The effectiveness of pre- and post-shadowing in improving listening comprehension skills

Yo Hamada
Akita University

The results of years of research on shadowing have shown that it is an effective technique for improving listening skills (e.g., Hamada, 2011a, 2012; Kato, 2009; Kuramoto, Nishida, Isobe, & Shiki, 2010; Mochizuki, 2006). The most recent trend in research is to further explore the mechanisms of shadowing, especially from the cognitive point of view, and to develop effective pedagogical procedures for shadowing. This study focuses on procedures aimed at using shadowing more effectively in the classroom and particularly addresses the question of whether the contents of learning materials should be learned before or after shadowing training.

Definition and mechanism of shadowing
Shadowing is becoming one of the most effective techniques for formal listening practice in the Japanese classroom. Starting with a report by Tamai (1992), increasing research has been conducted in English as a Foreign Language (EFL) contexts (e.g., Kato, 2009; Kuramoto, Shiki, Nishida, & Ito, 2007; Mochizuki, 2006).

Shadowing is defined as an active and highly cognitive activity in which learners track speech they hear and vocalize it as clearly as possible while simultaneously listening (Tamai, 1997). Repeating is considered an offline task in which learners are given silent pauses to reproduce the sounds they have heard; shadowing is considered an online task (Shiki, Mori, Kadota, & Yoshida, 2010) in which there are no silent pauses. Learners’ attention is exclusively aimed at phonology in online tasks, whereas learners can deal with phonology and meaning within the pause in the offline process. Shadowing, seemingly considered a passive activity in the sense that learners appear to only listen and reproduce the sounds they hear, is actually an active online activity. However, the high
The mechanism of shadowing is commonly explained as being connected to the working memory system proposed by Baddeley (2007). Shadowing reinforces learners’ phonological coding and their speech perception (i.e., judging what they hear and transferring it to phonological form), particularly by training the phonological loop, which is part of the working memory (Baddeley, 2007). The phonological loop processes and stores incoming information by retaining phonological information for a few seconds in phonological short-term storage, and then repeating it during subvocal rehearsal (Kadota & Tamai, 2005). Through shadowing, learners will be able to automatize their speech perception, increase the capacity of their working memory, and strengthen the rehearsal process so that they can hold phonological information longer in the phonological loop (Kadota, 2007).

In addition, recent research has started to examine the relationship between the priming effect and shadowing (Nakayama & Armstrong, 2011). Priming, in the context of language use, is “the phenomenon in which prior exposure to language somehow influences subsequent language processing, which may occur in the form of recognition or production” (McDonough & Trofimovich, 2009, p. 1). The priming effect results in the previously learned stimulant positively influencing the response to subsequent, similar stimulants (Takahashi, 2005). The knowledge learners have already acquired can be stimulated and reinforced by shadowing, which will contribute to greater listening comprehension among learners.

Research into and the procedure of shadowing

Researchers have recently investigated shadowing in Japanese as a Second Language (JSL) and EFL contexts in classrooms in Japan. The research in JSL (Iwashita, 2012; Jo, 2010; Karasawa, 2009; Kurata, 2007) and EFL (Hamada, 2011a, 2012; Kato, 2009; Kuramoto et al., 2010; Hamada, 2011a; Matsui, 2011, cited in Kadota, 2012; Mochizuki, 2006). Shiki et al. (2010) discovered a plateau for the rate of reproduction for shadowing and reading aloud, indicating that improvement of shadowing performance can be limited. The incorporation of written texts increases the effectiveness of shadowing (Kuramoto et al., 2007), and repeating written scripts after listening is more effective than following the script silently while listening (Kuramoto & Matsumura, 2001); these findings indicate the necessity of using scripts in training. In summary, shadowing should be used as a core technique, accompanied by supplementary activities to maximize its effectiveness. For classrooms in which students need to learn vocabulary, digesting the contents of the textbook and practicing correct grammar will improve their integrated English skills. Potential ways that shadowing can fit into classroom teaching merit further examination.

Pre- and post-shadowing

To explore the procedure of shadowing in the classroom, we must consider the cognitive process of listening. Learners digest information using two commonly known, contrasting processes: bottom-up processing (i.e., the linguistic level that originates in the speech signal, dealing with knowledge of grammar, semantics, and pragmatics) and top-down processing (i.e., the level of processing that originates in the listener’s memory [Richards & Schmidt, 2010; Rost, 2011]). Applying this process to shadowing, Kadota (2012) introduces two concepts for shadowing: top-down shadowing, in which learners practice shadowing after they study the contents, structure, and vocabulary of the target passage, and bottom-up shadowing, in which learners practice shadowing before they study the target passage. Bottom-up shadowing is a phonology-based rehearsal task because learners try to listen to the sounds they are encountering for the first time; top-down shadowing is a knowledge-based task because learners rehearse based on the knowledge they have already acquired (Kadota, 2012).
However, one might wonder how to directly apply these concepts to daily lessons. The shadowing procedure in the classroom should include steps in which learners use a written script, including top-down and bottom-up processes, which indicates top-down and bottom-up shadowing might occasionally overlap. Thus, from a practical point of view, attention should be focused on whether students should work on shadowing training before or after learning lesson content, avoiding defining the training style as top-down and bottom-up shadowing.

Theoretical advantages and disadvantages of pre-shadowing (i.e., shadowing before learning the lesson content) and post-shadowing (i.e., shadowing after learning the lesson content) are described as follows. In pre-shadowing, learners can deliberately focus on the incoming sounds because those sounds comprise the only information on which they can rely; this practice should enhance their speech perception skills (Kadota, 2007). However, when the target passage content is unknown to the learners, shadowing these passages becomes more difficult, and the cognitive load for this task becomes higher. In fact, some participants who practiced shadowing before learning the target vocabulary and contents of the materials commented that “shadowing unknown English words is difficult. I felt anxious about shadowing before understanding the contents” (Matsui, 2011, as cited in Kadota, 2012, p. 199). In post-shadowing, learners possibly lose focus on the sounds by splitting their cognitive resources between phonology, vocabulary, and the grammar rules they have just learned (Kadota, 2007). However, being familiar with the target passage can ease learners’ anxiety (Hamada, 2011b), which consequently lowers the psychological costs of shadowing. Also, previously acquired knowledge (i.e., vocabulary and grammar) can be reinforced through repetition. In addition, the post-shadowing procedure fits one of the recently-encouraged teaching principles, “Presentation, Comprehension, Practice, Production” (PCPP), whose effectiveness for listening has been already reported (Iwanaka & Takazuka, 2011). PCPP stems from second-language acquisition theory, which effectively influences learners’ cognitive process; instructors can follow their usual procedures, including the use of the PCPP principle, without fundamentally changing the traditional teaching style in Japan (Muranoi, 2006).

Purpose of the study
To discover how shadowing technique is used effectively in current EFL classrooms, this study investigates the effectiveness of pre- and post-shadowing on listening comprehension skills in classroom.

Methods
Participants
A total of 56 freshmen at a Japanese national university participated in this study. To examine the two types of shadowing, a group of 32 students majoring in engineering (M27, F5) and another group of 24 students majoring in international communication and culture (M5, F19) were selected. The estimated proficiency level of each participant was determined to be intermediate, based on the results of placement tests (ELPA, 2012) taken by the participants in April, 2012. The mean listening score on the pre-test was 6.38 for the first group (pre-shadowing group) and 6.33 for the second group (post-shadowing group), with a maximum score of 13.

Materials
This study used the textbook Reading Explorer 2 (CEF: B1-B2 level; MacIntyre, 2009), which is used by all the freshmen at the university. Three chapters, comprising a total of eight passages, were selected from the book. The number of the words each passage contains and the readability of the passages are described in Table 1. The length of each passage ranges from approximately 100 to 145 words. Each passage was given a Flesch Reading Ease (FRE) score (the maximum is 100; the higher the score, the easier the passage is to read), with the passages having an FRE score ranging from 51.0 to 69.0. The Flesch-Kincaid Index (to index for which grade level the passage is appropriate, based on the grade levels of schools in the United States [Microsoft, 2012]) ranges from 7.0 to 12.5. The passages used in this study are considered challenging for the participants. However, students can improve their listening comprehension skills by practicing with difficult materials (Hamada, 2011a); hence, concern that the difficulty of the materials might negatively influence the results was disregarded.
Table 1. Word number and readability of the material

<table>
<thead>
<tr>
<th>Class No.</th>
<th>Word Number</th>
<th>Flesch Reading Ease</th>
<th>Flesch-Kincaid Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>104</td>
<td>51.9</td>
<td>12.4</td>
</tr>
<tr>
<td>Class 2</td>
<td>101</td>
<td>60.5</td>
<td>11.0</td>
</tr>
<tr>
<td>Class 3</td>
<td>110</td>
<td>69.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Class 4</td>
<td>129</td>
<td>66.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Class 5</td>
<td>142</td>
<td>62.5</td>
<td>8.9</td>
</tr>
<tr>
<td>Class 6</td>
<td>115</td>
<td>54.9</td>
<td>10.3</td>
</tr>
<tr>
<td>Class 7</td>
<td>106</td>
<td>64.8</td>
<td>9.4</td>
</tr>
<tr>
<td>Class 8</td>
<td>105</td>
<td>69.0</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Because a limited time was available for the assessment under the strictly designed curriculum, the collection of 13 sample listening questions in the TOEIC Test New Official Preparation Book (2008) was used for the pre-and post-tests to assess improvement in listening comprehension skills. Approximately one month elapsed between the pre-test and post-test; learners received no explanation about the test content after the pre-test. Details of the test questions are given in Table 2.

Table 2. Learners’ tasks in each part of the TOEIC, 2008 edition

<table>
<thead>
<tr>
<th>Section</th>
<th>What learners hear</th>
<th>Number of questions</th>
<th>Number of choices</th>
<th>What is written in the book</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1</td>
<td>Four statements about a picture</td>
<td>2</td>
<td>4</td>
<td>Nothing</td>
</tr>
<tr>
<td>Part 2</td>
<td>A question or statement</td>
<td>5</td>
<td>3</td>
<td>Nothing</td>
</tr>
<tr>
<td>Part 3</td>
<td>Conversations between two people</td>
<td>3</td>
<td>4</td>
<td>3 questions and distractors</td>
</tr>
<tr>
<td>Part 4</td>
<td>Talks given by a single speaker</td>
<td>3</td>
<td>4</td>
<td>3 questions and distractors</td>
</tr>
</tbody>
</table>

Procedure

Twice a week for a month (eight times in total), the participants were given shadowing-based lessons. Table 3 shows the procedure for each lesson and Table 4 describes the detailed procedure of shadowing practice.

Table 3. Procedure of each lesson for the two groups

<table>
<thead>
<tr>
<th>Step</th>
<th>Pre-shadowing group</th>
<th>Both groups</th>
<th>Post-shadowing group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Listen to the passage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Shadowing practice</td>
<td></td>
<td>(Skip)</td>
</tr>
<tr>
<td>3</td>
<td>Vocabulary activities</td>
<td></td>
<td>Comprehension of the passage</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>(Skip)</td>
<td></td>
<td>Shadowing practice</td>
</tr>
</tbody>
</table>

Table 4. Shadowing procedure used in the study

<table>
<thead>
<tr>
<th>Stage</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Listen to the passage</td>
</tr>
<tr>
<td>2</td>
<td>Mumbling twice (silently shadow the incoming sounds without text)</td>
</tr>
<tr>
<td>3</td>
<td>Parallel reading (shadow while reading the text)</td>
</tr>
<tr>
<td>4</td>
<td>Silently check understanding with the text (both English and Japanese translation) for 3 minutes</td>
</tr>
<tr>
<td>5</td>
<td>Shadowing 3 times</td>
</tr>
<tr>
<td>6</td>
<td>Review the text for 3 minutes, to clarify difficult sounds and meanings</td>
</tr>
<tr>
<td>7</td>
<td>Contents shadowing once (concentrate on both shadowing and the meaning)</td>
</tr>
</tbody>
</table>

In step 1, both groups listened to the target passage once. Then, in step 2, the pre-shadowing group practiced a set of shadowing procedures; the post shadowing group did this in step 5. The two groups followed exactly the same procedure, with the only difference being that
the pre-shadowing group practiced shadowing before the vocabulary-learning activities and comprehension check and the post-shadowing group practiced shadowing after those activities. Students practiced shadowing using the recommended procedure in Table 4 (Kadota & Tamai, 2005), through which learners were expected to improve their listening comprehension skills (Hamada, 2012).

In step 3, a modified version of a vocabulary learning activity introduced by Kasahara (2010) was used (Appendix). In this activity, students first checked the meanings and pronunciation of new words with the aid of the instructor using bilingual lists of the words. Then, they practiced individually for a limited time to memorize the English words. Afterwards, they paired up: one partner read aloud the Japanese translation and the other answered in English within a limited period (i.e., one second per one word, with a maximum of 13 words in each of the eight training sessions). Then, the partners changed roles. After another minute, in which they individually reviewed the words, they practiced this activity again.

In step 4 (the comprehension phase), following the technique Zenyaku-Sakiwatashi (A method to provide translation in advance; Kanatani, 2004), a bilingual script of the target passage was distributed (Appendix). The Japanese and English transcripts each contained some blanks, in which the students were supposed to place the new words they had practiced in step 3. Additionally, sentences that have key grammatical features were underlined, and the instructor explained these features after students each had completed the step 4 activity.

Analysis
To confirm that the initial listening comprehension skills of the two groups did not differ, a two-tailed independent t-test was conducted for the two groups. After the training session, a t-test was conducted for each group to measure the improvement of the students’ listening comprehension skills respectively.

Results
The two groups are considered to be equally balanced initially ($t_{29} = 1.11; p > .05$). The mean score of the pre-shadowing group increased by 0.53, while that of the post-shadowing group increased by 0.84. The results show that the post-shadowing group improved with statistically significant differences ($t_{23} = 2.17, p < .05, r = .41$), but the pre-shadowing group, as shown in Table 5, did not ($t_{31} = 1.26, p > .05, r = .22$). These results suggest that the post-shadowing group, for which the effect size was medium, improved their listening comprehension skills after a limited one month period of shadowing practice.

Discussion
The post-shadowing group alone improved their listening comprehension skills with statistically significant differences. At least three interpretations might account for this result.

First, the issue of learners’ attention and anxiety during practice sessions may account for higher performance in the post-shadowing group. In the pre-shadowing group, the target passage included words the participants had first encountered; in the post-shadowing group, the participants had already learned the target contents. Despite the disadvantage incurred by the students of the post-shadowing group, who were possibly splitting their cognitive resources to handle meanings, phonology, and so forth, the participants in this group appeared to focus on the phonology. Further, post-shadowing practice may ease the stress and anxiety that occur among learners when shadowing a passage that includes unknown words. As mentioned by Matsui (2011, cited in Kadota, 2012), students in the pre-shadowing group may have felt anxious about shadowing as well. Because shadowing is a highly cognitive activity, removing intensive anxiety may lower its cognitive load, leading to a positive outcome.

Second, the difficulty of the target passages might result in higher scores in the post-shadowing group. A widely accepted principle of

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre Mean</th>
<th>SD</th>
<th>Post Mean</th>
<th>SD</th>
<th>p-value</th>
<th>Effect size (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-shadowing</td>
<td>6.38</td>
<td>1.98</td>
<td>6.91</td>
<td>1.80</td>
<td>0.22</td>
<td>0.22</td>
</tr>
<tr>
<td>Post-shadowing</td>
<td>6.33</td>
<td>1.79</td>
<td>7.17</td>
<td>1.79</td>
<td>0.04</td>
<td>0.41</td>
</tr>
</tbody>
</table>
shadowing materials is to use relatively easier ones, with materials ideally containing two or three unknown words or less per 100 words (Kadota, 2007). However, the target passage for this experiment exceeded the recommended level, which possibly hindered improvement among the participants in the pre-shadowing group. Use of easier passages might have helped the participants to focus merely on the phonological aspect; the difficulty of the passage used in this experiment might have disrupted the process, making pre-shadowing cognitively more complex. Consequently, only the post-shadowing group improved.

Third, the activation of previously learned items (i.e., schema) through shadowing practice might account for the higher scores of the post-shadowing group. Learning the target contents before shadowing activated the semantic and phonological information contained in the target contents. During shadowing, because the knowledge of the target passage has already been activated, students were not only able to undertake bottom-up processing, such as identifying incoming phonological information but also top-down processing, such as guessing which word would come next. This presumably helped the students to shadow more successfully. Then, the accurate phonological information was then transferred to the students’ long-term memory, which enhanced their learning. In conjunction with this theoretical analysis, this result might show how the priming effect (McDonough & Trofimovich, 2009) occurred in this experiment. For the students in the post-shadowing group, the prime stimulation (i.e., the vocabulary and target contents they learned) might enhance the target stimulation (i.e., the vocabulary and target contents they shadowed), leading to students’ improvement in listening comprehension.

Implications of the findings

Based on the results of this study, I present two educational implications in terms of lesson style and learners’ psychological status. First, shadowing training is effective when done after learning the target contents. Additionally, instructors can use the Comprehension and Practice stages of the PCPP model. Although other common listening teaching techniques such as dictagloss and dictation can be used as once-only activities that take up only 5 to 10 minutes of a 50- to 90-minute class, the post-shadowing procedure can be holistically well fitted to a lesson (e.g., 30 minutes for learning the contents, then the next 30 minutes for post-shadowing using the same material, and the last 30 minutes for production activities). Moreover, this procedure may contribute to more effective internalization of newly-learned items. Some learners can pay attention to semantics as well as phonology while shadowing, possibly connecting the phonology of the words with the meanings (Oki, 2012). Thus, post-shadowing will enable learners to review what they have learned and to internalize the learned items.

Second, using this procedure, learners can work on shadowing while experiencing less cognitive burden. They start with learning new vocabulary, come to understand the lesson contents, and then practice shadowing; hence, when shadowing they do not have to fear pressure based on unknown contents. This should reduce the psychological cost of, or anxiety toward, the task among learners. As is pointed out in the results of investigations of shadowing regarding learners’ perceptions (Karasawa, 2009) and levels of cognitive complication (Kurata, 2007), shadowing is cognitively complicated. Thus, post-shadowing can reduce learners’ psychological burden.

Study limitations and future research

Although post-shadowing was shown to be effective for learners’ listening comprehension skills, there remain three issues that limit interpretation of the results of this case study. First, because the participants’ level is intermediate, their motivation level is not low, and the balance between their majors and genders are not equal, the results do not apply to all situations. For more advanced learners, pre-shadowing can be comfortably challenging and could result in a more favorable outcome. In the future, more data should be collected to provide empirical conclusions. Second, this study focused only on the improvement of listening comprehension skills as an outcome experienced most strongly by the post-shadowing group. Also, due to time restrictions, TOEIC Sample Tests (TOEIC, 2008) were used as a convenient way to evaluate listening ability; ideally, a more properly-designed assessment should be used. Other aspects, such as speech perception by distinguishing phonemics and accents, pronunciation, and linguistic knowledge (Kadota, 2012), merit exploration. Third, the findings of this experiment would be more convincing if compared with data from a control group; hence, setting a control group will be required in future studies.
Conclusion
It has been my desire as a researcher and a teacher to develop more effective teaching techniques to help improve students’ listening skills. My results indicate that post-shadowing is suitable for regular EFL classrooms, where difficult materials that contain new vocabulary and new expressions are used. This study also demonstrates how a theoretically-effective teaching technique, shadowing, can be used more practically, building a bridge between theory and practice. It appears that shadowing has not become popular outside Japan, and I hope for similar kinds of shadowing research that attempts to develop similar learning procedures to help greater numbers of students to increase their foreign-language skills.

References
Matsui, T. (2011). Chugakko ni okeru bottom-up shadowing no jissen [The practice of bottom-
up shadowing in a junior high school]. LET Kansai Chapter 2011 Spring Conference.


Yo Hamada is an assistant professor at Akita University. He holds a Master’s degree in TESOL from Temple University and a doctoral degree in Education from Hiroshima University. His research principle is to incorporate theories into classroom teaching practice. His research area covers motivation, demotivation, and listening, with a focus on shadowing. He can be contacted at <yhamada@gipc.akita-u.ac.jp>.

Appendix: (Based on Reading Explorer 2, p. 17)
1. treasure 1. 宝
2. travel journal 2. 旅行記
3. describe 3. 描く
4. palace 4. 宮殿
5. admire 5. 賞賛する
6. is located in 6. ～位置する
7. perceive 7. 識別する
8. modern 8. 現代の
9. capital 9. 首都

In the (1 service ) of Kublai Khan, “the most powerful man in people and in lands and in (2 treasure ) that ever was in the world,” Marco was able to learn and experience many things that were (3 new ) to Europeans. In his travel journal, he described Kublai Khan’s palace as the greatest he had ever seen. He admired the Khan’s recently completed new capital, Daidu, (4 whose ) streets were “so straight and so broad.” The city was located in (5 what ) is now the center of Beijing, and Kublai Khan’s city planning can still be perceived in the straight, broad streets of China’s modern capital.

「(1史上最大の )影響力を人民と国家と財宝に及ぼす人物」と崇めるフビライ・ハーンに仕えたマルコは、西洋人には目新しいうちのことを学び、経験した。彼は(2 旅行記 )で、フビライ・ハーンの城をそれまでで見た中で最も偉大な国と訂正している。マルコはハーンが新たに築いた都、大都を崇め、その道路は「驚くほど真っ直ぐで広い」と描いた。大都は今の北京の中心地に位置している。フビライ・ハーンの(3 都市計画 )は、(4 3 近代化 )した中国の首都の広い道路に今でも(5 坦間見ること )ができるのだ。
The TOEIC (Test of English for International Communication) is currently the main examination used in Japan as an employment requirement and has also been used in educational settings to streamline students. For students who are non-English majors, it can be especially difficult to reach the required target set by each organization. A self-directed learning model for TOEIC study was thus designed that encouraged students to renegotiate their learning goals and try a new style of learning in order to achieve their TOEIC target in a more focused manner. The acronym FITE (Focus – Input – Training – Evaluation) was used to help students focus on specific areas of their learning, find a good balance for their self-directed activities and self-monitor their development each month as they prepared for the test. This study follows the progress of a lower-proficiency level student who was struggling to achieve his target. After eight weeks of self-directed learning, he showed gains in both reading and listening scores. The research concluded that whereas a program of daily study of TOEIC-specific practice exercises from textbooks was the main component in learner success, it was also essential for students to be cognizant of strengths and weaknesses; to focus on a particular area of improvement; to expose themselves to other forms of learning for enjoyment; and to self-evaluate their learning progress in order to increase their overall abilities.

Renegotiating the TOEIC: A self-directed learning approach

Tanya McCarthy
Osaka Institute of Technology

The TOEIC (Test of English for International Communication) is currently the main examination used in Japan as an employment requirement and has also been used in educational settings to streamline students. For students who are non-English majors, it can be especially difficult to reach the required target set by each organization. A self-directed learning (SDL) model for TOEIC study was thus designed that encouraged students to renegotiate their learning goals and try a new style of learning in order to achieve their TOEIC target in a more focused manner.

The effects of SDL on students’ academic achievements have been widely investigated in research literature over several disciplines over the past three decades (see for example Savoie, 1980; Long, 1991; Darmayanti, 1994; Schunk & Zimmerman, 1997; Zimmerman & Kitsantas, 1999; Zimmerman & Riseberg, 1997; Hsu & Shiue, 2005; Stewart, 2007). Due to the benefits to learning outcomes described in studies such as these, there has been an emphasis in various institutions in Japan to increase access to SDL practices. SDL has been defined as “any