

日本人学習者と母音の後の /r/ について：事例研究

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要 約

この研究の目的は日本人英語学習者がどのように母音の後の /r/ を発音しているかを調査するためである。母音の後の /r/ はアメリカ英語とイギリス英語の大きな違いの一つである。筆者は日本人の被験者 65 人を二つの大学から募集し、彼らに二分間のテキストを読んでもらいそれを録音した。それらの録音結果を「杉スピーチアナライザー」(2000) を用いて、個々の被験者の発音等をコンピューター分析した。結果として次の三つの際立った特徴が見つかった。(1) 綴り字発音 (2) 前又は中舌円唇母音の代用 (3) 過剰般化。これらを踏まえて感じたことは、「r」の過剰般化を防ぐために、「r」はすべての母音の特徴ではなくて、綴り字のあるところのみ、発音すべきだと学習者に教えることである。

Pronunciation of postvocalic /r/ by Japanese learners of English: Some case studies

Margaret Maeda

Many Japanese learners of English want to speak American English, and they are more exposed to American English than to non rhotic varieties (Maeda, 2009). The aim of this study was to describe how Japanese learners pronounce postvocalic /r/. Sixty-five students from two Japanese universities were recorded for a larger study reading texts edited to include features of pronunciation which are conspicuously different in American and British English. They answered a questionnaire about preferred varieties of English. Three judges assessed the recordings for pronunciation proficiency and American, British or other influence. Seven of the students' recordings were chosen for closer study of postvocalic /r/. The formants of interest for postvocalic /r/, the 2nd and 3rd formants, were obtained using speech analysis software SUGI SpeechAnalyzer (2000). Careful listening, together with examination of the formants, was used to make inferences about strategies students use to pronounce postvocalic /r/. Characteristics which were found were spelling influence, substitution of lip-rounded vowels for postvocalic /r/, and over-generalization. Only the last strategy tends to interfere with intelligibility. Teaching the one-to-one correspondence of postvocalic /r/ to *r* in the spelling may be helpful in overcoming the problem of over-generalization.

Key words: r-colored vowels, spelling influence, over-generalization, third formant, lip-rounded vowels

Introduction

Many studies have dealt with the well-known difficulty Japanese learners of English have in distinguishing /l/ and /r/ both perceptively and productively. Studies have been carried out on perception of syllable-initial /l/ and /r/ as singletons or in initial clusters, and some have also dealt with /l/ and /r/ between vowels (Aoyama, Flege, Guion, Yamada, R.A., & Yamada, T., 2004; Best & Strange, 1992; Miyawaki et al., 1975). Others also report on perception and production of postvocalic /r/ and /l/. They have noted that Japanese learners have less difficulty perceiving and producing /r/ and /l/ in postvocalic position than in syllable-initial or inter-vocalic position (Goto, 1971; Mochizuki, 1981; Lively, Pisoni, Yamada, Sheldon & Strange, 1982; Takagi & Mann, 1995; Yamada & Tohkura, 1992).

In postvocalic position, the distinction between /l/ and /r/ has a low functional load. Few problems of intelligibility arise from confusion of postvocalic /l/ and /r/. Moreover, omission of postvocalic /r/ is not problematic, because widely used varieties of English, such as General American, (which will be referred to as AmE,) and Received Pronunciation, (which will be referred to as BrE,) are both rhotic and non-rhotic (with and without postvocalic /r/). However, it is of interest to study how students pronounce postvocalic /r/ and what problems are involved, because students in Japan are mostly exposed to AmE (Maeda, 2009), particularly recorded materials, and more Japanese students want to speak AmE than want to speak other varieties (Fukuda, 2009; Maeda, 2009).

Rhotic and non-rhotic varieties of English

Phoneticians describe the pronunciation of /r/ as the most conspicuous difference between rhotic and non-rhotic varieties of

English such as AmE and BrE. Collins & Mees (2008:91) describe the division between rhotic and non-rhotic varieties as very significant. Ladefoged & Johnson (2006:94) describe the main difference between the two varieties as the pronouncing of /r/ after vowels in AmE. Wells (1982:75) describes the distribution of /r/ as one fundamental way to divide accent types.

In rhotic varieties, which include among others, American, Canadian, West Indian, Irish, and some British varieties such as Scottish or West Country English, /r/ is pronounced wherever there is an *r* in the spelling. In other regions of England, Wales, Australia, much of New Zealand and South Africa, /r/ is only pronounced before vowels. (It is not pronounced in words such as “cart.”)

First Language Acquisition of postvocalic /r/ by American children

The phoneme /r/ is late-acquired in English (Gick, Bell-Berti, Collier, & Baer, 2008). McGowan, Nittrouer, & Manning (1994) report studies showing that American children acquire /r/ at around three years of age, but do not master it until between the ages of six and nine. Gick et al. (2008) note that articulations of the tongue for producing /l/ and /r/ are more complex than for other English sounds. Constrictions involving the tongue are made in two places - at the pharynx and behind the alveolar ridge. McGowan et al. (2004) found in a longitudinal study that postvocalic /r/ was the earliest-acquired allophone of /r/. They posit that postvocalic /r/ is easier to articulate because it requires only one constriction at the palate. Gick et al. (2008) note that children, and people with speech impediments involving /r/, sometimes omit both constrictions in the oral tract, and substitute the central vowel *schwa*, with the tongue in neutral position.

***Katakana* transcription and English spelling influence**

It is well known that the phonology of the L1 has a particularly important influence on L2 pronunciation, but factors other than the L1 also influence L2 pronunciation. One of these is the orthographic systems of the L1 and L2. Children learn to speak their L1 well before they start to read, but L2 learners generally learn to speak, read and write the L2 at about the same time. Coutsougera (2007) reported the influence of the orthographic systems of the L1 and L2 on the pronunciation of Greek learners of English. Nogita (2010) looked at the influence of *katakana* transcription on the pronunciation of Japanese learners of English.

Both the English spelling system and *katakana* transcription of English influence Japanese learners' pronunciation of English. Many thousands of English loanwords written in *katakana* are in common use. *Katakana* transcription is partly based on BrE pronunciation. This explains some British-sounding pronunciations in Japanese learners' speech, despite their greater exposure to AmE (Maeda, 2009). It also explains some Japanese pronunciations of English phonemes. For example, where AmE has postvocalic /r/, *katakana* transcription has [a], or in some words, lengthened [o]. Murakami & Lambacher (1995) state that Japanese learners have difficulty articulating postvocalic /r/ and replace it with Japanese [a]. (Phonetic symbols for Japanese sounds follow the transcription system used by Vance, 1987.) Nogita (2012) concluded from interviews with learners that some mispronunciations are simply a result of learners not having been taught the pronunciation of sounds represented by English spelling and *katakana* rather than difficulty with articulation.

At the time of the data collection for the earlier study, English-style gardening was very much in vogue. Pronunciation of the words “hard” and “gardening” in the same news story

were compared. Forty-eight students pronounced both in the same way, either with or without r-coloring. Seventeen students pronounced the two words differently, 14 with r-coloring for “hard” and without r-coloring for “gardening.” Only three students pronounced “hard” without /r/ and “gardening” with /r/. From these results, it can be seen that there was a stronger tendency to drop r-coloring in “gardening” than in “hard.” A three-syllable word, such as “gardening,” is harder to pronounce than a one-syllable word, but it is likely that repeatedly hearing the *katakana* pronunciation influenced the students to pronounce the word without postvocalic /r/.

A possible influence of English orthography on pronunciation (personal communication, H. Saito, 2006) is the pronunciation by Japanese learners of r-colored vowels as a non-colored vowel followed by a short /r/. The r-colored vowels of speakers of rhotic varieties of English have r-coloring from near the beginning of the vowel, or throughout the whole vowel (Ladefoged & Johnson, 2011). The students in this study sometimes had a non r-colored vowel for most of the syllable core, followed by a short /r/ at the end. English spelling for r-colored vowels has a letter for the vowel followed by the letter *r*. Students may believe that two separate sounds are pronounced. Phonetic transcription may also give the impression that there are two distinct sounds one after the other, except in the case of the symbols /ə/ (“singer”) and /ɜ:/ (“heard”) where the symbol for r-coloring is combined with the symbol for vowel quality.

Consciousness of postvocalic /r/

When the students were interviewed for the first experiment, 31 were asked about pronunciation differences between BrE and AmE. Twelve of the 31 subjects mentioned postvocalic /r/ (Maeda, 2009). Most of them were studying the

differences between BrE and AmE pronunciation in a phonetics class at the time. However, classroom experience suggests that only a small proportion of students, even those majoring in English, are conscious of postvocalic /r/ as a conspicuous pronunciation difference between AmE, and BrE. Hirai (2008) writes of noticing, as an undergraduate student, rhoticism in the English of Japanese graduate students whose English sounded very good to her, and believing it was a feature of “Englishlikeness” rather than a feature of AmE. It may be that many students who pronounce postvocalic /r/ believe that pronouncing it is just part of sounding like a native speaker of English. Judging by hyper-rhoticisms, (pronouncing /r/ after a vowel where there is no *r* in the spelling), many learners may be pronouncing too many vowels with r-coloring because they do not know that r-coloring is linked one-to-one to *r* in spelling, and not to all vowel sounds.

Acoustic properties of postvocalic /r/

A notable characteristic of the /r/ phoneme is that the third formant (F3) is much lower than in vowels or other approximants, and is close to F2. In prevocalic /r/, F3 goes well below 2000 Hz. In postvocalic /r/, F3 goes below 2000 Hz in men’s voices, but sometimes finishes at 2100 to 2200 Hz in women’s voices. F3 in vowels which are not r-colored is always well above 2000 Hz, mostly above 2500 Hz (Olive et al, 1993). The lowest F3 given for men in one study of English vowels is for the rounded vowel /u/ at 2343 Hz (Hillenbrand, Getty, Clark, & Wheeler, 1995). F3 gradually falls through the syllable core and F2 and F3 are close by the end of the syllable core. The different formant trajectories for a vowel with and without r-coloring are reproduced in Figure 1. In the case of /ə/ and /ɜ:/, as in “sister” and “heard,” the F3 is usually low and close to F2 throughout the syllable core, depending on the previous consonant. The

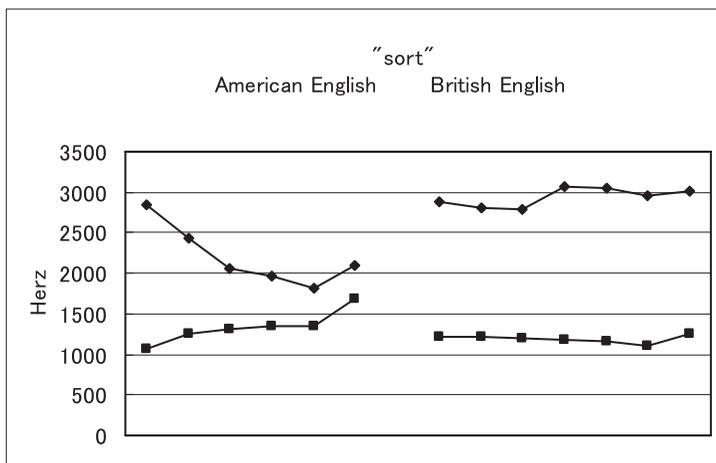


Figure 1 Second and third formants of the vowel /ɔ/ with and without r-coloring, pronounced by two women.

trajectory of the formants is determined by the shape of the vocal tract which is formed by the movements of the articulators. The characteristic lowering of F3 is produced by pulling the tongue back for “bunched” /r/, or by curling the tip of the tongue back behind the alveolar ridge for “retroflexed” /r/ (Zhou, Espy-Wilson, Tiede, & Boyce, 2007).

Over-generalization of postvocalic /r/

As mentioned above, the only characteristic of students’ pronunciation of postvocalic /r/ which can seriously interfere with intelligibility is over-generalization of postvocalic /r/. None of the 65 students in this study made this error frequently enough to cause serious problems. It is possible that they avoided too much over-generalization by preparing the speech beforehand. Classroom experience suggests that over-generalization of postvocalic /r/ is frequent in Japanese learners’ speech and can interfere with intelligibility.

In this study, students whose speech sounded very Japanese or very British had no postvocalic /r/. Most students whose pronunciation was close to that of American speakers had few over-generalized postvocalic /r/s. Students who over-generalized postvocalic /r/ mostly had scores for pronunciation proficiency in the middle range, and seemed to be trying very hard with their pronunciation.

There were various kinds of error involving over-generalization of postvocalic /r/ (See Table 1.). Some involved r-coloring of vowels with no *r* in the spelling. The most frequently mispronounced word was “was.” This may be influenced by the pronunciation of “were.” Some incorrect postvocalic /r/ involved more than one kind of confusion, for example confusion of “fast/first” and “work/walk” (Maeda & Saito, 2007). With “first” and “fast,” students sometimes substituted one for the other, probably because there is some similarity in meaning as well as pronunciation. They are also the same in *katakana* transcription. “Work” and “walk” have multiple sources of confusion (see Maeda, 2007). Errors with “smoke” involve an error with the vowel as well as r-coloring. The vowel was pronounced as the monophthong /ɔ/ and r-colored. (The error is sometimes seen in students’ spelling as “smork.”) Diphthongs are never r-colored, but one student attempted to r-color “stays,” and another, “ago.” Students sometimes hesitated before or after errors, especially those involving both wrong vowels and postvocalic /r/s, suggesting that they were conscious of their confusion.

A word which is frequently mispronounced by learners is “because,” pronounced with r-coloring in the second syllable. However “because” in the test materials was not pronounced with an /r/ by any of the students. This difference between the results here and classroom experience is probably also attributable to preparation of the reading.

Table 1 Pronunciation of Over-Generalized Postvocalic /r/ by 65 Students

| Word | Mispronunciation | Frequency in Test Materials | Number of Mispronunciations |
|---------------------|------------------|-----------------------------|-----------------------------|
| wa(r)s | [wəz] | 4 | 48 |
| wa(r)lk, -ing, -s | [wɔrk] [wɔrk] | 2 | 38 |
| tu(r)nes | [tənz] | 4 | 11 |
| smo(r)k-e, -ers, -y | [smɔrk] [smɛ:k] | 4 | 8 |
| snow(r) | [snɔr] | 2 | 2 |
| India(r) | [ɪndiə] | 1 | 16 |
| fa(r)st | [fɔrst] [fɛ:st] | 1 | 8 |
| bloo(r)d | [blɔrd] | 1 | 3 |
| stay(r)s | [steɪrɪz] | 1 | 1 |
| ago(r) | [əgɔr] | 1 | 2 |
| opera(r) | [ɒpərə] | 3 | 2 |

Substitution of lip-rounded front and central vowels for syllabic /r/

Many of the students substituted front-rounded or central-rounded vowels for /ə/ or /ɜ:/, for example in “singer” or “work,” sometimes with a short weak /r/ at the end of the syllable core. In American speech, most or all of the syllable core is an /r/ in these two phonemes. The F2 and F3 are close together and low - F3 often below 2000 Hz in men’s voices, and from about 2200 Hz to below 2000 Hz in women’s voices. The lip-rounded vowels were compared with lip-rounded vowels on sound files on the Internet created by B. Hayes of UCLA, and the formants were compared with the values from his vowel chart (Hayes, 2012). The students’ substitutions for syllabic /r/ sounded like /ø/, /œ/, /θ/ or /ɞ/, or the central unrounded *schwa* /ə/. The vowel /ø/ is an upper-mid front rounded vowel which sounds similar to French “eux.” The second vowel, /œ/, is a lower-mid front rounded vowel similar to the French vowel in “œuf.” The other two lip-rounded vowels, /ɞ/ and /θ/, are similar

in quality to *schwa*. There are no lip-rounded front or central vowels in English. The second and third formants for the lip-rounded vowels were higher and further apart than for syllabic /r/. Lip-rounding pulls down F2 and F3 (Ladefoged & Maddieson, 1996:234), but not to the low levels found in r-colored vowels.

Tongue shapes for lip-rounded vowels are described in Raphael, Bell-Berti, Collier, & Baer, (1979). The tongue is bunched, higher and further back than for similar unrounded vowels, but not as high as for /r/. It is possible that students are approximating the sound of syllabic /r/ by rounding the lips and bunching the tongue, with the tongue not high or back enough to produce syllabic /r/. There is an interesting resemblance to the strategy in first language acquisition of substituting *schwa* for /r/, with a less complex tongue position (Gick et al., 2008). Gick et al. note that similar strategies are also used by second language learners. The question arises as to whether students hear syllabic /r/ but fail to articulate it, or whether they perceive syllabic /r/ differently from American speakers.

Aims

The aims of this study were as follows:

1. To learn how Japanese learners pronounce postvocalic /r/.
2. To use what is learned, where possible, to make recommendations for the teaching of postvocalic /r/.

Method

Recordings were made as part of a larger study of varieties of English Japanese learners are learning (Maeda, 2009).

Sixty-five students, nearly all majoring in English at two universities in the Kanto area, were recorded in a soundproof room reading five short news stories selected from the Internet. The stories were slightly edited to include features of English

pronunciation which are conspicuously different in BrE and AmE. The script had 305 words and took about two minutes to read. One British and one American woman and two American men also recorded the stories. The subjects reported that they had no speech or hearing problems. In return for their participation, the students were given a small payment, copies of their recordings, and feedback on their pronunciation.

Before recording, the students filled in a questionnaire asking about their exposure to varieties of English and which variety they wanted to learn. They were told that the purpose of the recording was to study their pronunciation. After reading, they were recorded in an interview to provide samples of unprepared speech. Some were asked if they knew any pronunciation differences between AmE and BrE.

The writer (British) marked sounds on scripts for each student as sounding British, American, Australian, Japanese or other. The judgments were checked by an American speaker trained in phonetics and a Japanese phonetician who had lived in the US and Australia as a child and in Britain as a graduate student. Postvocalic /r/ was counted if there was a clearly audible attempt at it. Barely audible r-coloring was discounted. The two judges scored the recordings out of 5 for overall pronunciation proficiency. They also judged the recordings as sounding predominantly American, British, Australian, or Japanese.

The American readers pronounced 52 to 53 postvocalic /r/s in their recordings. Twelve students who had lived in the United States before puberty pronounced between 44 and 52 postvocalic /r/s. The numbers of postvocalic /r/ pronounced by the students who had not lived in the US before puberty is reproduced from Maeda (2009) in Figure 2.

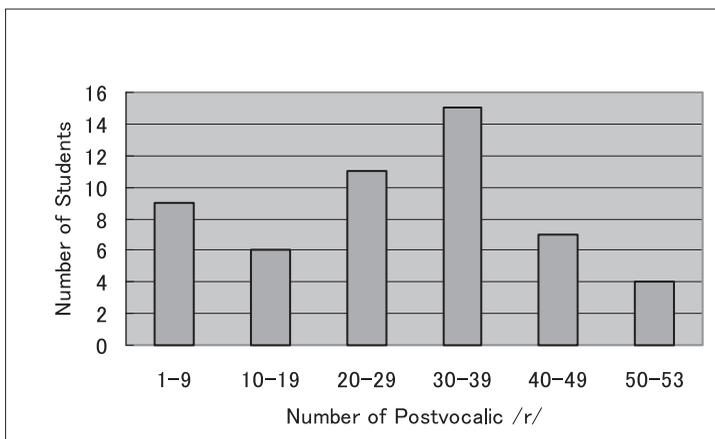


Figure 2 Pronunciation of postvocalic /r/ by students who had not lived in the United States before puberty

Subjects

For this study, the recordings of seven students were selected from the larger study for closer examination of their pronunciation of postvocalic /r/. They were selected to show a range of pronunciation ability. Except for the student who was selected for sounding very Japanese, they all said they wished to speak AmE and were judged as sounding American or trying to sound American. Three types of students were selected:

1. One woman who had pronunciation which sounded very Japanese.
2. One man and three women who had spent two months or less in English-speaking countries.
3. A man and a woman who had gone to school in the United States and Australia for one year at age 17 as part of exchange programs. The student who had been to Australia was chosen because she expressed a strong desire to speak

AmE and sounded to two of the three judges as if she was trying hard to sound American. The American judge noticed Australian influence.

The students will be referred to as Students 1, 2A, 2B, 2C, 2D, 3A, and 3B.

Apparatus and procedure

The 53 vowels in the test materials which are r-colored in AmE were re-examined for this study by close listening and by using acoustic information obtained from speech analysis software, SUGI SpeechAnalyzer (2000). Vowels with incorrect r-coloring were examined in the same way. The acoustic information was used to confirm auditory impressions, where possible, and to infer what articulatory strategies were used by the students. The r-colored vowels were compared with those of two American speakers (one woman and one man) and with the vowels of a British speaker (a woman). Trajectories of the 2nd and 3rd formants of the vowels were obtained using the software, and measurements of F2 and F3 were noted starting from the onset of the vowels. They were plotted using Excel.

Postvocalic /r/ in the test materials

Words from the texts with postvocalic /r/ are listed in the Appendix. Some function words with *r* in the spelling were pronounced without postvocalic /r/ by at least one American speaker. These are in parentheses. In rapid speech, American speakers tend to omit postvocalic /r/ in unstressed syllables. Pollock (2007) divides postvocalic /r/ into six types, depending on the preceding vowel: (1) unstressed /ə/ as in *father*, (2) stressed /ɜ:/ as in *bird*, (3) /ɪr/ as in *fear* (4) /er/ as in *fair*, (5) /ar/ as in *car* and (6) /ɔr/ as in *oar*. The sound /er/ only

occurred in an unstressed word so results are not reported.

Case studies

The pronunciation of postvocalic /r/ in the recordings of the seven students listed above is described below.

Student 1

Student 1 was majoring in English. She was judged as sounding very Japanese and received a pronunciation score of 2 out of 5 for overall pronunciation proficiency. She had spent two months in Canada and reported that she was not aiming at a particular variety of pronunciation.

She had one clear pronunciation of postvocalic /r/ in “smokers,” and five short postvocalic /r/s. Some other phonemes sounded American, but overall she sounded Japanese with a little British influence. The BrE phoneme /ɜ:/, which is AmE /ɜ:/, generally sounded like Japanese [a], but some sounded like slightly open versions of the British vowel.

Student 2A

Student 2A received a score for overall pronunciation proficiency of 3.5 out of 5. She was judged to be aiming at AmE. One of the judges noted the large number of postvocalic /r/s, 40 out of 52, as a reason for overall impression of American pronunciation. The student had never been to North America. She stated that she wanted to speak AmE.

She pronounced more of the postvocalic /r/s that were singletons than in clusters. For example, she pronounced /r/ in “your” but not in “sort.” The numbers pronounced were respectively 25 out of 27 and 15 out of 25. She pronounced two syllabic /r/s as the front lip-rounded vowel /ø/. She pronounced five over-generalized postvocalic /r/s in “tunes,” “was,” and three in “walk.”

Student 2B

Student 2B was given a score of 3 out of 5 for overall

pronunciation proficiency. She reported her target as AmE and was judged as sounding American. She had spent eight weeks in the United States and had mixed a great deal with Americans in Japan. One judge, while noting that she was aiming at AmE, reduced her score because of her intonation and other errors not involving postvocalic /r/.

In the earlier study, 41 of 52 postvocalic /r/s were judged to be attempts at postvocalic /r/. On closer examination, it was found that many of the syllables with postvocalic /r/ in AmE did not sound like those of American speakers. Some syllabic /r/s (/ə/ and /ɜ:/) sounded like the front lip-rounded vowels /ø/ or /œ/, with weak r-coloring, or like *schwa* with weak r-coloring, and some sounded like lip-rounded vowels without any r-coloring. She pronounced 7 of 26 syllables which have /ə/ and /ɜ:/ as front lip-rounded vowels without r-coloring.

She pronounced the *t* in “sort of,” “better,” “bitter,” and “later” as an American voiced /t/ but without r-coloring of the vowels. Voiced /t/ can sound like an /r/, and the auditory impression of /r/ carries over to adjacent phonemes. The trajectories of F2 and F3 suggested that there was no r-coloring of the vowels, even though there was an impression of r-coloring on listening to the words.

In “versions,” “Martin,” and “heart,” a change in vowel quality near the end of the syllable core gave an impression of r-coloring, but close listening suggested there was an [ɪ] offglide rather than /r/. The word “gardening” was pronounced without /r/. The words “years,” “atmospheres,” and “Here’s” sounded as if they had postvocalic /r/, but the r-coloring was weak.

None of the trajectories for F2 and F3 were found to look like those of American speakers, suggesting that the student was using different articulation from American speakers to pronounce sounds which gave an impression of postvocalic /r/. The formants were higher and further apart than for /r/. For syllabic /r/, they approximated the values reported by Hayes (2012) for

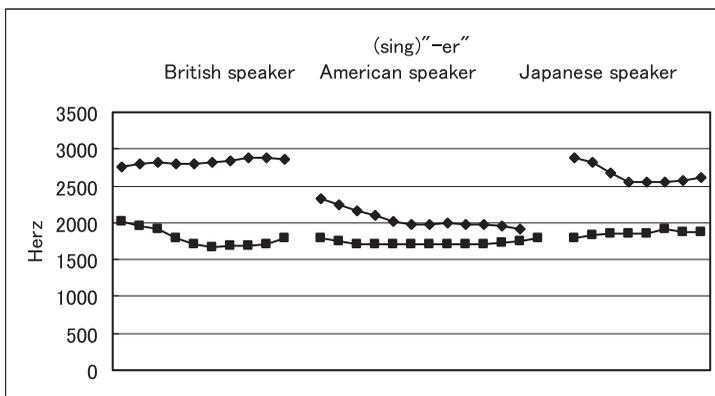


Figure 3 Second and third formants in “-er” in “singer,” pronounced by a British, an American and a Japanese speaker, both women.

lip-rounded vowels. At the narrowest point, F3 was around 2500 Hz or higher, and F2 around 2000 Hz.

Figure 3 shows the formants for “-er” in “singer” spoken by a British and an American woman, and Student 2B. The formants for the three speakers are, respectively, 1100 Hz, 200 Hz, and 700 Hz apart at the narrowest points. The Japanese speaker (Student 2B) seems to be pronouncing a *schwa* with some r-coloring rather than a syllabic /r/. The student’s formants are closer together than those of the British speaker pronouncing the “-er” in “singer.”

Student 2C

This student was given a score of 4 out of 5 for overall pronunciation proficiency. He reported his target as AmE and was judged as sounding American. He had never been outside Japan. He was judged in the earlier study to have pronounced 26 clear attempts at postvocalic /r/ out of 52. Other sounds, like /ɑ/ in “cough”, and voiced /t/, sounded American and may have contributed more to the impression that his English sounded American than his pronunciation of postvocalic /r/.

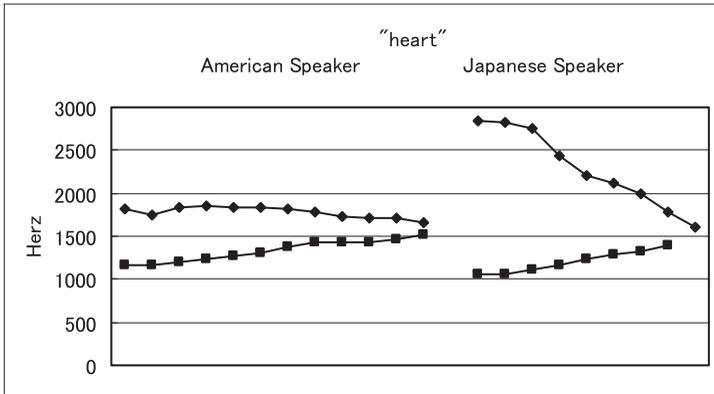


Figure 4 Second and third formants in /ar/ pronounced by an American and a Japanese speaker, both men, showing early and late start of r-coloring.

Six of this student’s r-colored vowels showed possible influence of spelling, with a non r-colored first portion of the syllable core, and then a short /r/ sound at the end (see Figure 4). The American speaker’s formants have values typical of r-coloring from the onset of the syllable core. The American speaker presumably had a “bunched” or retroflex articulation of the tongue from the onset whereas the student seems to have articulated an /r/ only at the end of syllable core. The student also had this kind of pronunciation for /ɜ:/, which sounded like British /ɜ:/ followed by an /r/ rather than syllabic /r/ with r-coloring through the syllable core.

Five words which have /ə/ or /ɜ:/ in AmE were pronounced with what sounded like front or central lip-rounded vowels, with or without a weak /r/ at the end. The formants were higher and further apart than those of the American speaker.

This student, like Student 2B and some others, pronounced the *t* in “sort of,” “better,” “bitter,” and “later” as an American voiced /t/ but without r-coloring of the vowels.

He had r-coloring in two of his pronunciations of “was.”

More complex errors, made by this student and others, involved confusion about which vowel to pronounce, as well as whether or not the vowel was r-colored. This extra confusion showed up as noticeable hesitation before or after pronouncing the words where he made the errors. His pronunciation of “worked” sounded like “woked” in two places. He pronounced “hard” as [ha:d] with a vowel almost as front as the vowel /æ/ in American “fast,” and without /r/, as if he were trying to avoid the British phoneme /ɑ:/ in “fast.”

Another feature of his pronunciation, which was found in a number of other students’ recordings, was absence of r-linking, with or without pronunciation of postvocalic /r/. His pronunciations of “for up,” and “hour of” were linked smoothly, but with no /r/. The words “hear a” were separated by a glottal stop, with no /r/ in “hear.”

Out of a total of 26 postvocalic /r/s that were counted as attempts at postvocalic /r/, only 12 were found to sound similar to those of American speakers.

Student 2D

The student was given a score of 5 out of 5 for overall pronunciation proficiency. She reported that she was often told that her English pronunciation was American, and she said she wanted to make it perfect. She had spent only two weeks outside Japan, in Britain. She went to a high school specializing in foreign languages, and her father’s profession involved her in contact with Americans. She had a part-time job in an American working environment. She pronounced 49 of 52 postvocalic /r/s. When she was asked about differences between BrE and AmE in her interview, she mentioned /r/ as well as other differences.

Nearly all her postvocalic /r/s sounded like those of the American speakers, and F2 and F3 trajectories looked similar. One “er” in “singer” sounded like a *schwa* followed by a weak /r/. One pronunciation of “housework” and one of “work” sounded like

the British vowel /ɒ/ followed by /r/. The pronunciation may have been spelling-influenced, or there may have been confusion with AmE “walk.” The word “worst” was pronounced /ɜ:/ followed by /r/. One pronunciation of “stronger” had a vowel like front lip-rounded /ø/ not followed by /r/. One “was” had r-coloring. She pronounced all linking-r. Some pronunciations of other sounds were Japanese or British so that the overall impression of her English was not completely of American English.

Student 3A

The student had spent a year in Australia as an exchange student at the age of 17. She was chosen for these case studies because she was keen to speak AmE. She reported having been taught only by North American and Japanese teachers in high school. One judge noted that she had frequent hypercorrections in the direction of AmE phonemes. The American judge noticed Australian influence, but the other two did not, and thought her English sounded American overall. The student was given a score of 4 out of 5 for overall pronunciation proficiency. She pronounced 42 of 52 postvocalic /r/s and three over-generalized postvocalic /r/.

She pronounced the first word in the recordings, “What,” with an r-colored vowel. She pronounced “sort” as /sɑt/, with no /r/. She was probably hypercorrecting the British or similar Japanese vowel /ɔ:/, as in “thought,” to the American /ɑ/ in “thought” and missing the connection between postvocalic /r/ and *r* in the spelling. “Hard” and “gardening” were pronounced without /r/ and with the front vowel [a]. The vowel quality could have been Japanese or Australian. “Heart” was hypercorrected to “hurt” with a weak /r/. She pronounced “smokers” like “smerkers,” [smɜ:kəz] with postvocalic /r/ in both syllables and the wrong r-colored vowel in the first. She pronounced “walking” like AmE “working.” She had vowels in “thirty” and “stronger” which sounded lip-rounded with weak /r/.

The vowel quality again could have been Australian-influenced, or it could have been a substitution for postvocalic /r/.

Most of her postvocalic /r/ did not sound weak, but in syllabic /r/, /ɜː/ and /ə/, more of the vowel quality could be heard than in American pronunciation. In her interview, she pronounced postvocalic /r/ in “China” and “was.” When asked, she mentioned /r/ as a difference between BrE or Australian English, and AmE.

Student 3B

Of the 65 students, he was the only one who had not been to an English-speaking country before puberty whose pronunciation was very close to that of American speakers. He was an exchange student in the US for one year at the age of 17. He was given a score of 5 for pronunciation proficiency. Most of his few mispronunciations did not involve r-colored vowels.

He had a few hypercorrections. “Martin” sounded like “Mertin,” and “heart” sounded like “hurt.” Other “ar” sounds also were not quite open enough. It may be that articulating a strong /r/ is difficult while articulating the open vowel /ɑ/. Many students pronounced good /ɔr/ sounds. It is possible that /r/ is easier to articulate with a back vowel. One “was” had r-coloring. The second and third formants have typical values for postvocalic /r/ (see Figure 5).

Summary and discussion

Characteristics of the students’ recordings reported in the case studies will be summarized, together with some general impressions of their pronunciation of postvocalic /r/.

Postvocalic /r/ was easier to pronounce in some environments than others. They were more successfully pronounced as singletons than in clusters. Easier r-colored vowels were /ɔr / and /ɪr/, especially when the /r/s were singletons. Stressed r-colored vowels were more successfully pronounced,

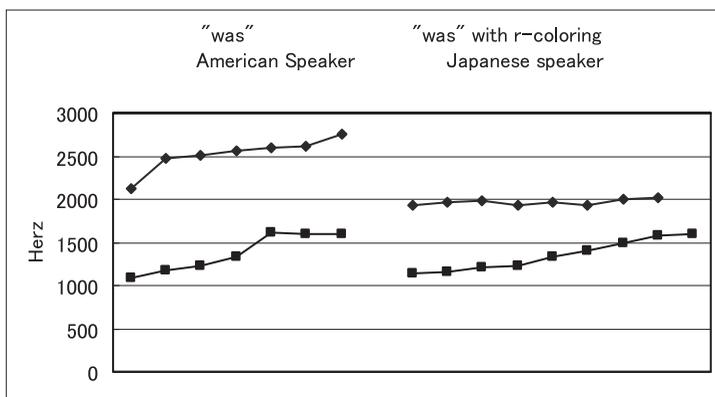


Figure 5 Second and third formants in “was” pronounced by an American and a Japanese speaker, both men.

possibly because students had more time to pronounce clear postvocalic /r/ in syllables with longer duration.

Commonly used loanwords were more likely to have vowels with Japanese quality and without r-coloring. This was particularly noticeable with the word “gardening.” Some other words were “circle” and “version.”

Some students substituted front and central lip-rounded vowels for syllabic /r/. The feature presents no problems for intelligibility. The articulation of lip-rounded vowels is similar to that for postvocalic /r/ but probably involves less movement of the tongue. Some substitutions sounded similar to syllabic /r/ and some sounded noticeably different. Some sounded so close that they were very hard to distinguish from /r/. Only students who are very interested in sounding like American speakers would need to change this pronunciation.

Some students pronounced vowels which are r-colored in American English as a non r-colored vowel followed by an /r/. This is another feature that does not need to be corrected unless students are aiming at sounding very similar to American speakers.

Few students linked final /r/ to a following word starting with a vowel. R-linking is a feature of Both BrE and AmE and is not strictly a problem with postvocalic /r/. Pronunciation features above the word level are more difficult, and few students, even those with many postvocalic /r/, linked final /r/ to a following word starting with a vowel. Some pronounced final /r/ and followed it with a glottal stop.

One characteristic of students' pronunciation of postvocalic /r/ which might need remedial teaching is that involving more than one error in one syllable. One student produced three errors with postvocalic /r/ in close proximity: "I worked [wɑ:kt] in a pub. There was [wəz] so much smoke [smɔrk]." These pronunciations seemed to produce conscious discomfort and could also lead to problems of intelligibility.

The writer does not advocate teaching a particular variety of English, but teachers need to decide on one, or possibly two models. Jenkins (2000), one of the leading proponents of reducing the importance of former prestige varieties such as British and American English, recommends teaching the easiest features of British, American, and other varieties of English. One of the features she recommends teaching is postvocalic /r/ because of its one-to-one link with spelling. In the writer's experience, Japanese learners are able to articulate postvocalic /r/ fairly easily when taught. The link to spelling can be taught in order to try to reduce errors which can affect intelligibility, such as over-generalization.

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Appendix
Words with R-Colored Vowels in the Test Materials

| /ə/ | /ɜː/ | /ɔr/ | /ɪr/ | /er/ | /ɑr/ |
|------------|--------------|---------|-------------|----------|-----------|
| were 3 | versions | sort | years 3 | (there)2 | Martin |
| later | circle | (or)2 | atmospheres | | heart 3 |
| fewer | worked | (your)3 | here' s | | hard |
| singer 2 | service | indoors | | | gardening |
| smokers | thirty | for | | | (are) |
| ever | worst 2 | | | | |
| exercise | commercial 2 | | | | |
| per | work | | | | |
| stronger 3 | | | | | |
| longer | | | | | |
| housework | | | | | |
| better | | | | | |
| bitter | | | | | |
| winter 2 | | | | | |

Notes

1. Numbers after words indicate number of occurrences in the test materials above one.
2. Parentheses indicate words pronounced without postvocalic /r/ by at least one American speaker.