated. RRMC's (2015, 2016) experimental results are supported by Grey and van Hell's (2017) ERP study, indeed. Therefore, PC and linguistic communication need not be dealt with as an *either-or* proposition.

4. Simplified Japanese Alphabet

4.1 Argument for IPA.

We have identified, as a starter hypothesis set, the following as the key negative factors against the development of JL's PC.

(4) a. Lack of discrimination ability.
b. Interference from the orthography of the native language.

(4a) arises typically because one's native language does not discriminate two contrasted phones in the target language, just as in tense/laxed *i* [i] vs. [ɪ], or [l] vs. [r] in Japanese. Not all post-pubescent Japanese native speakers without an early exposure to English or other foreign languages, can accurately distinguish *i* in *ziti* and *zit*, or *leave* from *reeve*. Likewise, English speakers often mix up *toshokan* (としょかん) and *tooshookan* (とうしょうかん) as English lacks the long/short vowel distinction.

JLs are often unaware of the phonetic difference between Japanese and their native language; the relevant phonetic discrimination has not been established for the two sets of phones (cf. Kissling 2015). This is a reverse situation of what Nogita (2010: 112) observes in Japanese ESL learners:

> When Japanese ESL learners mispronounce English, they often intend to pronounce different sounds due to their misconception about target sounds, or due to their own interpretations of English phonology, as opposed to current ideas about Japanese learners' articulatory inability to produce particular sounds.

Both Kissling and Nogita found crucial for the PC development the proper understanding of the phonetic inventory and morphophonemic system of both the target language and one's native language.

Subtly distinct values of phones expressed by the orthographical system of two languages are very difficult to detect, as JLs often lack the reference point (relevant phonetic features) to distinguish the target phones from the familiar. Consider the following example. Typically, hiragana is introduced with the aid of the roman alphabet:

e.g., (ん n), or に (ni). While this is helpful for JL to some extent, it can also be very misleading, as JLs could make inaccurate associations between *kana* and its phonetic values, as illustrated in (5), where '#' indicates *improper* and '√' *proper*.

(5)	a.	ほんをよむ	*hon-o yomu*	# [hon.no yomu]	√ [hõ ʔo yomu]
	b.	あった	*atta*	# [ata]	√ [at.ta]

(5a) is an illegal Sandhi (*ren-jou* 連声) due to the incorrect understanding of the phonetic value of the moraic nasal ん; (5b) is over-application of the English degemination rule to Japanese. In order to deal with (5a/b), we should include from the early stage of Japanese course:

(6) a. Some articulatory-level instruction is needed for certain phones.
b. JLs should be given some tool(s)/symbols to consciously deal with relevant phonological contrast and allophonic variations.

IPA can solve the problems described immediately above, as the symbols can express fine-grained differences among similar phones of various languages, and the Japanese phonetic inventory is readily available (See Vance 2008, for example).

Yet, standard Japanese textbooks rarely explain the differences in Japanese and English letter-phone correspondence, despite its importance and advantage noted above. The reason can be easily speculated; IPA is notoriously exotic-looking and counter-intuitive, as seen in (7).

(7)	a.	[ɯcɕʲ]	うち 'uchi'	e.	[cɕʲka]	ちか	'chika'
	b.	[çʲɰɑɾi]	ひわり 'hiwari'	f.	[ɸɯɰɯ]	ふゆ	'huyu
	c.	[ɟʑɯːsɯ]	ジュース 'juusu'	g.	[ɰɑɲi]	わに	'wani'
	d.	[dzoː]	ぞう 'zoo'	h.	[hõn]	ほん	'hon'

Further, IPA expresses the phonetic facts too closely, indeed, for practical classroom use. Fully adopting IPA symbols would thus be unpopular for both JLs and instructors, as it adds another writing system in the course. Having struggled through hiragana and katakana, teaching/learning an additional – and highly visually complex – writing system in an elementary level Japanese course appears superfluous and unnecessary. Finally, unlike those in (5), some inaccurate pronunciations are communicatively negligible, such as in (8).

(8)	a.	う	[u] (English)/[ɯ] (Japanese): ±round
	b.	に	[ni] (English)/[ɲi] (Japanese): +nasal, ±anterior

4.2 Simplified Japanese Phonetic Alphabet

The IPA symbols can be streamlined down to what are necessary for the objective of the program and the courses therein. For instance, moraic nasal ん may be transcribed as either [n] or [˜], excluding [ŋ] for simplicity (9a); long and short vowels are distinctly

represented (9b), and some symbols are replaced for better visual recognition: e.g., instead of [çi] for ひ, we may use something intuitively relatable to the [h], as in (9c).

(9)	a.	ほんや	[hõya]	ほんき	[hõki],	ほんと [hõto]
	b.	とおく	[tooku]	とおり	[toori]	そうじ [souji]
	c.	ひ	[ɦi]			

Which symbols should be used depends upon the needs and wants of the instructor and the program. For example, if a program finds that (9c) is not important enough and [h] is sufficient, then it can be dropped from the list. Likewise, if the difference of the quality of *n* in [ni] and [ɲi] is important enough for the course, the latter should be included. One can also add some others if JLs frequently misuse certain phones that need to be discouraged. Here is a suggested SJPA Inventory.

(10)	a.	Vowels:	[a, i, u, e, o, aa, ii, uu, ee, ei, oo, ou]
	b.	Consonants:	[p, t, k, b, d, g, ha, ɦi, fu, he, ho, ta, chi, tsu, te, to]
			[s, sh, z, j, m, n, y, w, r, n, and ã, ĩ, ũ, ê, õ for moraic nasals]

Here, the long vowels reflect corresponding hiragana, as the choice is lexically determined, whereas the [ou]→ [oo] reduction is optional and automatic. If this is seen as unnecessary, then it can be eliminated. SJPA ignores palatalization of *n* and *k,* as well as the fricative/affricate consonants (e.g., [z] vs. [dz], and [j] vs. [jʑ]/[dj]); it suffices to briefly explain those in class when the phonetic values of kana are explained. The most important for our purpose are moraic nasals, long/short vowels and geminates consonants which are to be explicitly recognized as very distinct from the "corresponding" English phones. For JLs whose native language is not English, obvious minor modifications are to be made.

4.3 Argument for the Alphabetic Notation: Japanese Verbal Morphology

Thus far, we have argued for the merits of teaching an independent alphabet system (SJPA) along hiragana. One might doubt the usefulness of SJPA, an alphabet-based writing system, once hiragana is introduced. Perhaps, SJPA can be dispensed with, once *kana* is introduced. Here, we present a case for SJPA past that point of the course design. Namely, an alphabet-based notation of Japanese lexical items is helpful for handling some morphophonemic processes (rules) of Japanese verbal morphology. This is because the processes/rules are operating on alphabetic inputs.

Some Japanese lexical entries (roots and suffixes) are best listed in alphabet, not syllabary. For example, spelling out the verbal stem of よむ (*yomu*), かう (*kau*), はかる (*hakaru*) and たべる (*taberu*) as, respectively, /yom/, kaw/, hakar/, /tabe/, is effective for acquiring the Japanese verbal inflectional system (e.g., plain forms and te-forms). The う (*u*)- and る (*ru*)-verbs, found in some textbooks, presupposes the knowledge of consonant-ending vs. vowel-ending verbs, not an obvious distinction. It is misleading for the beginners because r-ending verbs (such as *wakar*, *kaer*, and *tor*) and vowel-ending verbs (such as *tabe, oki, mi*) both end with る(*ru*) in the dictionary form (the plain

indicative present positive form). Likewise, きる (*kiru*) is ambiguous between /kir/ and /ki/. This root distinction cannot be captured by hiragana.

Related, consonant verbs behave distinctly depending upon the stem-final consonant with respect to verb inflection. For example, it is well known that in the plain past positive form, consonant verbs form four subclasses (r/t/w, n/m/b, k/g, and s) and behave accordingly, reflecting their [±voice, ±anterior, ±continuant] properties of their stem-final consonant (11).

(11) a. r/t/w class: [r/t/w] → [t], with no change in the suffix initial consonant
b. n/m/b class: [n/m/b] → [n], with voice agreement with the stem final C.
c. k/g class: [k,g] → [∅i], with voice agreement with the stem final C.
d. s class: [s] → [shi], with no change in suffix initial consonant.

(11a) results in gemination (～った), (11b) creates an *–nd–* sequence (～んだ), (11d) triggers epenthesis (～した), and (11c) involves (i) voice agreement between the stem-final C, (ii) epenthesis, and (iii) the deletion of the stem-final C (via [ki]/[gi]→[yi] palatalization) (～いた・いだ). Thus, it is easier to master the proper verb inflection patterns if the underlying stem forms are explicitly taught.

5. Conclusion

The present paper considered the questions in (1). Following the positive answer to (1a) in such works as Lord (2004), Kissling (2014), Sturm (2018), Nogita (2010), and RRMC (2015, 2016), we proceeded to the question in (1b). Our goal is set as to aid JLs to become perceptively proficient in the Japanese phonetic inventory distinct from that of English, using some tool to make it explicit, such as IPA, in an earlier stage of the program. IPA is, however, overly complex to be practical in classroom use. We thus suggested a set of reduced phonetic symbols, referred to as Simplified Japanese Phonetic Alphabet (SJPA). SJPA can be one of effective methods to bring to JLs' attention some of the subtle Japanese phonetic facts (cf. Kissling 2014, Sturm 2018). The symbols therein are simple and intuitive enough so as not to disrupt JLs studying other aspects of Japanese.

SJPA has been extensively used in Japanese IV at Huron, with its basic concept introduced at Japanese I, when hiragana is introduced. For example, a handout of vocabulary list may include the verb roots in SJPA:

(12) a. きる kir (r)/vt: Doer-ga obj-o (instruement)-de
b. きる ki (i)/vt: Doer-ga obj-o

Explicit knowledge of verb roots in this manner is useful in saving time for a long run, when it comes to plain-form verb inflection and other Japanese verbal morphological phenomena (Kawai 2006). It is useful when we "name" the mistakes in JLs pronunciation, such as "you are saying [hon] with an [n], instead of [õ]," or "can you spell 濃度 ([noudo])?" when a student pronounces it as [nodo]. [nodoo] or [noodoo].

SJPA also serves as a reference point for the proper morphophonemic processes/rules, such as verbal inflection. For example, [kaita] used as the past of かう

(*kau*) may be reminded that it is a W-verb (/kaw/), not a K-verb (/kak/). Students typically correct their mistakes immediately, having a clear reference to the morphophonemic rules. While verb forms may come naturally and intuitively to some students, many students lack their intuition, and such theoretical cues allow JLs navigate through complex interactions of the grammatical principles behind the Japanese language.

Throughout the discussion above, we have ignored intonation, another important phonetic property. The absence of this in our discussion by no means indicates our indifference in this topic. It is our next challenge; we are exploring effective, but simple and intuitive, method to aid JLs develop self-awareness and self-control on this aspect of phonetics. How exactly that can be accomplished remains to be seen.

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