Production of English Rhythmic Patterns by Japanese Learners: Exploring Differential Features of Epenthetic Vowels, Stress, and Timing between Japanese and English

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It is often problematic for Japanese learners of English to master the target language pronunciation, since they encounter new and different phonological features in the learning process. To deal with the learners’ difficulty with sound acquisition, contrastive analysis has been one of the important ways for language teachers to diagnose students’ specific problems and implement effective activities to improve their pronunciation abilities in the target language. This paper first briefly describes general aspects of the phonology of the Japanese language. It then discusses epenthesis, sentence stress, and timing as possible factors which explain Japanese learners’ difficulties in learning rhythmic patterns in English. This second portion of the paper also presents another general analysis which shows suprasegmental features in Japanese, since Japanese L2 learners often rely on their native language patterns to learn English pronunciation. Finally, it introduces teaching suggestions to remedy some of Japanese learners’ particular problems, which are the focus in this study.

**General Analysis of Japanese Vowels, Consonants, Syllables, and Intonation**

As Chart 1 shows, Japanese contains five vowels (Ohata, 2004, p. 4). In contrast to English, Japanese does not characterize its vowels as tense or lax. The inventory of Japanese consonants is exhibited in Chart 2, and it shows that there are no /ɨ/, /v/, /θ/, /ð/, /ʃ/, /ʒ/, /tʃ/, /dʒ/ in the inventory (Ohata, 2004, p. 6). While these eight sounds are phonemes in English, they either do not exist in Japanese or are allophones of phonemes. The two affricates, /tʃ/ and /dʒ/, are phonemes in English, but they are allophones in Japanese. A liquid sound exists in Japanese, but the sound does not perfectly correspond to either of the English liquids. For syllable structure, Japanese has open syllables, and the constant patterns of the open syllable are
Consonant and Vowel (CV), CVCV, or CVCVCVCV. As opposed to English, which contains both open and closed syllables, Japanese does not often allow words and syllables to end with consonants (Tsujimura, 1999, p. 32). There are a few special cases of consonant final syllables such as syllable-final nasals as in /Kampai/ ‘a toast.’ Furthermore, initial and final consonant clusters are impossible in Japanese. Regarding the suprasegmental aspect, Japanese relies on pitch change to indicate accent at the word level. Japanese speakers can speak for several syllables without changing the pitch, and this may result in structuring “monotonous” intonation contours. Like English, Japanese intonation shows a final rising pattern used for yes-no questions. Yet, Japanese pitch range and variation are different from those in English.

Chart 1 Japanese vowels

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<th>Front</th>
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<tr>
<td>High</td>
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<td>Low</td>
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Chart 2 Japanese consonants

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<tr>
<th></th>
<th>Bilabial</th>
<th>Labiodental</th>
<th>Dental</th>
<th>Alveolar</th>
<th>Postalveolar</th>
<th>Retroflex</th>
<th>Palatal</th>
<th>Velar</th>
<th>Uvular</th>
<th>Pharyngeal</th>
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<td>Affricate</td>
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<td>Lateral fricative</td>
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Epenthetic Vowel Insertion

English words may contain up to three consonants clustered at the beginning and up to four consonants clustered at the end of syllables, whereas Japanese does not typically allow consonants to be in a sequence or at the end of most syllables. These different syllable features induce vowel insertion, which Japanese learners use to avoid the unfamiliar consonant structure in the target phonology. This means that epenthetic vowels are used to break up the complex clusters. Although the deletion of consonants is another option and seems effortless to avoid clusters, vowel insertion is more frequently seen in Japanese utterances (Saunders, 1987, p. 247).

Studies have also revealed that Japanese students often become less aware of consonant clusters in English utterances because they not only articulate with vowel insertion but also misperceive vowels which are actually absent in native English speakers’ articulation. According to Dupoux and Kakehi (1999), Japanese learners often perceive “illusory” vowels between consonants in the sequenced stimuli of vowel-consonant-consonant-vowel (VCuCV), even though no vowels are originally inserted (p. 1571). It is often problematic for Japanese learners to distinguish between VCCV stimuli and VCuCV stimuli as in /fesutibal/ ‘festival’.

There are three epenthetic vowels used to break up such complex consonant clusters, and those vowels are /u/, /o/, and /i/. For example, Japanese learners often produce “strike” as /sutoraiku/, “fight” as /faito/, and “slim” as /sulimu/. In the rule based pattern of the insertion, /u/ and /o/ are inserted after every syllable final consonant unless the syllable ends with the nasal consonant /n/ (Dupoux & Kakehi, 1999, p. 1569). In fact, researchers revealed that 98.9 % of vowel insertion appeared after voiceless stop consonants in the final syllable (Takeyasu, 2010, p. 2). These epenthetic vowels also appear in syllable internal consonant clusters such as VC/u/CV, and are articulated in order to break up the internal consonant sequence. In general, /o/ and /i/ are
inserted after /t, d/ and /ʃ, ʒ/ respectively, and /u/ is added after other consonant sounds. /u/ is often preferred for vowel insertion, since this epenthetic vowel has the shortest duration and devoicing ability (Matsuda & Arai, 2010, p. 320). The Japanese simple syllable structure employs patterns of vowel (V), (VV), consonant-vowel (CV), consonant-vowel-nasal (CVN), consonant-vowel-the first half of a geminate consonant (Dupoux & Kakehi, 1999, p. 1569). Thus, the consistency of CV pattern in L1 syllabic organization tends to influence Japanese L2 learners to disregard the L2 system of syllabic structure. In addition, Hiragana and Katakana characters follow a CV pattern in that they represent CV syllables. Kanji orthography can also be related to the use of epenthetic vowels for the target utterance. The Kanji characters contain sounds such as /n/, V, and CV (Dupoux & Kakehi, 1999, P. 1569). This shows that no orthographic characters in Japanese allow consonant clusters to be in syllables.

A phonological transfer in which Japanese learners make English conform to their L1 norm may be strongly related to the manner of vowel insertion. Ross (1994) conducted an experiment in order to investigate the developmental process with the notions of paragoge and apocope. Paragoge and apocope are vowel insertion at the end of a word and final vowel deletion respectively. In addition, paragoge was considered the learners’ motivation to articulate English words by following the norm of L1 phonology, whereas apocope was measured to indicate their manner of comfort with the target phonology. As presumed, his study revealed that beginning learners used the paragogic phenomenon to shift syllable structures of English into only open syllables occurring in Japanese. The results of apocope, on the other hand, indicated that learners developed hypotheses in the target phonology (Ross, 1994, p. 21). Japanese loan words were also discussed, claiming that paragoge was characterized by the rephonolization from learned Japanese loan words to the syllable structure of the target language. For example, /aisukuri:mu/
is a Japanese loan word, but it will be rephonolized as “ice cream” in the learner’s developmental process.

**Mora-Based Rhythm in Japanese**

One of the crucial factors which characterizes a language rhythm is the duration of utterance in syllables. How syllables are timed significantly affects second language acquisition, especially in mastering the target language rhythmic patterns. Mora is an element that structures syllable weight, which then determines stress and timing. In other words, each element of mora regulates temporal patterns in Japanese oral production. Every mora has an equal duration; *higashi* ‘east’ has three morae: /hi/ga/shi respectively (Kubozono, 1989, p. 251). Each mora functions as an independent unit, although they do not form syllables on their own. However, although morae are not designed to form syllables, special morae, non-syllabic morae, build the uniqueness of mora-timed rhythm, distinguishing the Japanese rhythm pattern and syllable-timed nature. For example, a moraic nasal ン /n/ in the coda position serves as an independent sound unit, but it does not form a syllable as ロンドン ‘London’ /ro-n• do-n/ has two syllables and four morae. The second half of long vowels is also a special mora as とうきょう ‘Tokyo’ /to・o- kyo・o/ has two syllables and four morae. (Kubozono, 1989, p. 252). The mora-based rhythmic pattern can be seen in Japanese poetic forms, such as *Haiku* and *Tanka*.

English is a stress-timed language in which the time length of an utterance depends on the number of stressed syllables. In contrast, as discussed, Japanese is a mora-timed language which relies on the number of morae for the duration of an utterance. The examples that demonstrate the different syllabic structures are shown below (1) and (2) (Ohata, 2004, p. 9).

(1) **Birds/ eat/ worms.**

The/birds /will/have/eat/en /the/worms.
(2) To/ri/wa/mu/shi/wo/ta/be/ru.

So/no/to/ri/wa/so/no/mu/shi/wo/ta/be/ta/da/ro/u.

The two sentences in English and the two sentences in Japanese indicate the same meanings, and the number of syllables is marked with (/). For the English example, the two sentences are timed approximately the same because they both have an equal number of stressed content words. Yet, the function words in between the content words are not stressed, and this makes the second sentence timed approximately the same as the first sentence. On the other hand, the Japanese examples show two different timed statements in that the second sentence has a longer duration than the first. The important point here is that although Japanese changes the duration based on the number of syllables, English depends on the number of stressed syllables for its uttered duration. Ohata (2004) claimed that Japanese learners tended to follow the theory of mora-timed rhythm for the duration of their target language utterance, and the equivalently timed sentences above would take different amounts of duration (p. 10). Japanese learners of English may pronounce a sentence longer than the natural speech if they pronounce function words in the same amount of time as content words. Thus, it is crucial to understand the different syllabic structures between the two languages in order to know the language timing.

**Stress Accent and Pitch Accent**

The different types of accent between English and Japanese significantly affect the condition of syllables which characterize their language rhythm. English has a stress accent which makes vowels longer and louder, while Japanese depends on pitch accent which raises vowels to a higher pitch. In particular, the different accent types form vowel quality differently in an utterance. This means stress makes vowels stressed and unstressed in English, and these differentiated vowels designate the length of syllables.
In Japanese, pitch is used to mark accent on vowels, but the accented higher pitch does not allow vowels to surpass other vowels or syllables in duration that are slightly lower pitched. This phenomenon explains that the timing of Japanese is not changed by accented syllables. On the other hand, as a reduced or unstressed vowel, shwa is used in English. It is a natural process in English that a strongly stressed vowel or syllable in a word affects the quality of other vowels or syllables by forcing them to be less significant (Ohata, 2004, p. 10).

Kondo (2009) claimed that the utterance duration of unstressed vowels in English was more reduced by native speakers than Japanese learners speaking English. On the other hand, stress markers had little effect on the vowel duration in the Japanese learners’ utterances (p. 111). Kondo also added that in her experiment, Japanese students, whose first language followed pitch accent, often found it difficult to place lexical stress accurately in English utterances. The experiment was conducted to investigate oral production from native English speakers and Japanese learners of English who were relatively fluent. In the English oral production collected from these participants, both the native speakers and non-native speakers increased fundamental frequency (F0) on stressed vowels, yet native speakers changed the level of F0 more depending on whether syllables were stressed or unstressed (Kondo, 2009, p. 111). For the placement of lexical stress, the non-native speakers tended to change F0 to mark stress, while the native speakers were more sensitive to intensity than being sensitive to F0 change to indicate lexical stress. The result shows that Japanese English speakers may have difficulty distinguishing stressed and unstressed vowels and forming natural syllable duration for the target articulation, since they still conform to their first language phonological pattern.
Teaching Suggestions

Walking in the English Rhythm

This activity is useful, especially for younger learners in Japanese EFL classes, to raise their awareness of timing and rhythm in English. Some aspects of this teaching method were discussed by Laroy (1996). Before the class, the teacher needs to prepare short narratives that should be less complex and contain a variety of sentence lengths as well as prominence patterns. In addition, the teacher translates those selected narratives from English into Japanese and prepares a handout for discussion. In the class, the teacher first points out that English and Japanese have different rhythmical patterns; although Japanese utterances are timed by the mora system as well as pitch accent, students need to conform to English rhythmic patterns. Then the teacher pairs up students and gives roles to each pair member, telling them that they are going to walk around the classroom with a partner. For the roles, one student will lead a walking path for their partner, and the other partner will follow the leader. The teacher reads aloud each narrative, the Japanese version first and the English version second. While the teacher is reading the narratives, the partner following the leader repeats the teacher’s reading. Based on the student imitating each sentence uttered by the teacher, the leader then begins to walk while the partner reads, and stops while he/she is silent. Since Japanese and English versions of narratives are read respectively, students will become aware of the different timing structures between the two languages by physical movement and speaking the narratives. After this activity is done, the teacher will pass out the handouts, which students will use to discuss different language timing and rhythm.
Clapping to Keep Rhythm with Poems

This activity is also useful for Japanese learners of English to become aware of different rhythmic patterns in English. Some features of this method were employed by Laroy (1996). In particular, it is important for teachers to let students experience different rhythmic patterns after instruction. Before the class, the teacher needs to choose short English poems which are easy to understand and are suitable for repetition. In addition, the teacher prepares Japanese poems such as Haiku and Tanka, which are structured with the mora system. The teacher should make groups of five students. The teacher will tell the students facing each other in a circle to repeat orally the poems read by the teacher, and they also clap hands to keep the rhythm with the readings. After this activity, students will discuss the different language rhythms with other group members.

Matching Stress Patterns

This activity is useful to help students practice English stress patterns, and some aspects of this activity were introduced by Kelly (2000). The teacher prepares two sets of cards; one has only a word and the other has a phrase(s). These sets of cards have various matching stress patterns. For example, if one card has the word “politician,” the other card has the matching phrase in terms of stress pattern such as “it’s important.” Each student is given one card with either a word or a phrase. The teacher asks them to walk around the classroom to find someone who has the matching card. In other words, if a student has the card of a word, he/she needs to find a classmate who has a matching phrase. After students find the partner with the same stress pattern, they will show the cards to the teacher for checking. As a final class activity, each pair goes in front of the class and writes their word and phrase with stress marks on the white board.
Erasing vowels to Produce Consonant Clusters

This activity is useful to practice the pronunciation of consonant clusters in English (Laroy, 1996). First, the teacher writes a sentence such as “Do you speak English?” using phonetic symbols and asks students to pronounce the sentence on the board. Second, the teacher removes all vowel sounds changing the original sentence into “Dy spk Ngls?” Then the teacher asks students again to pronounce the sentence. Finally, after students practice the meaningless sentence orally, the teacher adds vowels one by one to make the original sentence again. Students practice pronouncing as the teacher adds each vowel.

Conclusion

This paper has shown the importance of relations between linguistic comparison studies and teaching methods. It is crucial for language teachers to shift learners’ own theories of English phonology which follow the norm of their L1 sound structure to the norm of the target phonology. In particular, the suprasegmental features discussed above may be absent in Japanese learners, and those learners may find it difficult to detect specific factors of intelligibility in L2 communication. This study suggests that more emphasis on the English rhythmic pattern should be considered in future language instruction. Activities for English rhythmic pattern practice do not have to be major parts of each lesson, but need to appear consistently. Thus, easy and effective activities are ideal, and teachers should be able to find enjoyable materials that will give purpose and fulfillment to learners.

References


