

## LEARNER PREFERENCE AND THE LEARNING OF JAPANESE RHYTHM

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This paper reports research which examined the effects of introducing different Japanese rhythm instruction techniques to second language learners. Any successful teaching method needs to take individual variation in both levels of attainment and the learning preferences of the learners into account. Multiple instruction techniques were introduced during Japanese pronunciation classes, which were 1) rhythm marking, 2) clapping, 3) grouping rhythmic patterns, 4) haiku, 5) pronouncing to a beat, 6) visual acoustic analysis (Praat), and 7) shadowing. A questionnaire asking the students their preferred instruction technique administered at the conclusion of the class demonstrated that learners varied in both their learning method preference, and the number of methods they found useful. Of the 25 participants, 16 preferred a single method and the remainder preferred multiple techniques. Using Praat software for visual acoustic analysis and shadowing were the most popular (8 selections each), followed by clapping (7 selections). Participants significantly improved their ability to perceive rhythmic minimal pairs when compared to a pre-test of the same words. They were also able to transfer their improved understanding to a new set of minimal pairs.

### INTRODUCTION

This paper examines the effectiveness of second language pronunciation instruction for learning Japanese rhythm. While the original classification system of syllable-timed, stress-timed (Abercrombie, 1967), and mora-timed (Ladefoged, 1975) languages has been discredited (Ramus et al. 1999, Grabe & Low, 2002), rhythm remains an important part of supra-segmental pronunciation.

Although there are a number of acoustic correlates of rhythm (Dauer, 1987), Japanese rhythm is largely determined by the structure of the syllable, and the special morae. The special morae consist of long vowels and diphthongs (*chouon*), geminate consonants (*sokuon*), and syllabic nasal consonants (*hatsuon*). Syllables containing special mora tend towards a similar length of enunciation which is roughly 1.6 times (citation) the length of standard Japanese syllables. Toki and Murata (1989) have summarized the structure of Japanese into standard (short) syllables, and moraic (long) syllables, which is summarized in Table 1. Here vowels are notated as V, semi-vowels as SV, consonants as C and special mora as + (N, Q, R, V, V').

Rhythm is an important part of second language learner speech. The goodness of a learners' rhythm influences native speaker evaluations of comprehensibility and quality (e.g., Derwing & Munro, 1997; Munro, 1995; and Kinoshita & Sheppard, 2011). In spite of this, research investigating the acquisition and teaching of prosody, in general, and rhythm in particular, is sparse (Trouvain & Gut, 2007). In addition, education practice tends to be bias towards one or two techniques (Kinoshita, 2010, 2011).

Table 1

*Japanese Syllabic Structure*

Syllable	Syllable Structure	No. Mora	Example
Standard (Short)	V	1	胃( <i>i</i> ), 絵( <i>e</i> )
	CV	1	木( <i>ki</i> ), 目( <i>me</i> )
	SVV	1	矢( <i>ya</i> ), 輪( <i>wa</i> )
	CSVV	1	書( <i>syo</i> ), 茶( <i>cha</i> )
Long (Moraic)	V+ 【N, Q, R, V, V'】	2	恩( <i>on</i> ), 運( <i>un</i> )
	CV+ 【N, Q, R, V, V'】	2	金( <i>kin</i> ), 禅( <i>zen</i> )
	SVV+ 【N, Q, R, V, V'】	2	ヨ ッ( <i>yo+Q</i> )
	CSVV+ 【N, Q, R, V, V'】	2	今日( <i>kyo+R</i> )
	CSVV+ 【N, Q, R, V, V'】	2	ヒ ヨ イ( <i>hyoi</i> )

**Rhythm Acquisition and Instruction**

In order to improve the teaching of rhythm in Japanese (and other languages), it can be argued that methodology needs to be informed by understanding of the natural processes of rhythm acquisition. The following is a summary of the findings to date. 1) As with other aspects of pronunciation, it appears that second language rhythm is learned from a first language starting point. In a three year longitudinal study of learners of Japanese as a second language, Kinoshita (2009, 2010) found that they produced rhythm metric scores closer to those of their first language than the target language. 2) Another important finding is learners often failed to develop their rhythm (Kinoshita, 2010, 2011). This is supported by Toda (2003) who suggested that the rhythm and timing of the special mora is particularly difficult to learn. 3) A further point is that rather than a universal rhythm acquisition process, where all learners gradually develop towards native speaker norms, it appears that learners follow different paths. Nakagawa et al. (2008) determined that learners acquire Japanese rhythm more effectively when using a method which better matched their preferred perceptual learning style (Reid, 1987, 1992). A perceptual learning style is the preferred perceptual channel to process information through the working memory (Baddeley, 2000). According to Bernard (1999), working memory has three perceptual processing channels, visio-spatial, auditory, and body state. Individual preference and experience using these processing channels lead to preferred perceptual learning styles. 4) There is also some evidence from the literature that the acquisition of rhythm is similar to skill acquisition. Anderson (1982) proposed that proficient competence in a skill is represented by unconscious procedural knowledge. Kinoshita (2013) demonstrated that second language learner rhythm performance is most likely based on underlying rules. 5) This procedural knowledge is

developed through the power law of practice (Newell & Rosenbloom, 1981), where learners become increasingly more efficient with practice. Practice can be assisted by declarative rule based knowledge, which through conscious attentional systems, can assist the development of the procedural knowledge. Yanagisawa et al. (2013) provided some support for this when they found that learning approaches which enabled the creation of explicit representations of rhythm were effective in second language rhythm acquisition.

It is clear that in order for many second language learners to develop their perception and production of rhythm, it needs to be explicitly taught. Secondly, as rhythm is a skill, rules need to be provided followed by the opportunity to internalize them. This should be followed by ample opportunity to practice rhythm through application of the rule in a controlled environment. Finally, instruction would likely benefit from taking the individual learning processes into account. This could be done is by introducing a number of different instructional techniques focusing on different perceptual learning styles during the course.

### **Research Questions**

In this paper, a course which used this approach to rhythm instruction was evaluated using an action research method. The research aimed to determine the effectiveness of a multi-instructional technique approach. The following research questions were investigated.

- RQ1: After a semester-long pronunciation course in which students were exposed to seven instruction techniques to learn Japanese rhythm, which technique(s) did learners prefer?
  
- RQ2a: Did the second language learners of Japanese improve their perception of Japanese rhythm after this instructional intervention?
  
- RQ2b: Did improvement demonstrated on pre-post test transfer to the perception of rhythm differences on novel lexical items?

## **METHOD**

### **Participants**

The participants in this study were 25 university students enrolled in a lower intermediate-level Japanese pronunciation course. The majority of the participants had studied Japanese in their home institutions, and had arrived in Japan between 3 weeks prior to the beginning of the course. Enrolment and level was self-determined, leading to variety of ability levels in the class. They came from a variety of different countries and spoke a large number of first languages (China, 6; Hong Kong, 3; USA, 3; England, 3; Ireland, 2; Indonesia, 2; Korea, 2; Russia, 2; and Taiwan and Uganda, 1 each). The students agreed to allow their data to be used in this study.

The course was run over a 15 90-minute classes, once a week. The goals of the course were as follow: 1) understand the rules of Japanese rhythm, accent, and intonation, 2) understand the characteristics of their own pronunciation, 3) be able to apply the rules of pronunciation during speech, and 4) determine a more appropriate rhythm instruction technique.

## Procedure

At the beginning of the rhythm section of the course, the participants were required to complete a pre-test, which represented their perceptual rhythmic knowledge. They were then introduced to the different pronunciation instruction techniques, described in detail below, and experienced learning pronunciation through each of them. Each method was introduced over about 40 minutes, half of a weekly class. After the four weeks, the participants then completed a post-test of rhythm which consisted of the same six items as the pretest. A second test (post-test 2), which contained new items was administered following the first post-test to check if there had been transfer of knowledge. In the final class of the semester, the participants filled out a learning preferences questionnaire and an agreement to participate in the study. The different instruction techniques are described in detail below and summarized in Table 2:

Table 2

### *A Summary of Japanese Rhythm Instruction Techniques*

<b>Instruction Technique</b>	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic</b>	<b>Explicit Training, Explanation (Minutes)</b>	<b>Time on Task (Minutes)</b>
Rhythmic Marking	X		X	10	20
Clapping			X	10	20
Pattern Grouping		X		10	20
Metronome Haiku		X		10	25
Auditory Beat		X		10	25
Acoustic Analysis	X			15	25
Shadowing		X		15	25

## Rhythmic marking

Rhythmic marking is a method where the teacher begins by explaining the difference between simple and long syllables. Next, the learners are asked to mark the long and the short syllables shown in Figure 1. Then students trace the symbols with their fingers as they listen to the teacher and say the words aloud. As the learners build up these visual, aural, and tactile representations, the complexity is increased first by placing the words into carrier sentences, and then by placing them into more authentic communicative utterances.

<i>Kokyoo</i>	<i>Kookyoo</i>	<i>Kookyo</i>
• —	— —	— •
hometown	public	the Imperial Palace

Figure 1. Rhythm marking annotation.

The objective of rhythmic marking is to assist the learners to create explicit visual and kinesthetic representations of the target rhythmic structure. It is hoped that the learners are able to transfer these representations to implicit auditory and oral representations through multiple practice sessions and conscious application of the process developed above

### Clapping

As above, this method starts with an explicit explanation of the difference between long and short syllables. The students then mimic the teacher as he/she reads words out loud while clapping once for a short syllable, and twice for a long syllable (see Figure 2). Similarly to the process in Rhythm Marking, the utterances increase gradually in complexity; from single words, to simple sentences, to multiple clause sentences.

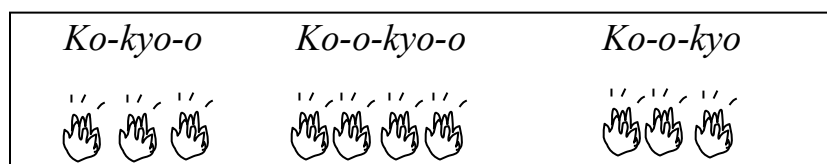


Figure 2. Visualization of clapping.

This method is thought to contribute to learning by assisting learners to create a kinesthetic representation of rhythm. Once this representation is established, the learners are able to base their repetitive practice on conscious application of it. This is different to Rhythm Marking in that it does not have a visual component to the representation.

### Rhythmic Pattern Grouping

This approach requires learners to group lists of words currently in their lexicon into their respective rhythm patterns. A 1-2 pattern consists of a word made up of a short and a long syllable. A 1-2-1 pattern word is one with a short, a long, and a short syllable. Examples are provided in Figure 3. (The rhythmic marks are added to denote short and long syllables in the figure, and are not actually part of the teaching technique). Once the lists have been created, the learners should read the words aloud repetitively, vocalizing the pattern.

1-2 type	<i>Ko kyoo</i>	<i>Ki noo</i>	<i>Ka ban</i>	<i>Sa too</i>
	• —	• —	• —	• —
	hometown	yesterday	bag	sugar
1-2-1 type	<i>Ji doosya</i>	<i>De paa to</i>	<i>Fu ran su</i>	<i>A sat te</i>
	• — •	• — •	• — •	• — •
	car	department store	France	the day after tomorrow

Figure 3. An example of Rhythmic Pattern Grouping.

This method assists learners to create a conscious auditory representation of the different rhythmic structures, and provides the opportunity to internalize them through repeated practice. It is different from the above method as it does not provide kinesthetic support. Nor does it provide the opportunity to generalize representations to sentences. The effectiveness of this method is reported and discussed in Kinoshita (2013).

### Metronome Haiku

This method introduces Japanese haiku, which are structured around mora-rhythm; five morae in the first line, seven in the second, and five in the final line. First, the teacher reads a haiku out loud, as a metronome beats time. Two morae are pronounced with each metronome click, and the pause between each line takes half a beat. The learners read in time with the teacher and metronome. Following this, learners create their own haiku and read them aloud in time to the metronome.

<i>Furu ike ya /</i>	<i>Kawa zuto biko mu /</i>	<i>Mizu noo to /</i>
♪ ♪ ♫	♪ ♪ ♫ ♫	♪ ♪ ♫

Figure 4. Metronome Haiku beat placement.

The aim is that learners will be able to create auditory representations of mora-timing and a sense of isochronic timing through this technique. Although this method does not include a large amount of practice, it is hoped that the learner is able to apply the representations they learn through this technique when practicing using other methods, and through communication.

### Auditory Beat

In Auditory Beat, a similar technique to Metronome Haiku, students read several short sentences with similar rhythmic structure aloud to a musical beat. This method is much like jazz chants

which are often used for teaching English stress and timing to children (Graham & Veltfort, 1979). Auditory Beat assists acquisition in similar ways to Metronome Haiku. However, the rhythmic structures that can be used are not restricted by the structure of haiku. This method can also provide students with the opportunity to practice which will assist in the internalization and automatization of the conscious representation.

## Visual Acoustic Analysis

Learners using Visual Acoustic Analysis as a method compare their own pronunciation with that of a model. They are first required to learn to use acoustic analysis software such as Praat (Boersma & Weenick, 2014). After learning how to record, upload, and analyze length in their utterances, they compare their own pronunciation with that of a pre-recorded native speaker (Figure 5). The learner then re-records their utterance in an attempt to pronounce the word/phrase/sentence with a sound pattern closer to the native speaker model.

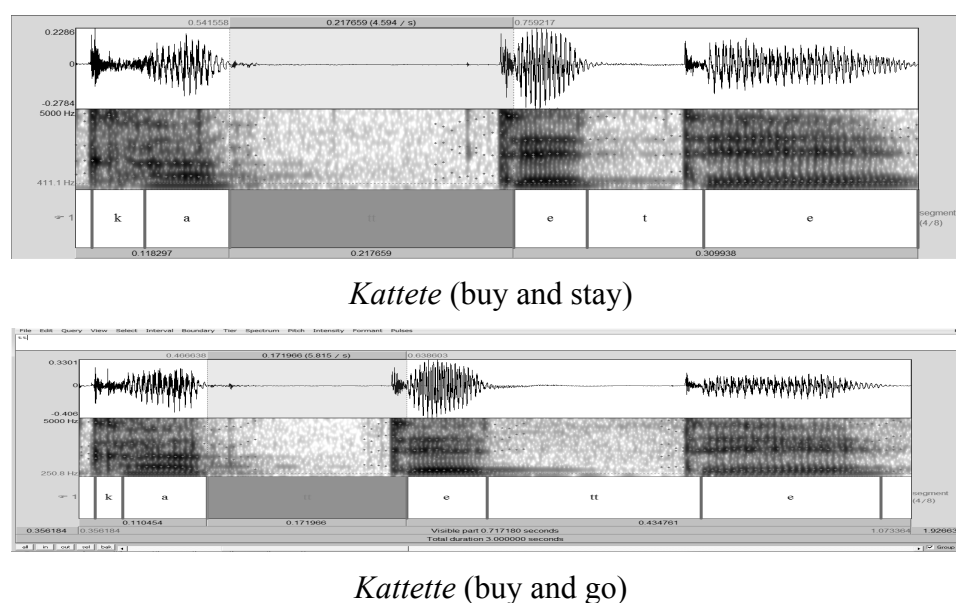


Figure 5. Comparing *Kattete* and *Kattette* with Praat (2014).

Visual Acoustic Analysis offers the opportunity for visual feedback on production. Students are given the ability to compare their production with a model and are then enabled to make adjustments to their rhythmic production. This assists in building an accurate, conscious representation of the target sound patterns. As the comparison can be done at any time, it also enables the learners to monitor their performance outside the limited capacity of their working memory.

## Shadowing

Shadowing is the final pronunciation learning method introduced during the class described in this paper. Using this method, the learners first watched a drama, focusing on comprehending the

content. Once the story was understood, the drama script was provided, and the drama played once again, while learners listened to the drama, and read the script aloud in time with it. Once they had shadowed the drama, the learners then recorded their production and checked their own pronunciation and rhythm by comparing it to the drama script.

The mechanism of acquisition through shadowing is discussed in Kadota (2007). This technique differs from the others in that it attempts to build an implicit representation of the target pronunciation structures directly through a large amount of practice. The method relies on encoding a segment of the auditory information from the drama in the auditory loop of the working memory, matching it with its meaning through the pre-shadowing viewing of the drama, and the instantaneous reading of the text, and then forming one's own representation through conscious rehearsal and monitoring performance by comparison with the representation encoded in the working memory (see Atkinson & Shiffrin, 1971). This method assumes that through the process of shadowing, implicit representations are created, which can be generalized to new contexts.

## **Analysis**

Variables measured in order to answer the above research questions were learning method preference and achievement. Learning method preference was measured by questionnaire. It required the participants to select (with a check-mark) the methods which they believed matched their own way of learning or motivated them most. Multiple responses were allowed, and learners were given the opportunity to add additional methods which they thought effective, but were not covered in the course.

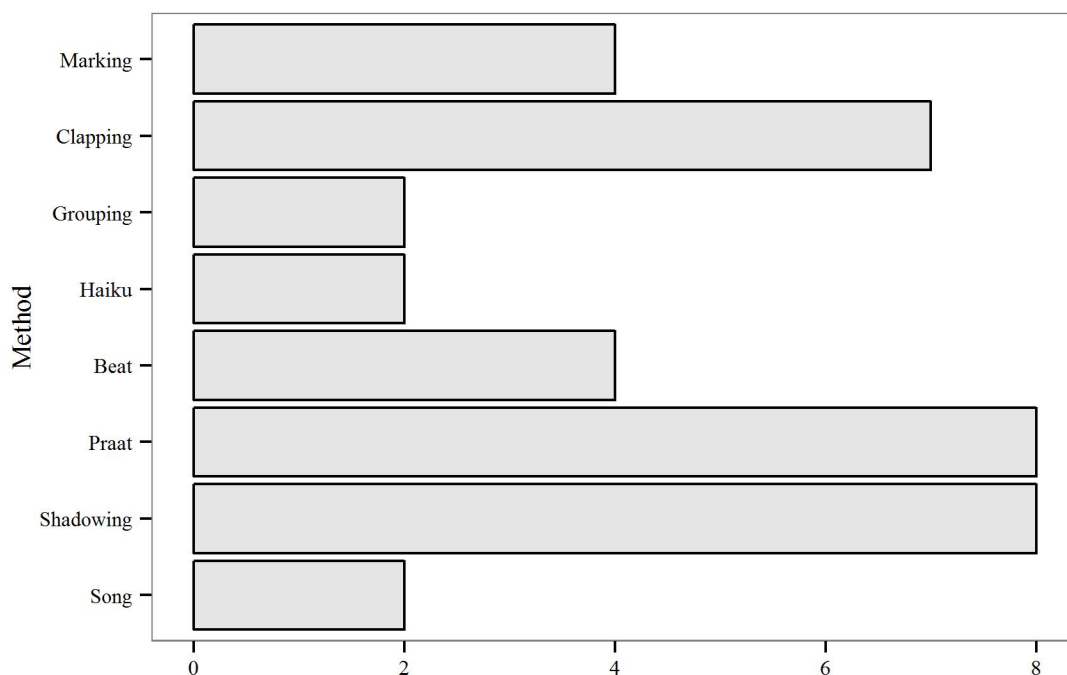
Achievement was measured by performance on a rhythm test. The test consisted of a 6-item listening test which required the participants to listen to and identify the correct rhythmic pattern from a number of choices representing different rhythmic patterns. For example: kokyo (hometown), kookyoo (public), kookyoo (the Imperial Palace). A second version of the test was created to determine if what was learned was transferable to a new context. The test items for this perceptual rhythm discrimination test are provided in Appendix A.

## **RESULTS**

RQ1: After a semester-long pronunciation course in which students were exposed to seven instruction techniques to learn Japanese rhythm, which technique(s) did learners prefer?

The first research question set out to determine what method learners prefer. Figure 6 shows the number of students who selected each of the learning methods as their preference. 16 participants selected just one method, the remaining participants choose an average of three methods. Two participants wrote 'song' as their preferred method of learning, even though it was not one of the methods covered in class. Of the techniques which were covered in class, Visual Acoustic Analysis (Praat) (8), Shadowing (8), and clapping (7) were the most popular. Grouping and haiku were the least popular of the methods. The remainder, marking and beat were both selected by about 16% of the participants (4).





*Figure 6. Participant Preferences for Learning Japanese Pronunciation (Rhythm).*

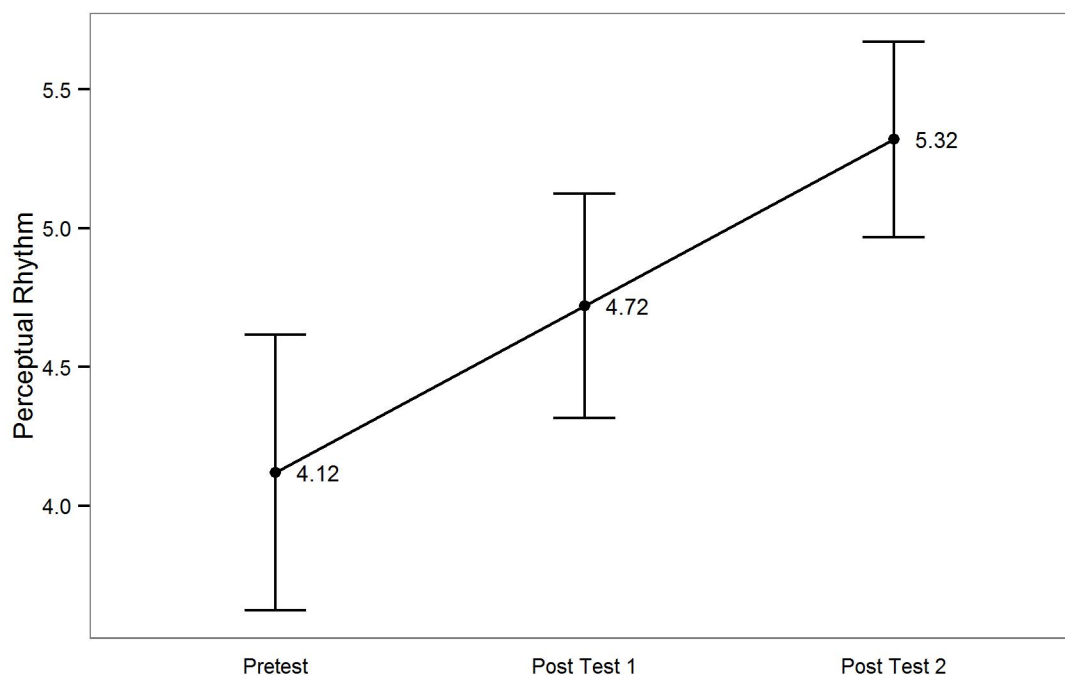
The results demonstrate that there is a wide range of individual difference in both learning preference and the number of preferred methods. Just over half preferred a single method while the remainder preferred a larger number of methods. It is also apparent that the participants were not biased towards a particular learning style. The three most popular techniques were based on different perceptual learning styles: Visual Acoustic analysis (8) can be considered to be primarily visual, Shadowing (8) relies largely on the auditory channel, and Clapping (7) is primarily an auditory and kinesthetic method.

RQ2a: Did the second language learners of Japanese improve their perception of Japanese rhythm after this instructional intervention?

RQ2b: Did improvement demonstrated on pre-post test transfer to the perception of rhythm differences on novel lexical items?

The second research questions examined the overall effectiveness of providing the learners with a variety of instruction techniques. Figure 7 depicts the change in the average Japanese rhythm scores over the pre-test and the two post-tests. The graph shows a linear increase from the pre-test to post-test one then to post-test two. There is also a corresponding decrease in the test score standard deviation. A final point that can be made here is that it is likely that the second post-test is demonstrating a ceiling effect as the maximum score of 6 is within one standard deviation of

the average. A Repeated Measures ANOVA (corrected for sphericity violations) ( $F(2, 48) = 11.172, p < .001, \eta^2 = 0.19$ ) supported this result. Post-hoc tests (Bonferroni correction) demonstrated that both post-test 1 ( $p < .05$ ) and post-test 2 ( $p < .05$ ) were significantly better than the pre-test.



*Figure 7.* Pre- and post-test means of the rhythm test (error bars represent standard error).

These tests demonstrated that the learners were able to improve their ability to perceive differences in Japanese rhythm. This ability is also transferred to a new set of test items. This transfer is important because of the study's design. As it was unethical to create a control group, some way to demonstrate that the improvement was not only due to taking the same test twice was needed. A variation on time-series designs (i.e. Mellow et al., 1996) was used here to attempt to overcome this weakness. It was hoped that the performance on the new test items used in post-test 2 would reflect overall improvement, and mitigate the practice effect that may have been present as a result of doing the pre-test twice. There is an underlying assumption here that if the items in the two test versions are equivalent and the participants had completed the second test version as a pre-test, they would have had similar scores to that of the actual pre-test.

## **DISCUSSION**

The main findings demonstrated that 1) learners have different preferences when it comes to learning, and that using varied instruction techniques results in improvement in Japanese

language rhythm. Taken together, these results provide some limited support for a teaching approach which uses multiple instructional approaches. This is supported by Alvermann (2002) in reading development, Francisco et al. (1998) in science education, and Ainsworth (2006) in general education. Providing an opportunity to experience different Japanese rhythm instruction techniques most likely enabled the learners to find, and learn through method/s which best matched their own perceptual learning styles. This may have resulted in the improvement of Japanese rhythm which was measured by perceptual discrimination.

The results of this study suggest that future classes should continue to present a number of instruction techniques, and provide multiple opportunity to practice, rather than just teaching the rules of rhythm explicitly. Perhaps more time can be spent on the more popular methods of shadowing, clapping, and Praat. It is also important that time is spent actually using each method in class and at home, so that the learners will have enough experience to know which of the methods most suits their learning.

Future research needs to clarify if using preferred methods of learning leads to more improvement in rhythmic ability when compared to using less-preferred methods and would benefit from the inclusion of a control group. In addition a follow up study should be conducted to determine if students continue learning using the methods they selected, and if their pronunciation continues to improve outside of the classroom environment. Other limitations of this study stemmed from the self-report nature of the learners preferred instruction technique and the fact that there was no direct measurement of the perceptual learning style of the learner.

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Naoko Kinoshita ([kinosyta@gmail.com](mailto:kinosyta@gmail.com)) received her Ph.D. in 2010 from Waseda University. She has taught Japanese as a Foreign Language in Busan University of Foreign Studies, Korea, and as a second language in Meikai University in Japan. She is currently working at the Japanese Language Education Center at Waseda University in Japan as an Associate Professor. Her research interests focus on the education and acquisition of second language pronunciation. She has published research in the measurement, the acquisition, and education of second language rhythm acquisition. She is currently working on three projects. The first has the goal of creating an on-demand learning system where students can continue learning Japanese pronunciation autonomously. The second is investigating the role of individual word syllabic structure on the development of generalized rhythm representations. The third deals with the development of critical thinking skills in Japanese universities.

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## APPENDIX

Table 1

*Items for the pre/post and post-post perceptual rhythm discrimination test.*

No.	Test Items	
	Pre/Post Test	Post-Post Test
1	tori - toori	kako - kakko
2	koki - kokki	ido - idoo
3	mina - minna	kinen - kinnen
4	kyouju - kyoujuu	jocyou - joucyo - joucyou
5	saka - sakka - sakkaa	gaka - gakka
6	ryokou - ryoukou - ryouko	kokyou - koukyo - koukyou