

Kinesthetic Instruction and Pronunciation 運動感覚的指導と発音

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Abstract: This paper reviews the use of teaching suprasegmentals to aid in the teaching of pronunciation to Japanese speakers as previous research has shown them to be more advantageous for communicative language teaching. Most primary and secondary education programs in Japan focus on the teaching of segmentals, if at all. A case study was conducted with one Japanese female English language learner using kinesthetic reinforcement in conjunction with pronunciation teaching. The goal of the research was to make aspects of English pronunciation more salient to Japanese learners and test for what gains could be made. This research shows that some gains are possible through more physical demonstrations of suprasegmentals but ultimately more research needs to be conducted in this area of English language pronunciation research.

Keywords: pronunciation, suprasegmentals, kinesthetic instruction

要旨: 本稿は、日本語の話者に英語の発音を教授する上で、超分節的要素について教えることの有用性を検討するものである。このような教授法が、コミュニケーションに重点を置く言語教育において有益であることは、先行研究によって明らかにされている。しかし、日本における初等・中等教育プログラムは、分節的要素を教えることに注力しがちである。本研究では、一名の日本人女性英語学習者を対象とし、発音指導を運動感覚的に補強するケース・スタディを実施した。その目的は、英語の発音の諸相を日本人学習者により分かりやすく示し、そのことにどのような利点があるかを見極めることであった。その結果、超分節的要素をより身体的に実演することの効果を確認できたが、英語発音分野におけるさらなる研究の蓄積が求められる。

キーワード: 発音、超分節的要素、運動感覚的指導

1. Introduction

Pronunciation is an area of language learning that is often overlooked in comparison to other language skills. As more researchers accepted the critical period hypothesis, instruction shifted to focus more on aspects that showed better improvement in learners (Lightbrown & Spada, 2013, p. 68). With communicative language learning some emphasis was placed on suprasegmentals, which was found to more likely affect a learners ability to communicate (Celce-Murcia, Brinton, and Goodwin, 1996). In a survey of English junior and high school teachers in Japan, Arimoto (2005) found 30% of all teachers had not practiced pronunciation and most had also not made use of the

pronunciation section in their textbooks (as cited in Tominaga, 2011). Prior research on pronunciation and instructor training found that many had little to no training and it is speculated that this is much the same case in Japan where many instructors are not required to have any formal English language training (Jordan, 2011). In a later survey of what features of pronunciation were important to teach Saito (2014) surveyed 120 English teachers at a nationwide conversational school in Japan (61 of which were native English speakers) and Jordan's hypothesis was confirmed as most teachers expressed little training in teaching pronunciation. However, no statistics were reported in the paper or any information about how they approached pronunciation, if pronunciation was regularly taught in the classroom, or length of instruction spent on pronunciation.

There does appear to be a distinction between the type of pronunciation practice segmental or suprasegmental and its effect on the learner's English intelligibility. McNerney and Mendelsohn (1992) showed that short-term suprasegmental pronunciation practice improved a learner's comprehensibility (as cited in Hahn, 2004). And even as far back as 1957 a study by Nida had shown that intonation contributed to intelligibility more than segmentals (as cited in Hahn, 2004). Hahn also showed that sentence stress and intonation helped to increase a speaker's intelligibility. Word stress was also shown to be of importance for intelligibility since when word stress was shifted to a different syllable there was an 8% decrease in intelligibility by raters (Fields, 2005). While not overly significant these words were evaluated in isolation and one could argue if they were to be produced in running speech there would be a decrease in intelligibility.

In this study I wanted to use these aspects of pronunciation to improve my speaker's pronunciation through suprasegmental practice. Intelligibility was not measured due to time constraints of planning a study and difficulty to find non-native speakers of English or non-English teachers to evaluate the results.

Kinesthetic reinforcement is an often-mentioned technique in pronunciation literature but a strategy that in my opinion is under study and under used. Kinesthetic reinforcement is defined as instruction where hand signals and body movements augment other instructional practices (Celce-Murcia, Brinton, and Goodwin, 1996). Several techniques are mentioned with regards to word stress, rhythm, linking, and intonation (Goodwin, 2014), which also overlap with qualities seen to aid in intelligibility with the exception of linking. In this study I looked at how kinesthetic reinforcement could be used, if at all, to increase a learner's pronunciation skills.

1.1 Literature review

One of the most important aspects of this study was Japanese learner's view of their own speaking ability. Japanese students show a preference to native English, in particular British and American accents, and have negative attitudes of non-native English including Japanese as studied by Chiba et al. (1995) (as cited Tokumoto & Shibata, 2011). A more intensive survey of Japanese, Korean, and Malaysian university students with regard to their views on their own pronunciation was conducted by Tokumoto & Shibata (2011). A six-point Likert-scale was used (1= strongly disagree – 6 = strongly agree) to measure the student's attitudes. Overall Japanese speakers felt that their pronunciation was not acceptable (for example, with non-native speakers or in business context) compared to the other two groups with the exception of in an English classroom (Japanese – 3.20, Korean – 2.80, Malaysian – 4.91, out of a possible 6). Furthermore, Japanese students scored themselves significantly lower on the question 'I am confident in my English pronunciation' (Japanese – 2.34, Korean – 3.22, Malaysian – 4.25, also out of a possible 6). A final statistic of importance in this study was priority in speaking ability. Japanese speakers placed the highest importance on sounding native like, 68%, compared to the Koreans and Malaysians, 58.7% and 16% respectively. The numbers are reversed for meaning conveyance as the Japanese subjects had the lowest score, 32%, compared with Koreans and Malaysians, 41.3% and 84% respectively. As this goal of native like pronunciation for adults is almost impossible for adult learners we need to focus on factors we can change. Improving pronunciation involves attending to factors that influence comprehension and intelligibility such as stress, voice quality, body movement, styles of dress, and gestures (Acton 1984).

There appears to be two areas English teachers in Japan need to prioritize. First, we need to encourage and promote our student's confidence in their acceptance of their pronunciation and accent. Secondly, as native like pronunciation has been shown to be mostly unattainable to older learners a focus on intelligibility should be emphasized.

Preference of learning style is another topic of interest in this study. It is generally agreed upon that there are four major styles of learning:

- Visual - reading
- Auditory - listening
- Kinesthetic – incorporating physical movement
- Tactile – hands-on learning

Research on native speaking learners has shown that younger learners tend to favor kinesthetic and tactile learning as well as learners who are poor readers (as cited in Reid 1987). Reid developed a self-reported survey to compare this with non-native speakers across age, language, TOEFL score, length of study abroad, length of English study, age, highest education, field of study, and sex. Of particular note was that a significant variety of responses were shown in the Japanese speakers as opposed to other groups. Of all nine groups in the survey (Arabic, Spanish, Japanese, Malay, Chinese, Korean, Thai, Indonesian, and English) all groups rated kinesthetic the highest out of six categories (visual, auditory, kinesthetic, tactile, group, and individual) with the exception of English speakers who preferred auditory but, just barely. Japanese speakers expressed the least preference to auditory learning which could be problematic for pronunciation learning. While the Japanese learners expressed the strongest preference towards kinesthetic learning overall compared to other groups they had no strong preference to any of the six learning styles.

In previous research there has been some proposed evidence that language was encoded in gestures originally (as cited in Kraemer & Swerts, 2007) and that the same area of the brain that controls language also controls manual gestures. It is further speculated that the evolution of gestures to speech is because of evolutionary changes to the brain. It is suggested that speech and manual gestures are seen as one singular process. A study cited by Dobogreav from 1931 showed that learners not allowed to make any sort of physical movements used less variation in pitch. In the study by Kraemer & Swerts, 10 Dutch speakers were given a four-word sentence and recorded using audiovisual equipment. They were then instructed to use a visual gesture (manual, head nod, or eyebrow movement) on both stresses present in the sentence, one stress, or none. Using computer analysis it was shown that providing any gesture resulted in a longer duration. Between the three types, gesture, eyebrow movement, or head nod, no significant difference was shown. The researchers expressed that while gains were shown perhaps they were too insignificant to be perceptible to human raters. This was tested in part II of the experiment where human raters also stated an increase in prominence when the subject used a physical movement while reading the sentence. The researchers concluded that there does appear to be a crossover between gestures and speech. One caveat of the study was that the authors speculate that speakers of languages that do not use stress for communicative purposes (such as Japanese) might struggle with making such a connection.

To the best of knowledge no research has been conducted giving empirical results for teaching and testing multiple areas of pronunciation with kinesthetic reinforcement. There are numerous papers that survey learner's preferences and previous instruction. There are also a number of papers that provide instructional guidelines for teaching kinesthetic reinforcement but do not provide a study.

1.2 Research question

1. Will kinesthetic instruction show any improvement on sentence stress, word stress, linking, and intonation when coupled with listening practice?
2. Will kinesthetic instruction show any improvement on sentence stress, word stress, linking, and intonation with no listening practice and explicit instruction?
3. Will kinesthetic instruction show any implicit improvement on sentence stress, word stress, linking, and intonation with a text that is unfamiliar to the student?

2. Method

For this study, my participant was a Japanese female in her 40s. Previously she had English instruction in the Japanese school system from middle school through high school and had taken two years of English instruction at a university level. For the past seven years she had also taken instruction at an eikaiwa (Japanese conversational school) where instruction is predominately based on communicative learning. Pronunciation practice is not regularly taught at her particular conversational school and if it is the focus is on segmentals. The student expressed a desire to work on her speaking ability as she regularly travels internationally for athletic competitions and had a desire to improve her communication with both athletic peers as well as service workers in her travels.

For this study three texts were chosen for her pronunciation evaluation. The pre- and post-tests were text taken from the *The Speech Accent Archive* (see Appendix A). This text was chosen for the pre- and post-test, as the speaker was highly unlikely to be familiar with the text and therefore couldn't practice or review it. The pre- and post-test was made available to the student during the test only and was able to review the text for two minutes before being asked to reproduce the text. It also contains a large amount of English phonemes and could test if it was possible for the speaker to apply any of the treatments implicitly. Two different texts were used in the treatments. First, during the

treatments the text from Tominaga (2011) (see Appendix B) was used for in-treatment practice. Explicit instruction was provided with regard to pronunciation instruction and practice over the course of the treatment. A second text, part of a monologue from the film *Ratatouille* (see Appendix C), was used as homework practice. This was chosen for several reasons as it is a real world example, aimed at native speakers, she could listen to for practice, and as the target audience is children the language would be easily understood and allow her to focus on pronunciation. After the in person treatment she was instructed to use this text over the next couple of days listening with a script and try to apply the treatments on her own and at the beginning of each successive treatment her progress was checked. All texts used for the treatments, homework and tests were similar in size at around 100 words.

Four treatments were delivered in total as well as a pre- and post-test over the course of three weeks. Each of the treatments focused on one particular aspect (sentence stress, word stress, linking, and intonation) and lasted approximately 40 minutes. Practice for sentence stress involved first finding content words and a discussion of their importance. The kinesthetic reinforcement involved her then opening her fist for stressed words and making a fist for unstressed. The teaching of word stress involved analyzing a list of common rules and applying them to the text. Word stress was practiced by having the student raise or lower a flat palm for stress or unstressed syllables. Similar to word stress linking was taught by providing examples of common types and applying them to the text. The practice for teaching linking involved joining the thumb and index finger on both hands into a chain to draw attention when reading. Intonation was practiced with a sweeping motion up or down depending upon the sentence.

Recordings were made of the pre- and post-test as well as from both treatment texts pre- and post-treatment. These six recordings were then analyzed by 5 native English speakers who are also teachers in Japan. The age of the raters ranged from 23-45 years old and had experience teaching in Japan from 1 year to 22 years. There were four male raters and one female rater. Three of the raters were from the United States, one from Canada, and one from England. All of the raters were unfamiliar with the texts being rated and no transcripts were provided. None of the raters were from the same school as the student so it can be assumed that they had no previous contact with the learner. The raters listened to each pre- and post-treatment/test but had no knowledge of what instruction was given to the learner. Each recording was scored for sentence stress, word stress, linking, and intonation according to the following rubric:

1. This aspect was not present at all.
2. This aspect was present 25% of the time but inconsistent.
3. This aspect was present 50% of the time and fairly noticeable.
4. This aspect was present 75% of the time and highly consistent.
5. This aspect was native like.

3. Results

Raters were presented with the audio track and scored them according to the rubric. The results were then added up and divided by 5 to give an average score across each category. The results are presented in a table below (full results are presented in Appendix D).

Track	Sentence Stress	Word Stress	Linking	Intonation	Total
<i>Ratatouille</i> pretest	2.4	2.4	2.4	2.8	2.5
<i>Ratatouille</i> posttest	2.8	3.4	3.2	3.2	3.15
<i>The Speech Accent Archive</i> pretest	2.2	2.6	2.4	3	2.55
<i>The Speech Accent Archive</i> posttest	3.4	3.6	2.8	3.6	3.35
Tominaga text pretest	2.8	2.8	2.2	2.4	2.55
Tominaga text posttest	2.6	3.2	2.8	3	2.9

Overall improvements were seen in all categories with the exception of sentence stress in the Tominaga article text. Many of the improvements seen were statistically small. The largest increase was in *The Speech Accent Archive* sentence stress category where there was an increase of 1.2 but moderately increased in the *Ratatouille* text, which incorporated listening, and surprisingly decreased for the Tominaga text. Word stress improved in both the *Ratatouille* test and *The Speech Accent Archive* test by one point but only moderately so in the Tominaga text test. Increase in linking was average for *The Speech Accent Archive* text and Tominaga text but showed some significant

improvement in the *Ratatouille* text. Intonation was overall seen to have a moderate increase. Overall the largest increase was in *The Speech Accent Archive* text that saw an increase of .8 followed by the *Ratatouille* text, .65, and finally the Tominaga article text with .35.

It appears that explicit instruction didn't have a strong overall effect. When instruction was coupled with listening practice word stress and linking were shown to have an improvement. This could be likely due to the fact that constant and repeated listenings could take place and these are two areas where repeated listening is needed. As for *The Speech Accent Archive* test, which is where we tested implicit knowledge, sentence stress drastically improved as did word stress. The text contains only contains 4 multisyllabic words which would be quite easy for an advanced learner so the results from this area should be taken with a grain of salt. Most importantly the student was able to apply word stress to the text over a short period of time.

4. Discussion

Overall, we can see that while there were some improvement pronunciation skills were still relatively low. The student had not received much pronunciation practice in the past and this appears to be inline with the literature review. While the learner did express that she felt the kinesthetic treatment was helpful no strong preference towards it was expressed or any desire to use the techniques practice in future learning. Gestures did seem to have an improvement on noticing the factors for pronunciation but as it is only one study further review is needed. As mention in the literature review younger learners tend to prefer kinesthetic learning and it would be interesting to look into a comparison of age and instruction.

Explicit instruction seemed to show very little improvement. Word stress and linking are both areas with a long list of rules and it is a fair assumption that over such a short time it would not be possible to implicitly apply them. As pronunciation is an often-overlooked skill one can assume that, at least in Japan, few teachers also couple it with vocabulary. Both the learning of vocabulary and word stress requires repetition to acquire (Goodwin 2014) and the use of kinesthetic reinforcement could help to make word stress more salient.

The text from *Ratatouille* showed a significant improvement in word stress and linking. The learner was instructed to review the video with focus on the previous treatment topic. While the student was instructed to use the exercises at home with the

listening and script this was all completely self-reported since the student was motivated and showed correct usage of the gesture when demonstrating the text in the follow up treatment it is assumed that her reporting of practice was truthful. At the beginning of second treatment the learner reported that she had spent up to an hour practicing in one particular day which was far more than the two or three practices suggested.

The Speech Accent Archive text had a significant gain with regard to the area of sentence stress. This area is probably the easiest to apply implicitly reading from a text especially for a more advanced learner. The student had a few moments to review the text and was instructed to read through the text and apply the gestures learned before performing the posttest. Because of a lack of multisyllabic words in the text the improvement with regards to kinesthetic reinforcement might have drawn more attention to those words and a comparison of a more dense multisyllabic text would be needed for comparison.

Lastly, the area of intonation was the most consistent showing a gain of around .5 in all three texts. The noticing of this area is quite easy and possibly the most commonly taught aspect of pronunciation in the eikaiwa system as it is important for conveying emotion and accurate communication. It is mentioned by Goodwin (2014) that intonation is largely dependent on the speaker's intent and there is a chance larger improvements would have been seen from spontaneous speech as the learner has more control over the language being produced. This would be an interesting area of study in the future.

One of the major problems of this study is that while the student was receiving explicit instruction it was clear she understood what the gestures meant but a connection between speaking and movement was not made. This problem was suggested in Kraemer & Swerts (2007) as Japanese is a stress-timed language. For example, while giving instruction on word stress the student would raise or lower her hand in the proper place for stress but her pronunciation would remain flat. Building a connection between the physical motion and the change in voice may take repeated and extended exposure. Building on this study it would be interesting to use computer analysis to check for increases in pitch for sentence stress, word stress and intonation. This resource could also be highly useful for motivating the students as if it can be shown that any sort of gesture can actually improve these parts of speech, with empirical results, students may strive to make a stronger connection between kinesthetic instruction and their own pronunciation.

One final aspect of the instruction that was not apparent until midway through was the possible need for an assessment. For example it was discovered during the word stress treatment that the learner was unfamiliar with exact division of syllables and how to use stress. While in general she could identify the correct area where word stress should be in familiar words she placed them over only the vowel. So for example with the word 'Japan' in the Tominaga text she would place the stress over just the 'a' and not 'ja'. This gave it more of a sweeping intonation-like motion as opposed to the strong/weak pattern of sentence stress. It was just assumed that a learner at her level would have had more information but if this were to be replicated in the future an assessment of pronunciation knowledge would be best to help design the lessons and make the best use of time.

5. Limitations

One of the major limitations of this study is although we can see that there are some similarities between kinesthetic learning and intelligibility, intelligibility was not measured. There were two reasons for this. First, as this was a case study, the results would not be as credible as there would be no control group. Secondly, the only raters available at the time were either native Japanese speakers or native English speakers who are teachers in Japan. As expressed earlier in the study, Japanese learners were highly critical of non-native accents, including their own, and I felt that they would skew the results if they were to listen for intelligibility. As for the native English speakers since all had spent at least one year in Japan and were English teachers, they would be accustomed to the accent and rate them higher. A group of non-native, non-Japanese speakers or native English speakers who have not spent a significant time in Japan would have been ideal but was not possible due to constraints. The ratings of these two groups in a larger study of pronunciation and intelligibility would be something of interest to look into in the future.

Another major influence of the study was of the recordings themselves. There was no possibility of having the ideal conditions of a sound proof room with recording software. Meetings had to take place in public areas and there was inevitably background noise. This was minimized as much as possible but I was unable to completely eliminate it. This could have influenced the ratings and if it were a larger study with more time steps would be taken to eliminate any outside factors such as the use of a private recording studio.

Lastly, this study only looks into a small segment of kinesthetic reinforcement. We have seen that factors such as the native language of the speaker and age could have an effect on learners but not enough study has been done in this area. Furthermore this study only looked into what effect kinesthetic reinforcement has on reading a passage. It is possible that learners might be able to improve their pronunciation better through spontaneous speech. The differences between kinesthetic pronunciation from reading and kinesthetic pronunciation from spontaneous speech would be an area of interest to research in the future.

6. Conclusion

In conclusion, there does seem to be some overall improvement that can be had from kinesthetic reinforcement. There are no studies that look overall at kinesthetic reinforcement and its effects on pronunciation so there was little I could find to build upon. General studies that use kinesthetic reinforcement are also very limited however many authors recommend the use of such treatment. While this is just a single study of a single learner it does show that there is need for more research in this area. It appears that focusing on word stress and linking need to be accompanied by listening practice and possibly repeated and extended practice. Sentence stress can possibly be taught in such a short time and implicitly applied although studies with lower level learners should be conducted before any large assumptions are made. In texts that are read intonation is noticed but has no significant improvements.

Since no studies to my knowledge on this area exist it is difficult to gauge if these results are exceptional, common, or under performing. Also since there is a lack of a control group we have no idea how a learner receiving other types of instruction might compare to such instruction. In the future it would be useful to have similar kinesthetic instruction with a control group and carried out over a longer period of time. It would also be useful to see if other factors such as age and the learner's native tongue might play a role in how useful kinesthetic reinforcement might be.

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Appendix A

Text from *The Speech Accent Archive*

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

Appendix B

Text From Yuko Tominaga *An Analysis of English Pronunciation of Japanese Learners: From the Viewpoint of EIL* (2005)

Have you ever thought, “There are no other people who love rice as much as the Japanese?” Yet people in Southeast Asia also often say they can’t live without rice. People in Vietnam, Myanmar, and Indonesia eat more than twice as much rice as people in Japan. In Korea, and Taiwan, too, rice is an important staple. Just as in Japan, they cook plain rice and eat it with all kinds of dishes.

Appendix C

Text section taken from *Ratatouille*

In many ways, the work of a critic is easy. We risk very little yet enjoy a position over those who offer up their work and their selves to our judgment. We thrive on negative criticism, which is fun to write and to read. But the bitter truth we critics must face, is that in the grand scheme of things, the average piece of junk is probably more meaningful than our criticism designating it so. But there are times when a critic truly risks something, and that is in the discovery and defense of the new. The world is often unkind to new talent, new creations, the new needs friends.

Appendix D

Male, Canadian, two years of teaching in Japan, two years of teaching in South Korea

Track	Sentence Stress	Word Stress	Linking	Intonation
<i>Ratatouille</i> pretest	2	2	2	3
<i>Ratatouille</i> posttest	3	3	3	3
<i>The Speech</i> <i>Accent Archive</i> pretest	2	2	3	3
<i>The Speech</i> <i>Accent Archive</i> posttest	3	4	3	4

Tominaga text pretest	3	3	2	3
Tominaga text posttest	3	3	2	3

Male, British, four years of teaching in Japan

Track	Sentence Stress	Word Stress	Linking	Intonation
<i>Ratatouille</i> pretest	3	2	2	3
<i>Ratatouille</i> posttest	3	3	3	3
<i>The Speech Accent Archive</i> pretest	3	4	3	3
<i>The Speech Accent Archive</i> posttest	3	4	3	4
Tominaga text pretest	3	3	2	2
Tominaga text posttest	3	3	3	3

Male, American, 22 years of teaching in Japan

Track	Sentence Stress	Word Stress	Linking	Intonation
<i>Ratatouille</i> pretest	3	3	2	2
<i>Ratatouille</i> posttest	3	3	3	3
<i>The Speech Accent Archive</i> pretest	2	2	1	2

<i>The Speech Accent Archive</i> posttest	4	3	1	3
Tominaga text pretest	3	3	2	3
Tominaga text posttest	2	3	3	3

Female, American, one year of teaching in Japan

Track	Sentence Stress	Word Stress	Linking	Intonation
<i>Ratatouille</i> pretest	3	3	3	4
<i>Ratatouille</i> posttest	3	4	4	4
<i>The Speech Accent Archive</i> pretest	2	3	2	4
<i>The Speech Accent Archive</i> posttest	4	4	3	4
Tominaga text pretest	3	3	2	2
Tominaga text posttest	3	4	3	3

Male, American, 8 years of teaching in Japan

Track	Sentence Stress	Word Stress	Linking	Intonation
<i>Ratatouille</i> pretest	1	2	2	2
<i>Ratatouille</i> posttest	2	4	3	3

<i>The Speech Accent Archive pretest</i>	2	2	3	3
<i>The Speech Accent Archive posttest</i>	3	3	4	3
Tominaga text pretest	2	2	3	2
Tominaga text posttest	2	3	3	3