

Measuring the Effects of Pronunciation Pedagogy

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The purpose of this paper is to show the effects of pedagogical pronunciation training on the English vowel length of Japanese EFL speakers. Many studies of English have claimed that vowel length is one of the most important features to consider in the pronunciation of the target language. However, there has been little research on Japanese EFL speakers' values. The following hypothesis is examined: "After training, Japanese EFL speakers will have greater differences in vowel length before voiced vs. voiceless stops than they had before training." As an effect of pedagogical pronunciation training, the Japanese EFL speakers will approximate the vowel length values of the native English speakers more than they did before training. The findings are useful for the development of language teaching, especially for Japanese learners of English, by applying this pedagogical training to pronunciation teaching.

本研究は、『日本人英語話者に対する母音長に関する教育的効果の研究』と題して、コンピューターを用いた母音長の音響音声学的分析を行った。日本人英語話者に対してVowel Length (母音長) に関する英語の発音訓練を行った。訓練を行う前に、全ての被験者はタスクの音読を行い、実験前の録音を行った。およそ1時間の発音訓練を母音長に関して焦点を定めて行った後、被験者の音読録音を行った。その結果、短時間のセッションで、母音長の発音に対して非常に高い教育的効果をあげる結果が得られた。訓練前においては

有声子音の前の母音長と無声子音の前での母音長との間にそれほど大きな差が見られなかったのに対して、発音訓練後は、その差が顕著に見られた。母音長は、日本語には音韻としての概念があるのに対して、英語のような音声学的区分は存在しない。このような意味においても、日本人英語話者においては、母音長の概念は、学習によって習得される可能性が高いと考えられる。母音長に関する教育学的発音訓練の高い効果が得られた。

The purpose of this study is to show the effects of pedagogical pronunciation training on the English vowel length of Japanese EFL speakers. Many studies of English have mentioned that vowel length is one of the most important features in considering the accuracy of pronunciation of the target language. However, there has been little research on Japanese EFL speakers' vowel length values. It is of interest to measure the training effects on the English vowel length of Japanese EFL speakers.

In English, vowels followed by voiced stops and fricatives are considerably longer than those followed by voiceless consonants as in the [i] of 'bit' and 'bid'. On the other hand, Japanese has no obstruent in the final position, and it uses "mora units" as a unit of timing. This is perhaps one of the problems for Japanese EFL speakers to speak English. For these reasons, pedagogical training on English vowel length was carried out with 5 Japanese EFL speakers. An experiment was carried out based on the following hypothesis: After training,

Japanese EFL speakers will have a greater difference in vowel length in vowels that appear before voiced vs. voiceless stops than they had before training.

The findings will be useful for the development of language teaching, especially for Japanese learners of English, by applying this pedagogical training to pronunciation teaching. Finally, English pronunciation textbooks published in Japan and overseas are considered from the viewpoint of vowel length.

Vowel Length

Vowel length is dependent on, or conditioned by, the quality of the vowel itself and by consonants adjacent to the vowel. Clark and Yallop (1996) described the effects of following consonants on vowel length in the following way:

"In English, vowels followed by voiced stops and fricatives are considerably longer than those followed by voiceless consonants: compare *feed* and *feet* or *fad* and *fat*" (p. 33).

As Clark and Yallop (1996) state, the point of articulation of neighboring consonants seems to have an effect on the vowel length. It seems to be one of the difficult areas for Japanese EFL speakers to differentiate vowel length before voiced and voiceless consonants. One reason is that Japanese does not have CVC word

structures. It may be difficult to apply this vowel length rule that English has. It is of interest to know what Japanese EFL speakers will do on English vowel length before training and after training.

This motivated a hypothesis: After instruction, the Japanese EFL speakers will have a greater difference in vowel length before voiced stops vs. voiceless stops than they had before instruction.

Methodology

Speakers

This study involved 5 Japanese speakers of English as a foreign language (JEFL speakers), who were all freshmen at a university in Japan. Additionally, as a control group, 2 native-English speakers were involved. The 5 Japanese speakers were selected on the basis of a number of criteria: (a) only speakers who speak Japanese in their home, (b) whose parents or guardians were native speakers of Japanese, (c) who did not have overseas experience more than three months, and (d) who did not take classes in English phonology or phonetics at a university. They were referred to as J1, J2, J3, J4, and J5. Native-English speakers were speakers of American English, who were referred to as E1 and E2.

Speech Materials

For an experiment of vowel length, the speech materials consisted of 34 words. In a reading task, there were 17

minimal pairs such as “bad” and “bat” that ended in a final voiced and voiceless obstruent. All words were read three times at Time 1 only by native English speakers, and three times at both Time 1 and Time 2 by Japanese EFL speakers. All words were one syllable words that ended in a singleton stop like the /t/ and /d/ in “hat” and “had”. An appendix provides the speech material used in the recording of this project.

Training

The trainer (the writer) was a native speaker of Japanese, who was brought up in Japan and attended Japanese schools. The trainer has a clearly intelligible accent of English pronunciation. One reason for choosing a trainer who was a native speaker of Japanese was to see whether Japanese teachers could positively affect the English pronunciation of their students.

The English pronunciation training was carried out between the recording at Time 1 (before training) and Time 2 (after training). Each session took approximately 60 minutes. Firstly, the difference between English pronunciation and Japanese pronunciation were explained from the viewpoint of vowel length. Secondly, not all, but about half of the words on a task sheet were read aloud by both the trainer and speakers. In the reading task, words were not juxtaposed in minimal pairs but appeared in random order.

Recording

The speakers were recorded individually in a soundproof studio room. All tokens were recorded onto a DAT tape using a SONY DAT TCD-D8 recorder and using a Panasonic XBS microphone. The recordings of Japanese English speakers were done at Time 1 before the pronunciation training, and at Time 2 after the training.

The speakers (5 Japanese English speakers and 2 Native English speakers) read all the words in a carrier phrase. Recordings were made at Time 1 only for native English speakers, and at both Time 1 (before training) and Time 2 (after training) for Japanese EFL speakers.

Acoustic analyses

All the tokens were sampled onto a Windows 98 based computer at a rate of 44100 Hz and 16-bit quantization using Cool Edit 96 software (Syntrillium Software Corporation, 1992-1996). As the connector cord, SONY stereo plug RK-G136 was used to connect a DAT recorder with a computer. Using the waveform display and spectrograms, vowel length was measured in millisecond from the beginning of the onset of the voicing to the end of the voicing.

Results

Table 1 and Figure 1 show the mean English vowel length of Time 1 (before training) and Time 2 (after training) before voiced and voiceless obstruents.

Table 1: Vowel Length before Voiced and Voiceless Obstruents “Before Training” and “After Training”, and Differences of Vowel Length before Voiced and Voiceless Obstruents Before Training and After Training.

	Before training			After training		
	before	before		before	before	
	voiced	voiceless	difference	voiced	voiceless	difference
E2	308.5	169.3	139.2			
E1	195.7	11.8	78.0			
J1	199.7	174.3	25.3	226.4	144.4	82.0
J2	191.4	152.8	38.6	255.2	124.9	130.3
J3	153.3	143.1	10.2	198.3	106.9	91.4
J4	204.5	182.8	21.7	210.1	123.1	87.0
J5	187.4	179.1	8.2	220.3	127.0	93.4

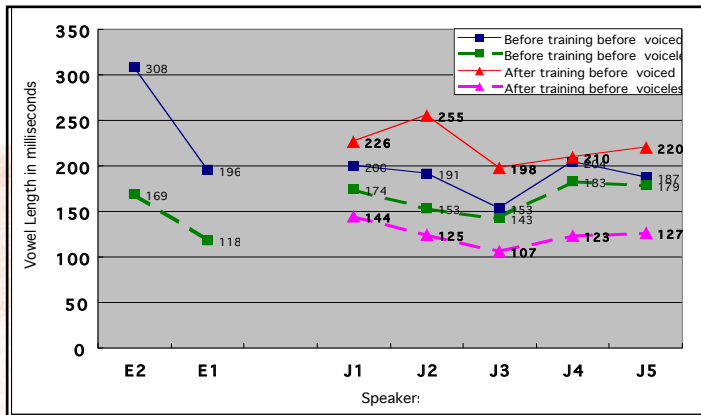


Figure 1: *Vowel Length “Before Training” and “After Training” before Voiced and Voiceless Obstruents.*

The mean vowel lengths of Native English speakers were 308.5 msec (E2) and 195.7 msec (E1) before voiced consonants, and were 169.3 msec and 117.8 msec before voiceless consonants. Furthermore, Japanese EFL speakers’ mean vowel length before voiced consonants were 199.7 msec (J1), 191.4 msec (J2), 153.3 msec (J3), 204.5 msec (J4), and 187.4 msec (J5), and those before voiceless consonants were 174.3 msec (J1), 152.8 msec (J2), 143.1 msec (J3), 182.8 msec (J4), and 179.1 msec (J5) at Time 1, before training. One of the findings is that their vowel length before voiced stops are longer than their vowels before training, and

their vowels before voiceless stops are shorter than their vowels before training. There is a little difference in values before voiced and voiceless consonants before training, however, the difference in values before voiced and voiceless consonants became much greater after the training.

At Time 2, after the training, Japanese EFL speakers’ mean vowel length before voiced consonants were 226.4 msec (J1), 255.2 msec (J2), 198.3 msec (J3), 210.1 msec (J4), and 220.3 msec (J5), and those before voiceless consonants were 144.4 msec (J1), 124.9 msec (J2), 106.9 msec (J3), 123.1 msec (J4), and 127.0 msec (J5).

Table 1 and Figure 1 show how the Japanese EFL speakers’ mean vowel length values before voiced consonants increased after the training and their values before voiceless consonants decreased after the training. Moreover, the differences were shown in Figure 2. Values shown in Table 1 (“difference”) and Figure 2 were calculated “vowel length values before voiced consonants” – “vowel length values before voiceless consonants” in order to look at the difference of vowel length only, before and after the training.

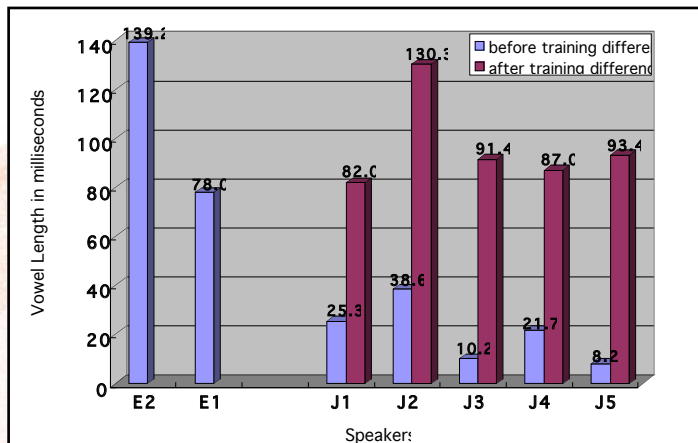


Figure 2: Difference of Vowel Length before Voiced and Voiceless Obstruents Before “Training” and “After Training”.

Figure 3 shows the average total mean vowel length values of the Native English group and the Japanese EFL group. All the values of both groups were averaged within each group.

According to Figure 3, the value of average mean vowel length for Native English group was 108.6 msec, and that of Japanese EFL group was 20.8 at Time 1 (before training) and 96.8 msec at Time 2 (after training). The average mean value of Japanese EFL group was greatly increased after the training.

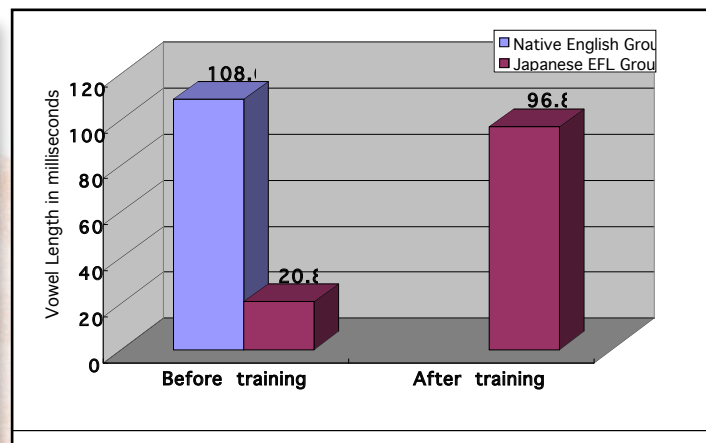


Figure 3: Average Mean Difference of Vowel Length Values “Before Training” and “After Training” for Combined All Vowel Length for Native English Group and Japanese EFL Group.

Discussion

Discussion Vowel Length of Native English Speakers as a Control Group

There were found to be large differences in values between Native English speakers, E2 and E1. As one of the reasons for this difference, speaking rate seems to have an effect on vowel length. Listening to the recorded tokens, E2 speaks slower than E1. If the speaking rate is slower, the vowel length becomes longer. It was one of the limitations of this study not to control

the speaking rate. However, the differences of vowel length values between “before voiced consonants” and “before voiceless consonants” are far more important for this discussion, and native English speakers have great differences in vowel length between “before voiced consonants” and “before voiceless consonants”.

Vowel Length of Japanese EFL Speakers as an Experimental Group

Interesting findings in this study on vowel length of JEFLL speakers were; (a) Differences of vowel length before voiced consonants and before voiceless consonants were much smaller than those of native English speakers’ before training. (b) After training, the vowel length before voiceless consonants decreased, while that before voiced consonants increased. This means that the difference of vowel length between “before voiced” and “before voiceless” became greater after training. (c) The vowel length differences of JEFLL speakers between “before voiced” and “before voiceless” became greater after training and approximated to native-English values.

Pedagogical Textbook Analysis

Purpose of Pedagogical Textbook Analysis

The purpose of this analysis is to show what aspects of pronunciation teaching are focused on in each English textbook. Vowel length is an important aspect

of pronunciation teaching. Of the 14 textbooks, 11 textbooks (No. 1 – No. 11) were published in Japan or for Japanese EFL speakers, and 3 of the 14 textbooks (No. 12 – No. 14) were published in North America and U.K.

The Findings of Textbook Analysis

Clear differences of focus and contexts were seen between textbooks published in Japan and those in North America and UK. In textbooks published in Japan, vowels and consonants of English were explained and appeared in lots of minimal pairs. On the contrary, textbooks published in North America or UK tend to focus on over segmental aspects such as intonation, pitch, stress, vowel length, longer sentence of speech, and teaching pronunciation in context. Things other than segmental came to be focused in textbooks published North America or UK.

NO	V	C	W	PHR.	SENT.	CONTEXT	PIC.	PITCH	V. L..	VOT
1	○	○	○	○	○	△ a few	○	○	×	×
2	○	○	○	○	○	×	○	×	×	○
3	○	○	○	○	○	×	○	×	×	○
4	○	○	○	○	○	×	○	△ a few	×	○
5	○	○	○	○	○	×	○	○	×	△ a few
6	○	○	○	×	×	×	×	○	×	×
7	○	○	○	○	○	×	○ a few	○	×	×
8	○	○	○	○	○	×	○	○	×	×
9	○	○	○	○	○	×	○	×	×	×
10	○	○	○	○	×	×	○	×	×	△ a few
11	○	○	○	○	○	×	○	○	×	×
12	○	○	○	○	○	○	○	○	×	○
13	○	○	○	○	○	○	×	○	×	○
14	○	○	○	○	○	○	○	○	○	×

[ABBREVIATIONS]

V. : vowel

C. : consonants

W. : word level

PHR. : pronunciation in phrasal level

SENT. : pronunciation in sentence level

CONT. : pronunciation in context

PIC. : picture of place of articulation

INTON. : intonation

V.L. : vowel length

VOT : voice onset time

[MARKS]

○ = There is explanation, section, or exercise.

× = There is no explanation, section, or exercise.

△ = There is some explanation, section, or exercise.

Conclusion

Pedagogical pronunciation training was carried out with 5 Japanese EFL speakers. The hypothesis was “After training, the Japanese EFL speakers will have a greater difference in vowel length in vowels that appear before voiced vs. voiceless stops than they had before training.” It was a very interesting finding that vowel length values of all 5 Japanese EFL speakers approximated native English values after instruction.

One of the most interesting findings was that as an effect of pronunciation training, Japanese EFL speakers approximated the vowel length values of the native English speakers more than they did before training. After the training, their vowel length before voiced stops were longer and their vowels before voiceless stops were shorter than their vowels before training. There had been seen a little difference in values before voiced and voiceless consonants before training, however, the difference in values before voiced and voiceless

consonants became greater after the training. A T-test determined that the difference was significant. The hypothesis was therefore supported.

This study included only one short time pedagogical training session. It is unknown whether Japanese EFL speakers improve their vowel length production to native English speakers’ values, and whether they can maintain the improvement shown in this study in the future. These issues are left for future study.

Finally, textbook analysis showed there were few pronunciation textbooks explaining vowel length. As this study reported, teaching vowel length in pronunciation lessons worked well for Japanese EFL speakers. The findings show that pedagogical training on English vowel length seems to be useful in contributing not only to the development of the field of phonetics, but also to the study of English teaching, especially to Japanese learners of English, by applying this pedagogical training to teaching pronunciation.

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Appendix

Reading Task

Read the number, and read the following words in the sentence “And I say _____”. Read each word three times.

- | | |
|-----------------------|------------------------|
| 1) And I say “bat”. | 18) And I say “hot”. |
| 2) And I say “need”. | 19) And I say “good”. |
| 3) And I say “hat”. | 20) And I say “got”. |
| 4) And I say “sad”. | 21) And I say “neat”. |
| 5) And I say “seat”. | 22) And I say “seed”. |
| 6) And I say “back”. | 23) And I say “sat”. |
| 7) And I say “let”. | 24) And I say “bed”. |
| 8) And I say “food”. | 25) And I say “bag”. |
| 9) And I say “cook”. | 26) And I say “pick”. |
| 10) And I say “lose”. | 27) And I say “foot”. |
| 11) And I say “bad”. | 28) And I say “hod”. |
| 12) And I say “seat”. | 29) And I say “loose”. |
| 13) And I say “had”. | 30) And I say “god”. |
| 14) And I say “bet”. | 31) And I say “beat”. |
| 15) And I say “seed”. | 32) And I say “bit”. |
| 16) And I say “pig”. | 33) And I say “bead”. |
| 17) And I say “led”. | 34) And I say “bid”. |