Exploring the Effects of the Shadowing Method: Case Studies of Japanese Language Learners at an Australian University

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Contents

Abstract

While listening is an essential skill in any spoken language, there are limited practice methods for developing learners' listening skills (Seo, 2005). In classrooms, teachers usually employ simple 'repetition', which is a traditional audio-lingual method to improve this skill. Today's technological advancement has generated readily available authentic materials for listening practice. However, learners tend to engage in passive listening since they have no control over the speech speed, unlike the other three language skills where one can adjust the speed (of speaking, writing and reading) at will.

Research conducted in the past decade on English as a foreign language (EFL) in Japan has shown that shadowing is an effective method for improving listening skills. Shadowing requires learners to listen and speak at the same time. This simultaneity is considered to trigger active listening since it requires close attention to phonological loop of working memory (Kadota, 2007). Nevertheless, the popularity of shadowing is mostly limited to Japan, with limited studies conducted in the other parts of the world (Hamada, 2014). The present study aims to explore effective implementation of shadowing method in an Australian university for Japanese as a foreign language (JFL), by investigating the effect of shadowing through multifaceted approaches, and to propose implications emerge from the findings of this study.

This research conducts shadowing method in Japanese language courses among Australian university students. Four case studies are conducted in four separate semesters. Each focuses on different research objectives as follows: (1) the effect of shadowing on sound recognition ability in relation to the speed variety of shadowing model audio; (2) the effect of shadowing on listening comprehension skills with a focus on the use of different listening strategies; (3) the effect of shadowing on the prosodic feature of high-low

pitch-accent in speech production; and (4) learners' perceived motivation and attitudes towards shadowing method. Measuring instruments are devised according to the research objectives: pinpoint dictation tasks for sound recognition ability; listening tasks at different lengths and formats for listening comprehension strategies; marking method using visualised intonation curves for judging pitch-accent in order to minimise marker's subjectivity; and survey questionnaire items in reference to the literature review to explore learners' perceptions toward shadowing. Statistical analysis is performed using SPSS to examine the collected data.

The main findings highlight four aspects of the shadowing practice: (1) appropriate speed range of shadowing model audio for the target audience; (2) positive relationship in the improvement between the competence of shadowing skill and use of listening comprehension strategy; (3) improvement in pitch-accent accuracy in shadowing reproduction; and (4) contributing motivation factors towards shadowing. A summary of the common shadowing procedures applied in this study are presented; and the implications of further shadowing conduct are discussed.

Statement of Originality

I certify that the research described in this thesis titled “Exploring the Effects of the Shadowing Method: Case Studies of Japanese Language Learners at an Australian University” has not previously been submitted for a higher degree nor has it been submitted as part of requirements for a degree to any university or institution other than Macquarie University. I also certify that this thesis is an original piece of research; all data, references and other sources of information, including co-authored journal publications, have been acknowledged.

I declare that the research presented in this thesis complies with requirements of academic ethics. This research was approved by the Human Research Ethics Committee of Macquarie University (Reference number: 5201600098).

Hideki Sumiyoshi

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Chapter 1

Introduction

1.1 Introduction

Australia has a large number of learners of Japanese, which in terms of size of learner population was the first 'truly foreign' language for Australians (Bianco, 2009). The population of Japanese language learners in Australia came in fourth in the world in 2015 (Japan Foundation 2016). Despite such a large number of learners, few continue to an advanced level of the language (Northwood & Thomson, 2012). This learning context of Japanese in Australia is categorized as 'foreign language' where the target language (L2) is not spoken, as opposed to 'second language' where the L2 is spoken (Ellis, 1997; Kachru, 1992). In a 'second language' context such as English as a second language (ESL), English has an important role in the society and the common-sense utility of learning the language is obvious, so motivation for achievement is higher; but in a 'foreign language' context such as English as a foreign language (EFL), it is no more important or prominent than any other language as there is no obvious reason for learning English, so motivation in learning the language is low (Stevens, 1978). The present research, teaching Japanese at Macquarie University in Australia, falls into the context of Japanese as a foreign language (JFL), where Japanese is not spoken as a public language, and learners have little exposure to Japanese outside the classroom.

Many foreign language curriculums encourage study abroad programs, because the L2 as a second language context offers advantages for learners to become exposed not only to the target language but also to the target community, which is considered as the most important driver for integrative motivation (Gardner, 1985).

Despite the lesser opportunity for L2 exposure and the target community in the JFL context, technological advancement offers readily available access to authentic media materials, which

enables learners to have more exposure to the target language even outside classroom. For instance, Japanese popular culture, such as manga, anime and drama, was found to be a major motivation to continue studying Japanese among JFL learners at Australian universities (Northwood & Thomson, 2012).

This present research aims to explore effective implementation of shadowing method to improve listening and speaking skills in JFL classrooms, which method has been recognized as an effective practice for improving skills in EFL and JSL contexts in Japan. Such an examination needs to consider the potentials and limitations of this new teaching method, and factors that influence learners' motivation and attitudes towards shadowing. The research project presented here investigates these questions with the aim of understanding the implications of the findings.

1.2 Contextualising the research

1.2.1 Japanese courses in an Australian university

The Australian university where this present research was conducted offers Japanese language courses from introductory to advanced levels as core courses. The structure of these courses is consistently composed of lectures and tutorials, each of which is conducted once a week for 2 hours for 13 weeks in one semester. Lectures are held in classrooms capable of accommodating 100 students of a theatre type, using PowerPoint (PPT) presentation to introduce new learning content such as grammar and vocabulary of the week in a one-way presentation format. By contrast, tutorials are divided into a smaller groups of up to 20 students, consolidating the week's lecture content by practising workbook exercises, reading aloud, conversation with peers, etc., which offers more frequent peer to peer interactions and between the instructor.

Each level has a benchmark of learning outcomes targeted to pass a standardized Japanese Language Proficiency Test (JLPT) level of N4 for introductory, N3 for intermediate, and N2 for advanced level. Therefore, the curriculum is developed based on the grammar points, vocabulary level and kanji that are equivalent to the JLPT levels. Teaching materials are developed by the

teaching staff in charge (e.g. unit convenor) in cooperation with other instructors who are appointed to teach each level.

The data for this research were collected in four semesters from 2016 to 2017, with each semester using different sets of shadowing model audio and measuring equipment conforming to the purpose of the research topics. The data collection methods of this thesis have been approved by the Ethics Committee of the university (see Appendix 1).

1.2.2 The emergence of the study

The shadowing method procedure applied in this research was developed through practical conduct in Japanese language courses at an Australian university. Shadowing was adapted for the purpose of compensating for the lack of listening and speaking practice in the L2 classroom context where the curriculum was of grammar-translation orientation.

During the several years prior to the commencement of this research project, attempts were made in the implementation of the shadowing method (e.g. the model audio selection from various media, checking system of learners' shadowing reproduction), and modifications were made in reference to the empirical data accumulated during these applications of shadowing technique. This process of adjustment of shadowing procedures provided more specific directions for the conduct of shadowing in terms of the relationship between students' proficiency level, the model audio speeds, and reproduction rates. Positive feedback in the end-of-semester student survey opened up a possible research area in learners' motivation towards shadowing. All of the above led to the development of research projects in the focus areas that form the main body of this thesis.

1.3 Introduction to shadowing

1.3.1 Key characteristics of shadowing

1.3.1.1 Shadowing method

Shadowing refers to a listening and speaking practice by repeating immediately after, or almost simultaneous with, hearing the native speech. This technique was originally used as a basic training for simultaneous interpreters, as they have to listen and speak at the same time. It is suggested to wear headphones during shadowing for the "word-for-word repetition, in the same language, parrot-style" (Lambert, 1992, p. 266), which is assumed to maximise the learners' attention to the model speech without concern for external noise including their own voice. Tamai (1997), the pioneer of shadowing research in Japan's EFL context, emphasised the 'attentive listening' in shadowing instead of mere repetition of heard speech, in order for more effective listening practice to develop learners' listening skills. In other words, Lambert's shadowing in 'parrot-style' may potentially lead interpreters to commit the methodological error of 'mindless parroting', since it is possible for learners to shadow without attempting to understand the meaning (Déjean Le Féal, 1997).

Shadowing may appear to be a similar practice as the traditional audio-lingual method of repeating after the teacher's utterance by chunks as exactly as possible (Freeman, 1986). However, the fundamental difference is the timing of the 'repetition'. Kadota (2007) suggests that the effect of shadowing comes from its 'on-line' brain activity of simultaneously processing both listening and speaking activities. In repeating practice, on the other hand, the brain processes the 'off-line activity of listening', and speaking occurs during the blank between the utterances, for which information comes from the memory. The difference between shadowing and repetition can be illustrated as follows (Hamada, 2016, p. 36):

Shadowing (on-line)

Model: Boston is in America, in the north-east part of America.

Learner: Boston is in America, in the north-east part of America.

Repetition (off-line)

Model: Boston is in America, in the north-east

Learner: Boston is in America in the north-east

1.3.1.2 Working memory

It is the simultaneity of the listening and speaking in shadowing method that is significantly different from other listening exercises in terms of the emphasis on 'reacting' to the heard speech instead of 'reproducing' from memory. As shown in Figure 1, Baddeley (1992) proposes the term *working memory* (WM) of the human brain in terms of information processing of incoming visual and sound stimuli. He describes the following three components: the *central executive* operates as an attentional-control system; the *visuospatial sketchpad* processes visual images; and the *phonological loop* is for incoming sound storage.

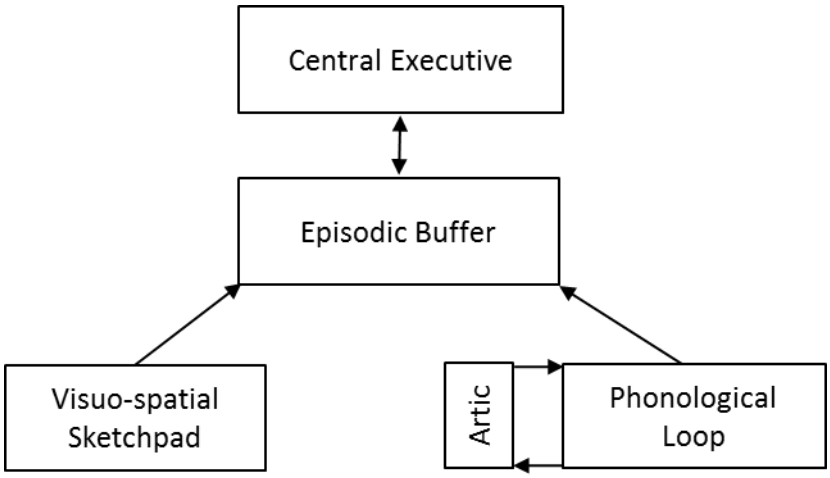

Figure 1. The recent multi-component working memory model (Baddeley, 2012, p. 23).

The *central executive* is solely an attentional system with no storage capacity of its own, and it functions as a processing device between the 'slave systems' with their own temporary short-term memory function (Baddeley, 2000, p. 556). In the process of listening comprehension, firstly, the heard speech is temporarily stored in the *phonological loop*, which is considered to last for approximately two seconds (ibid, p. 558). Then, the *central executive* runs a semantic

analysis of the auditory signals by referring to the long-term memory (LTM), and after examining the pragmatic and contextual usage of the language, the heard speech is understood. Here, the crucial point in this listening comprehension processing is that the capacity of the WM is limited. For example, if the *central executive* mobilises a large portion of its resources to focus on *visuospatial sketchpad* linkage instead of the *phonological loop*, listening comprehension may hardly occur as the link between the *central executive* and the *phonological loop* becomes limited or even non-existent. In other words, even native speakers do not necessarily comprehend what they have heard since listening ability tends to decline when they do not pay attention to the speech or when they are in a state of multi-tasking.

The key function for listening comprehension explained above is the *phonological loop*. Regarding the listening process, it is assumed to have two additional functions: *phonological short-term storage* and *subvocal rehearsal* (see Figure 2). The former is the memory function of sound stimuli; and *subvocal rehearsal* is the mental repetition of the heard speech stored inside the *phonological loop*. This *phonological short-term storage* is assumed to last for up to two seconds, but Kadota (2007) suggests that the length of *subvocal rehearsal* can be extended with active attention to subvocalization, and it is also suggested that the WM capacity can be improved (Klingberg et al., 2002). Therefore, in order to retain the heard speech longer, the role of the *central executive* becomes important, as it will require greater processing resources for more active subvocalization.

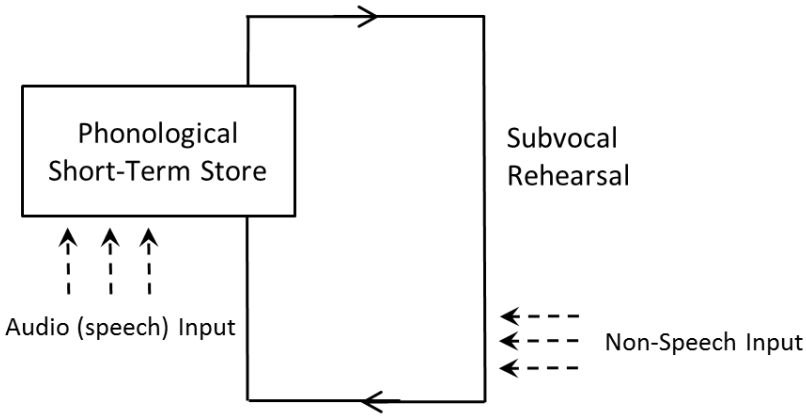

Figure 2. Phonological loop construction (Gathercole and Baddeley, 1993, p. 8).

From the SLA point of view, listening comprehension process can be categorized into bottom-up and top-down processing. The former is based on the interpretation of the linguistic characteristics such as individual words and grammatical processing upwards to larger units of meaning. Top-down processing, on the other hand, refers to the effective use of learner's schematic knowledge, which is drawn from inference of information in LTM or text meaning for comprehension (O'Malley et al., 1989). Effective L2 listeners have been suggested to have the ability to utilize both top-down and bottom-up processing, while unskilled L2 listeners are reported to have limited ability within bottom-up processing (Kurata, 2009; O'Malley et al., 1989; Seo, 2005). This is considered to be due to allocating a large proportion of the WM capacity for sound and word recognition, which is the bottom phase of language processing, and there is as a result little room left over to process the meaning. The purpose of shadowing is to automatize this bottom language process and make more WM usage available for semantic processing (Kadota, 2007, 2012).

1.3.2 Conducting shadowing in classroom teaching

Along with the rise in the popularity of shadowing method in Japan's EFL context, various types of shadowing model audio have been selected by practitioners according to the objective of their L2 contexts, for example textbook CDs, standardized tests such as TOEFL and TOEIC, and authentic media such as movies and news clips. Regardless of the source for the model audio, the

premise is to provide the script of the model audio so that the learners can review the content of the materials in a written form. The implementation of shadowing method into the classroom may also vary depending on the purpose of the L2 teaching context; however, Table 1 shows the shadowing steps recommended by Kadota and Tamai (2004), which procedure is widely accepted by teachers and researchers (e.g. Hamada, 2012; Kyo, 2012; Saito, Nagasawa & Ishikawa, 2011).

Table 1. Recommended six steps of shadowing practice (Kadota & Tamai, 2004, p. 62)

Steps	Procedure	Details
1	Listening	Listening to the audio without the script, and trying to roughly grasp the content and the speech style.
2	Mumbling	Shadowing without the script focusing on the heard sound rather than reproducing pronunciation.
3	Synchronized reading (content understanding)	Shadowing with the script focusing on the meaning of the script.
4	Prosody shadowing	Shadowing focusing on prosodic features, such as the stress, rhythm, intonation, speed, pause, etc.
5	Synchronized reading (difficult points)	Shadowing with the script focusing on the parts listeners find difficult.
6	Content shadowing	Shadowing focusing on the content without reading the script.

Kadota (2007) recommends shadowing materials to be slightly easier than the learners' current L2 proficiency level, and not to contain unfamiliar vocabulary and expressions of more than 3% (p. 236). This account is reflected in the inclusion of *synchronized reading* (shadowing with the script) in Steps 3 and 5 in Table 1 before proceeding to more sophisticated shadowing steps such as *prosody shadowing* and *content shadowing*. The first *synchronized reading* (Step 3: focus on meaning) aims to enhance understanding of the content, and the second (Step 5: focus on difficult parts) to improve reproduction rates. However, the use of scripts during shadowing practice has become controversial because shadowing is fundamentally phonological, and the

effect of shadowing may be inhibited by the use of visual assistance, or simply ‘reading out’ the script along with the model audio (Kondo, 2012). In other words, any dictation or listening comprehension tests will lose the objective of ‘listening’ if the texts are provided alongside. Another possible negative effect of *synchronized reading* is that the visual recognition of the scripts may replace the subvocalization through the *phonological loop* if the *central executive* allocates more attention to the *visuospatial sketchpad* or LTM while shadowing. Therefore, all the studies in the following four chapters will employ post-shadowing script method, not only for the above reasons but also in order to measure learners’ reproduction rates without the assistance of the scripts.

1.3.3 Shadowing practice in this thesis

1.3.3.1 Shadowing as a course assignment

It is ideal to conduct shadowing in an audio-vidual classroom or similar setting which can offer learners the access to individual audio equipment by wearing headphones. However, language classes are often taught in a conventional classroom setting: with blackboard (or whiteboard, interactive whiteboard, or a computer-controlled projector system) and main speakers at the front facing students; or even in a theatre-type venue at universities. Conducting shadowing in such a setting most likely hinders the effect of shadowing due to the noise of peers’ shadowing voice, which makes it difficult for learners to focus on the model audio. It is also assumed that some learners may feel anxiety towards performing spoken L2 in front of their peers (Gregersen & Horwitz, 2002).

In order to avoid these inconveniences and to maximize the effect of shadowing, the following projects conduct shadowing as a homework assignment, where learners download the model audio file via the course module in the university online learning system. This shadowing conduct bears multiple advantages, not only of enabling learners to use their own headphones/earphones (to focus on the model audio) at their own convenient time and place

(free from anxiety) to encourage more shadowing opportunity (Teeter, 2017), but also the online file submission of their shadowing reproduction allows the investigator to measure individual learners' shadowing performance, since their shadowing reproductions are converted into audio files.

Marking the accuracy of spoken Japanese is considered relatively easier than that of English due to its rather simple phonetic representations of more limited combinations of vowels and consonants than many other languages (Isomura, 2009). In fact, there are only 46 basic syllabaries with additional 50 voiced alternatives and three glide-sound and double-consonant variations. This allows the marker to judge the accuracy of the pronunciation in the systematic manner since it enables to focus on each kana script for phonetic representation. This measurement is incorporated as a form of marked feedback, where the collected audio files were marked by the instructor on the printed script, each mistaken part was highlighted, and the correct reading was put above the kana script using roman letters (see Figure 3). The total accuracy was calculated on a 100% scale, so that the learners could study the exact part where they had made mistakes.

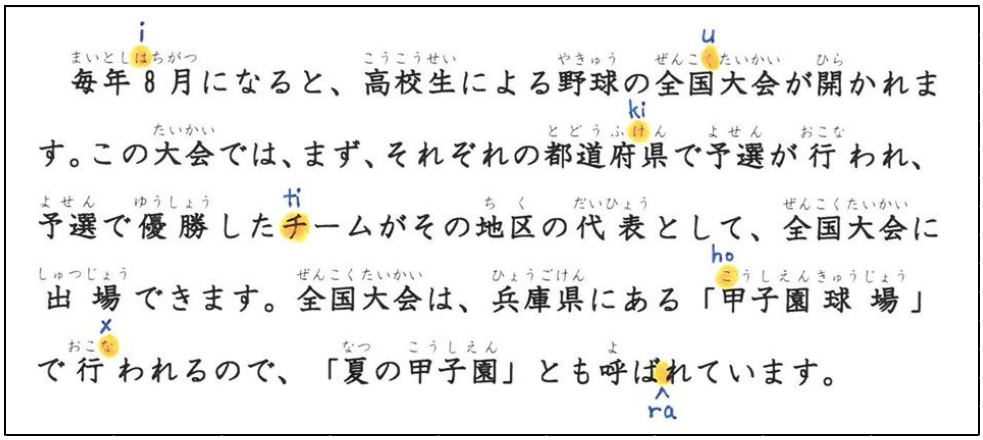

Figure 3. An example of shadowing feedback sheet.

Shadowing practice was conducted in a weekly cycle; and the length of the model audio was approximately one minute. The number of times of the shadowing practice varied from 6 to 8 times, depending on the curriculum of the semester in which study was conducted. The model audio was selected, created and/or edited from various media to meet the purpose of each study.

For example, authentic online media were used for the Advanced Spoken Japanese class to investigate sound recognition ability (Chapter 2); a read aloud textbook for intermediate-level learners was used for the Advanced Japanese II class to examine listening comprehension skills (Chapter 3); a pronunciation textbook for introductory and intermediate-level was used for the Intermediate Spoken Japanese class to investigate speech production (Chapter 4); and online text materials were used for the Advanced Japanese I class to explore perceived motivation (Chapter 5). Common to all the shadowing model audio throughout the above chapters, monologue format was selected since, unlike dialogue between different interlocutors, individual prosodic features such as speech speed, pauses, dialect, or gender difference are consistent. Using dialogic drama performance in the language curriculum would encourage learners to appropriately consider the context of language usage and to apply what they learn in the activity to real-life situations (Hewgill, Noro, & Poulton, 2004); however, it is excluded as being outside the scope of this thesis.

1.3.3.2 Gradual speed increase of shadowing model audio

Although listening is the only language skill in which the language users cannot control the speed by themselves, unlike the other three areas of language skills (of reading, writing and speaking), there is yet no study on the use of various speeds in shadowing model audio. In conversations, for instance, when one cannot pick up or understand the utterance, it is common for the speaker to slow down in consideration of better comprehension, but rare for the speaker to speed up instead. In fact, it has been suggested that listening comprehension drops significantly as speed increases over around 280 words per minute (Hausfeld, 1981). This illustrates that, the faster the speed, the more challenging the listening comprehension becomes. The same can be said for tongue twisters, that the speed is the most challenging factor, where almost everyone can succeed at slow speed. Drawing on this speed factor as a difficulty variable in listening and speaking, this thesis employs a gradual speed increase in the shadowing model audio during each

study period. This method, inspired by Vygotsky's (1978) theoretical concept of zone of proximal development, proposes that learners would gradually get accustomed to the speed increase of shadowing to eventually become able to shadow at near-native speed.

The model audio speed was calculated by the number of the mora[1] the script contains, which is divided by the audio running time (seconds). The selected audio files were then arranged according to the calculated speeds so that the earlier weeks' materials were slower than those of the later weeks. When the selected texts (e.g. online texts) had no sound, the instructor recorded the audio at the speed for the week's shadowing. This method is advantageous, since the speed adjustment can be made at will, and especially in the case where the textbook CD audio speed was significantly different from the speeds that were desired for the study. If the CD audio speed needed a slight adjustment for the purpose of the study, the investigator used the digital audio editing software, Audacity[2].

1.4 Thesis by publication format

The experimental studies in this thesis have been granted Approval for Study by Macquarie University Ethics Committee (see Appendix 1), and in 'thesis by publication' format in accordance with the Macquarie University Higher Degree Research Thesis by Publication Guidelines (Macquarie University, 2018; see Appendix 2 for more detail):

> A thesis by publication may include relevant papers, including conference presentations, which have been published, accepted, submitted or prepared for publication for which at least half of the research has been undertaken during your enrolment. The papers must form a coherent and integrated body of work, which focusses on a single thesis project or set of

[1] Japanese is a mora-timed language in which each mora is spoken at a roughly constant rate, while English is a stress-timed language with syllables (Ishihara, Tsurutani, & Tsukada, 2011).

[2] Audacity allows for adjusting the audio speed without affecting the pitch width so that the modified speech sounds natural, unlike sounding like fast-forwarding a conventional tape recording (Audacity Team, 2018).

related questions or propositions. The papers are one part of the thesis, rather than a separate component (or appendix).

The thesis includes four journal papers, each of which addresses two to four specific research questions. One of the four papers was co-authored with my supervisor (Dr Chavalin Svetanant), and the other three papers were solo authored. These four papers function as a main part of the thesis. I was responsible for designing and conducting the research, and my supervisor provided me with guidance and insightful advice which helped shape the research. I conducted the data collection through my teaching classes at Macquarie University, and my supervisor offered comments, feedback and advice in terms of how to revise the papers before submission to the journals.

Each of the four papers is published, accepted, submitted or prepared for publication. The differences in the format of the papers are attributed to the different requirements of the journals. Some repetition across the papers is also unavoidable (e.g. the shadowing background and some aspects of the literature review). The references at the end of the thesis include the references listed in the four papers.

1.5 The organisation and research questions of the thesis

This thesis is presented in the by-publication format, which consists of a series of four relevant papers. This chapter introduces the context of this research and explains the shadowing mechanism and implementation methods in the Japanese courses, which are consistent throughout the projects. It also illustrates the aims of the research project, outlining the four main research questions, and highlights the significance of this study. The following chapters form a coherent and integrated body of work which focusses on shadowing project with a set of related questions.

The initial investigation of shadowing effect departs from the very first step of the listening process in the phonological loop of working memory, that is, the recognition of the sound input

as words. Chapter 2 examines the effect of shadowing on sound recognition ability among the participants. In the process of recognising sound, speech speed is considered as one of the most influential variables of listening skills, since learners have no control over the speed of incoming sound. The focus of this chapter is on the speed increase of the shadowing model audio in relation to the pinpoint dictation scores at slow and fast speeds.

The next step after sound recognition is the linguistic processing from morpheme, word, and sentence, to contextual pragmatic use, eventually leading to understanding. Chapter 3 investigates the effect of shadowing on listening comprehension strategies. Two types of listening comprehension strategies, bottom-up and top-down, are drawn from the literature, and a pinpoint listening quiz is devised as a measurement instrument in order to analyse participants' ability in the use of these strategies. The quiz consists of two parts, to test bottom-up strategy (one sentence length) and top-down strategy (a paragraph length). Along with the speed increase of the shadowing model audio, the pinpoint listening quiz consists of two different speeds (slow and fast) in order to measure participants' processing ability in the different listening strategies (bottom-up and top-down).

Shadowing requires learners to listen and speak at the same time. These two language activities are phonologic by nature, and it is assumed that there is a close linkage between speech perception and motor units of speech production inside the brain. This theory is based on a rationale of a linkage between the motor action of speaking and the perceptual act of listening. In other words, motor theory states that there is a close link between the parts of the brain that are responsible for perceiving speech sounds and those for activating the motor mechanisms to produce particular sounds (Goldstein, 2007). Chapter 4 analyses the relationship between shadowing and speech production, focusing on the prosodic feature of high and low pitch-accent. English and Japanese intonational structures are different in that the former consists of stress patterns, and the latter, tonal accent patterns (Beckman & Pierrehumbert, 1986). The Japanese tonal accent pattern, or pitch-accent, is based on fundamental frequency (F0) shift between high

and low. Japanese F0 shift plays a functional role in differentiating the meaning of the words; therefore, pitch-accent difference becomes important for mutual understanding in some cases. Participants' shadowing reproduction audio files are referred to as data for analysis. In order to minimise subjectivity in the markers' judgement between high-low pitch falls, visualized intonation curves and pitch-accent signs are drawn above texts projected by the online prosodic reading system called 'Suzuki-kun' (Minematsu et al., 2015). The audio files are played via the audio analytical computer software called 'Praat' (Boersma, 2001), to project an F0 curve which appears similar to intonation curves above the texts to assist the markers' judgement. A survey is conducted in order to explore participants' perceived attitudes toward shadowing regarding speech production. Parallel to the investigation of shadowing reproduction, the recitation task is undertaken in the general Japanese course in order to examine the effect of shadowing on recitation.

Apart from the investigations of the effect of shadowing on language skills, it is equally important to explore learners' perceptions in implementing a new teaching method in the classrooms. Shadowing requires a cognitively heavy task, since no one listens and speaks at the same time in daily life. This unfamiliar practice may potentially cause resistance among learners, since the quality of teaching can be more harmful than beneficial (Markee, 1992, p. 233). Chapter 5 explores the participants' psychological factors, from the motivation framework point of view, in relation to shadowing. This study employs the shadowing procedure consistent with the other three projects above (the gradual speed increase of the model audio, marking the accuracy of shadowing reproduction, feedback method, etc.), so that the results and findings of this project can be applicable to the whole thesis. The literature review explores a variety of motivation theories in the domain of SLA, to build a theoretical framework for motivational aspects among L2 learners in conducting shadowing. Gardner's (1985) Socio-Educational Model is referred to explain learners' motivational factors in social context; Ryan and Deci's (2000) Self-Determination Theory is studied to examine learners' attitudes towards shadowing

in the continuum between extrinsic and intrinsic motivation; and Dörnyei's (2009) L2 Motivational Self System is referred to further explore learners' internal motivational factors in terms of Ideal L2 self to perceive shadowing task as a useful practice method for autonomous language learning in the future. This project conducts a survey with 35 questionnaire items compiled through a review of the motivation literature. Factor analysis is performed in order to reveal underlying sources of attitudes towards shadowing. Between-variables correlation analysis is also conducted in order to identify attitudes that are closely related to the item of intention to continue shadowing, which item is considered as a crucial indicator of motivation towards shadowing.

Chapter 6 concludes the thesis by summarising the main findings of the previous chapters. Implications for implementing shadowing method in classroom teaching are also discussed.

1.6 Aims of the research project

The purpose of the present thesis is to investigate the effective implementation of shadowing method in JFL context. The four chapters deal with aspects of shadowing method, each of which aims to explore the specific area of language learning. The four main research questions are as follows:

(1) What is the most effective shadowing model audio speed to improve sound recognition ability? (Chapter 2)

(2) How does content shadowing competence relate to listening comprehension strategy use? Is there any difference in the strategy use at different speech speeds? (Chapter 3)

(3) Is shadowing effective in improving high-low pitch-accent in learners' speech production? (Chapter 4)

(4) How do learners perceive shadowing, and what are the influential factors that encourage them to continue shadowing? (Chapter 5)

1.7 Significance of this study

The thesis makes a number of significant contributions to the field of SLA and shadowing research. Firstly, shadowing has been recognised as an effective method specialized for listening skills, through many findings of previous studies. The distinct characteristics of shadowing, which offers specific procedures based on a theoretical foundation, sheds light on the still developing listening research in SLA. For example, conventional listening practices such as dictation and listening comprehension exercises tend to make learners passive listeners, since the objective of these activities is to demonstrate how much learners can gather accurate information. In contrast, shadowing requires learners to speak while listening, which action makes them active listeners because they have to produce all the incoming information as accurately as possible. This thesis, evolving from existing shadowing procedures, aims to propose additional, elaborate methodology, contributing to implementation of shadowing into new curriculum development that meets the goals of various learning environments.

The gradual speed increase of the model audio is one example of the contribution this thesis proposes to make, since there is no study yet using speed increase in the field of shadowing research. Another contribution particular to this thesis is the detailed measurement of learners' shadowing performance, which is a rare case in shadowing research as this requires recording learners' performance as well as an additional marking workload. However, it plays a crucial role in keeping track of learners' shadowing performance in order to examine the effect of shadowing in further depth. The marked feedback is also considered beneficial, as it makes it possible for the learners to set more specific effort goals by recognizing the divergence between the present state and the target (native speaker). Unlike other listening practices, shadowing aims at constant improvement along with repeated attempts, as it is suggested that the shadowing skill of reproduction accuracy is likely to improve significantly after four or five trials (Shiki et al., 2010). This self-correction and improvement process, together with detailed marked feedback, is suggested to contribute to encouraging learners' motivation towards Japanese study (Sumiyoshi

& Svetanant, 2017).

Furthermore, it is highly beneficial not only for the purpose of listening skills but also for SLA to create a habit of exposure to the target language on a daily basis in the foreign language learning context in a country where the target language is not spoken. By the same token, practising shadowing means practising speaking as well in the form of reproducing the heard speech. This act of 'speaking' is not really a synonym for speaking in terms of the communicative use of the target language; nevertheless, it is considered to contribute to improving prosodic features of speaking skills. In addition, this increased opportunity to 'speak' the target language along with shadowing exercises is crucial in a foreign language context where the L2 use is mostly limited to within classrooms, and especially when learners have no one to speak with.

Finally, this thesis contributes as a reference for the future implementation of shadowing into L2 pedagogy in relation to learners' perceived motivation towards shadowing. It is warned that innovative practice in language teaching may potentially trigger resistance among the learners, since the quality of teaching can be more harmful than beneficial (Markee, 1992, p. 233). In other words, the audio-lingual aspect of shadowing practice can potentially cause learners' resistance in an L2 pedagogical context of communicative language teaching, where learners' creative language output is mostly emphasized (Hamada, 2015, p. 9).

Chapter 2

Exploring the Speed Variation of Model Audio and Sound Recognition Ability in Japanese as a Foreign Language Context

2.1 Introduction

This initial investigation of shadowing effect departs from the very first step of the listening process in the phonological loop of working memory, that is, the recognition of the sound input as words. In the process of recognising sound, speech speed is considered as one of the most influential variables of listening skills, since learners have no control over the speed of incoming sound. The focus of this chapter is therefore on the speed increase of the shadowing model audio in order to investigate the most effective speed range for the participants to improve their sound recognition ability.

Participants are recruited from Australian university students who are enrolled in the Japanese language courses, Advanced Japanese I and Advanced Spoken Japanese. The former is a general language course and the latter is an optional course with a speaking focus, both of which are offered in the same semester. The participants are divided into the control group who are enrolled in the general Japanese course only (without shadowing) and the experimental group who are also enrolled in the spoken Japanese course (with shadowing). Two kinds of measurement instruments are prepared: (1) a listening section of a standardised language test, Japanese Language Proficiency Test (JLPT), is prepared to measure the participants' overall listening skills; and (2) a pinpoint dictation is devised to test the participants' sound recognition ability at slow and fast speeds. The measurement instruments are conducted in the general Japanese course in which all of the participants are enrolled. The findings can shed light on implications for the appropriate speed range of shadowing model audio for Japanese learners at

proficiency equivalent to JLPT N2 level.

The participants' Information and Consent form for this paper can be found in Appendix 3. This paper has been submitted for consideration for review. The article formatting follows the target journal requirements.

2.2 Exploring the Speed Variety of Model Audio and Sound Recognition Ability in Japanese as a Foreign Language Context

The Effect of Shadowing: Exploring the Speed Variety of Model Audio and Sound Recognition Ability in Japanese as a Foreign Language Context

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Abstract

Shadowing has increasingly been recognized as an effective practice for developing listening skills in second language learning. The common claim is that the act of simultaneous listening and speaking activates sub-vocalization in the working memory, which helps improve bottom-up processing (Kadota, 2007). This helps improve morpheme perception that contributes to sound recognition skills leading to listening comprehension (Hamada, 2016). However, there is very little research focusing on the influence of speed variation in shadowing model audio. The aim of this study is to investigate the effect of shadowing in relation to gradual speed progression of the model audio and sound recognition ability. Participants in this study were 29 university students who were enrolled in the language courses, Advanced Spoken Japanese (experimental group) and Advanced Japanese (control group) at an Australian university. Shadowing practice was conducted for eight weeks during a 13-week semester. The pre- and post-tests used parts of standardized Japanese proficiency tests for listening comprehension (24 questions) and a dictation test (10 items) for sound recognition ability. The results indicated that the experimental group improved in both listening comprehension and dictation at slow and fast speed, whereas the control group showed improvement only in slow speed dictation.

Keywords: second language learning; Japanese; shadowing; listening; sound recognition

1 Introduction

1.1 Shadowing

Listening skill is the only area of communication in which one cannot have control over the speed, unlike the other three language skills where one can adjust the speed (of speaking, writing and reading) at will. So once a listener is left behind or misses certain utterances during a conversation, the listener must ask the speaker to repeat what they said in order to recover the missed information, or if watching a movie, rewind and play the part again. However, failing to hear information is problematic when it comes to examinations, academic or business conferences, or even when watching movies at the cinema for example, where listeners are given only one attempt at listening. By the same token, if a learner is unable to keep up with the speed of communication at their proficiency level, their acquired linguistic competence would be of no use as there is virtually no incoming information to process to begin with. Despite the fact that listening skill is the most common area that learners of Japanese language wish to improve (Yang, 2008), there is no solid teaching method in L2 pedagogy to improve listening skills when communicating at a fast speed.

In the field of second language acquisition (SLA), shadowing has increasingly been recognized as an effective practice for developing listening skills in L2 learning in Japan (e.g. Kadota, 2012; Kondo, 2012; Nakayama, 2011). Shadowing refers to "a paced, auditory tracking task which involves the immediate vocalization of auditorily presented stimuli, i.e., word-for-word repetition, in the same language, parrot-style, of a message presented through headphones (Lambert, 1992, p. 266)." It was originally used as a training method for simultaneous interpreters. This simultaneous task of listening and speaking has been suggested as an effective means of improving listening skills in L2 learning, as the learner is required to listen and speak at the same time (Kadota, 2007, 2012). However, Lambert's metaphor of 'parrot-style' may give the impression that shadowing itself does not require much brain work as

parrots apparently repeat without linguistic processing, but simultaneous interpreters must perform a series of cognitive tasks while shadowing (Spiller et al., 1990). Tamai (1997), the pioneer of shadowing research in Japan's English as a foreign language (EFL) context, re-defined Lambert's definition of shadowing as 'an act or a task of listening in which the learner tracks the heard speech and repeats it as exactly as possible while listening attentively to the incoming information' (pp. 105-106). This definition of shadowing highlights the importance of active attention to incoming sound in terms of linguistic processing in the human brain; otherwise, without paying attention, the speech becomes as good as background noise. This study, therefore, puts a focus on speed progression to examine learners' sound recognition ability through shadowing practice.

1.2 Shadowing Mechanisms

In listening, the information is in the auditory medium, which is transient and vanishes quickly, unlike written characters in reading where readers can control the pace and even repeatedly read parts for better comprehension. Therefore, listening comprehension must be considered from not only a linguistic processing point of view, but also in terms of the recognition of sound, especially the speed of the incoming information, because it has been suggested that listening comprehension drops significantly as speed increases over around 280 words per minute (Hausfeld, 1981).

The human brain is often explained using the metaphoric expression of a computer's memory system and the central processing unit. Baddeley (1992) proposes the term 'working memory' (WM) of the human brain when discussing information processing of incoming visual and sound stimuli. He describes the WM in three components: the *central executive* operates as an attentional-control system; the *visuospatial sketchpad* processes visual images; and the *phonological loop* is for incoming sound storage. The *central executive* is solely an attentional system with no storage capacity of its own, and it functions as a processing device between the

two ‘slave systems’ with their own temporary short-term memory function (Ibid, p. 556). To illustrate the process of listening comprehension, the heard speech is temporarily stored in the *phonological loop*, which is considered to last only one to two seconds (Ibid, p. 558). The *central executive* then runs a semantic analysis of the phonetic signals by referring to the long-term memory (LTM), after which comprehension is achieved after examining the pragmatic and contextual usage of the language. The crucial point in this listening comprehension process is that the capacity of the *central executive* is limited. Furthermore, if the *central executive* mobilizes a large portion of its resources to focus on *visuospatial sketchpad* or *episodic buffer*[3]linkage instead of on the *phonological loop*, listening comprehension may not occur as the link between the *central executive* and the *phonological loop* becomes very limited or even non-existent. In other words, people do not always comprehend what they hear even in their native language, especially when they are in an absent-minded or multi-tasking state, because the heard speech is not processed for comprehension.

One of the key functions is the *phonological loop*. With respect to the listening process, it is assumed to have two additional functions: phonological short-term storage and subvocal rehearsal. The former is the memory function of sound stimuli, and the latter is the mental repetition of the heard speech stored inside the phonological loop. This subvocalization is assumed to last for about two seconds (Darro & Fabbro, 1994), but it is suggested that the length of subvocal rehearsal can be extended with active subvocalization (Kadota, 2007), and the memory capacity of WM can also be improved by training (Klingberg et al., 2002). Namely, in order to retain the heard speech longer, the role of the *central executive* becomes crucial because it will require larger processing power for more active subvocalization.

From the SLA point of view, there are two opposite approaches that L2 learners typically

[3] The *episodic buffer* is assumed to be a temporary store controlled by the *central executive*, which feeds and retrieves information from LTM through the medium of conscious awareness (Baddeley, 2000). The buffer is episodic and can be associated with incoming information via *visuospatial sketchpad* and/or *phonological loop*.

take in the listening comprehension process: bottom-up processing and top-down processing (Kadota, 2007; O'Malley et al., 1989). The former refers to the processing that starts from a minimum element of speech, such as sound, which forms a morpheme, then a word, then a sentence and then finally the context and pragmatic use of the language, which leads to comprehension. On the contrary, top-down processing refers to processing that starts from the context and only recognized words to guess the meaning by compensating for missed words. This listening technique is naturally practiced by native and advanced L2 speakers, especially in daily conversations where incomplete sentence exchanges are likely to occur. For example, linguistically speaking, functional words, such as the English articles 'a' and 'the', are often pronounced much more weakly than other words (Nakayama, 2011), and Japanese particles are often omitted in spoken language (Maeda, 1998). However, for novice and intermediate L2 learners, it is of crucial importance to develop sound recognition skills for bottom-up processing in order to maximize the number of recognizable words in their limited lexicon (Vandergrift & Baker, 2015). Shadowing is considered especially effective in training this bottom-up processing by forcing active subvocalization in WM, and automatizing this process would enable the brain to utilize its limited resources for higher level linguistic processing, just like native and advanced L2 speakers (Kadota, 2007, 2012).

Cognitive load theory assumes that extraneous cognitive load is imposed when multiple sources are presented and the brain is required to mentally integrate the separate information (Chandler & Sweller, 1991). Extraneous cognitive load is caused by the limited capacity of WM to deal with repeated or unnecessary information, resulting in inefficient processing. Moussa-Inaty, Ayres and Sweller (2012) found simultaneous reading and listening was significantly less effective than reading only in learning new vocabulary and translating sentences among 38 university students in the EFL context. The participants were divided into the Read Only group and Read + Listen group, and the experiment consisted of six acquisition activities (word learning, word translation, sentence learning, sentence translation, cloze activity,

and sentence creation). The former group received only the written materials, while the latter received both the written and auditory materials simultaneously. Their research supported the hypothesis that the auditory information was redundant and therefore imposed an extraneous cognitive load, resulting in lower achievement after instruction using multiple sources. Leahy and Sweller (2011) found the Audio/visual group performed significantly lower than the Visual only group in a PowerPoint learning environment for 24 Year 6 students. The investigators argued that instructions containing a considerable amount of information resulted in exceeding the WM limits of the Audio/visual group members since the information had to be remembered after hearing the transient instruction once, while the Visual only group was able to read and process the instruction repeatedly. These findings suggest that extraneous cognitive load was imposed as the result of split attention caused by attempts to mobilize different channels of WM, the *visuospatial sketch pad* and the *phonological loop*. During this process, comprehension was assumed to be hindered by the disparate processing, especially when these channels were processing the information at different speeds. Shadowing, on the other hand, requires learners to focus on the *phonological loop* and to synchronize incoming information into the phonetic representation of speech production. In this respect, shadowing may require a heavy cognitive load as it requires simultaneous attention to the *phonological loop* and speech production, but it is different from a negative cognitive load like extraneous cognitive load caused by split attention.

1.3 Shadowing Research

As the pioneer of the shadowing research in Japan's EFL context, Tamai (1992) examined the difference between shadowing and dictation among 94 high school students. He conducted a listening lesson once a week for 50 minutes (for 13 weeks). One session consisted of five parts – 1) listening, 2) parallel reading (reading while listening), 3) vocabulary check, 4) shadowing (for the experimental group) or dictation (for the control group), and 5) self-check of mistakes. Once

the session was completed, the same process was repeated for different texts during the 50-minute lesson. Pre-post-test results in listening comprehension indicated with statistical significance that shadowing was more effective than dictation. Led by Tamai's study, there has been a rise in the popularity of shadowing practice as an L2 teaching technique in Japan.

Common shadowing practice adapted into language classrooms uses various types of shadowing model audio, including teaching materials such as textbook CDs (e.g. Hamada, 2011; Suzuki, 2007; Sakoda, 2010), standardized test audio such as TOEFL and TOEIC (e.g. Hamada, 2012; Oki, 2010; Kurata, 2007), and authentic audio materials such as movies and news clips (e.g. Shiki et al., 2010; Saito, 2011; Nakayama, 2011; Mochizuki, 2006). All such audio materials are accompanied by written scripts for the purpose of reviewing shadowing accuracy. Table 1 shows the shadowing steps recommended by Kadota and Tamai (2004, p. 62), and widely practiced by teachers and researchers (e.g. Hamada, 2012; Kyo, 2012; Saito, Nagasawa, & Ishikawa, 2011).

Table 1. Recommended Six Steps of Shadowing Training

Steps	Procedure	Details
1	Listening	Listening to the audio without the script, and trying to roughly grasp the content and the speech style.
2	Mumbling	Shadowing without the script focusing on the heard sound rather than reproducing pronunciation.
3	Synchronized reading (content understanding)	Shadowing with the script focusing on the meaning of the script.
4	Prosody shadowing	Shadowing focusing on prosodic features, such as the stress, rhythm, intonation, speed, pauses, etc.
5	Synchronized reading (difficult points)	Shadowing with the script focusing on the parts listeners find difficult.
6	Content shadowing	Shadowing focusing on the content without reading the script.

Kadota & Tamai (2004).

Since Kadota recommends that the shadowing scripts be easier than the learners' current

language level, e.g. using less than 3% of unknown vocabulary, steps 3 and 5 (Synchronized reading) reasonably fit in the process of shadowing development as they play the important role of eliminating the gap between unfamiliar pronunciation and identification of vocabulary in the script. However, Kondo (2012) points out the possibility of a negative effect of this reading process during the shadowing practice; that is, she questions whether the shadower neglects the phonological aspects by using recognized vocabulary from the LTM in the reading process. She also implies there is a positive effect of not showing the script during shadowing practice, arguing that it is closer to authentic listening in actual conversation in the target language. In fact, the timing of the use of a shadowing script has become controversial as some researchers have found it more effective for the script to be shown after the shadowing (Hamada, 2014; Kondo, 2012). This study employs this post-shadowing script method not only for the above reasons, but also because based on cognitive load theory, synchronized reading is considered likely to trigger split-attention effect and impose unnecessary extraneous cognitive load, which would become problematic especially when attempting shadowing at faster speeds.

In terms of the shadowing skill of reproduction accuracy, Shiki et al. (2010) report that the reproduction rate likely hits the ceiling point after four or five shadowing trials. Although this finding was based on a one-day session involving 48 Japanese university students, and the implication may be limited to the conditions of their study, this ceiling phenomenon was observed in Tamai's (2002) studies as well. However, the shadowing materials were set at the average of the participants' L2 proficiency levels in these studies, and different materials (but the same difficulty level and speed) were used throughout the study period. Therefore, it is reasonable to assume that those at lower L2 proficiency show more improvement than those at a higher proficiency level, as they are assumed to have more room for improvement. Within the progressive speed range of this study's shadowing materials (see the *Shadowing Materials* section for more details), it is reasonable to assume that most participants reached their ceiling speed for shadowing earlier than they would for a listening task by itself, since shadowing

involves the act of speaking, which is cognitively more challenging than listening alone as no one usually listens and speaks at the same time (Kadota, 2007). Taking this into consideration, starting at a slower speed than necessary is a way to allow learners to practice shadowing. It is also assumed that learners' anxiety towards spoken language can be mitigated if the speed is manageable for shadowing (Gregersen & Horwitz, 2002). However, when the speed increases to the point where the shadower feels it is challenging to process the incoming sound, the learner needs to practice more in order to be able to perform the shadowing at a satisfactory level; such practice is considered vital for improvement.

As for listening skills, Onaha (2004) investigated the effect of shadowing in relation to listening comprehension, dictation and phonological memory among 62 university students for one semester. Students' shadowing recordings were also graded on reproduction ability and stress and intonation five times by the instructors (a native Japanese speaker and a native English speaker). The results indicated that post-test listening comprehension scores were strongly correlated to shadowing and moderately related to the dictation and digit span scores. With regard to the differences in linguistic processing, Hamada (2016) examined the effect of shadowing on listening comprehension and phoneme perception among 43 Japanese national university students. The author conducted 15-20 minutes of in-class shadowing practice twice a week for a month (nine times). Pre- and post-tests in listening comprehension and phoneme perception were conducted before and after the study period. Participants were divided into two proficiency groups (low and intermediate) for analysis. The results revealed that both groups improved in phoneme perception, but only the low-proficiency group improved at high-school level listening comprehension, and neither group improved at university level listening comprehension.

Since learners are likely to feel that the audio speed is the most difficult to follow in shadowing practice (Chang, 2008), it is of vital importance to consider the audio speed as one variable; however, most of the shadowing studies leave this out. In this respect, Nakayama's

(2011) study in an EFL context in Japan presents a very important account addressing speed differences in shadowing material. The author conducted a short shadowing session among 26 university students to examine the relationship between the model audio speed and sound recognition of weak forms of function words in English. He divided the participants into two groups to conduct shadowing with three different model audio speeds (experimental group) and fast speeds only (control group). The experimental group was asked to shadow three recordings that were recorded at different speeds, each containing different numbers of weak forms of function words, while the control group was asked to shadow the same materials but all were recorded at a fast speed. The pre-post-test results revealed that only the experimental group showed statistically significant improvement in the recognition of weakly pronounced function words, while neither group showed any improvement in the content words. However, as Nakayama pointed out himself, these results may be limited to the study context as the same script was used for the recordings in which the weak forms of function words were expressed more clearly at a slower speed, and thus the experimental group may have developed better recognition of the script than the control group.

1.4 The aim and research questions

Previous shadowing research reveals that shadowing is effective for improving listening skills, particularly by contributing to bottom-up linguistic processing. However, there is still a lack of empirical data about which shadowing model audio speed is effective. Therefore, this study will attempt to investigate the effect of shadowing in relation to the speed of the model audio and sound recognition ability by employing gradual speed progression of the shadowing model audio and a short dictation test as a specific measurement for sound recognition ability. This study employs the post-shadowing script method in order to encourage attentive listening to incoming sound without reading scripts, and also to enable the researcher to monitor participants' shadowing performance for analysis.

The two research questions are as follows:

RQ1. Is there any difference in the effect of shadowing on sound recognition ability between slow and fast model audio speeds?

RQ2. What is the most effective speed range of shadowing model audio for improving sound recognition ability?

2 Methods

2.1 Participants

Participants in this study were recruited from Australian university students who were enrolled in the general language course of Advanced Japanese II, and its co-requisite (optional), Advanced Spoken Japanese, so that the participants were divided into the control (general course only: without shadowing) and experimental (both spoken and general courses: with shadowing) groups. It was necessary to recruit participants from two different courses in order to set up these groups within the university's ethical framework, which requires that the same teaching materials be used within one course. The Advanced Japanese course met twice a week, once for a lecture and once for a tutorial (for two hours each), and the Advanced Spoken Japanese course met once a week for two hours. It was considered that shadowing exercises would fit well in the speaking-focused course as it inherently involves speaking practice. A total of 29 students agreed to participate in this study. Nine of those students were enrolled in the spoken course as the experimental group (n = 9), and the remaining students in the general course were considered as the control group (n = 20). Table 2 summarises the participants of this study.

Table 2. Summary of Participants

		Experimental Group (n = 9)	Control Group (n = 20)	Total (n = 29)
Gender	Male	3 (33%)	7 (35%)	10 (34%)
	Female	6 (66%)	13 (65%)	19 (66%)
Native language	English	3 (33%)	9 (45%)	12 (41%)
	Chinese	4 (44%)	8 (40%)	12 (41%)
	Korean	1 (11%)	1 (5%)	2 (7%)
	Indonesian	1 (11%)	1 (5%)	2 (7%)
	Thai	0 (0%)	1 (5%)	1 (3%)
Born in Australia	Yes	5 (56%)	13 (65%)	18 (62%)
	No	4 (44%)	7 (35%)	11 (38%)
Japanese Major	Yes	7 (78%)	14 (70%)	21 (72%)
	No	2 (22%)	6 (30%)	8 (28%)

Overall, there were almost twice as many females (n = 19) than males (n = 10), and this was the same trend in the control and the experimental groups. All the participants spoke English as a required language in an Australian university; however, there were various native language speakers among the participants of this study (English: n = 12, Chinese: n = 12, Korean: n = 2, Indonesian: n = 2, Thai: n = 1), which is considered to be due to their family circumstances as immigrants. Eleven participants were born overseas and moved to Australia when they were two (n = 1), nine (n = 2), ten (n = 3), twelve (n = 3), sixteen (n = 1), and nineteen years old (n = 1). The majority of the participants were majoring in Japanese (n = 21), while the majors of the remaining participants were International Studies (n = 1), Marketing (n = 1), or undecided (n = 6). All the participants were continuous students from a course in the previous semester, Advanced Japanese I, and had experience of shadowing in that course.

2.2 Materials

This study consisted of three phases – a pre-test, eight weekly shadowing exercises, and a post-test. Small dictation quizzes were also administered in order to measure the participants'

sound recognition ability, because the pre-post tests were considered to measure overall listening comprehension skills.

2.2.1 Shadowing materials

For shadowing model audio, monologic narrative recordings were used because they are read at a stable pace with appropriate pauses, which is considered ideal for the purposes of this study to measure the effect of shadowing in relation to the gradual speed progression of the model audio and sound recognition ability. Descriptors of linguistic competence for the five levels of the standardized language test, the Japanese Language Proficiency Test (JLPT), refer to the speed of listening comprehension skills for L2 Japanese learners as follows: novice learners (levels N4 & N5) can comprehend Japanese which is spoken "slowly", and more advanced learners can comprehend at "at near-natural speed" (level N3), "at nearly natural speed" (level N2) and "at natural speed" (level N1) (Japan Foundation, 2017). It is fair to assume the "natural" speed in this description is of native equivalent. Therefore, audio recordings were selected from a reading aloud textbook (Matsuura, Fukuike, Kohno, & Yoshida, 2014) for "near-natural" speed materials, and from NHK online news (NHK, 2016) for "natural" speed materials. The former is a textbook for intermediate level Japanese learners, while the latter is broadcast for native audiences. The NHK news material was selected during the month prior to the study period so that the news content was reasonably up-to-date. The speeds of the audio materials were then calculated by dividing the total number of mora[4] in the script by the running time. Pauses were not excluded from this calculation since it is considered that appropriate pausing is naturally required in proportion to the speech speed. The investigator then selected materials at various speeds in order to provide gradual speed progression of the shadowing materials (see Table 3). Each audio recording was approximately one minute long. Kadota (2007) recommends that shadowing

[4] Japanese is a mora-timed language in which each mora is spoken at a roughly constant rate, while English is a stress-timed language with syllables (Ishihara, Tsurutani, & Tsukada, 2011).

materials contain no more than 3% of unfamiliar vocabulary; however, this recommendation is based on the requirements for content shadowing, where the aim is to understand the content while shadowing. This study, on the other hand, put a focus on sound recognition, not comprehension, so NHK news audio was considered suitable for providing a wider range of speed variation up to the native speed in the shadowing materials. Therefore, in order to prepare students for the progressive speed increase of the shadowing materials, in the first week of semester the investigator explained the shadowing mechanism, various shadowing purposes at multiple steps (see Table 1), and the aim of adapting the shadowing method for this particular study in order to focus on speed progression and accuracy. Table 3 summarises the shadowing speed for each week.

Table 3. Progression of Weekly Shadowing Model Audio Speed

Materials	Read Aloud Textbook				NHK Web News			
Week	W02	W03	W04	W05	W07	W09	W10	W11
Mora per minute (m/m)	315	340	350	370	400	410	430	440
Number of mora	331	332	333	329	409	391	352	437
Gender of speaker	F	M	F	M	F	M	M	M

Notes. For Gender of speaker, F = female, M = male.

The adjustable speed of shadowing materials is particularly unique in this field of shadowing research. The greatest advantage of increasing the speed of the shadowing audio is assumed to be the scaffolding effect for almost all the participants, since the material started at 315 mora per minute (m/m), increased by 10-30 mora every week, and eventually reached 440 m/m by the end of the study period. These model audio speeds were selected in reference to data obtained in the previous semester, where all the participants in the experimental group had experienced shadowing, as mentioned in the previous section. The model audio speeds of the previous semester ranged between 300 and 400 m/m, which were the reference points for selecting the audio speeds between W02 and W07 for this study. The W09 to W11 speeds were added in order to explore the possible speed range, in line with the objective of this study to

investigate the effect of variation in the speed of the shadowing model audio.

2.2.2 Pre-post listening comprehension tests

Since the Advanced Japanese course encourages students to sit for the JLPT N2 level, the pre-post tests used N2 equivalent tests that were sourced from a mock examination book for JLPT preparation (Tanahashi, Sugiyama, & Nohara, 2011). The content of these tests is designed to measure students' overall listening skills, which are based on comprehensive linguistic competence to use the knowledge in actual communication (Japan Foundation, 2017). Twenty-four questions were used from the original 32 questions due to the time constraints of the class, and different set of tests were used in order to avoid test-retest effect of memorization.

2.2.3 Pinpoint Dictation

As a counterpart to the pre-post-shadowing tests, the author devised a dictation quiz called pinpoint dictation (PD), where students were asked to write down only certain information from a short sentence. The quiz aimed to measure listening skill by focusing as much as possible on sound recognition, and was inspired by the cloze test and the digit span test format. In the quiz, 10 short Japanese sentences were read aloud, followed by a question in English after each sentence. The sentence included one or two pieces of information containing either random numbers or names that L2 learners are likely unfamiliar with (e.g. celebrities and popular travel destinations were not used in this test).

Consider the following example:

Sentence: このねぎとろ丼は 560 円だ。

[*kono negitorodon wa gohyakurokujū en da.*]

(This spring onion and raw tuna mince on rice costs 560 yen.)

Pattern 1. Q: How much is the dish?

A: 560 yen.

Pattern 2. Q: What is the name of the dish?

A: ねぎとろどん [*negitorodon*].

In order to measure participants' sound recognition ability at different speeds, PD was divided into two parts: the first five sentences were read at relatively slow speed and the latter five at fast speed. The instructor, who is a native Japanese speaker and also the investigator of this study, recorded the PD audio after careful revision of the first week's slow and fast speeds in order to maintain consistency throughout the semester. The slow speed sentences were read at 5.75 mora per second, and the fast speed sentences at 7.61 mora per second on average. The total number of mora for the slow and fast speed sentences were made equal each week in order to avoid differences in the difficulty level caused by the length of the answers.

2.3 Procedures

Out of the 13-week semester period, shadowing practice was conducted as a homework assignment for eight weeks between W02 and W11 (for brevity this study uses the format WXX, where W stands for week and XX for number) in the Advanced Spoken Japanese class only. There was no shadowing in W06 and W08 as there were speaking and written tests. The theoretical background of shadowing was explained to the students during the W02 class before the commencement of weekly shadowing assessments, as it is considered crucial to share such information in order to help students better understand the objectives (Mochizuki, 2006). Also, it was explained that the shadowing script would not be made available in the one week period between one lesson and the next because the purpose of the exercise was to train their sound recognition ability. The gradual increase of the shadowing model audio speed was also mentioned, in order to raise students' awareness of the challenges that lay ahead in the following weeks.

The shadowing model audio was made available via the course module in the university online learning system on the day of the class, and the submission date was set four days later in

order to maintain the weekly cycle. Each shadowing week, the instructor listened to the submitted shadowing audio and marked it for accuracy against the model audio script. The mistaken parts were highlighted on a printout of the audio script typed in kana scripts. Each mistake was manually spelt out above the highlighted kana script, and the total accuracy was calculated on a 100% scale. This marking process took approximately two hours for 25 shadowing submissions. Feedback and a marked script sheet were returned to each student in the following week's class. During the class, shadowing feedback involved the following steps: 1) the instructor played the model audio once while everyone shadowed altogether; 2) the instructor briefly pointed out the common mistakes and provided general comments on that week's shadowing performance; 3) a marked feedback sheet, which was a printed script with mistakes highlighted in red and the correct spelling of pronunciation errors provided above the highlighted part, was returned; and 4) the average score of the class was shown. This in-class shadowing feedback normally took approximately 10 minutes each week.

Pre-post listening comprehension tests and PD were conducted in the general Japanese course only: the pre-test in W01 and the post-test in W11, and PD six times in W02, W03, W05, W07, W09 and W11. Each PD test took about three minutes, and the audio was played only once as it was designed to measure students' sound recognition ability with a one-off attempt at listening to the audio sentence. Out of 10 items, the answer for the first five (slow) and the latter five (fast) contained the same number of mora (40 each), and each answer was marked on the number of correct phonetic representations so that the test score represented detailed accuracy as opposed to an all-or-nothing scoring method. The W02 PD was considered as an introduction because most students were not familiar with the dictation format. Therefore, in order to ensure that any improvements in performance resulting from the participants becoming accustomed to the test format did not lead to misleading results, the W03 PD was considered as the pre-test for sound recognition, and W11 as the post-test. In order to test the reliability of the PD scores due to the possible differences in difficulty between W03 and W11, W03 items were included in the

W11 PD for the purpose of correlation analysis. As a result, the W11 PD contained 20 items: 10 slow and 10 fast items with W03 PD items included alternatingly. It is reasonable to assume that there was very little chance that participants remembered the W03 PD answers given the nature of the content, such as sequences of random numbers, and that there was a nine-week interval between W03 and W11 (including the two-week mid-semester recess).

2.4 Data Analysis

Descriptive statistics were used to present the overall features of the collected data. The raw test scores were converted into percentages (%) for consistent presentation. The effect sizes (Cohen's *d*) were calculated based on the standard deviation scores from a paired-sample t-test for each test. Line graphs were produced for clearer data presentation. For statistical analysis using the SPSS program, a mixed-design two-way analysis of variance (ANOVA) was performed to compare the improvements of each group for pre-post listening comprehension and PD tests. The *treatment* (experimental-control group) was the between-participants factor, and *time* (pre-post) the within-participants factor.

Regarding the pre-post listening comprehension tests, the number of participants was smaller than other tests due to the late enrollment of participants in the course, and as a result of filtering for genuine group scores for the same individuals who took both tests for valid comparison of the mean scores (experimental: $n = 6$, control: $n = 17$).

3 Results

In this section, firstly, pre-post test results and PD results will be presented, where PD scores were analyzed separately between Slow and Fast in order to compare the speed differences. Secondly, overall shadowing performance scores will be presented followed by the results for the five PD tests in Slow and Fast in order to make detailed comparison based on the time elapsed.

In the pre-post listening comprehension tests (24-item JLPT proficiency test), both groups showed improvement in the mean scores: by 23.4 from 36.3 to 59.7 in the experimental group, and by 12.1 from 41.0 to 53.1 in the control group (Figure 1 and Tables 4 and 5).

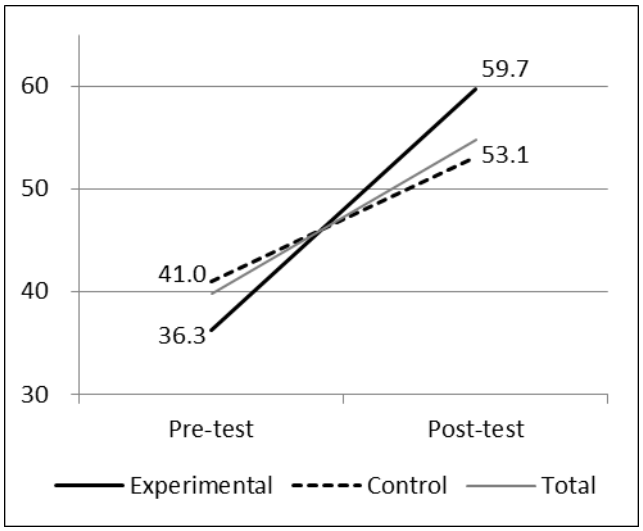

Figure 1. Test Results of Pre-post Listening Comprehension Tests.

A mixed-design of two-way ANOVA showed a statistically significant difference for *time* [F (1, 21) = 21.662, p =< .01, η^2 = .508]; however, no significant difference was observed for *treatment* [F (1, 21) = 0.019, p = .893, η^2 = .001] or *interaction* [F (1, 21) = 2.17, p = .156, η^2 = .094] (Table 4). The large effect size for the experimental group (d = 2.57) and the medium effect size for the control group (d = 0.69) along with these results indicate that the experimental group showed stronger improvement than the control group (Table 4).

Table 4. Test Results of Listening Comprehension and PD scores (%)

Tests		Group	Pre Mean	*SD*	Post Mean	*SD*	Effect Size (*d*)
Listening Comprehension		Experimental	36.33	18.52	59.67	21.18	2.57 (L)
		Control	41.00	17.79	53.12	12.67	0.69 (M)
PD	Slow	Experimental	77.21	22.63	88.89	11.53	0.82 (L)
		Control	72.56	19.81	81.88	15.15	0.73 (M)
	Fast	Experimental	75.50	22.02	81.11	13.87	0.60 (M)
		Control	77.18	16.51	75.13	14.06	0.16 (S)

Notes. For effect size, L = large, M = medium, S = small (Cohen, 1992)

Table 5. Summary of the ANOVA Results

Factor	Measurement		
	Listening Comprehension	PD	
		Slow	Fast
Time	$F(1, 21) = 21.662^{*}$, $p = .000$, $\eta^2 = .508$	$F(1, 27) = 15.684^{*}$, $p = .000$, $\eta^2 = .367$	$F(1, 27) = 0.524$, $p = .475$, $\eta^2 = .019$
Treatment	$F(1, 21) = 0.019$, $p = .893$, $\eta^2 = .001$	$F(1, 27) = 0.779$, $p = .385$, $\eta^2 = .028$	$F(1, 27) = 0.126$, $p = .725$, $\eta^2 = .005$
Interaction	$F(1, 21) = 2.17$, $p = .156$, $\eta^2 = .094$	$F(1, 27) = 0.200$, $p = .658$, $\eta^2 = .007$	$F(1, 27) = 2.435$, $p = .130$, $\eta^2 = .083$

Notes. $^{*}p < .05$.

As for the PD (10-item dictation test), there was strong positive correlation between the aforementioned W03 repeat and W11 scores ($r = 0.932$, $p = 0.000$), which indicates that the W11 PD is reliable for comparative analysis.

In the PD Slow, both groups showed improvement. The experimental group improved by 11.7 from 77.2 to 88.9, while the control group improved by 9.3 from 72.6 to 81.9 (Figure 2 and Table 4). A mixed-design of two-way ANOVA showed a statistically significant difference for *time* [$F(1, 27) = 15.684$, =< .01, $\eta^2 = .367$] but no significant difference was observed for *treatment* [$F(1, 27) = 0.779$, $p = .385$, $\eta^2 = .028$], or *interaction* [$F(1, 27) = 0.200$, $p = .658$, $\eta^2 = .007$] (Table 5). The large effect size for the experimental group ($d = 0.82$) and the medium

effect size for the control group (d = 0.73) along with these results suggest that both groups improved in the PD Slow to a similar degree (Table 4).

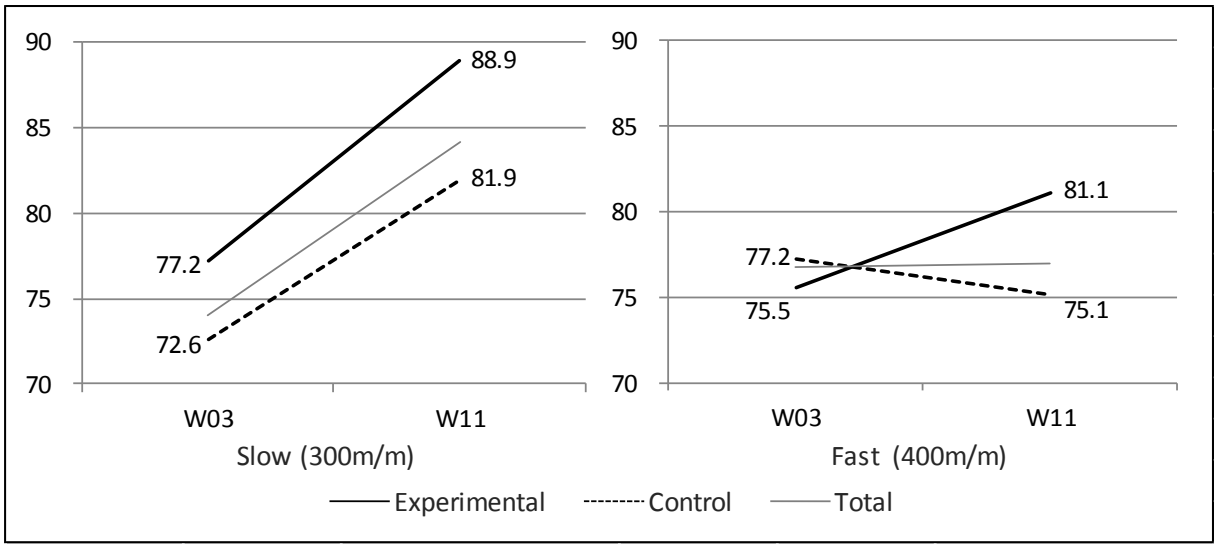

Figure 2. Test Results of PD in W03 and W11 at Slow and Fast Speed.

With regard to the PD Fast, the experimental and control groups showed a different trend. The experimental group improved by 5.6 from 75.5 to 81.1, but on the contrary, the control group decreased by 2.1 from 77.2 to 75.1 (Figure 2 and Table 4). A mixed-design of two-way ANOVA showed no significant difference in *time* [$F(1, 27) = 0.524$, $p = .475$, $\eta^2 = .019$], *treatment* [$F(1, 27) = 0.126$, $p = .725$, $\eta^2 = .005$], or *interaction* [$F(1, 27) = 2.435$, $p = .130$, $\eta^2 = .083$] (Table 5). The medium effect size for the experimental group (d = 0.60) and the small effect size for the control group (d = 0.16) along with these results indicate that the experimental group improved in the PD Fast more strongly than the control group (Table 4).

As for the overall shadowing performance, Figure 3 shows the mean scores between W02 and W11 for the experimental group. Out of the eight-week shadowing period, six weeks show a gradual shift in the mean scores, but there were sharp declines in W07 and W11, by 7.3 from 95.6 to 88.3 and by 8.1 from 91.5 to 83.4 respectively.

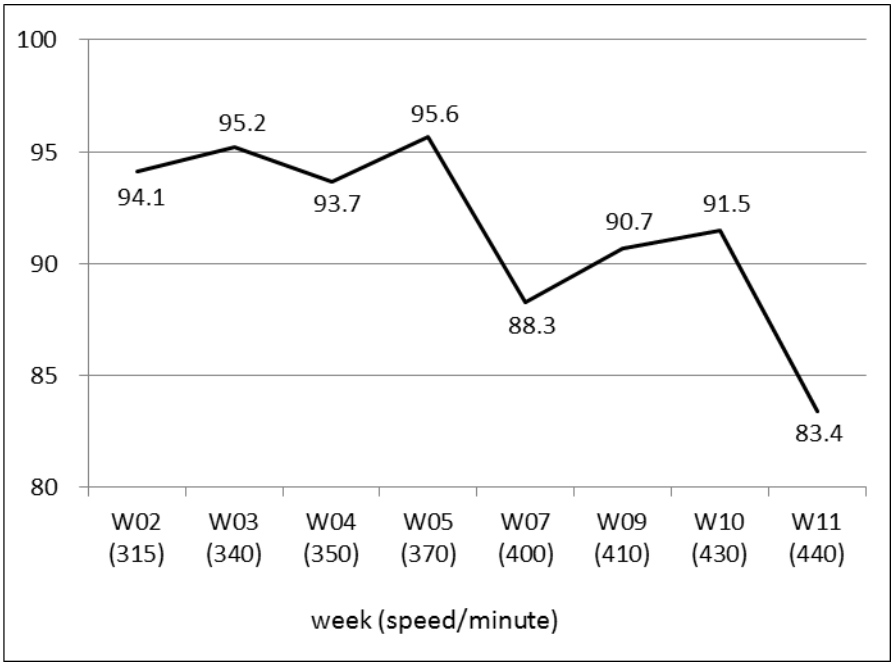

Figure 3. Mean of Shadowing Performance Scores.

In order to present the overall PD score shifts from W03 to W11, the raw scores were converted into relative standard deviation values where the mean score was 50 in order to highlight the between-group comparison without fluctuations of test mean scores (Figure 4).

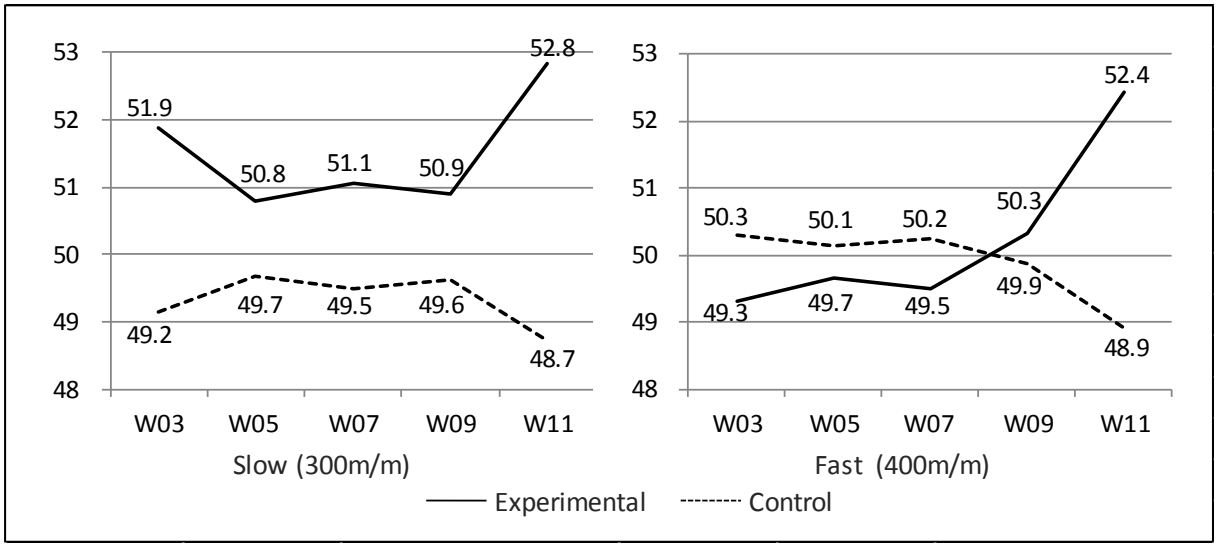

Figure 4. Test Results of PD in Standard Deviation Value from W03 to W11.

Regarding the PD Slow, the experimental group scored higher than the control group in W03 by 2.7, then the gap between the groups narrowed in W05 to 1.1 and remained small until W09, then the gap widened to 4.1 in W11. On the contrary, PD Fast traces a different pattern, where the

control group commenced at a higher score than the experimental group with a gap of 1.0, then the groups remained parallel until W07 at a gap of 0.7, then the experimental group overtook the control group in W09 by 0.4, and widened the gap to 3.0 in W11.

In summary, both groups improved general listening comprehension skills and PD at slow speed, while only the experimental group showed improvement in PD at fast speed. The five-week PD test results show that the experimental group improved at slow speed more strongly than the control group in W11, and at fast speed after W07.

4 Discussion

The pre-post listening comprehension tests revealed significant improvements in both the experimental and control groups, and the PD Slow indicated that both groups improved sound recognition skills at slow speed to a very similar degree (see Figure 1 and 2 and Tables 4 and 5 in the Results section). This commonality in improvements indicates the linkage between sound recognition ability and comprehension skills; namely, sound recognition ability at slow speed is the fundamental step of bottom-up processing. This point echoes Nakayama's (2011) finding that slow speed shadowing material contributed to improvement in recognition of weakly pronounced function words in English. In addition, the results suggest another link between sound recognition and comprehension skills, in that the experimental group surpassed the control group in the post-listening comprehension tests and in the fast speed PD scores. One possible explanation for the experimental group improving more strongly in the listening comprehension test is that their newly developed sound recognition skills at fast speed enabled more elaborated bottom-up processing. In fact, both groups improved their sound recognition skills at slow speed, which alone could lead to improvements in the post-listening comprehension test, but the additional degree of improvement by the experimental group could be due to improvement in fast speed sound recognition ability.

After obtaining the results of the eight weeks of shadowing, which showed a sharp drop in

the mean scores in W07 and W11 (see Figure 3 in the Results section), the investigator further examined the content of the shadowing scripts. A Japanese text readability measurement system called "jReadability" (Hasebe & Lee, 2015) was used to assess the difficulty level of the shadowing materials. The system operates online, and assesses the readability of a text regardless of the use of kana scripts or kanji, with a highly reliable outcome. Readability is evaluated between 6.4 (Lower-Elementary = very easy) and 0.5 (Upper-Advanced = very difficult). Table 6 summarises the content of the shadowing scripts.

Table 6. Readability and Difficulty Level of the Shadowing Material

Materials	Read Aloud Textbook				NHK Web News			
Week	W02	W03	W04	W05	W07	W09	W10	W11
Mora per minute (m/m)	315	340	350	370	400	410	430	440
Readability	3.63	4.32	2.93	3.81	2.45	1.93	1.70	1.18
(Difficulty Level)	(I-)	(I-)	(I+)	(I-)	(A-)	(A-)	(A-)	(A+)
Number of sentences	9	8	7	9	5	4	4	5
Words per sentence	21.3	22.0	25.6	18.9	40.2	47.5	48.3	41.8

Notes. For Difficulty level, I = Intermediate, A = Advanced; - = Lower, + = Upper

There is a large gap between W05 and W07 in a number of aspects. Firstly, the speed increase from W05 to W07 was 30m/m, which was larger than that of previous weeks. Secondly, the audio materials for the first four weeks were taken from a textbook which was developed for L2 Japanese learners, while the materials for the latter four weeks were taken from NHK news, which was broadcast for a native Japanese audience. Thirdly, a gap in the readability and difficulty levels of the materials used in the two four-week periods is to be expected, given the difference in the target audiences. The materials of the first four-week period were all at the Intermediate level with an average readability of 3.7; on the other hand, the materials used in the latter period were all at the Advanced level with an average readability of 1.8. And finally, the number of sentences in the scripts is different between the two periods: in the former period it ranges between seven and nine sentences, while in the latter it ranges between four and five

sentences, resulting in substantial differences in the words per sentence; an average of 22.0 and 44.5 words per sentence respectively.

As for the other sharp drop of the mean scores in W11, it is reasonable to assume that this is due to both the speed (440m/m) and the difficulty of the script (readability = 1.18) being at their highest levels, which may well have exceeded the capacity of the shadowing skills of the participants. However, the increase in the mean scores in W09 (*M* = 90.7) and W10 (*M* = 91.5), despite the faster speed and the greater difficulty of the scripts compared to W07 (*M* = 88.3), indicates that the shadowing skills of the participants improved during this period. Furthermore, comparison between the W02 and W10 results corroborates this observation, in that there is a huge gap in the speed (from 315m/m to 430m/m) and difficulty (from 3.63 to 1.70), but a very small decrease in the mean scores by only 2.6 from 94.1 in W02 to 91.5 in W10.

Considering that the drop in the shadowing performance scores and the improvements in PD Fast coincided after W07, it is reasonable to assume that these outcomes resulted from resistance to the shadowing practice, a consequence of the participants being pushed beyond their comfort zones by the faster, more difficult materials. These different trends before and after W07 indicate that the Read Aloud textbook materials (used between W02 and W05) had little or no effect on Slow or Fast PD scores, but the NHK Web News materials (used between W07 and W11) had a substantial effect, especially on Fast speed scores. These results suggest that shadowing materials at slow speed (up to 370m/m) did not have much effect on sound recognition ability, but shadowing materials at fast speed (faster than 400m/m) improved sound recognition ability, especially for fast speed dictation materials. These findings echo Onaha's (2004) finding of a correlation between shadowing performance and listening comprehension, in that improvement in shadowing ability leads to more elaborated listening skills. However, it remains uncertain if a speed of 440m/m was suitable for the participants in this study.

5 Conclusion

5.1 Summary

The ANOVA results, based on the comparison between W02 and W10 scores, did not show statistical significance in the *Interaction* between *Treatment* (shadowing) and *Time* (pre and post); however, the analysis of eight-week shadowing performance and five-week PD scores revealed a possible effect of shadowing for improving sound recognition ability. The results indicated that shadowing can be effective when the model audio speed is 400m/m or faster, but not at 370m/m or slower for L2 Japanese learners at proficiency equivalent to JLPT N2 level. It is also suggested that the improvement in sound recognition ability contributes to improving general listening comprehension skills, as it is assumed to elaborate bottom-up processing. This study used shadowing materials at slow speed with intermediate difficulty level and fast speed with advanced difficulty level, but the relationship between the difficulty level and comprehension skills remains uninvestigated. Further research needs to be conducted to explore the effect of shadowing in relation to these two variables of speed difference and difficulty level.

The implementation of shadowing in the L2 teaching context can be applied to any target language since it aims to activate the *phonological loop* of WM, which is universal to second language acquisition. The selection of the model audio can be relatively flexible and a wide range of audio materials can be used, however a written script is indispensable in conducting shadowing practice in order to enable learners to check the accuracy of their performance. The genre of the model audio may be determined depending on the target learning outcomes; for instance, monologic narrative may be appropriate for training accurate sound recognition and constant speech pace, and fictional materials such as movie excerpts may be most suitable for enhancing emotional expression through performing language (Bryce et al., 2013).

The instructor should monitor the learners' shadowing performance so as to grasp the discrepancy between the model audio and the learners' proficiency levels. The results of this study suggest that the effective range of learners' shadowing performance accuracy falls between

90% and 95% (see Figure 3), where the discrepancy between the model audio and the learners' proficiency levels is considered to provide appropriate resistance for learners to improve sound recognition ability. As for the model audio speed, it is the author's recommendation that when introducing shadowing at any level, it is important to begin at a relatively slow speed, in order to avoid possible anxiety among the learners since shadowing requires the unusual behaviour of simultaneous listening and speaking, and more importantly, to encourage motivation towards shadowing practice as learners may feel frustrated when the shadowing speed is too fast to comprehend the content (Sumiyoshi & Svetanant, 2017). The author hopes that the findings of this study will trigger interest among language instructors in incorporating shadowing into their pedagogy, since shadowing can potentially contribute to improvement in listening at fast speeds.

5.2 Limitation of the study

This study employed quasi-experimental design by recruiting participants for the experimental group from a spoken Japanese course that was a co-requisite to the general Japanese language course, and participants for the control group from the general course. This recruitment method was necessary in order to set up the control group within the university's ethics guidelines, but resulted in a different number of participants in the experimental (n = 9) and the control (n = 20) groups since enrollment in the co-requisite course was optional. This also resulted in a small number of participants, which may not have been sufficient to perform statistical analyses to validate the results for more appropriate interpretation, as p-values are likely to become non-significant when the sample size is small (Demidenko, 2015).

This recruitment method also involved another between-group difference in terms of the required study hours. The experimental group had two extra class hours per week, which may have contributed to stronger improvement in their general listening comprehension skills. In addition, the fact that the experimental group participants chose to enroll in two Japanese courses out of the four courses available to them in the semester implies a high level of interest,

motivation and/or engagement in Japanese study, which may have resulted in the higher degree of development in language competence.

References

Ayres, P., & Sweller, J. (2014). The split-attention principle in multimedia learning. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (Vol. 2nd Ed., pp. 206-226). New York: Cambridge University Press.

Baddeley, A. D. (1992). Working memory. Science, 255(5044), 556-559.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? Trends in Cognitive Sciences, 4(11), 417-423.

Bryce, M., Suzuki, H., Mori, T., Sumiyoshi, H., & Barber, C. (2013). Performing language in Japanese language learning. THE INTERNATIONAL JOURNAL OF LEARNING, 18(12), 85-94.

Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. Cognition and Instruction, 8(4), 293-332.

Chang, J. (2008). The result and prospection in applying shadowing training into Japanese conversation class (2) -Using Wenzao Ursuline College of languages. Department of Japanese as Model-. Taiwan Application Japanese Association, 5, 415-430.

Darro, V., & Fabbro, F. (1994). Verbal memory during simultaneous interpretation: Effects of phonological interference. Applied Linguistics, 15(4), 365-381.

Demidenko, E. (2015). The p-value you can't buy. The American Statistician, 70(1), 33-38. doi:10.1080/00031305.2015.1069760

Gregersen, T., & Horwitz, E. (2002). Language learning and perfectionism: Anxious and non-anxious language learner's reactions to their own oral performance. The Modern Language Journal, 86(4), 562-570.

Hamada, Y. (2012). An effective way to improve listening skills through shadowing. The

Language Teacher, 36(1), 3-10.

Hamada, Y. (2014). The effectiveness of pre- and post-shadowing in improving listening comprehension skills. The Language Teacher, 38(1), 3-10.

Hamada, Y. (2016). Shadowing: Who benefits and how? Uncovering a booming EFL teaching technique for listening comprehension. Language teaching research, 20(1), 35-52. doi:10.1177/1362168815597504

Hasebe, Y., & Lee, J. H. (2015). Introducing a readability evaluation system for Japanese language education. Proceedings of the 6th International Conference on Computer Assisted Systems for Teaching & Learning Japanese (CASTEL/J), 19-22.

Hausfeld, S. (1981). Speeded reading and listening comprehension for easy and difficult materials. American Psychological Association, 73(3), 312-319.

Ishihara, S., Tsurutani, C., & Tsukada, K. (2011). What constitutes "good pronunciation" from L2 Japanese learners' and native speakers' perspectives? A perception study. Electronic Journal of Foreign Language Teaching, 8(1), 277-290.

Japan Foundation. (2017). Japanese language proficiency test. Retrieved from http://www.jlpt.jp/e/about/points.html

Kadota, S. (2007). Shadowing to Ondoku no Kagaku [Shadowing and the Science of Oral Reading]. Tokyo: CosmoPier Publishing Company.

Kadota, S. (2012). Shadowing, Ondoku to Eigo Shutoku no Kagaku (The Science of Shadowing, Oral Reading and English Acquisition). Tokyo: CosmoPier Publishing Company.

Kadota, S., & Tamai, K. (2004). Ketteiban, Eigo Shadowing (The Definitive Edition English Shadowing). Tokyo: CosmoPier Publishing Company.

Klingberg, T., Forssberg, H., & Westerberg, H. (2002). Training of working memory in children with ADHD. Journal of Clinical and Experimental Neuropsychology, 24(6), 781-791.

Kondo, R. (2012). Effects of providing scripts in shadowing practice on learners' Japanese-language acquisition. Japanese Studies Journal, 28(2), 43-57.

Kurata, K. (2007). A fundamental study on the cognitive mechanism of shadowing in Japanese - From the view point of oral reproduction, memory span and sentence structure -. Bulletin of the Graduate School of Education, Hiroshima University, 56(2), 259-265.

Kyo, H. (2012). Nihongo gakushū ni mirareru shadowing no kōka [The effect of shadowing observed in Japanese learning]. Meikai Nihongo, 17, 103-111.

Lambert, S. (1992). Shadowing. Meta, 37(2), 263-273.

Leahy, W., & Sweller, J. (2011). Cognitive load theory, modality of presentation and the transient information effect. Applied Cognitive Psychology, 25, 943-951. doi:10.1002/acp.1787

Levelt, W. J. M. (1989). Speaking: From Intention to Articulation. Cambridge, Mass.: MIT Press.

Maeda, A. (1998). Nichijō kaiwa ni okeru joshi no shōryaku [Particle ommision in daily conversation]. Bulletin of the International Student Center, Nagasaki University, 6, 43-70.

Matsuura, M., Fukuike, A., Kohno, M., & Yoshida, K. (2014). Maneshite Jōtatsu! Nihongo Ondoku Torēningu [Mimic and Improve! Japanese Reading Aloud Training]. Tokyo: ASK Publishing.

Mochizuki, M. (2006). On the application of shadowing method to Japanese language education : With special reference to relevance of learners' Japanese competence to their self-assessment of the effects of shadowing. Kansai University Audio-Visual Education, 29, 37-53.

Moussa-Inaty, J., Ayres, P., & Sweller, J. (2012). Improving listening skills in English as a foreign language by reading rather than listening: A cognitive load perspective. Applied Cognitive Psychology, 26, 391-402. doi:10.1002/acp.1840

Nakayama, T. (2011). Weak forms in shadowing: How can Japanese EFL learners perform better in shadowing tasks? The Society of English Studies, 41, 17-31.

NHK. (2016). NHK News Web. Retrieved from

http://www3.nhk.or.jp/news/catnew.html?utm_int=all_header_menu_news-new

Oki, T. (2010). The role of latency for word recognition in shadowing. Japan Society of English Language Education, 21, 51-60.

Onaha, H. (2004). Effect of shadowing and dictation on listening comprehension ability of Japanese EFL learners based on the theory of working memory. JACET Bulletin, 39, 137-148.

Saito, Y., Nagasawa, Y., & Ishikawa, S. (2011). Effective instruction of shadowing using a movie. JALT Conference Proceedings, JALT 2010, 139-148.

Spiller-Bosatra, E., Darò, V., Fabbro, F., & Bosatra, A. (1990). Audio-phonological and neuropsychological aspects of simultaneous interpretation: Role of auditory shadowing. Scandinavian Audiology, 19, 81-87.

Sumiyoshi, H., & Svetanant, C. (2017). Motivation and attitude towards shadowing: Learners perspectives in Japanese as a foreign language. Asian-Pacific Journal of Second and Foreign Language Education, 2(16).

Suzuki, K. (2007). Shadowing wo mochiita eigo chokairyoku kojo no shido nitsuite no kensho [Investigation on the instruction for listening comprehension through shadowing]. STEP Bulletin, 19, 112-124.

Tamai, K. (1992). "Follow-up" no chōkairyoku kōjō ni oyobosu kōka oyobi "follow-up" nōryoku to chōkairyoku no kankei. [The effect of follow-up on listening Comprehension]. STEP Bulletin, 4, 48-62.

Tamai, K. (1997). Shadowing no kōa to chōkai process ni okeru ichizuke [The effectiveness of shadowing and its position in the listening process]. Current English Studies, 36, 105-116.

Tamai, K. (2002). On the effects of shadowing on listening comprehension. Paper presented at the Japan Association for Interpretation Studies.

Tanahashi, A., Sugiyama, M., & Nohara, Y. (2011). N2 Chōkai Supiido Masutā [N2 Listening

Speed Master]. Tokyo: J Research Publisher.

Vandergrift, L., & Baker, S. (2015). Learner variables in second language listening comprehension: An exploratory path analysis. Language Learning, 65(2), 390-416. doi:10.1111/lang.12105

Yang, J. (2008). Motivational orientations and selected learner variables of East Asian language learners in the United States. Foreign Language Annals, 36(1), 44-56.

Chapter 3

Exploring the Content Shadowing and Listening Comprehension Strategy

3.1 Introduction

This chapter presents findings of the analysis of the effect of shadowing on listening comprehension strategies. In Chapter 2, I investigated the effect of shadowing on sound recognition ability in relation to the speed variation of model audio. The next step after sound recognition is the linguistic processing from morpheme, word and sentence, to contextual pragmatic use, eventually leading to understanding. Two types of listening comprehension strategies, bottom-up and top-down, are drawn from the literature review as an indicator between efficient and inefficient listeners.

In this chapter, I explore the effect of shadowing on the efficient use of listening strategies. For measurement instruments: (1) a listening section of a standardised language test, Japanese Language Proficiency Test (JLPT), is prepared to measure the participants' overall listening skills; and (2) a pinpoint listening quiz is devised in order to analyse participants' ability in the use of listening comprehension strategies. This quiz contains two parts: (1) at sentence level length to measure the use of bottom-up strategy; and (2) at paragraph length to measure the use of top-down strategy. As shown in Chapter 2, speed variation was suggested as one of the influential factors for sound recognition ability. From this observation, the pinpoint listening quiz contains two different speeds, at slow and fast, in order to examine the effect of shadowing in relation to the use of listening strategies at different speeds.

Participants are recruited from Australian university students who are enrolled in the general Japanese course only (unlike the study in Chapter 2), since an optional course is not offered in

the same semester. The participants are divided into the efficient and the inefficient listener groups based on their content shadowing scores.

The participants' Information and Consent form for this paper can be found in Appendix 4. This paper has been prepared for journal submission. The article formatting follows the prospective journal requirements.

3.2 Exploring the Content Shadowing and Listening Comprehension Strategy

The Effect of Shadowing: Exploring the Content Shadowing and Listening Comprehension Strategy

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Abstract

Shadowing has been recognized as an effective practice for improving listening skills in second language learning. The common claim is that simultaneous listening and speaking is particularly effective in activating sub-vocalization in the working memory, which helps bottom-up processing. A number of studies have found effects of shadowing on general listening skills; however, few shadowing studies have focused on the process of listening comprehension. The aim of this study is to investigate the effect of shadowing in relation to the comprehension process (bottom-up and top-down), and to listening audio speed variation (slow and fast). Participants were 22 university students who were enrolled in an Advanced Japanese language course at an Australian university. Shadowing practice was conducted over six weeks during a 13-week semester. The pre- and post-tests used part of a standardized Japanese proficiency test for general listening comprehension skills, and a pinpoint listening quiz was developed to measure the participants' listening ability in bottom-up and top-down processing. The results indicate that the more efficient group improved in all parts (bottom-up and top-down at slow and fast speeds), while the less efficient group showed improvement only in one part, top-down at slow speed. Implications of the findings are discussed.

Keywords: second language acquisition, listening comprehension, listening strategy, shadowing,

working memory

Introduction

In the past decades, shadowing method has been used as a popular practice for listening and speaking in Japan's EFL context. Shadowing is a practice that requires learners to repeat immediately after (or simultaneous with) hearing the heard speech through headphones. This practice method is said to be particularly effective in improving listening comprehension (Kadota, 2007, 2012). To date, the main body of the shadowing research has mostly been concerned with improvement of listening comprehension, and most of the study results were drawn from measurement instruments such as standardized language proficiency listening tests. However, very few studies have been conducted to explore the effect of shadowing on the comprehension process in detail. Therefore, the aim of this study is to investigate for which comprehension process shadowing is most effective. For that purpose, the shadowing mechanism was firstly examined in order to identify which specific shadowing method is considered particularly meaningful for listening comprehension. Listening comprehension literature was, then, reviewed in order to construct measurement instruments that reflect the effect of shadowing within the framework of comprehension theory. Finally, two measurement instruments were devised in order to gain valid data that are legitimate according to the model of comprehension strategies.

Background

Shadowing method

Shadowing was originally used as a training method for simultaneous interpretation, and introduced as "a paced, auditory tracking task which involves the immediate vocalization of auditorily presented stimuli, i.e., word-for-word repetition, in the same language, parrot-style (Lambert, 1992, p.266). This method requires learners to listen and speak at the same time, since

simultaneous interpreters must be able to handle these tasks simultaneously. However, to use Lambert's metaphor of 'parrot-style' in shadowing, this may lead to committing the methodological error of "mindless parroting", since it is possible for learners to shadow without attempting to understand the meaning (Déjean Le Féal, 1997). When adopted into the English as a foreign language (EFL) context in Japan, Lambert's definition of shadowing was re-defined as "an act or a task of listening in which the learner tracks the heard speech and repeats it as exactly as possible while listening *attentively* to the incoming information' (emphasis added, Tamai, 1997, pp. 105-106). This *attentive* listening while shadowing has significance in the field of second language acquisition (SLA).

The shadowing mechanism is theoretically based on Baddeley's (1992) working memory (WM) model of the *phonological loop*. The simultaneous act of listening and speaking visualises the *subvocal rehearsal*, or inner voice in the brain, in a form of speech production. This so-called *online brain activity* is assumed to be particularly effective in automatizing the bottom-up processing of listening comprehension in order to allocate limited cognitive resources to higher language processing (Kadota, 2007, 2012).

In implementing shadowing method in the second or foreign language (L2) classroom, Kadota and Tamai (2004) recommend a shadowing procedure in stages by order of difficulty, as follows: (a) *Listening*: listening to the audio without the script, and trying to roughly grasp the content and the speech style; (b) *Mumbling*: shadowing without the script, focusing on the heard sound rather than reproducing pronunciation; (c) *Prosody shadowing*: shadowing focusing on prosodic features, such as stress, rhythm, intonation, speed and pauses; and (d) *Content shadowing*: shadowing focusing on the content without reading the script (p. 62).

A large body of shadowing research has reported the effect of shadowing on listening comprehension skills, based on the pre- and post-test results drawn from learners' listening test performance (Hamada, 2011, 2012, 2014, 2015; Kondo, 2012; Suzuki, 2007; Tamai, 1997, 2002). The commonality of these studies is that standardized listening tests (e.g. TOEFL, TOEIC, SLEP,

etc.) were used for test instruments for measurement. However, the possible problem here is that, in such a device for measuring comprehensive listening skills, various factors other than listening ability (e.g. vocabulary, grammatical, person knowledge, etc.) are highly likely to influence test scores. There is also an apprehension that such standardized proficiency English tests as TOEFL are too challenging for Japanese university students[5], so that the question items should be carefully reviewed as to whether they match the participants' proficiency level in order to obtain valid results when using standardized testing materials (Nakanishi & Ueda, 2011).

Apart from the effect of shadowing on comprehensive listening skills, Hamada (2016) conducted a shadowing study specifically designed to investigate its effect on phoneme perception, and found significant effect among 43 university students in Japan's EFL context. The author used a 20-item dictation cloze for the measuring instrument, which is considered appropriate for this type of study. Another specific shadowing study was conducted by Nakayama (2011) to examine the relationship between the model audio speed and sound recognition of weak forms of function words in English. He employed three different speeds for shadowing model audio, and compared the participants' shadowing reproduction rate based on the accuracy of function words among 26 Japanese university students. The results reveal significant difference in the improvement of the accuracy of function words for the experimental group.

These phonology-focused shadowing studies support Kadota's (2007) claim of the shadowing effect on bottom-up processing of listening comprehension. Considering that the working assumption of shadowing is for it to be primarily effective on the *phonological loop* in WM, the success of shadowing found in these studies offers convincing evidence of its effectiveness. However, no shadowing studies, to the best of the author's knowledge, have investigated the detailed process of listening comprehension. Nakayama et al. (2015) point out

[5] The 2016 statistics show that the mean score in the Listening section by Japanese candidates was 27th out of 31 Asian countries (ETS, 2016, p.14).

the difficulties in conducting a shadowing study focusing on the comprehension process. Their claim is based on the structural defect of the shadowing practice, that it is a training to precisely reproduce heard speech wherein it is possible that learners cannot reach content understanding by this method alone. This view is based on *prosody shadowing* (focusing on prosodic features of the model audio), which is the previous stage before *content shadowing* (focusing on the meaning of the heard speech), according to Kadota and Tamai's (2004) recommended shadowing procedure. It is obviously considered difficult for learners to reach *content shadowing* (the final shadowing stage); however, it is worth attempting this challenge since it is suggested that *content shadowing* will enhance top-down processing in listening (Ota, 2006). The present study, therefore, aims to investigate the effect of *content shadowing* in relation to learners' ability to understand at different listening comprehension processing stages.

Listening comprehension strategy

In the field of SLA, it is a common claim that, in reading and listening comprehension, learners reach understanding through the same process, of the *phonological loop* of WM (Kadota, 2007). However, as Lund (1991) points out, since the input mode is different (written versus spoken texts), different comprehension strategies must be applied by the learners. O'Malley et al. (1989) developed *cognitive* and *metacognitive* listening comprehension strategies. *Cognitive strategies* involve active manipulation of the task, including repeating (names, objects or items), organization (grouping information), and elaboration (relating new information to previously stored memory or interconnecting portions to the new text). On the other hand, *metacognitive strategies* do not process the input directly but involve controlling learning through planning (what strategy to use), monitoring (focusing on specific information, or general task demand), and evaluation (appropriate use of the selected strategy). While *metacognitive strategies* encourage learners to become more active and autonomous language learners (Goh, 1997; Nunan, 1996; Vandergrift, 2002), *cognitive strategies* are directly concerned with the input and

comprehension process. The listening comprehension process can be categorized into *top-down* and *bottom-up strategy*. The former refers to the effective use of learner's schematic knowledge, which is drawn from inference of information in memory or text meaning for comprehension. *Bottom-up strategy*, on the other hand, is based on the interpretation of the linguistic characteristics such as individual words and grammatical processing, upwards to larger units of meaning (O'Malley et al., 1989).

The salient difference between the two strategies lies in whether the process is passive or active. While the *bottom-up strategy* builds semantic processing after listening to speech, the *top-down strategy* attempts semantic processing pre-emptive to the input. Considering that the WM capacity is limited, this time lag is decisive in the listening process. In other words, the *bottom-up strategy* is assumed to fall behind the comprehension processing, considering that the phonological short-term store is limited to approximately 2 seconds (Baddeley, 1992), and that a series of language processes (e.g. sound recognition, subvocal rehearsal, semantic processing, etc.) may not reach comprehension within the limited time period. On the other hand, the *top-down strategy* is assumed to be advantageous in terms of the time allocation for monitoring and evaluating the directional correction. Even though studies have indicated the possibility of training WM to improve its capacity (Iwashita, 2008; Klingberg et al., 2002), any dramatic transformation cannot be expected, on its own, sufficient enough to neutralize the difference between *bottom-up* and *top-down strategies*. Rather, it is considered more fruitful to instruct learners how to apply the *top-down strategy*. This is because unskilled L2 listeners tend to fall into the trap of determining the meaning within the *bottom-up strategy* alone, while effective L2 listeners have been found to have the ability to utilize both strategies (Kurata, 2009; O'Malley et al., 1989; Seo, 2005).

The *top-down strategy* is an attempt to reach understanding of the content by inferring the context by reference to personal knowledge, and the crucial key in this strategy is considered to be the act of inference (Lund, 1991; Mizuta, 1996; Vandergrift, 2002). Active use of this

inferential listening strategy is effective because it can work in both directions in order to enhance comprehension: prediction and recollection. Prediction is effective in attempting to follow topical development in a logical manner, and recollection to recover missed or unfamiliar words. However, learners must be careful in applying the *top-down strategy*, as familiar schema in the wrong direction during a listening task may mislead comprehension (Long, 1990). Therefore, constant monitoring whether the strategy use is in concordance with the on-going listening content by the use of the *bottom-up strategy* is suggested, as in the case of effective listeners mentioned above.

Measurement instruments and research questions

The purpose of this study is to investigate the effect of *content shadowing* on the different stage of listening comprehension. The classifications derived from the literature are the following: *top-down strategy* and *bottom-up strategy*. Kurata (2008) investigated, in her shadowing study of Japanese speakers, whether meaning consistency between sentences affects shadowing performance. She used different sets of shadowing materials, of two sentences with and without logical flow. The results suggest that the contextual consistency between sentences has an influence on shadowing performance. Her study indicates that learners pay attention to the meaning while shadowing, and that the meaning consistency/inconsistency between sentences is assumed to play a key role in comprehension. Together with O'Malley et al.'s (1989) definition of *bottom-up strategy*, for the present study measuring instruments were devised for the *bottom-up strategy* to consist of one sentence unit, and for the *top-down strategy* to have contextual connections between two or more sentences. In order to trace the different linguistic processing between the two strategies, this study uses test items of one sentence length with multiple-choice for the *bottom-up strategy*, and the 'voice cloze' (or fill-in-the-blank) format of one paragraph length for the *top-down strategy*. This format requires learners to apply an inferential listening strategy in order to fill in the missed word/phrase that matches the context

and logical flow (Du, 2009). Some examples of the Pinpoint Listening Quiz will be illustrated in the Methods section.

Along with the different listening strategies, this study also aims to investigate whether the *content shadowing* competence reflects the learners' ability in *bottom-up* and *top-down strategies*. In order to investigate the differences in the *content shadowing* competence level, the participants were divided into two groups, of High (efficient) and Low (inefficient), based on their shadowing content quiz scores.

The last variable, as discussed above, WM capacity, is considered to play an influential role in listening comprehension, and shadowing is potentially effective in improving WM capacity (Iwashita, 2008). In this respect, speech speed of the shadowing model audio and the measurement instruments become as crucial as the difference between the different listening strategies, because the faster the speed, the more information to process, as phonological short-term store is limited to no longer than 2 seconds.

The three research questions are as follows:

RQ1. Is shadowing effective in improving listening comprehension? If so, is there any difference in the effect of *content shadowing* between *bottom-up* and *top-down strategies*?

RQ2. Is there any difference in *content shadowing* competence for the listening comprehension process between High and Low groups?

RQ3. Is there any difference in *content shadowing* competence for the listening comprehension process at different speech speeds?

Methods

Participants

Participants in this study were recruited from students who were enrolled in the Advanced Japanese II at an Australian university. This course aims at developing Japanese proficiency to

pass the Japanese Language Proficiency Test (JLPT) N2 level upon completion of the academic year. This course met twice a week, once for a lecture and once for a tutorial (for two hours each). Forty students agreed to participate in this study; however, the screening process with the condition of conducting all the assessment tasks (shadowing, shadowing content quiz, JLPT test and pinpoint listening quiz) in both of the pre- and post-weeks for the analysis of this study resulted in a total number of 22 participants (5 males and 17 females). All the participants spoke English as a required language in an Australian university; however, there were other native language speakers than English among the participants of this study (English: n = 16, Chinese: n = 4, Korean: n = 1, and Italian: n = 1), which is considered to be due either to their family circumstances as immigrants or to international student enrolment. The majority of the participants were between eighteen and twenty-two years old (n = 21), and the remaining were between twenty-three and twenty-five years old (n = 1). The majority of the participants were majoring in Japanese (n = 15), while the majors of the remaining participants were International Studies (n = 4), Translation and interpretation (n = 1), and International business (n = 1).

Materials

This study consisted of three phases: a pre-test, six weekly shadowing exercises, and a post-test. Each weekly shadowing exercise was followed by a shadowing content quiz to check the degree of comprehension after the shadowing exercise. As for pre- and post-tests, the standardized language test, JLPT, was used in order to measure the participants' general listening skills; and small listening quizzes, called the pinpoint listening quiz (PL), were administered in order to measure the participants' listening ability in two different levels of listening comprehension process, at a sentence length, and a paragraph length, the latter which involves contextual prediction.

1. Shadowing materials

For shadowing model audio, narrative recordings were selected from a reading aloud textbook

(Matsuura et al., 2014). This is a textbook for intermediate-level Japanese learners, which was considered suitable for participants enrolled in an Advanced Japanese course to focus on shadowing with content. It is suggested that shadowing materials be slightly easier than the learners' proficiency level, and contain no more than 3% unfamiliar vocabulary, where they can thus listen and grasp the general meaning (Kadota, 2007, p. 236). In this respect, the difficulty level of the shadowing text, at between 4.32 and 2.93 (intermediate level)[6], is considered appropriate for the purpose of this study (Table 1).

Table 1. Summary of Shadowing Model Audio Material

Week	W02	W04	W06	W08	W10	W11
Mora per minute	330	350	370	380	390	400
Number of Mora	331	303	332	333	329	367
Running time (s)	60	52	53	53	51	55
Readability	3.70	3.92	4.32	2.93	3.81	4.29
(Difficulty level)	(Int-)	(Int-)	(Int-)	(Int+)	(Int-)	(Int-)
Number of sentences	9	8	8	7	9	10
Words per sentence	21.7	20.1	22.0	25.6	18.9	20.0

Notes. For Difficulty level, Elm = Elementary, Int = Intermediate; - = lower, + = upper
For Readability, 0.5 = very difficult, 6.5 = very easy (Hasebe & Lee, 2015)

The speeds of the model audio materials were calculated by dividing the total number of mora in the script by the running time. The original textbook audio speeds ranged between 275 and 300 mora per minute (m/m), which may have been suitable for intermediate Japanese learners; however, it was considered slow for advanced learners. The Advanced Japanese II course aims at developing Japanese proficiency to pass JLPT N2 level, which listening test speed is set "at nearly natural speed" (Japan Foundation, 2017). It is fair to assume that the "natural speed" in this description is of native equivalence. Considering that NHK news is broadcasted at

[6] A Japanese text readability measurement system called "jReadability" (Hasebe & Lee, 2015) was used to assess the difficulty level of the shadowing materials (0.5 = very difficult, 6.5 = very easy). The system operates online, and assesses the readability of a text regardless of the use of kana scripts or kanji.

the speech speed of between 400m/m and 440m/m[7], it was considered appropriate to set the audio speed for learners at advanced level somewhere between the intermediate and the native level: namely, between 300m/m and 400m/m. The speeds of selected textbook audio materials were then adjusted using the digital audio editing software, Audacity (Audacity Team, 2018). This software allows for adjusting the audio speed without affecting the pitch width so that the modified speech sounds natural, unlike sounding like fast-forwarding a conventional tape recording. It was considered that speed is one of the major factors that determine the difficulty of shadowing, which then should affect the level of comprehension accuracy as well. The speeds were then adjusted in a progressive manner. This gradual speed-increase method was inspired by Vygotsky's (1978) theoretical concept of zone of proximal development, and it was assumed that the participants would gradually get accustomed to the speed increase of shadowing to eventually become able to shadow at near-native speed. The increase ratio was set at 20m/m during the first three weeks, then down to 10m/m during the last three weeks, in consideration that the latter weeks' speeds would become more difficult to shadow as they are closer to the native speed.

2. Shadowing content quiz

Each shadowing practice was followed by a shadowing content quiz as a comprehension checking system on the weekly shadowing content. The quiz consisted of six questions of multiple-choice and one open-ended question to summarize the main point, which content was manually scored by the instructor.

3. JLPT test

In order to address the first part of the research question 1, Pre-post-shadowing test materials were sourced from a listening section from a JLPT mock examination collection book (Tanahashi et al., 2011). JLPT is a standardized proficiency test, which is designed to measure

[7] The author applied the same calculation method for speech speed in referring to four news clips available at NHK online news during July 2016 for another shadowing project (NHK, 2016).

learners' overall listening skills based on comprehensive linguistic competence to use the knowledge in actual communication (Japan Foundation, 2017). N2 level was used since the participants in this study were enrolled in the Advanced Japanese II, which aims for them to pass N2 level upon the completion of the course. Therefore, it was considered an appropriate difficulty level to test the participants' comprehensive listening proficiency.

4. Pinpoint listening quiz

As a counterpart to the JLPT tests, and in order to address the second part of the research question 1, the author devised a quiz called pinpoint listening quiz (PL) in order to measure the specific listening skills at different input lengths. The quiz consisted of two parts: part 1 was at sentence level length with multiple-choice style consisting of 12 questions; and part 2 was at paragraph length containing six to seven sentences with cloze (fill-in-the-blank) style questions consisting of two separate paragraphs with three blanks for each. The question sentences and paragraphs were sourced from a JLPT listening training book for N3 level (Sasaki & Matsumoto, 2011), as this offers questions at each step from a word to a paragraph in length. The reason for choosing N3 level was to ensure that the participants would not have difficulty with unfamiliar vocabulary/grammar, since the objective of this quiz was to measure the participants' comprehension processing ability, but not vocabulary knowledge.

In order to address the research question 3, and to measure participants' listening comprehension ability at different speeds, each part was divided into a slow and a fast section: the speech speed of the first six questions in part 1, and the first paragraph in part 2, were slow; and the second six questions in part 1 and the second paragraph in part 2 were fast. The speeds of the original audio files were adjusted via Audacity so that the slow part was played at approximately 300m/m and the fast at 400m/m, which speeds were roughly equal to the shadowing model audio speed range (see Table 1). These two different speeds were set as consistent between the pre- and the post-PL quizzes in order to measure whether there is a difference in the participants' improvement at slow and fast speeds.

The blank words in part 2 were replaced with monotonous tone sound generated via Audacity, so that the listener can tell whether the blank was a pause by the speaker or the cue to fill in the blank. The part 2 audio was made into two versions: the first version was the original length with replacement of the tone sound for exactly the same length as the word; and to the second version was added a blank of five seconds right after the tone sound for writing the answer. The entire quiz was then put together into an approximately 11-minute audio file, where part 1 was played only once and part 2 was played twice (once for each different version). Following are some examples:

Part 1 (sentence length, multiple-choice):

Q: 給料がいいわけじゃないけど、この仕事が好きなんです。

(Translation: My salary is not good, but I like this job.)

A: 1. The speaker likes the job, but the pay is not good.

2. The speaker likes the job because the pay is good.

3. The speaker does not like the job, but the pay is good.

Part 2 (paragraph length, cloze)

Q: 私が日本に来て思うことは、日本人は時間に厳しいということです。　バスや電車の時間はいつも（　　）し、友達と約束しても、遅れることはほとんどありません。

A: 正しい (marks are given as long as contextually correct, Japanese or English)

(Translation: What I think after coming to Japan is that Japanese people are strict about time. The bus and train times are always (　　), and people rarely come late when meeting with friends.)

A: right

Procedures

Shadowing was conducted six times between W02[8] and W11 out of the 13-week semester as a homework assignment. The weekly shadowing model audio was made available via the online course module, and students' shadowing speech audio files were submitted online to the weekly submission box. Upon commencement of the W02 shadowing, the detailed shadowing instruction was explained in class, including the shadowing mechanism and aim of the practice, in order to enhance students' better understanding and encourage engagement (Mochizuki, 2006). Students were encouraged to follow the shadowing steps to reach *content shadowing* as they became confident in their shadowing performance for submission. The gradual increase of shadowing speeds was also explained, so that students would expect the challenge of the different speech speeds in the following weeks. Shadowing content quizzes were also conducted online via the course module quiz function, which students were instructed to complete upon the submission of the weekly shadowing. The collected audio files were marked by the instructor on the printed script, each mistaken part was highlighted, and the correct reading was put above the kana script using roman letters for a feedback purpose, and the total accuracy was calculated on a 100% scale. The feedback sheet was returned to students in the following week's class after shadowing the week's material all together; at this time, students were instructed to focus on *content shadowing* in order to ensure that everyone was able to perform *content shadowing* the following week's material. Then, the shadowing content quiz was discussed and answers were explained using PowerPoint presentation. This shadowing feedback session took approximately 15 minutes.

The JLPT tests were conducted in W01 and W12 online via the course module, in consideration of the time constraints of the in-class activity. The quiz was available during the week, allowing only one attempt, and students were not allowed to manipulate the audio playing option (e.g. pause, repeat, etc.), and the time counter was set to close the quiz automatically once

[8] For brevity, this paper refers to the weeks of the university semester in the format WXX, where W stands for week and XX for week number.

the listening audio was complete. The pinpoint listening quizzes were conducted in W02 and W12 in class, as it was considered more appropriate to administer under physical pen and paper conditions when it came to free writing to fill in the blanks. It was also considered necessary to provide detailed instructions, especially on the second part, where students were asked to write down guessed phrases to fill in the blanks. The instructor explained the quiz format with some examples prior to conducting the quiz. The whole quiz took approximately 15 minutes, including the instructions. The quiz sheet was collected and marked by the instructor. The answers for the part 2 fill-in-the-blank section were given scores out of three points for each blank: the maximum points were given as long as the answer was contextually correct regardless of the language (Japanese or English); and points were deducted according to the degree of divergence from the contextual use (e.g. partially relevant, somehow logical, etc.); while no points were given if incorrect (e.g. positive/negative, irrelevant vocabulary, etc.).

In order to address the research question 2, participants were divided into two groups, of above and below the median score (66.7), based on the W11 shadowing content quiz scores; and they were labelled High (n = 11) and Low (n = 11), respectively. Regarding the reason for using the W11 shadowing content quiz score instead of W02 for grouping, it was considered that the degree of improvement in *content shadowing* was more conspicuously reflected at the end of the experiment than at the beginning.

Results

As a preliminary step in the analysis of the main results of the measurement instruments, the pre- and post-shadowing content quiz data were examined in order to validate the grouping method. Figure 1 shows the pre- and post-shadowing content quiz results. The High group improved 11.5 from 75.8 to 87.3, while the Low group declined by 9.1 from 50.3 to 41.2. The descriptive statistics show that the gap in the pre-shadowing scores have widened over the course of the study period in the pre-shadowing scores.

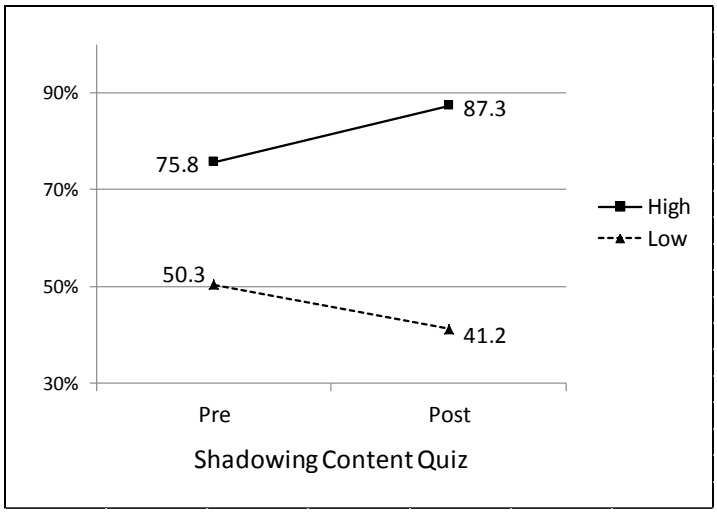

Figure 1. Test Results of Pre-post Shadowing Content Quiz.

The independent samples *t*-test in the pre-test showed a significant difference, $t(20) = 2.536$, $p = .020$. On the other hand, the *t*-test in the post-test showed a smaller *p*-value, $t(20) = 8.752$, $p = .000$. The results indicate that there was already a statistical difference at the time of the pre-test at $p < .05$ level; however, smaller *p*-value was found in the post-test at $p < .01$ level. This indicates that the gap has widened over the study period, which supports the assumption that the grouping method was based on a meaningful measurement.

As for the main findings of the measurement instruments, in the pre-post JLPT tests, both groups showed improvement in the mean scores: by 1.2 from 64.7 to 65.9 in the High group, and by 4.3 from 39.9 to 44.2 in the Low group (Figure 2 and Table 2).

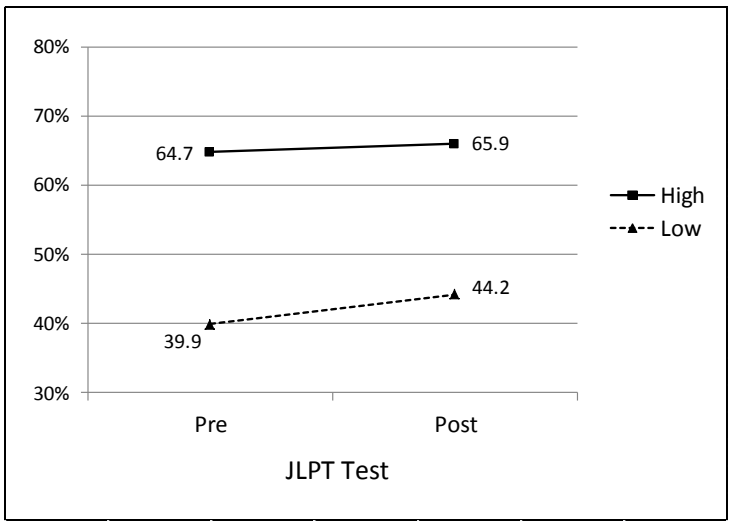

Figure 2. Test Results of Pre-post JLPT Tests.

A mixed-design of two-way ANOVA showed a statistically significant difference for *proficiency* [F (1, 20) = 9.233, p =< .01, η^2 = .316]; however, no significant difference was observed for *time* [F (1, 20) = .897, p = .355, η^2 = .043] or *interaction* [F (1, 20) = .288, p = .597, η^2 = .014] (Table 3). The large effect size for the High group (d = 8.94) and the small effect size for the Low group (d = 3.73) in these results indicate that the High group showed stronger improvement than the Low group (Table 2).

Table 2. Test Results of Shadowing, Shadowing Content Quiz, JLPT Test and Pinpoint Listening Scores between High and Low Groups

Tests			Group	Pre Mean	*SD*	Post Mean	*SD*	Effect Size (*d*)
JLPT Test			High	64.7	19.93	65.9	22.84	8.94 (L)
			Low	39.9	20.10	44.2	12.23	3.73 (S)
Pinpoint Listening	Part 1 (sentence)	Slow	High	71.2	21.20	78.8	18.39	2.48 (S)
			Low	66.7	24.72	59.1	21.55	3.60 (S)
		Fast	High	78.8	22.47	89.4	15.40	1.27 (S)
			Low	69.7	22.13	69.7	16.36	0.00 (S)
	Part 2 (cloze)	Slow	High	70.7	32.68	81.8	34.52	2.10 (S)
			Low	40.4	34.52	64.7	37.12	1.95 (S)
		Fast	High	53.6	36.46	70.8	33.45	0.56 (S)
			Low	27.3	24.08	28.2	27.90	0.06 (S)

Notes. For effect size, L = large, M = medium, S = small (Choen, 1992)

Table 3. Summary of the ANOVA Results

Factor	Measurement				
	JLPT Test	Pinpoint Listening			
		Part 1 (sentence)		Part 2 (cloze)	
		Slow	Fast	Slow	Fast
Time	$F(1, 20) = .897$, $p = .355$, $\eta^2 = .043$	$F(1, 20) = .000$, $p = 1.000$, $\eta^2 = .000$	$F(1, 20) = 1.976$, $p = .175$, $\eta^2 = .090$	$F(1, 20) = 49.273^*$, $p = .000$, $\eta^2 = .711$	$F(1, 20) = 3.002$, $p = .099$, $\eta^2 = .131$
Proficiency	$F(1, 20) = 9.233^*$, $p = .006$, $\eta^2 = .316$	$F(1, 20) = 2.457$, $p = .133$, $\eta^2 = .109$	$F(1, 20) = 3.840$, $p = .064$, $\eta^2 = .161$	$F(1, 20) = 5.195^*$, $p = .034$, $\eta^2 = .206$	$F(1, 20) = 8.149^*$, $p = .010$, $\eta^2 = .290$
Interaction	$F(1, 20) = .288$, $p = .597$, $\eta^2 = .014$	$F(1, 20) = 2.304$, $p = .145$, $\eta^2 = .103$	$F(1, 20) = 1.976$, $p = .175$, $\eta^2 = .090$	$F(1, 20) = 2.073$, $p = .165$, $\eta^2 = .094$	$F(1, 20) = 2.443$, $p = .134$, $\eta^2 = .109$

Notes. $^*p < .05$.

Regarding the PL Part 1 (sentence length, multiple-choice format), there is a similar trend between Slow and Fast in that the High group showed numerical improvement in both Slow and Fast, while the Low group either declined (Slow) or remained the same (Fast). In the PL Part 1 Slow, the High group improved by 7.6 from 71.2 to 78.8, while the Low group declined by 7.6 from 66.7 to 59.1 (Figure 3 (a), and Table 2). A mixed-design of two-way ANOVA did not show a statistically significant difference for *time* [$F(1, 20) = .000$, $p = 1.000$, $\eta^2 = .000$] , *proficiency* [$F(1, 20) = 2.457$, $p = .133$, $\eta^2 = .109$], or *interaction* [$F(1, 20) = 2.304$, $p = .145$, $\eta^2 = .103$] (Table 3). The small effect size for the High group ($d = 2.48$) and Low group ($d = 3.60$) in these results suggest that, despite the opposite trends of improvement / decline between the groups, there is no statistically significant difference found in the results in PL Part 1 Slow.

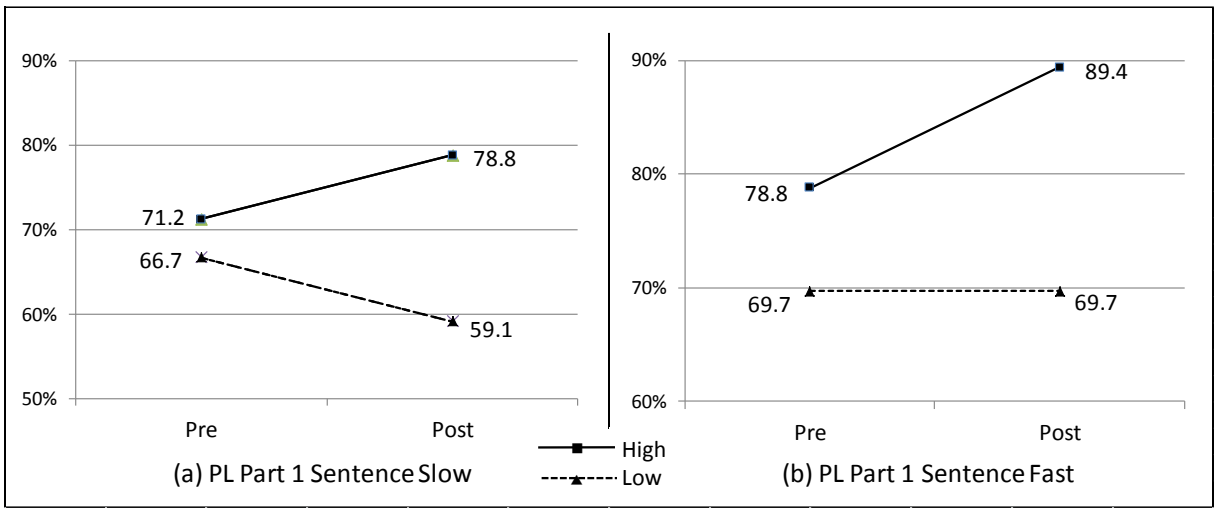

Figure 3. Test Results of Pinpoint Listening Quiz Part 1 (sentence) Slow and Fast Speeds.

As for the PL Part 1 Fast, the High group showed improvement but the Low group remained the same. The High group improved by 10.6 from 78.8 to 89.6, while the Low group stayed at exactly the same score of 69.7 (Figure 3 (b), and Table 2). A mixed-design of two-way ANOVA did not show a statistically significant difference for *time* [$F(1, 20) = 1.976$, $p = .175$, $\eta^2 = .090$] , *proficiency* [$F(1, 20) = 3.840$, $p = .064$, $\eta^2 = .161$], or *interaction* [$F(1, 20) = 1.976$, $p = .175$, $\eta^2 = .090$] (Table 3). The small effect size for the High group ($d = 1.27$) and Low group ($d = 0.00$) in these results suggest that, despite the numerical improvement in the High group, there is no statistically significant difference in the results in PL Part 1 Fast.

With regard to the PL Part 2 (paragraph length, cloze format), there was a similar trend with PL Part 1, in that the High group consistently showed improvement in both Slow and Fast, while the Low group showed improvement in PL Part 2 Slow, unlike in PL Part 1 Slow, but remained almost the same in PL Part 2 Fast. In the PL Part 2 Slow, the High group improved by 1.1 from 70.7 to 81.8, and the Low group improved by 24.3 from 40.4 to 64.7 (Figure 4 (a), and Table 2). A mixed-design of two-way ANOVA showed a statistically significant difference for *time* [$F(1, 20) = 49.273$, $p =< .01$, $\eta^2 = .711$] , *proficiency* [$F(1, 20) = 5.195$, $p =< .05$, $\eta^2 = .206$], but no significance was obtained in *interaction* [$F(1, 20) = 2.073$, $p = .165$, $\eta^2 = .094$] (Table 3). The small effect size for the High group ($d = 2.10$) and Low group ($d = 1.95$) in these results suggest

that both groups improved in the PL Part 2 Slow, but to a different degree.

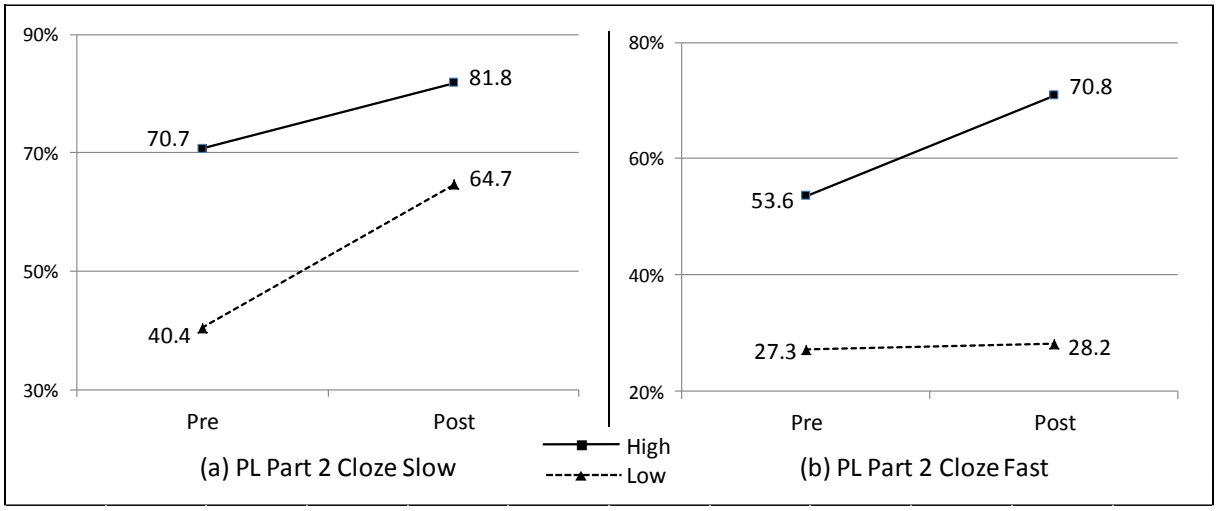

Figure 4. Test Results of Pinpoint Listening Quiz Part 2 (Cloze) Slow and Fast Speeds.

Regarding the PL Part 2 Fast, an almost identical trend was observed as seen in PL Part 1 Fast. The High group improved by 17.2 from 53.6 to 70.8, while the Low group stayed at almost the same score with a slight improvement by 0.9 from 27.3 to 28.2 (Figure 4 (b), and Table 2). A mixed-design of two-way ANOVA showed a statistically significant difference for *proficiency* [$F(1, 20) = 8.149$, $p =< .01$, $\eta^2 = .290$], but did not show a statistically significant difference for *time* [$F(1, 20) = 3.002$, $p = .099$, $\eta^2 = .131$], or *interaction* [$F(1, 20) = 2.443$, $p = .134$, $\eta^2 = .109$] (Table 3). The small effect size for the High group ($d = 0.56$) and Low group ($d = 0.06$) in these results suggest that there was a significant difference between the groups, but no significance was obtained in the pre-post difference or a combined between-group factor effect.

Discussion

As for the main results, the pre-post JLPT reveal numerical improvements but statistically non-significant results in both the High and Low groups (see Figure 2 and Tables 2 and 3 in the Results section). It is considered that, although improvements, albeit at relatively small degree, were observed in both groups for the JLPT tests, which is a comprehensive listening test, these are likely to be an indication of the comprehensive learning effect by both groups, and the effect

of shadowing thus cannot be specified here. However, the between-groups difference was statistically indicated, and this is consistent with the shadowing reproduction rate and *content shadowing* ability, which data were used in grouping into High and Low groups. That the improvement rate of the Low group was higher than that of the High group is considered to be due to the much lower score in the pre-test (39.9 and 64.7, respectively), leaving greater possibility for improvement. The High group, in contrast, may have suffered from a ceiling effect, considering that the passing line of the JLPT N2 level is an overall score of 50% (Japan Foundation, 2018).

With regard to the effect of shadowing in the Pinpoint listening (PL) quiz, Part 1 with sentence length (multiple-choice format) was assumed to measure the ability to use *bottom-up strategy*, and Part 2 with paragraph length (cloze format) for *top-down strategy*. Each part was divided in two different speeds, of Slow (300m/m) and Fast (400m/m), to investigate whether there is any difference between the variables. The statistical analysis of a mixed-design of two-way ANOVA indicated significant differences in the main effect of *time* in Part 2 (cloze) Slow, and between groups of *proficiency* in Part 2 (cloze) Slow and Fast, while no other significant results were found in the other parts (see Table 3 in the Results section). The following discussions are mainly based on the results of those descriptive statistics presented above for possible implications of the findings.

Three main trends were found in the results of PL: (1) the High group improved in all the parts regardless of the length of the texts or speed difference; (2) the Low group remained the same at fast speed in both parts regardless of the length of the texts; and (3) the Low group showed opposite growth at slow speed, to decline in Part 1 (sentence) Slow but improve in Part 2 (cloze) Slow. As for the first trend, of the High group demonstrating improvements in all parts in different length and speeds, the improvements in both length echo findings from previous studies that efficient L2 listeners are able to use both *top-down* and *bottom-up strategies* (Kurata, 2009; O'Malley et al., 1989; Seo, 2005).

With the contrast of the second trend, that the Low group did not show improvement at fast speed in either part (sentence or paragraph length), one possible explanation is that only the High group improving the comprehension processing speed at 400m/m was the result of the newly developed speed response capability in shadowing model audio at 400m/m (W11). By the same token, it is also assumed that the High group may have developed a WM capacity large enough to process incoming audio information at 400m/m, which contains 25% more information than 300m/m. In contrast, the Low group, declining in the pre- and post-shadowing content quiz, may have failed to develop comprehension processing speed up to 400m/m. This assumption leaves the possibility of there being room for the Low group to improve their processing speed with more appropriate shadowing model audio speed within the Low group participants' zone of proximal development, since it is suggested that WM capacity can be trained to improve (Iwashita, 2008; Klingberg et al., 2002).

What is puzzling are the results of the Low group declining in Part 1 (sentence) Slow but improving in Part 2 (cloze) Slow, which were exactly the opposite of the author's prediction. The literature suggests that inefficient L2 listeners tend to rely on the *bottom-up strategy*, and that efficient L2 listeners are able to use the *top-down strategy* (O'Malley et al., 1989). One possible interpretation of the Low group declining in Part 1 (sentence) Slow is that the measurement items' difficulty may have been more difficult in the post-test than those of the pre-test. The instrument items were sourced from the JLPT training book for N3 level. However, the items for one sentence length contained various grammar points, which may have led to different difficulty levels, since the order of the grammar input is considered to have influence on the L2 learning outcome (Krashen, 1985). Hypothetically speaking, if the scores in the post-test were adjusted so that the Low group remained at the same level, the difference between the groups would appear almost identical to the same part at fast speed. On the other hand, the improvement demonstrated by the Low group in Part 2 (cloze) Slow suggests a crucial implication, that *content shadowing* can potentially improve the *top-down strategy* by inefficient listeners as well,

as long as the texts' input is within the learners' WM capacity, or at a speed that the learner is able to process for comprehension.

Limitations of the study

The aim of the present study was to examine the effect of content shadowing. Although the objectives of *content shadowing* was explained and reminded throughout the study period, it may remain questionable whether all the participants have managed to conduct *content shadowing* since it was possible to complete shadowing content quiz in the same manner as a listening quiz. Also, this study divided the participants into two groups based on shadowing content quiz scores. However, the results of the analysis are based on the difference of the competence in *content shadowing* performance between the High and Low groups, which limits the generalizability of the results since all the participants have received the treatment. Therefore, in order to validate the findings of this study, further research with a control group is necessary. Another limitation may be suggested in the reliability of the statistical results due to the small number of participants. Small numbers in statistical analysis tend to suffer from disadvantageous conditions such as the tendency of the results with non-significant *p*-values (Demidenko, 2015). This study recruited participants from an advanced Japanese language course at a university; however, generally speaking, the number of enrolments tends to become lower as the level of language proficiency advances. Therefore, it is worthwhile for further studies to consider conducting research at intermediate or introductory proficiency levels, or across institutions if a joint project is possible, so that the number of participants is more likely to be sufficient for statistical analysis.

Conclusion

The purpose of this study was to investigate the effect of *content shadowing* on the listening comprehension process in relation to different speech speeds. The participants were divided into

two groups (High and Low) based on their shadowing content quiz scores, and measurement instruments for comprehensive listening skills (JLPT) and pinpoint listening quiz (for *bottom-up* and *top-down strategies*) were used. The latter instruments consisted of test items at slow speed (300m/m) and fast (400m/m). Participants in both groups showed some improvement in the comprehensive JLPT test. In the pinpoint listening quiz, the High group showed improvement in all parts (*bottom-up*, *top-down* x slow, fast), while the Low group remained the same in both parts at fast speed (*bottom-up*, *top-down* x fast). As for the other parts, the Low group declined in the part 1 at slow speed (*bottom-up* x slow), but improved in the part 2 at slow speed (*top-down* x slow). These results suggest that *content shadowing* is effective for listening comprehension, especially for the *top-down strategy*.

This study employed *content shadowing*, which is regarded as the most difficult compared to other shadowing methods. However, when introducing the shadowing method into the classroom teaching, there is no need to limit the options only to *content shadowing*; rather, it is recommended to incorporate this method into the curriculum as one means of pedagogy. For example, *prosodic shadowing* may as well be the most appropriate choice if the purpose of the training is to strengthen sound recognition ability or for prosodic aspects such as pronunciation, intonation, etc. In any case, regardless of the selected shadowing option, it is most recommended to introduce shadowing to commence with slightly lower proficient materials than the learners' current L2 level, and slower speed than practitioners may consider sufficient. In addition, in order to maintain and improve the motivation of learners, feedback on learners' shadowing output in any form (e.g. error correction, marked accuracy, teacher's comments, etc.) is considered to be essential (Sumiyoshi & Svetanant, 2017). The author hopes that the findings and shadowing method applied in this study will attract interest among practitioners and researchers for further research.

References

Audacity_Team. (2018). Audacity(R): Free Audio Editor and Recorder [Computer application] (Version 2.2.2). Retrieved from https://audacityteam.org/.

Baddeley, A. D. (1992). Working memory. Science, 255(5044), 556-559.

Demidenko, E. (2015). The p-value you can't buy. The American Statistician, 70(1), 33-38. doi:10.1080/00031305.2015.1069760

Déjean Le Féal, K. (1997). Simultaneous interpretation with "training wheels". Meta, 42(4), 616-621.

Du, Y. (2009). Chokaijugyo ni okeru suisoku sutoratejishido no kokoromi [An attempt to introduce inference strategy in listening lesson]. Journal of Japanese Language and Culture, 5, 167-194.

ETS. (2016). Test and score data summary for TOEFL iBT Tests. Retrieved from www.ets.org/toefl.

Goh, C. (1997). Metagognitive awareness and second language listeners. ELT Journal, 51(4), 361-369.

Hamada, Y. (2011). Improvement of listening comprehension skills through shadowing with difficult materials. The Journal of Asia TEFL, 8(1), 139-162.

Hamada, Y. (2012). An effective way to improve listening skills through shadowing. The Language Teacher, 36(1), 3-10.

Hamada, Y. (2014). The effectiveness of pre- and post-shadowing in improving listening comprehension skills. The Language Teacher, 38(1), 3-10.

Hamada, Y. (2015). Uncovering shadowing as an EFL teaching technique for listening: Learners' perceptions, self-confidence, and motivation. Akita University Annual Research Report on General Education, 9(22), 9-22.

Hamada, Y. (2016). Shadowing: Who benefits and how? Uncovering a booming EFL teaching technique for listening comprehension. Language teaching research, 20(1), 35-52.

doi:10.1177/1362168815597504.

Hasebe, Y., & Lee, J. H. (2015). Introducing a readability evaluation system for Japanese language education. Proceedings of the 6th International Conference on Computer Assisted Systems for Teaching & Learning Japanese (CASTEL/J), 19-22.

Iwashita, M. (2008). The effectiveness of shadowing training on Japanese learners - Based on month-long longitudinal study. Bulletin of the Graduate School of Education, Hiroshima University, 2(57), 219-228.

Japan Foundation. (2018). Japanese language proficiency test. Retrieved from http://www.jlpt.jp/e/about/points.html.

Kadota, S. (2007). Shadowing to Ondoku no Kagaku [Shadowing and the Science of Oral Reading]. Tokyo: CosmoPier Publishing Company.

Kadota, S. (2012). Shadowing, Ondoku to Eigo Shutoku no Kagaku [The Science of Shadowing, Oral Reading and English Acquisition]. Tokyo: CosmoPier Publishing Company.

Kadota, S., & Tamai, K. (2004). Ketteiban, Eigo Shadowing [The Definitive Edition English Shadowing]. Tokyo: CosmoPier Publishing Company.

Klingberg, T., Forssberg, H., & Westerberg, H. (2002). Training of working memory in children with ADHD. Journal of Clinical and Experimental Neuropsychology, 24(6), 781-791.

Kondo, R. (2012). Effects of providing scripts in shadowing practice on learners' Japanese-language acquisition. Japanese Studies Journal, 28(2), 43-57.

Krashen, S. (1985). The Input Hypothesis: Issues and Implications. London: Longman

Kurata, K. (2008). The influence of memory span, Types of sentences, and context on the phonological processing and semantic processing during shadowing in Japanese: A focus on Japanese native speakers. Bulletin of the Graduate School of Education, Hiroshima University, 57, 229-235.

Kurata, K. (2009). The influence of memory capacity on performance on text shadowing. Bulletin of the Graduate School of Education, Hiroshima University, 58, 185-193.

Lambert, S. (1992). Shadowing. Meta, 37(2), 263-273.

Long, D. R. (1990). What you don't know can't help you: An exploratory study of background knowledge and second language listening comprehension. Studies in Second Language Acquisition, 12, 65-80.

Lund, R. J. (1991). A comparison of second language listening and reading comprehension. The Modern Language Journal, 75(2), 196-204.

Matsuura, M., Fukuike, A., Kohno, M., & Yoshida, K. (2014). Maneshite Jōtatsu! Nihongo Ondoku Torēningu [Mimic and Improve! Japanese Reading Aloud Training]. Tokyo: ASK Publishing.

Mizuta, S. (1996). Dokuwa kikitori ni mirareru mondaishori no sutorateji [Strategy of problem solvong as seen in mnologue listening]. Japanese Language Education around the Globe, 6, 49-64.

Mochizuki, M. (2006). On the application of shadowing method to Japanese language education: With special reference to relevance of learners' Japanese competence to their self-assessment of the effects of shadowing. Kansai University Audio-Visual Education, 29, 37-53.

Nakanishi, T., & Ueda, A. (2011). Extensive reading and the effect of shadowing. Reading in Foreign Language, 23(1), 1-16.

Nakayama, T. (2011). Weak forms in shadowing: How can Japanese EFL learners perform better in shadowing tasks? The Society of English Studies, 41, 17-31.

Nakayama, T., Suzuki, A., & Matsunuma, M. (2015). Which aspects of listening comprehension does the shadowing method facilitate? Journal of Learning Science, Hiroshima University Institutional Repository, 8, 203-209.

NHK. (2016). NHK News Web. Retrieved from http://www3.nhk.or.jp/news/catnew.html?utm_int=all_header_menu_news-new.

Nunan, D. (1996). Learner strategy training in the classroom: An action research study. TESOL

Journal, 6(1), 35-41.

O'Malley, J. M., Chamot, A. U., & Kupper, L. (1989). Listening comprehension strategies in second language acquisition. Applied Linguistics, 10(4), 418-437.

Ota, E. (2006). The semantic processing encouragement in passage shadowing. Kantokoshinetsu Association of Teacher of English (KATE), 20, 25-36.

Sasaki, H., & Matsumoto, N. (2011). Nihongo Sōmatome N3 Chōkai [Japanese Comprehensive Listening N3]. Tokyo: ASK.

Seo, K. (2005). Development of a listening strategy intervention program for adult learners of Japanese. International Journal of Listening, 19(1), 63-78. doi:10.1080/10904018.2005.10499075.

Sumiyoshi, H., & Svetanant, C. (2017). Motivation and attitude towards shadowing: Learners perspectives in Japanese as a foreign language. Asian-Pacific Journal of Second and Foreign Language Education, 2(16), 1-21.

Suzuki, K. (2007). Shadowing wo mochiita eigo chokairyoku kojo no shido nitsuite no kensho [Investigation on the instruction for listening comprehension through shadowing]. STEP Bulletin, 19, 112-124.

Tamai, K. (1997). Shadowing no kōa to chōkai process ni okeru ichizuke [The effectiveness of shadowing and its position in the listening process]. Current English Studies, 36, 105-116.

Tamai, K. (2002). On the effects of shadowing on listening comprehension. Paper presented at the 3rd Annual Conference of JAIS (Japan Association for Interpretation Studies).

Tanahashi, A., Sugiyama, M., & Nohara, Y. (2011). N2 Chōkai Supiido Masutā [N2 Listening Speed Master]. Tokyo: J Research Publisher.

Vandergrift, L. (2002). 'It was nice to see that our predictions were right': Developing metacognition in L2 listening comprehension. The Canadian Modern Language Review, 58(4), 555-575.

Vygotsky, L. S. (1978). Interaction between learning and development. In M. Gauvain & M. Cole (Eds.), Reading on the Development of Children (pp. 29-36). New York: W.H. Freeman and Company

Chapter 4

Exploring the Prosodic Feature of High-Low Pitch-Accent in Japanese Language

4.1 Introduction

Shadowing requires learners to listen and speak at the same time. These two language activities are phonological by nature, and it is assumed that there is a close linkage between speech perception and motor units of speech production inside the brain (Goldstein, 2007). In Chapters 2 and 3, I investigated the effect of shadowing in relation to listening skills; and this chapter addresses the relationship between shadowing and speech production. The analysis of speech production is complex, and tends to rely on subjective judgements. However, pitch-accent consists of a structure of only two alternatives, of high and low accent shifts, which helps to narrow down to a single criterion for more objective judgement, rather than including other criteria such as pronunciation (Ayusawa, 2003).

Participants are recruited from Australian university students who are enrolled in a Intermediate Spoken Japanese course. This course focuses on speaking skills, which is an appropriate fit to the aim of this project to investigate the effect of shadowing on a prosodic feature of spoken Japanese. This study refers to the participants' shadowing reproduction as data, and analyses the prosodic feature of high and low pitch-accent. In order to minimise subjectivity in markers' judgement between high-low pitch falls, visualized intonation curves and pitch-accent signs are drawn above texts, projected by an online prosodic reading system called 'Suzuki-kun' (Minematsu et al., 2015). The audio files are played via an audio analytical computer software called 'Praat' (Boersma, 2001), to project an F0 curve, which appears similar to intonation curves above the texts, to assist the markers' judgement. A survey is conducted in

order to explore participants' perceived attitudes toward shadowing regarding speech production (see Appendix 6).

Parallel to the investigation of shadowing reproduction (STUDY 1), this project also investigates if shadowing is effective on recitation task (STUDY 2). Recitation task is conducted in Intermediate Japanese, which is a general language course including students enrolled in Intermediate Spoken Japanese in the same semester. The experimental research design is conducted in the same method as in Chapter 2, where the participants are divided into the control group who are enrolled in the general Japanese course only (without shadowing) and the experimental group who are also enrolled in the spoken Japanese course (with shadowing).

The participants' Information and Consent form for this paper can be found in Appendix 5 and 7. This paper has been submitted for consideration for review. The article formatting follows the target journal requirements.

4.2 Exploring the Prosodic Feature of High-Low Pitch-Accent in Japanese Language

The Effect of Shadowing: Exploring the Prosodic Feature of High-Low Pitch-Accent in Japanese Language

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Abstract

Shadowing is recognised as an effective practice for developing listening skills in second language learning. The act of simultaneous listening and speaking is assumed to activate sub-vocalisation in the working memory, which helps to improve listening skills. However, there are very few studies focusing on the effect of shadowing on speaking skills, even though shadowing involves speaking. The aim of this study is to investigate the effect of shadowing in relation to pitch-accent accuracy in Japanese as a foreign language. Participants in this study were 20 Australian university students who were enrolled in Intermediate Spoken Japanese (STUDY 1), and 46 participants enrolled in Intermediate Japanese I (STUDY 2) at the same university. The participants were divided into two groups, with shadowing (participants in both STUDY 1 and 2), and without shadowing (STUDY 2 only). Shadowing was conducted over seven weeks during a 13-week semester in STUDY 1 to examine whether participants improve pitch-accent accuracy as they conduct more shadowing practice. A survey was also conducted to explore participants' perceived attitudes toward shadowing. Recitation was conducted in STUDY 2 to investigate the effect of shadowing. The results indicate significant improvement in both shadowing and recitation tasks by the experimental group.

Keywords: second language learning, Japanese, pitch-accent, recitation

Introduction

Shadowing refers to ‘an act or a task of listening in which the learner tracks the heard speech and repeats it as exactly as possible while listening attentively to the incoming information’ (Tamai, 1997, pp. 105-106). This simultaneity of listening and speaking is considered to be effective in training listening skills, as it is assumed to activate sub-vocalisation in the *phonological loop* of Baddeley’s (1992) working memory (WM) model. For example, Hamada (2011a) found that shadowing was effective in improving listening skills in short passages among 44 Japanese high school first-year students. Nakayama (2011) suggests the effect of shadowing in improving learners’ sound recognition ability for English function words of definite/indefinite articles (e.g. ‘a’ and ‘the’) among 26 Japanese university students. The results of these studies indicate that shadowing is particularly effective in improving learners’ bottom-up processing, as shadowing is inherently phonetic (Kadota, 2007, 2012). The primary objective of shadowing, as far as listening comprehension skills are concerned, is to automatize the bottom-up processing such as sound and word recognition in order to minimize the usage of limited cognitive resources, to enable more attention to meaning-making processing or higher-level language processing.

Despite the popularity of shadowing research on listening skills (Hamada, 2011a, 2012, 2016; Kondo, 2012; Mochizuki, 2006; Nakayama, 2011; Onaha, 2004; Shiki et al., 2010; Takahashi et al., 2010a; Tamai, 1992, 2002), there is very limited shadowing research focusing on speaking skills (Rogna & Hayashi, 2012; Zakeri, 2014), to the best of the author’s knowledge, even though shadowing involves an act of both listening and speaking. The primary reason for this inclination toward listening skills is an apparent lack of assessment method of speech production. While there are abundant resources, instruments and methods to assess listening skills, such as standardised tests (e.g. TOEFL, TOEIC, EIKEN, etc.), comprehension tests, and dictations, just to name a few, there is no such testing tool to assess speaking skills. Another reason is that listening skills can be easily measured on quantitative scales by objective judgements, but speaking skills are usually assessed by people (e.g. teachers, instructors, or

examiners in a case of standardised tests such as IELTS), which methods must rely on qualitative scales and subjective judgements.

The difficulty in assessing speech production is considered to be that the production is sound, which is intangible and involves multiple variables to take into consideration in assessment criteria, such as pronunciation, fluency and the like. In addition, these criteria are presumably difficult to quantify through objective lens. However, pitch-accent, among other criteria, consists of a structure of only two alternatives, of high and low accent shifts. This narrow marking criterion appears to allow more objective judgement than do other criteria such as pronunciation and fluency (Ayusawa, 2003). In other words, the accuracy of pitch-accent can be measurable with judgement under a specific marking guideline, to make objective decisions on whether the learner's accent is right or wrong (high or low) in order to mark the speech production (Mori, 2011). This study, therefore, aims to explore learners' improvement in spoken Japanese, focusing on the prosodic production of pitch-accent accuracy along with shadowing practice.

Theoretical Background

Pitch-accent

English and Japanese intonational structures are different in that the former consists of stress patterns, and the latter, tonal accent patterns (Beckman & Pierrehumbert, 1986). The Japanese tonal accent pattern, or pitch-accent, is based on fundamental frequency (F0) shift between high (H) and low (L). This F0 shift can also be observed in English; however, it is systematically used at clause level in English, such as differentiating forms between affirmative and interrogative forms. In contrast, Japanese F0 shift plays a functional role in differentiating the meaning of the words. Japanese words are originally determined with the accent type to be given the pitch-accent on certain mora[9], or otherwise, are of the non-accent type. Hence, a word that has *n*

[9] Japanese is a mora-timed language in which each mora is spoken at a roughly constant rate, while English is a stress-timed language with syllables (Ishihara, Tsurutani, & Tsukada, 2011).

mora has [*n* + 1] accent patterns (Sakamoto, 2008). For example, a word 'hashi' (2 mora) has three possibilities ([2 + 1]) of different locations of the pitch-accent: 1) H+L: when it appears on the first mora, to mean 'chop sticks'; 2) L+H: on the second mora, to mean 'bridge'; and 3) Flat: without a pitch-accent, to mean 'edge'. Another rule is that one word contains a maximum of one pitch-accent; meaning that, once an accent fall occurs, there is no accentual rise within the same phrasal boundary, which includes the succeeding particle (Japanese functional words normally consisting of one or two mora, similar to English prepositions). For example, Toda (2004) explains that, for a sentence "*kyōkai-ni itta*", this can mean in three different ways depending on the pitch-accent locations in "*kyōkai-ni*": (1) no accent (LHHHH): 'I went to the church'; (2) initial accent + initial accent (HL+HLL): 'Today, I went to the meeting'; and (3) initial accent + second accent (HL+LHL): 'Today, I went to buy'. Japanese listeners acknowledge "*kyōkai-ni*" in (2) and (3) to contain two words, because there are two pitch-accent falls, where "*kyō*" (HL) means 'today', and "*kai-ni"* means (2) 'to the meeting' (HLL) and (3) 'to buy' (LHH). In writing, different words are written with different kanji characters, and such differences as above are explicitly indicated (e.g. (1) 教会に: to the church, (2) 今日、会に: Today, to the meeting; (3) 今日、買いに: Today, to buy). However, in verbal communication, pitch-accent difference becomes important for mutual understanding in some cases such as above.

Motor theory of speech perception

Motor theory of speech perception is defined as the close linkage between the speech perception and motor units of speech production inside the brain, and it assumes that "the objects of speech perception are the intended phonetic gestures of the speaker, represented in the brain as invariant motor commands that call for movements of the articulators through certain linguistically significant configurations" (Liberman & Mattingly, 1985, p. 2). This theory is based on a rationale of a linkage between the motor action of speaking and the perceptual act of listening. In other words, motor theory states that there is a close link between the parts of the brain that are

responsible for perceiving speech sounds and those for activating the motor mechanisms to produce particular sounds. Motor theory has been controversial, and has generated a large body of research (Galantuci et al., 2006; Goldstein, 2007). However, the discovery of *mirror neurons* in the field of neuroscience has provided the physiological link between motor actions and perception, which motor theory assumed. Mirror neurons are a class of neurons that show congruence between the observed and the executed action (Rizzolatti & Arbib, 1998). As the name 'mirror' suggests, the neurons discharge both when a human performs a motor act and when s/he sees another individual executing the same or similar motor act.

Wilson et al. (2004) observed, in their functional magnetic resonance imaging (fMRI) study in which participants listened passively to monosyllables and produced the same speech sounds, a robust response to speech production confirming the motor properties of the listening-responsive voxels, and that activity was much greater for speech than for non-speech sounds in all ten participants. Watkins et al. (2003) examined whether auditory perception of speech modulated the excitability of the motor system underlying speech production, using transcranial magnetic stimulation (TMS). The results indicate that speech perception, either by listening to speech or by visual observation of speech-related lip movements, enhanced excitability of the motor units underlying speech production. Another TMS study, by Fadiga et al. (2002), found an activation of the speech-related motor centres when individuals listened to verbal stimuli. Most interestingly, they also showed highly specific activation of tongue muscles when they heard phonemes that require strong tongue muscles.

Japanese language is often said to be rhythmical, because of its construct of mora connection in spoken mode. The rhythm unit consists of either short (one mora length) or long (two mora length), and the short mora tends to pair in two to make one mora unit. A popular teaching method of this rhythm is to use hand-claps while speaking (Toda, 2004). For example, "びょういん[byouin]" (hospital) consists of four mora [byo-u-i-n], but is pronounced in two units [byou-in] (2+2). By contrast, "びよういん[biyouin]" (hair-dresser), consisting of five mora

[bi-yo-u-i-n], is pronounced in three mora units [bi-you-in] (1+2+2): the former with hand-clap sounds "*tan-tan*", while the latter as "*ta-tan-tan*".

There is another teaching technique for spoken Japanese called 'Verbo-Tonal method' (VT method), proposed by Kawaguchi (1987). VT method aims to realize the synchronisation between body movements and speech production so that the learners can visualize the tonal shifts along with their arm/palm movements. Out of 10 VT sessions among 11 L2 learners of Japanese, he found that students with correct 'movements' were able to produce accurate pitch-accent, but those with movements at incorrect timing/height produced Japanese with unnatural accent. However, after practicing correct movements, the unnatural accent was corrected. This indicates that body movements have active influence on tonal production.

The commonality of the hand-clap teaching technique and VT method is that both mobilize body movements along with motor units of speech production. The effect is assumed to be generated by the synchronised act between the body movements and speech production in a form of a mastery of physical movements. This is the very linkage that motor theory assumes between motor units and speech perception, that mirror neurons are activated by the physical stimuli. It is also reasonable to assume that, if the simultaneity between the linked stimuli is effective for learning, shadowing (an act of simultaneous listening and speaking) can be effective in learning tonal differences in speech production.

This study aims to investigate the effect of shadowing in relation to speech production of pitch-accent accuracy in Japanese language. In doing so, this study will analyse the collected data in order to investigate the following research questions. STUDY 1 will address learners' improvement in pitch-accent accuracy in their shadowing performance; and STUDY 2 will examine whether shadowing is effective in improving pitch-accent accuracy in recitation tasks. The data for the studies were collected from two Japanese language courses in an Australian university during the same semester.

The three research questions are as follows:

RQ1. Do learners of Japanese language improve high-low pitch-accent as they practise shadowing?

RQ2. How do participants perceive shadowing regarding their speaking skills?

RQ3. Does the high-low pitch-accent accuracy in shadowing reflect that in recitation tasks?

STUDY 1

Methods

Participants

Participants in this study were recruited from Australian university students who were enrolled in the Intermediate Spoken Japanese course. The course met once a week for two hours. A total of 20 students (6 males and 14 females) agreed to participate in this study. The majority of the participants were between eighteen and twenty-three years old (n = 18), and the remaining were between twenty-four and thirty years old (n = 2). Most of the participants were majoring in Japanese (n = 16), while the majors of the remaining participants were International Studies (n = 1), Translation and interpretation (n = 1), Linguistics (n = 1).

Materials

1. Shadowing materials

For shadowing model audio, "*Japanese Pronunciation Practice through Shadowing* (Toda et al., 2012)" was chosen because it is targeted for elementary and intermediate L2 Japanese learners, which was considered suitable for the proficiency level of the participants in this study. This book is specifically designed to develop prosodic features of Japanese language, consisting of 20 chapters with a mixture of eleven dialogic and nine monologic texts. Each text is provided with pitch-accent fall signs above the texts. Seven monologic audio recordings were selected in consideration for learners to concentrate on accent flow by a single speaker, instead of paying extra attention to conversation by different speakers. The speeds of the audio materials were

calculated by dividing the total number of mora in the script by the running time. Pauses were not excluded from this calculation, since it is considered that appropriate pausing is naturally required in proportion to the speech speed. The selected materials were arranged based on the speech speed (mora per minute) so that the speed would increase at gradual rates each week. The model audio running times ranged between 47 and 64 seconds depending on the length of the texts and speech speed (see Table 1).

Table 1. Summary of Shadowing Model Audio Material

Week	W02	W03	W04	W06	W07	W09	W10
Speed (mora per minute)	220	245	260	270	295	300	305
Number of mora	204	202	278	253	311	236	269
Running time (s)	56	50	64	57	63	47	53
Readability	4.61	5.48	4.76	4.65	3.33	4.19	3.79
(Difficulty Level)	(Elm+)	(Elm+)	(Elm+)	(Elm+)	(Int+)	(Int-)	(Int-)
Number of sentences	10	8	7	8	9	7	7
Words per sentence	13.1	15.9	18.1	18.9	20.0	19.0	19.9
Gender of speaker	male	male	female	female	male	male	female

Notes. For Difficulty level, Elm = Elementary, Int = Intermediate; - = lower, + = upper.
For Readability, 0.5 = very difficult, 6.5 = very easy (Hasebe & Lee, 2015).

The text difficulty level was assessed using a measurement system called “jReadability” (Hasebe & Lee, 2015). This system operates online, and assesses the readability of a text regardless of the use of kana scripts or kanji, with a highly reliable outcome. Readability is evaluated between 6.4 (Lower-Elementary = very easy) and 0.5 (Upper-Advanced = very difficult); and the texts used in this study were rated between 5.48 and 3.33, which is between upper elementary and upper intermediate equivalent. Kadota (2007) recommends that shadowing materials be *i*-1 (slightly easier) than the learners’ L2 proficiency level, because shadowing is a cognitively heavy task. His recommendation is based on the assumption of *content shadowing* (shadowing focusing on the comprehension of the content); however, this study employs *prosody shadowing* (shadowing focusing on prosodic features, such as the stress,

rhythm, pitch-accent, speed, pauses, etc.) (Kadota & Tamai, 2004). In this respect, the shadowing text difficulty level for this study is considered appropriate for the participants, who were enrolled in Intermediate Spoken Japanese.

2. Survey questionnaires

The survey consisted of three parts: demographic information on the first part; questionnaire items on the second part; and open-ended questions on the third part. The questionnaire items in the second part were modified from Hamada's (2011b) study on shadowing and listening self-efficacy. The questionnaires were designed to gather information related to the constructs of the following areas, containing three questions in each category: perception of improvement in (1) listening, (2) speaking, (3) fluency, (4) pitch-accent, (5) pronunciation, (6) native-like speech, (7) speed variation, (8) simultaneous listening and speaking, (9) intrinsic motivation, and (10) comparison to other listening/speaking practice; and one question on (11) intention to continue. The total 31 items were randomly shuffled, and rearranged manually where questions in the same category continued in succession. These items used a six-point Likert-scale, with 6 indicating 'Strongly Agree', 5 'Agree', 4 'Partially Agree', 3 'Partially Disagree', 2 'Disagree', and 1 'Strongly Disagree', so that the results were expected to present either affirmative or negative orientation if participants were asked to choose whether they 'Agree' or 'Disagree', instead of choosing a neutral answer such as 'not applicable' or 'don't know'.

Procedures

Out of the 13-week semester period, shadowing practice was conducted as a homework assignment for seven weeks between W02 and W10 (for brevity this study uses the format WXX, where W stands for week and XX for number). There was no shadowing in W05 and W08 as there were speech and interview tests, respectively. The theoretical background of shadowing was explained to the students during the W02 class before conducting the first shadowing task, as it was considered important to share such information in order to help students better

understand the purposes of the task (Mochizuki, 2006). In addition, it was explained that the shadowing script would not be made available during the task because the objective of the exercise was to improve the accuracy of their reproduction ability. This post-shadowing script method was applied for the purpose of avoiding split-attention effect of cognitive load, so that the students could focus solely on the incoming speech sound instead of being distracted by visual stimuli (Ayres & Sweller, 2014); which method is considered to induce the sheer effect of shadowing. The gradual increase of the shadowing model audio speed was also mentioned, in order to raise students' awareness of the challenges that lay ahead in the following weeks.

The shadowing model audio was made available via the course module in the university online learning system on Monday of the shadowing week, and the students were required to produce an audio file of their voice recording of each week's shadowing, and upload the audio file via the online course module. The submission due date was set for Friday of the same week in order to maintain the weekly cycle: the students had five days to practice the week's shadowing material, then the instructor could mark the submitted audio files before the following week's class. The feedback was returned in the form of an A4 sheet with original shadowing script with kana scripts printed above kanji characters, and "¬"mark was also provided above each pitch-accent fall. The mistaken parts were highlighted, and each mistake was manually spelt out above the highlighted kana script, and the total accuracy was calculated on a 100% (see Figure 1). This marking process took approximately 1.5 hours to mark 20 shadowing submissions. The sum of the shadowing scores was counted as 10% of the final grades.

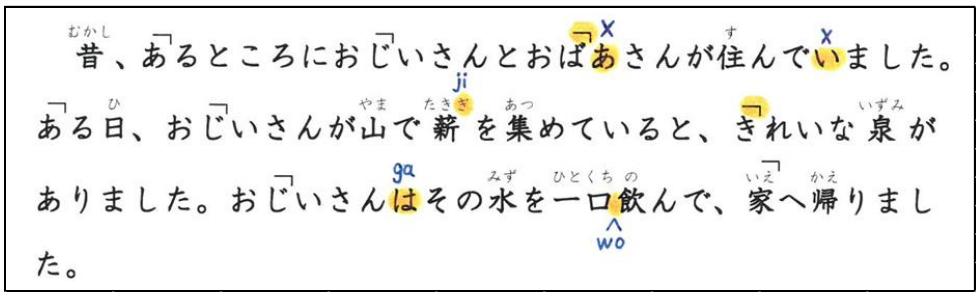
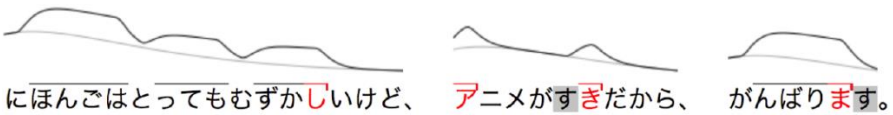


Figure 1. An example of shadowing feedback sheet.

Feedback and marked script sheets were returned to each student in the following week's class. During the class, shadowing feedback involved the following steps: 1) the instructor played the model audio once while everyone shadowed altogether; 2) the instructor briefly shared the common mistakes in students' shadowing performance; 3) a marked feedback sheet was returned to each student; and 4) shadowing was repeated all together with focus on the pitch-accent while looking at the "¯" mark on the feedback sheet. This in-class shadowing practice normally took approximately 15 minutes each week.

The participants' W02 and W10 shadowing audio files were re-analysed on the basis of pitch-accent accuracy for the purpose of the comparative analysis of pre-post shadowing differences. Although the textbook provides pitch-accent marks (¯) above the texts, the marks were not provided to every phrasal boundary, presumably in order not to confuse the reader with too much information. In order to provide pitch-accent marks for every phrasal boundary, an online prosodic reading tutor of a Japanese system called "Suzuki-kun" (Minematsu et al., 2015) was used (see Figure 2) for the marker to maintain consistency in judgement as objective as possible.



[Transcription: Nihongo wa tottemo muzukashii kedo, anime ga suki dakara, ganbari masu.]
(Translation: Although Japanese is very difficult, since I like anime, I will do my best.)
Figure 2. Visualized Intonation Curve and Pitch-Accent (Minematsu et al., 2015, p. 189).

The system allows modification of the predicted prosodic features by clicking the kana script to alter the high-low options, and the shadowing model audio was carefully reviewed to generate the pitch-accent falls that exactly matched the model audio. A total of 43 pitch-accent falls for W02 and 41 for W10 were detected (where the textbook provided 23 for each of the texts), and the raw scores were converted into a 100% scale in order to represent the value on the same unit for comparative analysis. In order to add objectivity in the marking process, a free computer

software for audio analysis called 'Praat' (Boersma, 2001) was used to project participants' shadowing audio in an F0 curve (see Figure 3) for visual assistance in marking pitch falls.

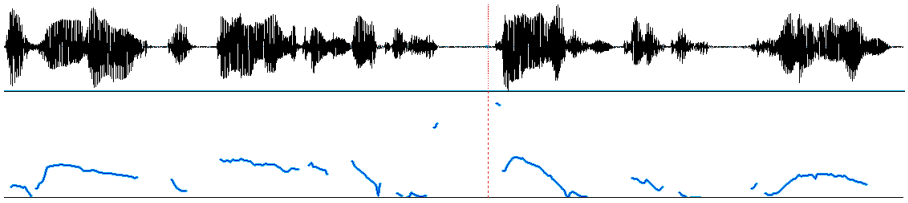


Figure 3. Praat Output of F0 Pitch Curve.

A survey was conducted during the final week along with the explanation of the information sheet on this study, and the prospective participants were asked whether they were interested in participating in this study, which process took approximately 15 minutes. This recruiting procedure was approved by the university's ethics committee.

Results and Discussion

Participants' Pitch-Accent Accuracy in Shadowing Tasks

The participants' (n = 20) pitch-accent accuracy in shadowing performance showed numerical improvement in the mean scores by 8.08 from 81.48 (SD = 11.19) in W02 to 89.56 (SD = 11.66) in W10 (Figure 4 and Table 3).

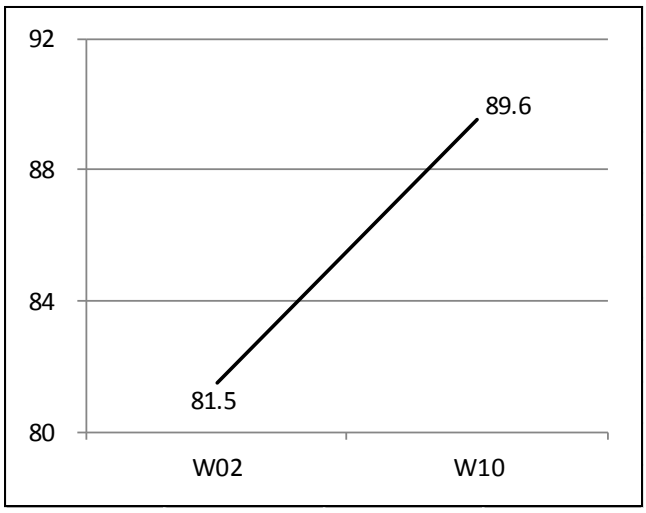


Figure 4. Mean scores of Pitch-Accent Accuracy in Shadowing.

To test the first hypothesis whether participants improve high-low pitch-accent as they

practice shadowing, the Wilcoxon signed-rank test, a non-parametric equivelent to the two-sample t-test, was conducted to compare the pitch-accent accuracy in W02 and W10 shadowing performance. The test indicated that the median post-test ranks, *Mdn* = 91.37, were statistically significantly higher than the median pre-test ranks, *Mdn* = 82.50, *Z* = 2.576, *p* = 0.010. Cohen's *d* was estimated at 0.57, which is a medium effect based on Choen's (1992) guidelines. These results suggest that the participants' pitch-accent accuracy statistically improved from W02 to W10.

Table 2. Results of Pitch-Accent Accuracy in Shadowing

	W02 Mean (Median)	*SD*	W10 Mean (Median)	*SD*	Effect Size (*d*)
Shadowing	81.48 (82.50)	11.19	89.56 (91.37)	11.66	0.57 (M)

Notes. For effect size, L = large, M = medium, S = small (Cohen, 1992).

In order to investigate individual changes in pitch-accent accuracy in shadowing performance, a scatter diagram was generated (see Figure 5), with "◆" indicating positive and "◇" indicating negative growth, with the guide line of [y = x]. The majority of the participants showed positive growth (*n* = 16), while four participants showed negative growth (*n* = 4, ID-1, 8, 11 and 17).

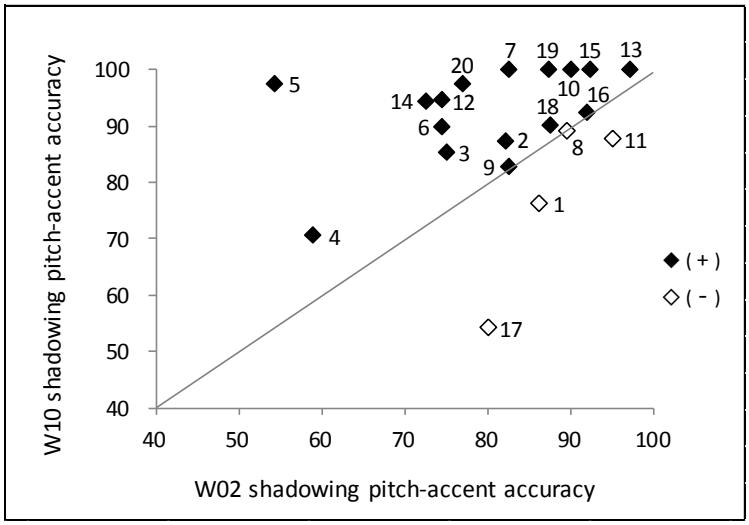


Figure 5. Participants' Shadowing Pitch-Accent Accuracy

The [y = x] line indicates scores that are equal between W02 and W10, which means that the above area shows positive growth (◆), and below area indicates negative growth (◇); while the closer to the line, the smaller is the difference. For example, participant (ID-8) showed a negative growth (◇), and participants (ID-9 and 16) showed positive growth (◆). However, the differences of their scores were minimal (e.g. ID-8: 89.5 to 89.2, ID-9: 82.5 to 82.9). On the other hand, the more distance from the [y = x] line, the greater is the difference (e.g. ID-17 (◇): 80.0 to 54.3, ID-5 (◆): 54.3 to 97.6). In this respect, there were three participants who showed actual negative growth (ID-1, 11 and 17).

The Wilcoxon signed-rank test results suggest that the participants improved pitch-accent accuracy over the study period of pre- and post-shadowing. This indicates that the participants developed more accurate linkage between the perception and the production of high-low pitch-accent. If this is the case, the results affirm motor theory of speech perception that high-low pitch difference in incoming stimuli activates the motor region to mirror the tonal differences to produce accurate pitch-accent. The simultaneity of listening/speaking in shadowing is also considered to be particularly effective in this activation of motor region, as there is no or minimal time difference between the input stimuli and speech production. In Kawaguchi's (1987) VT-method relationship between synchronised hand movements and pitch-accent speech production, shadowing is considered to play the role of the physical movements, and it applies phonological stimuli in order to synchronise speaking.

Participants' Responses for Survey

Questionnaire items

Table 3 summarizes the frequency and percentage of responses for the 31 questionnaire items of the survey. The responses, 'Agree + Strongly Agree', and 'Disagree + Strongly Disagree', were put together for the purpose of the simple organization of the table; however, the actual scores of 6 scales were used, and negatively phrased items used reversed scores in order to align the

positive consistency for statistical analyses. Cronbach alpha was calculated for internal consistent reliability for each category (α = .921). For the concise presentation of the table and discussion in this section, the questionnaire items were named as follows, with examples: ‘Listening’: “I think shadowing is effective in improving my listening skills”; ‘Speaking’: “I think shadowing is effective in improving my speaking skills”; ‘Pronunciation’: “I think shadowing helps improve my pronunciation”; ‘Fluency’: “I think shadowing helped me speak Japanese more fluently than I could before”; ‘Speed’: “I like the gradual speed progression of the shadowing model audio”; ‘Pitch-accent’: “Shadowing assists me to develop accurate High-Low intonation”; ‘Intrinsic motivation’: “I enjoy shadowing practice”; Other practice’: “I think shadowing is a better practice than repeating”; ‘Simultaneity’: “I think simultaneous listening and speaking is a very effective way of practice”; ‘Intention to continue’: “I will continue practicing shadowing even after completing this unit”; and ‘Native-like speech’: “Shadowing makes me feel like I'm speaking like a native Japanese speaker”. Table 3 presents the categories sorted in the order of the highest to lowest mean scores.

Table 3. Frequency and Percentage of Participants' Responses

Item Summary	Agree + Strongly Agree	Partially Agree	Partially Disagree	Disagree + Strongly Disagree	Mean (*SD*)
Listening*	49 (81.7%)	11 (18.3%)	0 (0%)	0 (0%)	5.28 (0.761)
Speaking*	39 (65.0%)	9 (15.0%)	8 (13.3%)	4 (6.7%)	4.63 (1.193)
Pronunciation*	33 (55.0%)	20 (33.3%)	6 (10.0%)	1 (1.7%)	4.55 (0.910)
Fluency*	28 (46.7%)	25 (41.7%)	7 (11.7%)	0 (0%)	4.50 (0.893)
Speed*	31 (51.6%)	17 (28.3%)	7 (11.7%)	5 (8.3%)	4.42 (1.169)
Pitch-accent*	29 (48.3%)	18 (30.0%)	11 (18.3%)	2 (3.3%)	4.38 (1.059)
Intrinsic motivation*	29 (48.3%)	14 (23.3%)	11 (18.3%)	6 (10.0%)	4.30 (1.369)
Other practice*	22 (36.6%)	21 (35.0%)	12 (20.0%)	5 (8.3%)	4.08 (1.078)
Simultaneity*	30 (50.0%)	8 (13.3%)	10 (16.7%)	12 (20.0%)	4.05 (1.455)
Intention to continue	5 (25.0%)	9 (45.0%)	5 (25.0%)	1 (5.0%)	3.95 (0.945)
Native-like speech*	12 (20.0%)	25 (41.7%)	14 (23.3%)	9 (15.0%)	3.65 (1.191)

Notes. *Three questionnaire items were merged into one category.

Out of 11 categories, 'Listening' was the highest (*M* = 5.28), where all participants agreed on its positive effect, followed by 'Speaking' (*M* = 4.63), 'Pronunciation' (*M* = 4.55), 'Fluency' (*M* = 4.50), and 'Speed' (*M* = 4.42) with more than 80% of positive orientation. 'Pitch-accent' (*M* = 4.38) ranked in the middle (78.3% positive). 'Native-like speech', the category with the lowest mean (*M* = 3.65), is still positively oriented (61.7%), which suggests that more than a half of the participants overall perceived shadowing in a favourable light.

As a post-hoc investigation of those participants who showed negative growth in the pitch-accent accuracy in shadowing (ID-1, 8, 11 and 17 in Figure 5), the individual questionnaire item scores are summarised in Table 4.

Table 4. Questionnaire Responses of Participants with Negative Growth in Figure 5

Item Summary	ID-1	ID-8	ID-11	ID-17	Mean
Listening*	4.67	5.33	4.67	5.00	5.28
Speaking*	3.00	6.00	5.00	3.33	4.63
Pronunciation*	3.33	5.33	4.67	3.67	4.55
Fluency*	3.33	5.33	4.00	3.67	4.50
Speed*	3.33	4.67	4.33	3.33	4.42
Pitch-accent*	3.00	5.33	4.67	3.67	4.38
Intrinsic motivation*	3.67	5.67	4.33	2.00	4.30
Other practice*	2.33	5.00	4.33	2.00	4.08
Simultaneity*	2.33	5.00	4.33	2.00	4.05
Intention to continue	3.00	3.00	4.00	2.00	3.95
Native-like speech*	2.67	4.33	4.00	3.33	3.65
Mean	3.15	5.00	4.39	3.09	4.30

Notes. *Three questionnaire items were merged into one category.

In the responses to questionnaire items on pitch-accent, participants who showed more substantial negative growth (ID-1 and 17) responded with less positive attitude than the mean score (ID-1 = 3.00 and ID-17 = 3.67 < *M* = 4.38), while the other participants showed more positive attitudes than the mean score (ID-8 = 5.33 and ID-11 = 4.67 > *M* = 4.38). There is another trend consistent with the results of the responses to the item of pitch-accent: the former participants with more negative growth in pitch-accent accuracy (ID-1 and 17) responded less positively for overall questionnaire items than the mean score (ID-1 = 3.15 and ID-17 = 3.09 < *M* = 4.30), while the other participants (ID-8 and 11) responded more positively than the mean score (ID-8 = 5.00 and ID11 = 4.39 > *M* = 4.30). In fact, both participants with substantial negative growth (ID-1 and 17) responded to all the questionnaire items with lower scores than the mean. This indicates that there is a close relationship between the degree of the improvement in pitch-accent accuracy in shadowing and participants' perceived attitude toward shadowing.

Open-ended questions

In response to the open-ended questions in the third part of the survey, 'What do you like about shadowing?' and 'What do you NOT like about shadowing?', most participants responded with the following comments: 19 participants (95%) responded to the positive aspects, and 15 participants (75%) responded to the negative aspects. Table 5 summarizes the frequencies of the key comments, which were counted as they appeared in the participants' comments.

Table 5. Frequency of Participants' Responses in Open-Ended Questions

Positive aspects		Negative aspects	
improve pronunciation	10	speed too fast	8
improve listening	7	difficult to listen and speak simultaneously	4
improve pitch-accent	5	difficult to maintain accuracy	3
improve fluency	5	cannot understand the content	3
improve speed	5	pitch-accent can be confusing	1
native-like speech	4	cannot pronounce fluently	1
improve accuracy	3		
improve speaking	2		
learn new grammar/vocabulary	2		
total	43	total	20

There was a large gap in total number between the positive (n = 43) and the negative (n = 20) key comments, which is considered to be consistent with the questionnaire results of positive orientation (see Table 3). The most frequent response in the positive aspect was to improve 'pronunciation' (n = 10), then 'listening' (n = 7), and 'pitch-accent' (n = 5), 'fluency' (n = 5) and 'speed' (n = 5) at the same frequency, followed by 'native-like speech' (n = 4), 'accuracy' (n = 3), 'speaking' (n = 2) and 'learn new grammar/vocabulary' (n = 2). As for the negative aspects, difficulty in 'speed too fast' came in first (n = 8), then 'simultaneous listening and speaking' (n = 4), followed by ''maintaining accuracy' (n = 3), 'understand the content' (n = 3), 'pitch-accent' (n = 1) and pronounce fluently' (n = 1). There were responses in both positive and negative

aspects from the same categories such as ‘speed’, ‘accuracy’, ‘pitch-accent’ and ‘fluency’; however, there was no overlapping comments made by the same participants in the collected data. This suggests that there are individual differences in participants’ perceptions towards shadowing whether in positive or negative orientation. For example, ‘speed’ may be a positive feature to some participants, e.g. “I like the challenge of speaking quickly & I feel that I get good practice” (ID-6), and “It forced my listening ability to increase as the speed was faster than I was originally capable of” (ID-17); but not for others, e.g. “It feels like intonation can be confused, especially when the speed is fast and I struggle to pick it up because it's fast” (ID-1), and “If I cannot keep up with the speed then I miss everything, so I prefer a comfortable speed” (ID-8).

The synchronisation of listening and speaking when shadowing is potentially positive or negative depending on the learner’s preference for speech speed. For example, the same shadowing model audio speed may be felt as easy for some, manageable for others, or challenging to a few. In fact, the speed was perceived as less positive to those participants who showed negative growth in W02-W10 shadowing pitch-accent accuracy (ID-1 and 17 in Table 4).

STUDY 2

Methods

Participants

Participants in STUDY 2 were recruited from the students who were enrolled in the Intermediate Japanese I at the same Australian university as for STUDY 1. This course met twice a week, once for a lecture and once for a tutorial (for two hours each). Intermediate Japanese I is a general language course offered in the same semester as the Intermediate Spoken Japanese in STUDY 1. Since the spoken language course is an optional one, the participants were divided into the experimental (enrolled in both general and spoken courses: with shadowing) and the control (enrolled in general course only: without shadowing) groups. Sixty-two students agreed to

participate in this study; however, the screening process of the condition of conducting both W02 and W10 recitation tasks resulted in a total number of 46 participants. There was an equal number of males (*n* = 6) and females (*n* = 6) in the experimental group, and more females (*n* = 20) than males (*n* = 14) in the control group.

Materials

The recitation tasks used the in-class reading materials for tutorial classes, which contain the week's target learning items such as new grammar points, vocabulary and kanji characters. The week's reading material is attached at the end of the week's workbook, an exercise material for students to practice. They are written in monologic form, and the content ranges over various topics on Japan such as travelling, geography, culture, education and the like. Table 6 summarises the length and the difficulty level of the reading materials.

Table 6. Summary of Recitation Material

Week	W02	W03	W04	W05	W10
Number of mora	588	447	512	561	548
Model audio speed (m/m)	258	218	236	257	291
Readability	3.86	3.40	4.19	3.85	2.89
(Difficulty level)	(Int-)	(Int+)	(Int-)	(Int-)	(Int+)
Number of sentences	15	13	14	17	11
Words per sentence	20.7	18.5	21.5	18.2	26.6

Notes For Difficulty level, Int = Intermediate; - = lower, + = upper.

. For Readability, 0.5 = very difficult, 6.5 = very easy (Hasebe & Lee, 2015).

The readability fluctuates between 4.19 (W04) and 2.89 (W10), but was the result of multiple factors such as the number of sentences, words per sentence, or perhaps vocabulary level used in the texts. However, all the weeks are consistent at the Intermediate level, which suggests that the texts were suitable for the participants' proficiency level. The model audio recording was available via the course module in the university online learning system each week. A female instructor, who is a native speaker of Tokyo standard Japanese, recorded the model audio. The

length of the recordings was approximately two minutes, which were similar to the shadowing model audio speeds between W02 and W07 in STUDY 1.

Procedure

During the same semester as the STUDY 1, a recitation task was administered as a homework assignment for five times between W02 and W10 in Intermediate Japanese I. There were no recitation tasks between W06 and W09, as there were major assignments, Speaking Test and Class Test. Students were asked to produce an audio file of their voice recording on each assigned reading at their own pace, and to upload the audio file via online course module. The submission due date was set on the following Friday, one week after the tutorial class. The submission was counted as part of the participation mark of 15% of the final grade. The participant IDs were replaced with numerical IDs using Excel's random function (e.g. W02-01, W02-02, W10-01, W10-02, and so on), in order to blind the identification of the participants between the experimental and the control groups; and random numbers were given in both W02 and W10, so that the numerical IDs were most likely different individuals between W02 and W10. This way, the marker was not able to identify the group, and so the marker's bias was considered to be avoided. The recitation audio files were analysed on the basis of pitch-accent accuracy for the purpose of the comparative analysis of pre- / post-shadowing differences. The online prosodic reading system, "Suzuki-kun" (see Figure 2 for more details), detected 78 pitch-accent falls in W02 and 72 in W10 recitation texts; and the raw scores were converted into a 100% scale for the purpose of comparative analysis. The prospective participants were asked whether they were interested in participating in this study, and to sign the consent form, during the final week, which recruiting procedure was approved by the university's ethics committee.

Results and discussion

In the pitch-accent accuracy in recitation tasks, both groups showed numerical improvement.

The experimental group (n = 12) improved by 2.81 from 76.75 (SD = 12.66) to 79.56 (SD = 13.87), while the control group (n = 34) improved by 1.48 from 70.12 (SD = 15.84) to 71.60 (SD = 14.70) (Figure 6 and Table 11).

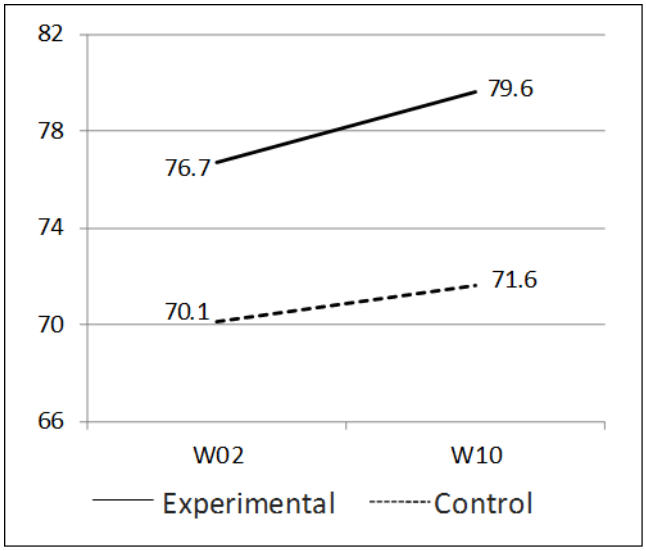


Figure 6. Mean scores of Pitch-Accent Accuracy in Recitation.

To test the second hypothesis, whether shadowing is effective in improving pitch-accent in recitation tasks, the Wilcoxon signed-rank test was performed to compare the improvement of pitch-accent accuracy in W02 and W10 recitation tasks. The test indicated that the median post-test ranks in the experimental group, Mdn = 81.26, were statistically significantly higher than the median pre-test ranks, Mdn = 76.04, Z = 2.040, p = 0.041, but the control group did not show statistically significant improvement from the median post-test ranks, Mdn = 71.83, were statistically significantly higher than the median pre-test ranks, Mdn = 71.80, Z = 1.048, p = 0.295. The medium effect size for the experimental group (d = 0.64) and the small effect size for the control group (d = 0.15) indicate that the experimental group showed stronger improvement than the control group. These results suggest that shadowing had an effect on improving pitch-accent accuracy in the recitation tasks.

Table 7. Results of Pitch-Accent Accuracy in Recitation

	W02 Mean (Median)	*SD*	W10 Mean (Median)	*SD*	Effect Size (*d*)
Experimental	76.75 (76.04)	12.66	79.56 (81.26)	13.87	0.64 (M)
Control	70.12 (71.80)	15.84	71.60 (71.83)	14.70	0.15 (S)

Notes. For effect size, L = large, M = medium, S = small (Cohen, 1992).

Figure 7 shows the individual change in scores. In the experimental group, eight participants showed positive growth (66.7%), while four participants showed negative growth (33.3%, ID-1, 8, 18 and 19). In the control group, 21 participants showed positive growth (61.8%), while 13 participants showed negative growth (38.2%). The proportions in positive and negative growth between the experimental and the control groups are similar; however, the degree in the negative growth appears different between them. The four participants in the experimental group showed numerical negative growth, but close to the [y = x] line (indicating scores that are equal between W02 and W10). In contrast, more than half of the participants in the control group with the negative growth are located distant from the [y = x] line, which is assumed to be the reason for the non-significant statistical value of the Wilcoxon signed-rank test ($p > 0.05$) and small effect size ($d = 0.21$).

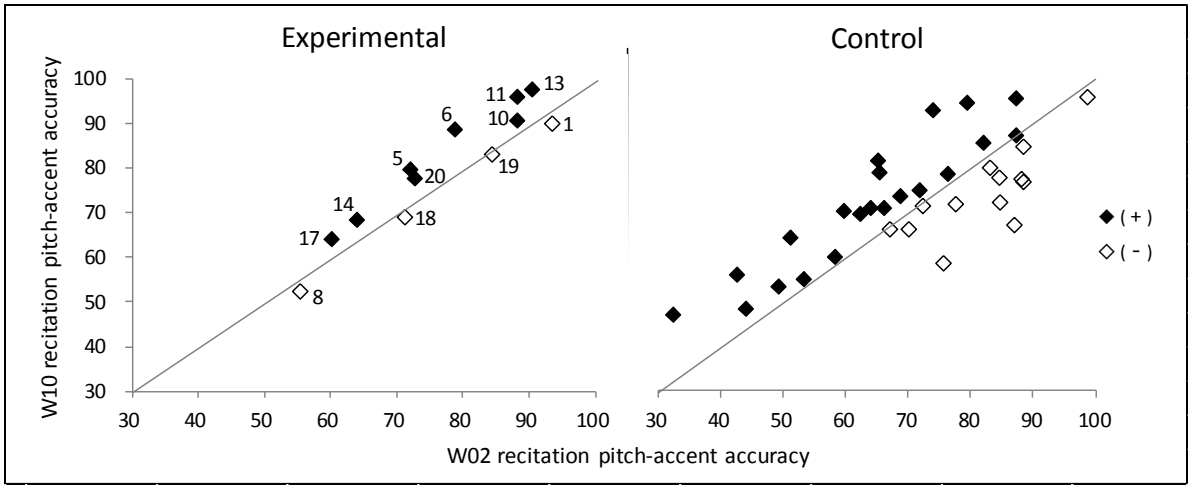


Figure 7. Recitation Pitch-Accent Accuracy in Experimental and Control Groups.

In order to measure the relationship in the pitch-accent accuracy between shadowing and recitation tasks among the participants in the experimental group (n = 12), Pearson's correlation coefficient was calculated. There was a positive correlation in the W02-W10 differences between shadowing (M = 7.24, SD = 17.80) and recitation (M = 2.81, SD = 4.40), r = 0.330, p = 0.296; however, no statistical significance was found in the result. In terms of those participants who showed negative growth, there are two participants (ID-1 and 8) who showed negative growth in both shadowing and recitation, two participants (ID-11 and 17) in shadowing only, and two participants (ID-18 and 19) in recitation only.

General Discussion

The results of STUDY 1 suggest that participants improved pitch-accent accuracy in their speech production of shadowing performance, with statistical significance. This indicates that the participants developed more accurate linkage between the perception and the production of high-low pitch-accent. If this is the case, the results affirm motor theory of speech perception that high-low pitch difference in incoming stimuli activates the motor region to mirror the tonal differences to produce accurate pitch-accent. The simultaneity of listening/speaking in shadowing is also considered to be particularly effective in this activation of motor region, as there is no or minimal time difference between the input stimuli and speech production. In Kawaguchi's (1987) VT-method relationship between synchronised hand movements and pitch-accent speech production, shadowing is considered to play the role of the physical movements, and it applies phonological stimuli in order to synchronise speaking. This synchronisation is potentially positive or negative depending on the learner's preference for speech speed. For example, the same shadowing model audio speed may be felt as easy for some, manageable for others, or challenging to a few. In fact, the speed was perceived as less positive to those participants who showed negative growth in W02-W10 shadowing pitch-accent accuracy (ID-1 and 17 in Table 5).

In the quasi-experimental study on shadowing and recitation, STUDY 2 results reveal that both groups showed numerical improvements in pitch-accent accuracy in recitation tasks, where the experimental group of with-shadowing showed statistical improvement, while the control group of without-shadowing did not show statistical improvement. The descriptive statistics show a similar degree of improvement (see Figure 6); however, the scatter diagram of individual participants shows otherwise (see Figure 7). There was a different trend in the participants with negative growth: the experimental group scored nearly equal between W02 and W10, while the control group contained substantial decline in the W10 scores from the W02. This is assumed to be because of the observed linkage between shadowing and recitation, that significant improvement in shadowing pitch-accent accuracy contributed to significant improvement in recitation tasks. In fact, out of four participants, two were the same individuals whose scores declined from W02 to W10 in both shadowing and recitation tasks (ID-1 and 8). Although this may also indicate the causal relationship between shadowing and recitation, there were a few participants who did not follow the shadowing-recitation causal trend that showed positive growth in shadowing but negative in recitation (ID-18 and 19), or the opposite: negative growth in shadowing but positive in recitation (ID-11 and 17).

This inconsistency may have been the result of the different nature of the tasks of shadowing and recitation. The former aims to activate the simultaneous stimuli of the *phonological loop* of the WM, while the latter relies on access to the long-term memory (LTM) when producing the speech. The simultaneity of shadowing is also assumed to be more effective in synchronising the speech perception and motor region of speech production than recitation, since the visual recognition of the written module is the only stimulus when attempting to recite: in other words, recitation is a task of speaking based on the stimuli from the LTM. Recitation may also trigger the split-attention effect of cognitive load (Ayres & Sweller, 2014), since it needs to mobilise different channels in Baddeley's (1992) WM model: *visuospatial sketchpad* for recognition of written letters, and *phonological loop* for speech production. In contrast, shadowing is assumed

to mitigate cognitive load in terms of avoiding split-attention effect, due to its concentrated usage of cognitive resources within the *phonological loop* alone.

Limitations of the study

This study employed a quasi-experimental design in STUDY 2 to recruit participants from different Japanese courses: one is for a speaking-focused language course which was optional to the general language course, resulting in different numbers in the experimental (n = 12) and the control (n = 34) group. This design was inevitable under the university's ethical guidelines, to offer the equal learning opportunity to conduct the same assessment tasks (e.g. shadowing and recitation), which set different study hours as a premise between the experimental and the control groups, with an additional two study hours per week for the experimental group. It is also reasonable to assume that participants in the experimental group were highly motivated in learning speaking skills to enrol in the optional Japanese language course in the same semester as the general course. This difference may have already been existent from the very beginning of this study period, in that the initial scores were different between the groups in the pitch-accent accuracy in recitation in STUDY 2 (see Figure 6), which may have resulted in the stronger improvement in speaking skills.

Conclusion

The results of this study suggest that shadowing is effective in improving the speaking skill of accurate pitch-accent. The Wilcoxon signed-rank test results also indicate that the participants showed stronger improvement in shadowing than in recitation. A possible explanation for this is because the study period of seven weeks may not have been sufficient for the participants to internalize the accurate pitch-accent, especially when there were different vocabularies used each week, and between shadowing and recitation. However, considering that participants showed much stronger improvement in shadowing pitch-accent accuracy, it is reasonable to

expect that shadowing can offer participants to be able to practise accurate pitch-accent even before they learn the theoretical rules in textbooks.

This study applied computer-assisted technological tools to quantify speech production on a 100% scale (see Figures 2 and 3 for details), which enabled more elaborated data collection than a conventional marking method to grade the speech in three or five scales at best. However, the scope was limited within the pitch-accent, which is one aspect of the domain of speech production. Considering that the pronunciation was the most popular response by the participants with shadowing in STUDY 1, the author hopes that this study will trigger interest among researchers and practitioners for further shadowing research in the domain of speech production.

References

Ayres, P., & Sweller, J. (2014). The split-attention principle in multimedia learning. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (Vol. 2nd Ed., pp. 206-226). New York: Cambridge University Press.

Ayusawa, T. (2003). Acquisition of Japanese accent and intonation by foreign learners. Journal of the Phonetic Society, 7(2), 47-58.

Baddeley, A. D. (1992). Working memory. Science, 255(5044), 556-559.

Beckman, M. E., & Pierrehumbert, J. B. (1986). Intonational structure in Japanese and English. Phonology Yearbook, 3, 255-309.

Boersma, P., & Weenink, D. (2012). Praat: doing phonetics by computer, version 5.3.35.

Choen, J. (1992). A power primer. Psychological Bulletin, 112(1), 155-159.

Demidenko, E. (2015). The p-value you can't buy. The American Statistician, 70(1), 33-38. doi:10.1080/00031305.2015.1069760

Fadiga, L., Craighero, L., Buccino, G., & Rizzolatti, G. (2002). Speech listening specificcaly modulates the excitability of tongue muscles: A TMS study. European Journal of

Neuroscience, 15, 399-402.

Galantuci, B., Fowler, C. A., & Turvey, M. T. (2006). Theoretical and review articles: The motor theory of speech perception reviewed. Psychonomic Buletin & Review, 13(3), 361-377.

Goldstein, E. B. (2007). Sensation and Perception. Belmont, California: Thomson Wadsworth.

Hamada, Y. (2011a). Improvement of listening comprehension skills through shadowing with difficult materials. The Journal of Asia TEFL, 8(1), 139-162.

Hamada, Y. (2011b). Psychological aspects of shadowing training. The Japan Association for Developmental Education, 6(2), 60-71.

Hamada, Y. (2012). An effective way to improve listening skills through shadowing. The Language Teacher, 36(1), 3-10.

Hamada, Y. (2016). Shadowing: Who benefits and how? Uncovering a booming EFL teaching technique for listening comprehension. Language teaching research, 20(1), 35-52. doi:10.1177/1362168815597504

Hasebe, Y., & Lee, J. H. (2015). Introducing a readability evaluation system for Japanese language education. Proceedings of the 6th International Conference on Computer Assisted Systems for Teaching & Learning Japanese (CASTEL/J), 19-22.

Ishihara, S., Tsurutani, C., & Tsukada, K. (2011). What constitutes "good pronunciation" from L2 Japanese learners' and native speakers' perspectives? A perception study. Electronic Journal of Foreign Language Teaching, 8(1), 277-290.

Kadota, S. (2007). Shadowing to Ondoku no Kagaku [Shadowing and the Science of Oral Reading]. Tokyo: CosmoPier Publishing Company.

Kadota, S. (2012). Shadowing, Ondoku to Eigo Shutoku no Kagaku [The Science of Shadowing, Oral Reading and English Acquisition]. Tokyo: CosmoPier Publishing Company.

Kadota, S., & Tamai, K. (2004). Ketteiban, Eigo Shadowing [The Definitive Edition English Shadowing]. Tokyo: CosmoPier Publishing Company.

Kawaguchi, Y. (1987). Hatsuon Shidō no Ichihōhō [One method of pronunciation instruction].

Bulletin of the Institute of Language Teaching, Waseda University, 23, 48-63.

Kondo, R. (2012). Effects of providing scripts in shadowing practice on learners' Japanese-language acquisition. Japanese Studies Journal, 28(2), 43-57.

Liberman, A. M., & Mattingly, I. G. (1985). The motor theory of speech perception revised. Cognition, 21, 1-36.

Minematsu, N., Hashimoto, H., Hirano, H., Saito, Y., & D. (2015). Development of a prosodic reading tutor of Japanese -Effective use of TTS and F0 counter modeling techniques for CALL-. Proc. SLaTE, 189.

Mochizuki, M. (2006). On the application of shadowing method to Japanese language education : With special reference to relevance of learners' Japanese competence to their self-assessment of the effects of shadowing. Kansai University Audio-Visual Education, 29, 37-53.

Mori, Y. (2011). Shadowing with oral reading: Effects of combined training on the improvement of Japanese EFL learners' prosody. Language Education & Technology, 1-22.

Nakayama, T. (2011). Weak forms in shadowing: How can Japanese EFL learners perform better in shadowing tasks? The Society of English Studies, 41, 17-31.

Onaha, H. (2004). Effect of shadowing and dictation on listening comprehension ability of Japanese EFL learners based on the theory of working memory. JACET Bulletin, 39, 137-148.

Rizzolatti, G., & Arbib, M. A. (1998). Language within our grasp. Trends in Neurosciences, 22(4), 188-194.

Rogna, A., & Hayashi, R. (2012). Accuracy of Japanese pitch accent rises during and after shadowing training. Graduate Schol of Intercultural Studies, Kobe University.

Sakamoto, E. (2008). Second language acquisition of Japanese pitch accent by native speakers of Engliish: An experimental perception study. Sophia Linguistica: working papers in linguistics, 56, 139-150.

Shiki, O., Mori, Y., Kadota, S., & Yoshida, S. (2010). Exploring differences between shadowing and repeating practices: An analysis of reproduction rate and types of reproduced words. Japan Society of English Language Education, 21, 81-90.

Takahashi, E., Fukuda, N., Iwashita, M., & Sakoda, K. (2010). A study of shadowing for advanced language learners - Learners' noticing and instructors' support -. Bulletin of the Graduate School of Education, Hiroshima University, 59(2), 299-308.

Tamai, K. (1992). "Follow-up" no chōkairyoku kōjō ni oyobosu kōka oyobi "follow-up" nōryoku to chōkairyoku no kankei. [The effect of follow-up on listening Comprehension]. STEP Bulletin, 4, 48-62.

Tamai, K. (1997). Shadowing no kōa to chōkai process ni okeru ichizuke [The effectiveness of shadowing and its position in the listening process]. Current English Studies, 36, 105-116.

Tamai, K. (2002). On the effects of shadowing on listening comprehension. Paper presented at the 3rd Annual Conference of JAIS (Japan Association for Interpretation Studies).

Toda, T. (2004). Komyunikeishon no Tame no Nihongo Hatsuon Ressun [Japanese Pronunciation Lessons for Communication]. Tokyo: 3A Network.

Toda, T., Okubo, M., Kamiyama, Y., Konishi, R., & Fukui, K. (2012). Shadowing de Nihongohatsuon Lesson [Japanese Pronunciation Practice through Shadowing] (T. Toda Ed.). Tokyo: 3A Network.

Watkins, K. E., Strafellla, A. P., & Paus, T. (2003). Seeing and hearing speech excites the motor system involved in speech production. Neuropsychologia, 41, 989-994.

Wilson, S. M., Saygin, A. P., Sereno, M., & Iaconobi, M. (2004). Listening to speech activates motor areas involved in speech production. Nature Neuroscience, 7, 701-702.

Zakeri, E. (2014). The effect of shadowing on EFL learners' oral performance in terms of fluency. International Journal of English Language Teaching, 2(1), 21-26.

Chapter 5

Exploring Learners' Perceptions towards Shadowing

5.1 Introduction

This chapter presents findings of the analysis of learners' perceptions in implementing shadowing method into classrooms. In Chapters 2 and 3, I explored the effect of shadowing on listening skills in two different processes, sound recognition ability and the use of listening comprehension strategies, respectively. In Chapter 4, I investigated the effect of shadowing on speaking skills, focusing on accuracy in the prosodic feature of high and low pitch-accent. The suggested effect of shadowing is theoretically supported by activation of the phonological loop in working memory, which requires a cognitively heavy task, since no one listens and speaks at the same time in daily life. This unfamiliar practice may potentially cause resistance among learners, since the quality of teaching can be harmful than beneficial (Markee, 1992, p. 233). In this chapter, I explore the participants' psychological factors, from the motivation framework point of view, in relation to shadowing.

In investigating the learners' perceptions towards shadowing, this study employs the shadowing procedure consistent with the other three projects in Chapters 2, 3 and 4 (e.g. the gradual speed increase of the model audio, marking the accuracy of shadowing reproduction, feedback method), so that the results and findings of this study can be applicable to the whole thesis. This project conducts a survey with 35 questionnaire items compiled through a review of motivation literature (see Appendix 9).

The article which is included in this chapter reports on the findings of the analysis of the participants' perceived motivation and attitudes towards shadowing. I developed the design of the study, carried out the teaching, conducted data collection, marked and provided shadowing

feedback, performed the statistical analysis using the software SPSS (exploratory factor analysis), and drafted the manuscript. My supervisor participated in the design of the study and helped to revise the manuscript critically for important intellectual content. The article was published in *Asian-Pacific Journal of Second and Foreign Language Education* as:

> Sumiyoshi, H., & Svetanant, C. (2017). Motivation and attitude towards shadowing: Learners perspectives in Japanese as a foreign language. *Asian-Pacific Journal of Second and Foreign Language Education*, 2(16), 1-21.

The participants' Information and Consent form for this paper can be found in Appendix 8. It is presented in this thesis in its published format.

5.2 Exploring Learners' Perceptions towards Shadowing

Motivation and Attitude towards Shadowing: Learners Perspectives in Japanese as a Foreign Language

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Abstract

Shadowing has increasingly been recognized as an effective practice for developing listening skills in second language learning. However, there is very little study focusing on learners' psychological aspects in implementing shadowing practice. The aim of this study is to explore second language learners' psychological factors, from the motivation framework point of view, in relation to shadowing practice in Japanese as a foreign language context. This study addresses research questions regarding: (1) perceived effectiveness of shadowing; (2) differences in perception depending on the shadowing performance skills; (3) factors that encourage continuing of shadowing; and (4) perceived positive and negative aspects of shadowing. The participants were 36 university students who were enrolled in an advanced Japanese language unit at an Australian university. They were asked to complete a written survey containing 35 questionnaire items and 3 open-ended questions at the end of the study period. The study employs mixed methods, of quantitative and qualitative approaches, to analyze the results and findings. The results indicate that the majority of participants perceive shadowing as effective for both listening and speaking skills, and agree on the usefulness of feedback. However, individual differences were found in how they favor the shadowing speed in relation to their comprehension of the content. The implication of classroom applications is also discussed.

Keywords: second language learning; Japanese; shadowing; motivation

Shadowing in Language Learning Context

In the field of second language acquisition (SLA), a teaching technique known as 'shadowing' has increasingly been recognized as an effective practice for developing listening skills in Japan. Shadowing refers to an auditory tracking task of simultaneous repetition of heard native speech through a headphone set (Lambert, 1992); which had been originally used as a training method for simultaneous interpreters, as it requires a high competency of both listening and speaking skills occurring at the same time. This act of simultaneous listening and speaking is not only unique to shadowing, but often occurs in our daily lives in a form of inner voice, or sub-vocalization, in the phonological loop of working memory in the brain (Baddeley, 1992). This sub-vocalization typically occurs when thinking aloud, repeating the interlocutor's speech in mind, or even reading a book to process the linguistic information inside the brain. This sub-vocalization is the very key feature of the shadowing technique since it activates high level of intended attention in the working memory. Tamai (1997), the pioneer of shadowing research in Japan's English as a foreign language (EFL) context, re-defined Lambert's definition of shadowing as a training technique of listening which the learner attempts to repeat the incoming information simultaneously as exactly as possible while listening attentively to the heard speech (pp. 105-106).

Tamai (1992) found statistical significance that shadowing was more effective than dictation. Led by Tamai's study, there has seen a rise in popularity of shadowing practice as a L2 teaching technique in Japan. The effectiveness of shadowing has been proven in a number of researches in the EFL context (Hamada, 2011a, 2016; Shiki, et al., 2010; Tamai, 1997), and by some studies in the Japanese as a second language (JSL) context (Kurata, 2007; Mochizuki, 2006; Toda, et al., 2012). The effect of shadowing is attributed to the stimuli of working memory during the attempt of on-line brain activity (simultaneous listening and speaking), which encourages automatization of the bottom-up language processing (Kadota, 2007, 2012). However, Kadota contends that it is a highly cognitive activity, which requires careful consideration by practitioners when implemented

as a pedagogical tool in language classroom teaching. The mechanical characteristic of shadowing practice has been considered suited to Japan's EFL context, since this context is mostly based on grammar-translation method and is a memorization-centered pedagogical culture (Sasaki, 2007); which is why shadowing has won popularity in Japan's L2 learning context.

On the other hand, this suggests possible difficulties in implementing shadowing in a different L2 context, outside Japan, such as in an English speaking context such as Australia in the present study. According to Markee's (1992) framework for innovation in language teaching, the mechanical routine work of shadowing would potentially trigger resistance in employing shadowing practice outside Japan, since the quality of teaching can be more harmful than beneficial (p. 233); largely due to differences in comparison to the L2 pedagogical mainstream of communicative language teaching, where learners' creative language output is mostly emphasized (Hamada, 2015, p.9). In addition, the audiolingual aspect of shadowing practice can also lead to learners' anxiety, such as speech apprehension, test anxiety, and fear of negative evaluation, because shadowing requires learners to output speech in exactly the same manner as in the model audio, in front of an audience in class (Horwitz, et al.,1986).

Taking into consideration these concerns in implementing shadowing in language classes at an Australian university, for the present study, it was decided to conduct shadowing as a homework assessment so that students could fully concentrate on the input of the model audio with a minimum of interference to his/her own output, which is expected to bring positive side effects in alleviating speech apprehension and fear of evaluation in front of the teacher and peers.

Theoretical Background

Motivation is of crucial importance in language learning. It is widely accepted that learners who are motivated are more likely to achieve the learning outcomes than those who are not. In this section, we will explore a variety of motivation theories in the domain of SLA, to build a theoretical

framework for the upcoming empirical analysis.

Motivation is a multifaceted construct and involves attitudinal component which is a strong predictor towards language learning because attitudes directly influence learners' behaviour towards achievement (Gardner, 1985). In his Socio-Educational Model, Gardner explains motivation in L2 learning as a dichotomy between integrative motive and instrumental orientations (ibid, p. 51). Figure 1 illustrates his more recent version of the model (Gardner, 2001, p.4). The central concept of this model is motivation, that is directly influenced by integrativeness and attitudes toward the learning situation (shown by the direction arrows), which all together form integrative motivation. Language aptitude is the other determinant of language achievement, among other support and other factors, which are assumed to involve instrumental motives.

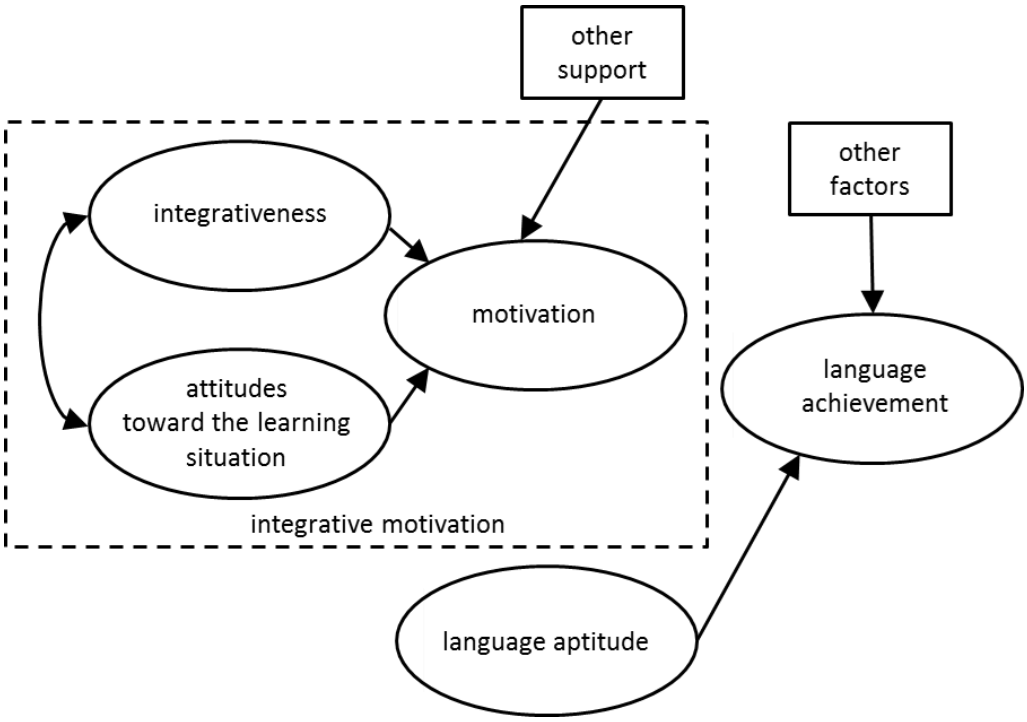

Figure 1 Socio-Educational Model of Second Language Acquisition (Gardner, 2001).

Out of this integrative-instrumental dichotomy, integrative motivation is the most important driver of motivation, since "one complex that seems particularly involved in second language learning was best identified as an integrative motive" (Gardner, 1985, p. 56). However, Gardner's Socio-Educational model is based on a specific social and cultural context, namely the

French-speaking community in Canada, where integrativeness and attitude toward the learning situation reflect genuine interests in the French/English bilingual community. Therefore, this model is considered not very applicable to the context of this study, where the target L2 community has much less to do with the learners of Japanese language in an Australian university.

In elaborating the external factors for integrative motivation, Deci et al. (1991) propose self-determination theory, which involves a motivated process of internalization, through a continuum from extrinsic towards intrinsic motivation (pp. 328-330). The main focus is on the elaboration of extrinsic motivation in four categories, based on the relationship between the external factors and the degree of self-determination.

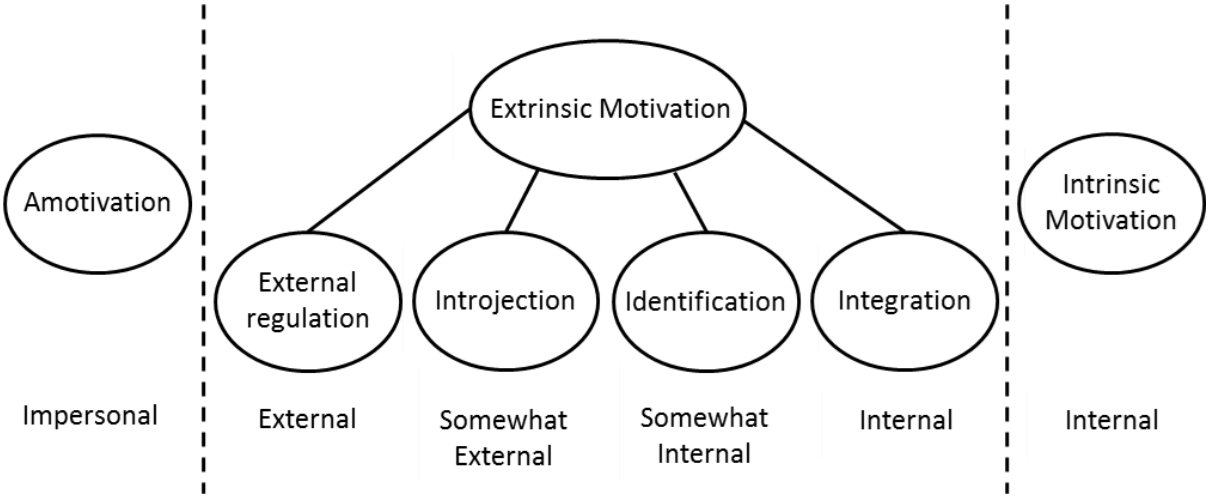

Figure 2 A Taxonomy of Human Motivation, adopted from Ryan & Deci (2000).

Figure 2 presents a visual continuum of self-determination theory, arranged from left to right, from non-self-determined to the most self-determined, in terms of the degree to which the individual is motivated in the behaviour. The far left is the newly added category, amotivation, which is the state of lacking an intention to act (Ryan & Deci, 2000). In the middle block is extrinsic motivation, which is divided into four categories: external regulation, the least self-determined form of extrinsic motivation (e.g. performance due to reward, threat, or to avoid punishment); introjected regulation, involving behaviours incorporating others (e.g. actions in order to impress others, or with the feeling of pressure or guilt); identification, involving behaviour based on personal belief of

worthiness or usefulness (e.g. willing to memorize vocabulary because it is relevant for reading); and integrated regulation, which is similar to intrinsic motivation but not for enjoyment or for interest (e.g. reading a newspaper in L2 because it is a good exercise to improve the target language). The far right end is intrinsic motivation, in which the learner is inherently interested in and enjoys the activity. Intrinsic motivation and extrinsic motivation are fundamentally different from each other, in that they are not mutually transformable (Ryan & Deci, 2000, pp. 61-62). This intrinsic motivation is the primary motivator towards L2 learning, which is equivalent to Gardner's integrative motivation; however, intrinsic motivation is more universal than integrative motivation, because it concerns the target language itself but not the community in which the language is used. For instance, L2 learners are likely to find intrinsic motivation in shadowing, because the activity itself provides realistic use of their target language; but will not necessarily find integrative motivation, because shadowing practice is fundamentally self-completed, and does not necessarily involve interaction with the target community.

Vallerand (1997) further develops and proposes a three-part taxonomy for intrinsic motivation (Watanabe, Oba, Sugiyama, Nohara, & Sakuta): IM-Knowledge is the motivation associated with gaining new ideas and knowledge; IM-Accomplishments relates to the feelings of trying to master the task or achieve the goal; and IM-Stimulation refers to pleasant sensations or enjoyment through performing the task (p. 285). The commonality of these IMs is the pleasant experiences in conducting the task and challenges. Vallerand's IM taxonomy is a significant leap from the traditional integrative/intrinsic motivation, in that IM is not viewed as static trait of L2 learners, such as for inherent interests in the target community or the language itself, but a sequence of sensations/feelings towards certain tasks: that motivation has momentum fluctuations of ups and downs.

This view is common to Dörnyei's (2002) task motivation, in terms of viewing motivation as temporal than static. Dörnyei's model is divided in three phases with different motives: the first

stage is called choice motivation, where motivation has to be generated; followed by the second stage, executive motivation, which relates to the generated motivation needing to be actively maintained; and the final stage is termed motivational retrospection, as the learner will determine the kind of activities to pursue in the future depending on the retrospective self-evaluation of the task (Dörnyei, 2002, p. 140). For example, in the shadowing homework task in the present study, it is the student who decides when and how much to practice (choice motivation), and so also the goal setting as to when to complete the task (executive motivation); then s/he will determine whether the efforts put into the task have been worthwhile, after receiving the feedback (motivational retrospection), which becomes the main source for deciding whether s/he is willing to continue the task in the future. Therefore, this task motivation model is specific to curriculum design; and the teachers' decisions on what activity to conduct becomes crucial, because if a student received negative self-evaluation after the task, s/he would not be willing to conduct the same type of activity again. On the contrary, the task motivation model assumes that students will most likely continue the activity if the first two task motivation phases proceed successfully, resulting in positive motivational retrospection even if the task requires excessive effort from the students.

Dörnyei (2009) further proposed the newest theoretical model in L2 motivation research today, the L2 Motivational Self System, which consists of the following three components: Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. The first component refers to the imaginary L2 speaker that the learner perceives as ideal (the person s/he wishes to become). Dörnyei explains that the Ideal L2 Self "is the powerful motivator to learn the L2 because of the desire to reduce the discrepancy between our actual and ideal selves" (ibid, p. 29); which component corresponds to the integrative and instrumental motives. The second one, Ought-to L2 Self, is related to the attributes that one perceives s/he ought to have, in order to satisfy expectations and to avoid negative outcomes; which is equivalent to more extrinsic types of instrumental motives. Finally, L2 Learning Experience refers to the immediate learning environment and experience (ibid, p. 29). The Ideal L2

Self contributes in a positive manner if it is perceived to be manageable and realistic. On the other hand, it may behave otherwise if the ideal self appears too distant or unrealistic. However, even if it appears distant, it is of vital importance for the learners to see the path towards the ideal self with clear vision, so that they can move forward in concrete steps. Shadowing model material is a good example of this, able to play a role as a 'powerful motivator', since the goal is set by native speech, from which learners likely notice the difference between their current competence and their L2 Self, regardless of the gap being in their listening and/or speaking skills, or as effective communicator in Japanese-speaking community (Sakeda & Kurata, 2016). This is, indeed, for a practical reason, limiting the scope of shadowing assessment criteria within the accuracy against the literal text (and not prosodic features such as pronunciation, intonation, etc.), in order to maintain objectivity in the marking scores; however, this goal setting as an assessment task enables students to set a realistic Ideal L2 Self, and detailed feedback of their shadowing performance is expected to provide a concrete picture of discrepancy between the present self and the assessment goal. It is also expected, on the other hand, that Ought-to L2 Self may invite negative effects for those who are not proficient in shadowing performance, because they may emphasize the distance between the present competence and the assessment goal. Therefore, in applying the L2 Motivational Self System to shadowing, it is best to provide materials that are within proximal range for the learners, so that they can see moderate discrepancy between their performance and Ideal L2 Self.

The main objective of the present study is to investigate the influences of shadowing on L2 learners' psychological factors, from the motivation framework point of view. It is considered crucial to investigate the sources that encourage learners' intention to continue shadowing, in order to improve the implementation of shadowing in JFL context. Therefore, in this study, the afore-mentioned motivation frameworks will be applied specifically for this shadowing study in constructing survey questionnaires, in order to investigate the following research questions:

1. Is shadowing considered effective by the participants?

2. Is there a difference in learners' attitude/motivation towards continuing shadowing, depending on their shadowing performance skills?
3. What are the influential factors that encourage participants to continue shadowing in the future?
4. What are positive and negative aspects of shadowing perceived by the participants?

Methods

Participants

The target participants of this study were Australian university students who were enrolled in an advanced-level Japanese language unit. Since shadowing practice and other listening-related tasks were part of the unit assessment, it was compulsory that students complete those tasks as unit requirements. However, students were told that their participation in this study was voluntary, and their decision would not affect their grades. They were asked to sign the consent form and answer a 3-page survey on the last day of the semester. Since the instructor and the author of this study is the same person, another teaching staff member collected these documents on behalf of the author. This procedure was approved by the university's Ethics Committee. Out of 43 enrolled students, 36 agreed to participate in this study. There are more females (n = 25) than males (n = 11), and all of them were between 18 and 24 years old. The majority of the participants were majoring in Japanese (n = 28), and more than half spoke English as a native language (n = 21), while other native languages included Chinese (n = 11), Korean (n = 2), and others (n = 2). With regard to previous experience in shadowing practice before this study, one third of the participants had experienced shadowing in the previous semester as a unit assessment, while two-thirds (n = 24) had never engaged in shadowing before this study.

Shadowing Materials

In implementing shadowing practice in the second language teaching context, Kadota and Tamai (Kadota & Tamai, 2004) recommend the following six shadowing steps: 1) listening: listening to the audio without the script, and trying to roughly grasp the content and the speech style; 2) mumbling: shadowing without the script, focusing on the heard sound rather than reproducing pronunciation; 3) synchronized reading (content understanding): shadowing with the script, focusing on the meaning of the script; 4) prosody shadowing: shadowing focusing on prosodic features, such as stress, rhythm, intonation, speed, and pause; 5) synchronized reading (difficult points): shadowing with the script, focusing on the parts listeners find difficult; and 6) content shadowing: shadowing focusing on the content without reading the script (p. 62). This set of shadowing steps has been widely referred to by teachers and researchers (Hamada, 2012; Kyo, 2012; Saito, Nagasawa, & Ishikawa, 2011, etc). It is suggested that the level of shadowing script ideally should include 2 or 3 unknown vocabulary items in every 100 words; and that it be presented at the speed that learners can listen and grasp the general meaning, which is the proximal level of i-1, where they can feel comfortable in shadowing (Kadota, 2007, p. 236). This recommended difficulty assumes content shadowing, the final shadowing step focusing on the understanding of the content meaning, in that it limits the least number of unfamiliar words, at moderate speech speed. However, the shadowing materials for the present study were developed in order to target the mastery of prosodic shadowing, focusing on the accuracy of the speech production. Therefore, the shadowing materials in this study included more than a few unknown vocabulary and grammar expressions; while the degree of unfamiliarity may largely vary depending on the language proficiency level of each student. As for the shadowing model audio speed, gradual speed progression method was employed. The main purpose of this method is to ascertain that all the students have become familiar with shadowing practice at relatively slow speed, and then to gradually adjust them to the moderate and then faster speed on a weekly basis, with the aim to be at a native-like speed at the end

of the study period. In doing so, instead of using commercial audio materials (e.g. textbook CDs), the teaching instructor, who is a native Japanese speaker, recorded the model audio himself, in order to flexibly adjust the speech speed to suit best this study design.

Shadowing Feedback

In conducting shadowing, the assessment criteria were placed on the accuracy against the literal text out of 100%, where each mistake was highlighted and corrected above the kana script on the printed feedback sheet, to be returned to students in the following class period. Students were instructed to repeat the week's shadowing material at least six times before recording their shadowing performance, in order to reach their maximum reproduction rate; according to Shiki et al.'s (2010) study result of ceiling effect in shadowing practice of 4 to 5 trials (p. 90). The shadowing-as-homework practice in the present study also contributes in alleviating the aforementioned, Horowitz's test anxiety, because students can re-take their recordings until they become satisfied with their shadowing performance. In Aida's (1994) study of foreign language anxiety in the JFL context, she found that test anxiety was not a contributing factor among American university students, who were enrolled in the second-year Japanese language unit. This finding is consistent with MacIntyre and Gardner's (1991) suggestion that, "as experience and proficiency increase, anxiety declines in a fairly consistent manner" (p. 111). It is reasonable to assume, as far as shadowing-as-homework is concerned, that students are least likely to feel anxious with this activity, even though it is of a listening and speaking nature.

Survey Questionnaires

The survey consisted of three parts: demographic information on the first page; questionnaire items on the second page; and open-ended questions on the third page (see Appendix). The questions in the second part were designed to gather information related to the constructs of the following areas,

containing 5 questions in each category: (1) perception of improvement in listening and speaking (Spiller, Daro, BFabbro, & Bosatra); (2) attitude towards shadowing performance (Pf) and satisfaction (St); (3) intrinsic motivation (Watanabe et al.) and extrinsic motivation (EM); and (4) cost (Ct). The total 35 items were randomly shuffled, and rearranged manually where questions in the same category continued in succession. These items used a six-point Likert-scale, with 6 indicating 'Strongly Agree', 5 'Agree', 4 'Partially Agree', 3 'Partially Disagree', 2 'Disagree', and 1 'Strongly Disagree'. The reason for employing the six-point instead of five-point scale was that the results were expected to present more detailed affirmative/negative orientation if participants were asked to choose whether they 'Agree' or 'Disagree', instead of choosing a neutral answer such as 'not applicable' or 'don't know'.

In constructing questionnaire items for 'motivation', Pintrich et al.'s (1991) Motivation Strategies for Learning Questionnaire (MSLQ) was considered a suitable reference for the present study, because it is widely applicable in the field of educational psychology, and aimed at university students. In addition, its self-reporting items constitute general descriptions rather than specific behaviours (Tseng, Dornyei, & Schmidt, 2006). The selected items were modified and paraphrased specifically to suit shadowing practice. With regard to the items for 'cost', Hamada's (2011b) questionnaire items were referred to and modified according to the shadowing conducted in the present study. The other items ('improvement' and 'attitude') were constructed by taking the actual shadowing conduct into consideration, such as returning detailed feedback, speed progression, and the like.

Data Analysis

a) To check the reliability of the second part of the questionnaire, the Cronbach alpha test was used to measure internal consistency for each category.

b) To address Research Question 1, frequencies and percentages of participants' responses to the

questionnaires were calculated. In doing this, the categories of ‘Strongly Agree’ and ‘Agree’ were merged, and so were ‘Strongly Disagree’ and ‘Disagree’, while ‘Partially Agree’ and ‘Partially Disagree’ remained separate, in order to make clear whether there was a positive or negative orientation toward the questionnaire items.

c) Exploratory factor analysis was performed in order to investigate possible common trends across the questionnaire items.

d) In addressing Research Question 2, participants were divided into two groups, of higher shadowing proficiency and lower proficiency, based on the average shadowing scores throughout the study period. In order to measure the degree of relationship with the questionnaire item of the intention to continue shadowing after this study (item Sf4, see Table 1), Pearson’s correlation coefficients were calculated with Sf4 as the dependent variable.

e) Scatter diagrams were generated to project visual mapping of the relationship between correlation values to the item Sf4 and mean item scores, to identify variables that needed to improve in order to encourage the intention to continue shadowing for Research Question 3.

f) Qualitative analysis was conducted for open-ended questions to explore Research Question 4.

Results and Discussion

Participants’ Responses for Questionnaire Items

Table 1 summarizes the frequency and percentage of responses for the 35 questionnaire items of the second part of the survey. The responses, ‘Agree + Strongly Agree’, and ‘Disagree + Strongly Disagree’, are put together for the purpose of the simple organization of the table; however, the actual scores of 6 scales were used, and negatively phrased items used reversed scores in order to align the positive consistency for statistical analyses. Cronbach alpha was calculated for internal consistent reliability for each category. The high consistency within the improvement (α = .907) and attitude (α = .848) is considered due to the question type being more simple and linear in either

positive or negative expressions (e.g. ‘I think shadowing is effective’, ‘I can become better at shadowing if I practice more’); whereas the motivation category (α = .663) and cost (α = .671), consisting of more complex expressions (e.g. ‘If I can, I want to get better marks in shadowing than most of the other students’, ‘I wait to start shadowing until the submission due date’), resulted in lower Cronbach alpha value.

Table 1 Frequency and percentage of participants’ responses

		Item Summary	Agree + Strongly Agree	Partially Agree	Partially Disagree	Disagree + Strongly Disagree	Mean (*SD*)
Improvement (α = .907)							
Listening (Lt)	1	Shadowing is effective in improving listening skills.	23 (63.9%)	7 (19.4%)	5 (13.9%)	1 (2.8%)	4.69 (1.091)
	2	Listening skills improve if shadowing improves.	21 (58.3%)	12 (33.3%)	3 (8.3%)	0 (0%)	4.72 (0.914)
	3	Listening skills improve the more practice shadowing.	22 (61.1%)	10 (27.8%)	3 (8.3%)	1 (2.8%)	4.72 (1.031)
	4	Became better at listening after practicing shadowing.	28 (77.8%)	5 (13.9%)	3 (8.3%)	0 (0%)	4.94 (0.860)
	$5^{(-)}$	Don't think shadowing is good for listening skills.	1 (2.8%)	4 (11.1%)	8 (22.2%)	23 (63.9%)	4.78 (1.098)
Speaking (Sp)	1	Shadowing is effective in improving pronunciation.	23 (63.9%)	10 (27.8%)	3 (8.3%)	0 (0%)	4.75 (0.874)
	2	Speaking skills will improve if shadowing improves.	24 (66.7%)	1 (2.8%)	7 (19.4%)	4 (11.1%)	4.74 (0.922)
	3	Speaking skills improve the more practice shadowing.	25 (69.4%)	6 (16.7%)	3 (8.3%)	2 (5.6%)	4.69 (1.064)
	4	Pronunciation became better after shadowing.	16 (44.4%)	12 (33.3%)	6 (16.7%)	2 (5.6%)	4.31 (1.091)
	$5^{(-)}$	Don't think shadowing is good for speaking skills.	4 (11.1%)	3 (8.3%)	4 (11.1%)	25 (69.4%)	4.64 (1.355)

Attitude (α = .848)							
Performance (Pf)	1	Become better at shadowing week after week.	21 (58.3%)	9 (25.0%)	5 (13.9%)	1 (2.8%)	4.61 (1.076)
	2	It is important to practice shadowing at a faster speed.	13 (36.1%)	17 (47.2%)	4 (11.1%)	2 (5.6%)	4.25 (1.105)
	3(-)	Not necessary to practice at a speed faster than I can.	6 (16.7%)	7 (19.4%)	11 (30.6%)	12 (33.3%)	3.92 (1.339)
	4	Can become better at shadowing if practice more.	29 (80.6%)	6 (16.7%)	1 (2.8%)	0 (0%)	5.14 (0.798)
	5	Feedback is very useful to find mistakes.	26 (74.3%)	9 (25.7%)	0 (0%)	0 (0%)	5.06 (0.765)
Satisfaction (Sf)	1	Shadowing practice is a valuable learning experience.	22 (61.1%)	10 (27.8%)	4 (11.1%)	0 (0%)	4.81 (1.009)
	2(-)	Shadowing practice did not assist learning in Japanese.	2 (5.6%)	3 (8.3%)	8 (22.2%)	23 (63.9%)	4.75 (1.156)
	3	Recommend shadowing practice to friends.	23 (63.9%)	9 (25.0%)	2 (5.6%)	2 (5.6%)	4.72 (1.085)
	4	Continue shadowing even after completing this unit.	8 (22.2%)	15 (41.7%)	6 (16.7%)	7 (19.4%)	3.67 (1.242)
	5(-)	Don't think shadowing improves conversation skills.	2 (5.6%)	8 (22.2%)	9 (25.0%)	16 (44.4%)	4.29 (1.274)
Motivation (α = .663)							
Intrinsic (IM)	1	Like shadowing because it is challenging.	10 (27.8%)	13 (36.1%)	7 (19.4%)	6 (16.7%)	3.78 (1.290)
	2	Correcting mistakes after the feedback is important.	25 (69.4%)	8 (22.2%)	3 (8.3%)	0 (0%)	4.89 (0.919)
	3	Satisfying thing is to understand the content.	13 (36.1%)	9 (25.0%)	7 (19.4%)	7 (19.4%)	3.83 (1.320)
	4	Choose material to learn even if not for a good grade.	19 (52.8%)	11 (30.6%)	4 (11.1%)	1 (2.8%)	4.54 (1.010)
	5	Practice shadowing to sound like a native speaker.	13 (36.1%)	14 (38.9%)	6 (16.7%)	3 (8.3%)	4.17 (1.134)

Extrinsic (EM)	1(-)	Shadowing should not be marked by the accuracy.	4 (11.1%)	4 (11.1%)	9 (25.0%)	18 (50.0%)	4.34 (1.327)
	2(-)	Not necessary to practice shadowing after feedback.	1 (2.8%)	6 (16.7%)	11 (30.6%)	18 (50.0%)	4.47 (1.082)
	3	Want to get better marks in shadowing than others.	19 (52.8%)	9 (25.0%)	5 (13.9%)	3 (8.3%)	4.47 (1.253)
	4(-)	Practice shadowing to perform well in class.	8 (22.2%)	11 (30.6%)	7 (19.4%)	10 (27.8%)	3.61 (1.358)
	5	Satisfied with 90% mark as already a high mark.	30 (83.3%)	3 (8.3%)	2 (5.6%)	0 (0%)	5.11 (1.105)
Cost (α = .671)							
Cost (Ct)	1(-)	Practicing shadowing makes me tired.	19 (52.8%)	8 (22.2%)	3 (8.3%)	6 (16.7%)	2.83 (1.612)
	2(-)	Cannot start working on shadowing easily.	16 (44.4%)	6 (16.7%)	4 (11.1%)	10 (27.8%)	3.14 (1.823)
	3(-)	Wait to start shadowing until the submission due date.	22 (61.1%)	8 (22.2%)	3 (8.3%)	3 (8.3%)	2.44 (1.370)
	4(-)	Frustrated easily when cannot catch up with the speed.	25 (69.4%)	5 (13.9%)	3 (8.3%)	3 (8.3%)	2.17 (1.363)
	5	Shadowing is not painful.	7 (19.4%)	7 19.4%)	13 (36.1%)	9 (25.0%)	3.28 (1.579)

Notes. (-) Reversed scores towards positive orientation in calculating Cronbach alpha.

It is highly consistent that the majority of participants perceived improvement in listening and speaking in a favorable light, where well over 80% of the responses agree with the positive aspects of shadowing. A similar trend is seen in the category of attitude, that the responses are fairly positively oriented towards shadowing; and most salient of all, 100% agreed that 'feedback is very useful' (Pf5); while 97% think they can become better at shadowing with more practice (Pf4). However, 36% think it is not necessary to practice shadowing at a speed faster than they can speak (Pf3). Although the majority (64%) showed an intention to continue shadowing after this study (Sf4), the remaining population may likely not continue. In the category of motivation, the

responses appear to fall into a diverse distribution: some are apparently positive, where 92% agree that ‘correcting mistakes after feedback is important’ (IM2); and 81% think it is necessary to practice after feedback (EM2), which is consistent with the above response in attitude (Pf5); and 94% are ‘satisfied with high mark’ (EM5); others cannot be said to be either positive or negative. In the last category of cost, there is a definite trend in the responses towards negative orientation against shadowing, where participants tend to procrastinate in completing the shadowing assessment (Ct3 and Ct2), and frustration about the fast speed (Ct4). Although the participants’ responses in Table 1 reveal such complex attitudes towards shadowing, both positive and negative, as far as the research question (1) is concerned, it is reasonable to conclude that the great majority of participants perceive shadowing as effective for improving listening and speaking skills.

In order to identify underlying sources of attitudes towards shadowing, Principal Axis Factoring extraction was used to perform factor analysis on the second part of the survey questionnaires. Since the improvement in listening and speaking questionnaires contain similar expressions, three items out of five from each category (Lt3, Lt4, Lt5, Sp1, Sp2 and Sp5) were excluded for the analysis, based on the communality scores, in order to reduce redundancy. Initially, nine factors with eigenvalues greater than one were extracted. Judging from the degree of the eigenvalues, four factors were considered the most interpretable solution. A Promax rotation was performed since factors were expected to be correlated. Table 2 shows the four factors and named as ‘positive speaking’ (F1 = IM1, Pf1, Sf4, Sf3, Sp4, Sp3, EM1, Pf2 and IM4), ‘accurate listening’ (F2 = EM2 and Lt2), ‘good appearance’ (F3 = EM3, IM5, Ct1 and EM4), and ‘feedback for marks’ (F4 = EM5, Sf1, Pf5 and IM2), based on the items loaded on each factor. Nine items (Pf4, Ct2, Ct5, Sf2, Sf5, IM3, Lt1, Pf3 and Ct4) were not referred to in the naming process, because they were overlapping more than two factors at above 0.3 factor loading scores.

Table 2 Results of Factor Analysis with Promax Rotation

Item	F1	F2	F3	F4	Communality
F1 (Eigenvalue = 9.14 (31.5%), α = .879)					
IM1	0.904	-0.150	-0.042	0.015	0.705
Pf4	0.850	0.045	0.172	-0.400	0.687
Pf1	0.670	0.001	-0.147	0.108	0.502
Sf4	0.669	0.039	0.010	0.031	0.498
Sf3	0.660	0.172	0.068	0.032	0.624
Sp4	0.642	0.114	-0.281	0.079	0.548
Ct2$^{(-)}$	0.634	-0.308	0.360	0.278	0.724
Sp3	0.589	0.191	-0.083	0.011	0.485
Ct5	0.555	-0.098	0.346	0.158	0.565
EM1$^{(-)}$	0.503	-0.057	0.158	0.024	0.296
Pf2	0.407	-0.005	-0.231	0.192	0.272
IM4	0.329	0.115	0.084	-0.168	0.144
F2 (Eigenvalue = 3.04 (10.5%), α = .858)					
EM2$^{(-)}$	-0.170	0.740	0.207	-0.024	0.493
Sf2$^{(-)}$	0.360	0.651	0.018	-0.098	0.730
Sf5$^{(-)}$	0.468	0.605	-0.034	-0.213	0.743
Lt2	0.213	0.598	-0.134	0.272	0.732
IM3	-0.221	0.585	0.496	0.256	0.635
Lt1	0.445	0.576	-0.177	-0.054	0.734
F3 (Eigenvalue = 2.18 (7.51%), α = .694)					
EM3	-0.183	0.119	0.754	-0.118	0.550
IM5	-0.089	0.252	0.615	-0.002	0.424
Pf3$^{(-)}$	0.204	0.322	0.500	-0.202	0.461
Ct1$^{(-)}$	0.140	0.189	0.497	0.217	0.493
EM4$^{(-)}$	0.130	-0.168	0.461	-0.057	0.247
Ct 4	0.240	-0.319	0.365	0.121	0.269
F4 (Eigenvalue = 1.93 (6.65%), α = .650)					
EM5	-0.111	-0.125	-0.063	0.667	0.371
Sf1	0.218	0.291	-0.204	0.562	0.695
Pf5	0.089	-0.031	0.062	0.554	0.362

IM2	-0.088	0.226	0.252	0.469	0.375

Notes. (-) Reversed scores towards positive orientation.

The first factor was named ‘positive speaking’, because it includes favourable attitudes toward shadowing, such as intention to continue shadowing, recommend to friends, like because challenging; and includes speaking skills such as pronunciation and fast speed. The second factor was named ‘accurate listening’, because it consists of the items referring to correcting mistakes and improving listening. The third factor was named ‘good appearance’, since it includes items expressing comparison to other students, in-class performance, and sounding like a native speaker. The fourth factor was named ‘feedback for marks’, as it contains items regarding feedback usefulness and shadowing marks. It is interesting to see how those factors are extracted in certain trends, such as speaking skill with positive attitude (F1) and listening skill with accuracy (F2), which suggests participants tend to perceive speaking skills with more optimistic view than listening skills. In other words, speech output itself is vital in the communicative language teaching context, because the active participation in the communication is the primary target. In such a context, willingness to speak is often valued more than the accurate use of the L2. However, when it comes to listening skills, accuracy is of crucial importance in order to gather accurate information. As for the third factor (F3), it is understandable that, in-class competition and desire to maintain social appearances, or even a desire to impress other peers by native-like L2 speech, naturally occur in group psychology. Finally, the fourth factor (F4) indicates that shadowing feedback is crucial for finding mistakes and getting higher marks. As shown in Table 3, there is a correlation between F1 (positive speaking) and F2 (accurate listening) at $p < 0.01$ level; and between F1 (positive speaking) and F4 (feedback for marks) at $p < 0.05$ level.

Table 3 Correlation Between the Four Factors

	F1	F2	F3	F4
F1 (positive speaking)	1.000			
F2 (accurate listening)	0.544**	1.000		
F3 (good appearance)	0.230	0.069	1.000	
F4 (feedback for marks)	0.384*	0.159	0.150	1.000

Notes. **. Correlation is significant at $p < .01$ level (2-tailed).

*. Correlation is significant at $p < .05$ level (2-tailed).

There is a tendency that the 'positive speaking' and 'accurate listening' factors are highly correlated, with statistical significance, because shadowing targets these very oral/aural skills. Likewise, 'positive speaking' is significantly correlated to 'feedback for marks', which indicates participants' perception of the usefulness of feedback in improving speaking skills. However, 'positive speaking' is not correlated to 'accurate listening', which appears puzzling, because feedback is indispensable for accuracy building. In one explanation, however, this is largely due to the marking method in the present study: that is, the feedback marks are solely based on the accuracy of shadowing (speech production) but not on comprehension of the content (listening). Therefore, it is reasonable to assume that participants develop linkage between feedback and speaking skills, but not listening skills. The third factor, 'good appearance', has no significant correlation to any of the other factors. This is considered to be due to the administration of the shadowing practice as a homework assessment in this study. Speaking activity in the individual's private space, with the freedom of choosing the practice time, undoubtedly helps reduce pressure of in-class competition and/or anxiety of speech presentation.

In order to investigate Research Question 2, participants were divided into two groups, of above and below the median score (50.4), based on their average shadowing performance scores; and they were labelled High Performance (HP, $n = 18$) and Low Performance (LP, $n = 18$), respectively. In measuring the intention to continue shadowing, the questionnaire item, 'I will continue practicing

shadowing even after completing this unit' (Sf4), was set as the dependent variable. Pearson correlation was calculated with other items as the independent variable. The ten most common items are presented in Table 4. In the HP group, five items (IM1: 'like shadowing because challenging', EM1: 'should be marked by submission but not by accuracy', Lt1: 'effective in improving listening skills', Sf3: 'recommend shadowing to friends', and Sf2: 'did not assist language learning') were significantly correlated at $p < .01$ level; and another five items (IM3: 'satisfying thing is to understand content', Pf1: 'become better at shadowing weekly', Pf4: 'become better at shadowing if practice', Sp5: 'shadowing is not good for speaking skills', and Ct2: 'cannot start shadowing easily') were at $p < .05$ level. On the other hand, the LP group has fewer items with statistical significance: three items (Pf1: 'become better at shadowing weekly', Sf1: 'shadowing is valuable learning experience', and Sp1: 'effective in improving speaking skills') are correlated at $p < .01$ level; and four items (IM4: 'choose materials to learn from', IM1: 'like shadowing because challenging', Pf2: 'important to practice at fast speed' and Sp4: 'pronunciation became better') are at $p < .05$ level. There are only two items (IM1 and Pf1) that are common to HP and LP with statistical significance.

Table 4 Top Ten Correlation Values Based on Intention to Continue Shadowing

	High Performance (n = 18)			Low Performance (n = 18)		
	Item	Correlation	Mean (*SD*)	Item	Correlation	Mean (*SD*)
1	IM1	0.820**	4.17 (1.295)	Pf1	0.730**	4.39 (1.195)
2	EM1(-)	0.778**	4.61 (1.092)	Sf1	0.668**	4.56 (1.097)
3	Lt1	0.654**	4.67 (0.840)	Sp1	0.633**	4.67 (0.907)
4	Sf3	0.641**	4.83 (0.985)	IM4	0.570*	4.72 (1.127)
5	Sf2(-)	0.606**	5.00 (1.029)	IM1	0.565*	3.39 (1.195)
6	IM3	0.587*	3.89 (1.323)	Pf2	0.562*	4.06 (0.998)
7	Pf1	0.587*	4.83 (0.924)	Sp4	0.471*	3.94 (1.110)
8	Pf4	0.565*	5.11 (0.832)	Pf4	0.449	5.17 (0.786)
9	Sp5(-)	0.548*	5.06 (0.998)	Sf5(-)	0.445	4.22 (1.555)
10	Ct2(-)	0.535*	3.11 (1.711)	Sp3	0.443	4.72 (1.227)

Notes. **. Correlation is significant at $p < .01$ level (2-tailed).

*. Correlation is significant at $p < .05$ level (2-tailed).

(-) Reversed scores towards positive orientation.

The most salient trend in the HP group in relation to intention to continue shadowing is the challenging (IM1) characteristic of shadowing. The model audio of native speech is certainly challenging for L2 learners; however, the accuracy-based assessment (EM1) enables them to set up a specific goal of their targeted scores (e.g., 80%, 90%, etc.), especially for those who are able to perform shadowing better than others, and see the discrepancy between their current accuracy and 100% as minimal, and therefore, manageable. This realistic ideal self helps in setting up the concrete path towards the goal. Such successful experiences would undoubtedly encourage motivation to continue shadowing; or applying Ryan and Deci's (2000) self-determination theory, this falls within integrated regulation (a form of extrinsic motivation that is closest to intrinsic motivation: e.g. willing to do because it is good for improvement). This positive intention also reflects the willingness to recommend shadowing to other L2 learners (Sf3). Because of the high shadowing performance in this group, it is natural that participants perceive shadowing as effective in listening skills (Lt1), and are interested in the content of the script (IM3). Comprehension of the content requires higher level of linguistic processing, which is built upon bottom-up language processing, starting from the minimum element of the speech, such as sound, morpheme, word, sentence, and so on. Shadowing is fundamentally targeted to automatize this bottom-up processing so that the brain can focus its limited resources on higher language processing in order to comprehend the content (Kadota, 2007).

In contrast, the LP group follows a different trend from its counterpart: in a nutshell, with physical rather than mental aspects, such as perceived improvement in shadowing performance (Pf1, Pf2 and Pf4) and pronunciation/speaking skills (Sp1, Sp4 and Sp3), among other positive aspects of shadowing such as valuable experience (Sf1) and challenging (IM1). This clearly indicates that the intention to continue shadowing among participants with lower shadowing skills is based on bottom-up processing; or in Ryan and Deci's (2000) term, those extrinsically motivated in

identification (the second closest to intrinsic motivation: e.g. willing to do because it is relevant). The equation, that improvement in shadowing performance equals improvement in pronunciation, means improvement in bottom-up processing to aim at higher level of the language processing ladder. It is understandable that they tend to focus on the discrepancy between the present and ideal self while the gap is still large and noticeable. It is the feedback that motivates them to continue shadowing, by providing visible steps to depart from their present selves. In sum, the results shown in Table 4 reveal attitudinal differences depending on the level of mastery of shadowing performance: that is, capable participants are likely to continue shadowing if they find it challenging, effective to their L2 learning, and if feedback is provided to show how much and where they need to improve. On the other hand, less capable participants would continue shadowing if they can improve their basic language skills such as pronunciation and sound recognition.

Besides the correlation value, the mean score of each item must also be taken into consideration, in order to measure the relative positivity with regard to the intention to continue shadowing (Research Question 3). Firstly, a scatter diagram was generated based on the correlation value (Y-axis) and the item mean scores (X-axis). Secondly, the mean of the correlation values and the item scores of the 34 questionnaire items in HP and LP groups were calculated (HP: item $M = 4.27$, correlation $M = 0.367$; LP: item $M = 4.10$, correlation $M = 0.303$), and placed as the origin of the coordinate axes (dotted cross, see Figure 3). Thirdly, items in the area above mean correlation value and below mean item score were identified (encircled area). These are the variables considered extremely important because of the high correlation to the intention item (Sf4) with below average positivity, which poses room for improvement in encouraging the intention to continue shadowing in the future.

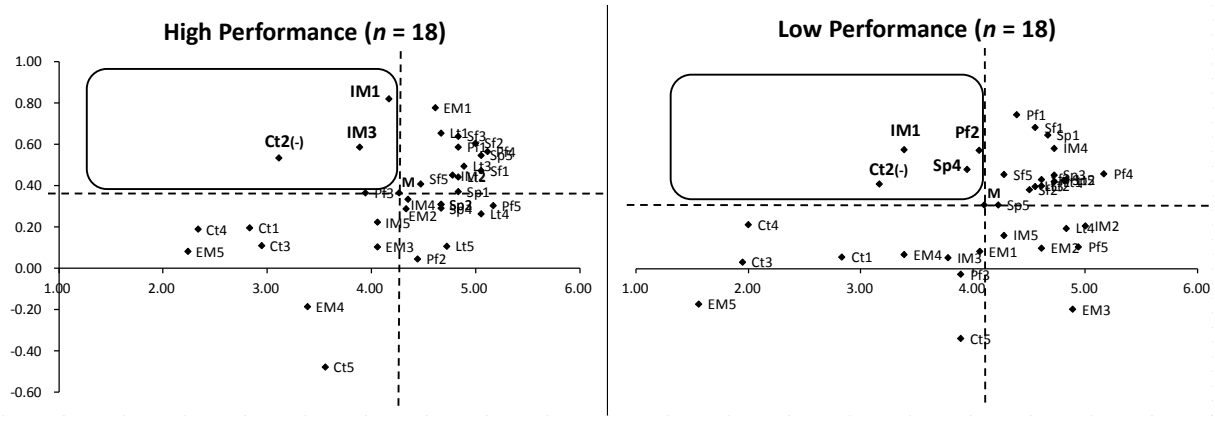

Figure 3 Diagram of Mean of Correlation and Item Scores Based on Intention to Continue Shadowing.

Common to both HP and LP groups, Ct2 (‘I cannot start working on shadowing easily’) and IM1 (‘I like shadowing because it is challenging’) were identified in the encircled area. HP included IM3 (‘the most satisfying thing is to understand the content’), while Pf2 (‘I became better at shadowing’) and Sp4 (‘My pronunciation became better’) were found only in LP group. In order to investigate the relationship between these identified variables, correlation was calculated (see Table 5), and significant correlation was found between Ct2 and IM1 (r = 0.522, p < .05) as well as IM1 and IM3 (r = 0.492, p < .05) for HP group; and Ct2 and Sp4 (r = 0.487, p < .05), IM1 and Pf2 (r = 0.671, p < .01) and IM1 and Sp4 (r = 0.638, p < .01) for LP group.

Table 5 Correlation Between the Variables Encircled in Figure 3

	Ct2$^{(-)}$	IM1	IM3
Ct2$^{(-)}$	1.000		
IM1	0.522*	1.000	
IM3	0.317	0.492*	1.000

Low Performance

	Ct2$^{(-)}$	IM1	Pf2	Sp4
Ct2$^{(-)}$	1.000			
IM1	0.394	1.000		
Pf2	0.412	0.671**	1.000	
Sp4	0.487*	0.638**	0.162	1.000

Notes. **. Correlation is significant at $p < .01$ level (2-tailed).

*. Correlation is significant at $p < .05$ level (2-tailed).

$^{(-)}$ Reversed scores towards positive orientation.

In the HP group, the challenging characteristic of shadowing (IM1) is the common variable in correlation to the sense of cost (Ct2) and satisfaction in understanding the content (IM3). This can create a linear relationship between the variables where significant correlation values function as juncture, that is, IM3 – IM1 – Ct2 line. The line is not directional, because the Pearson correlation does not assume the cause and effect relationship; however, considering procrastination (Ct2) is much like the effect than cause, this line would most likely be interpreted as: content comprehension (IM3) is challenging (IM1), so cannot start working on shadowing easily (Ct2). Therefore, it is suggested that content comprehension of shadowing materials is the key factor in order to improve the item scores of these variables. In other words, it is crucial to take content into consideration in order to encourage participants in the HP group to continue shadowing in the future.

In contrast, there is a different pattern in the LP group: challenging (IM1) and pronunciation (SP4) are the common variables in significant correlation to becoming better at shadowing (Pf2) and procrastination (Ct2), respectively. Applying the same method of correlation juncture above,

Pf2 – IM1 – Sp4 – Ct2 line is created. This can be interpreted as: improving shadowing every week (Pf2) is challenging (IM1) as much as improving pronunciation (Sp4), therefore cannot start working on shadowing easily (Ct2). Considering that shadowing tends to be regarded with the emphasis on bottom-up processing by the participants in the LP group, as discussed in the above section, it is suggested that accurate pronunciation is the key factor in order to improve the item scores of these variables. The result, accordingly, implies that difficulty level of shadowing materials and audio speed need to match the participants' level so that they can maintain high accuracy in their shadowing performance.

Participants' responses for open-ended questions

In response to the open-ended questions of the third part of the survey, 'What do you think are the positive aspect(s) of shadowing practice?', and 'What do you think are the negative aspect(s) of shadowing practice?' (Research Question 4), most participants responded with the following comments: positive aspects: 97%, n = 34; negative aspects: 89%, n = 31. Table 6 summarizes the frequency of the key comments in the HP and LP groups, sorted by the total frequency in each question. There were almost twice as many comments in the positive aspects (total: n = 72) as the negative aspects (total: n = 40), where there were equal number in both groups for the positive aspects (HP: n = 36, LP: n = 36); and more comments from the LP group for the negative aspects (n = 22) than for those from the HP group (n = 18).

Table 6 Frequency of participants' responses in open questions

Positive aspects	High Performance		Low Performance		total
improve speaking	6	(16, 20, 25, 28, 30, 34)	11	(3, 4, 6, 13, 15, 18, 24, 29, 33, 35, 36)	17
improve listening	4	(16, 25, 30, 31)	11	(3, 4, 6, 13, 15, 18, 21, 24, 29, 35, 36)	15
improve pronunciation	7	(1, 10, 19, 20, 23, 25, 27)	5	(3, 7, 26, 33, 35)	12
native-like speech	7	(5, 10, 12, 16, 17, 19, 27)	3	(3, 7, 22)	10
fast speed	6	(2, 10, 16, 27, 28, 32)	3	(3, 9, 22)	9
understanding	4	(10, 17, 23, 31)	2	(33, 35)	6
fun/interesting	2	(2, 10)	1	(36)	3
total	36		36		72
Negative aspects					
speed too fast	6	(5, 16, 20, 23, 25, 30)	12	(4, 7, 9, 13, 15, 18, 22, 24, 26, 33, 35, 36)	18
frustrated/stressed	5	(10, 20, 25, 30, 31)	5	(3, 13, 15, 21, 35)	10
difficult to understand	4	(12, 14, 28, 31)	5	(3, 4, 6, 8, 13)	9
time consuming	3	(5, 10, 27)	0		3
total	18		22		40

Notes. Participant ID number is shown in (brackets).

In terms of the group difference for the positive aspects, the LP group made a predominant number of comments on improvements in speaking (n = 11) and listening (n = 11), compared to the HP group (n = 6, n = 4, respectively). This is assumed to be because the degree of the improvement perceived by the participants in the LP group was larger than those in the HP group. This echoes Tamai's (2002) study results on the effect of shadowing on listening skills among Japanese EFL learners, that shadowing was more effective for students with lower English proficiency than for those with higher proficiency, which is considered to be due to there being more room for improvement. As with the case in the present study, participants with lower shadowing proficiency would have more opportunity to realize a degree of the improvement before and after the practice than those with high proficiency who can perform shadowing well already from the beginning. It is

interesting to find that more HP participants commented on the improvement in pronunciation (*n* = 7) and native-like speech (*n* = 7) than did LP participants (*n* = 5, *n* = 3, respectively), because these are specific aspects in the domain of speaking skills. This suggests that proficient participants are more aware of focused features of speaking skills than are less proficient participants, the latter who tend to perceive speaking skills in general terms. In fact, putting these three aspects together (speaking, pronunciation, and native-like speech), HP and LP sum up in almost equal numbers (HP = 20, LP = 19).

It is also understandable that more HP participants commented on sophisticated aspects of shadowing as positive, such as fast speed of the model audio (*n* = 6) and understanding the content of the materials (*n* = 4) than did LP participants (*n* = 3, *n* = 2, respectively). This is assumed to be because proficient participants can utilize their brain resources besides bottom-up processing for higher language processing to comprehend the content, which can also help accelerate the processing speed once succeeding in automatizing the lower language processing.

As for the negative aspects, the most salient difference between the groups is the number of the comments against the shadowing speed by the LP participants (*n* = 12), which is twice as many as HP participants (*n* = 6). This is a convincing result, because the weekly speed progression of the model audio inevitably increases the difficulty level, especially for those with less proficient participants. However, it is the pedagogical design to adopt this gradual speed progression in order to offer adequate challenge for the L2 learners to make steady progress. Learners then must make effort in order to achieve this goal; which effort may be recognized in the form of challenge or cost, depending on how they perceive the process. In fact, an equal number of participants in the HP group (*n* = 6), and even a small number in the LP group (*n* = 3), perceived the speed progression as positive. It is, however, something that must be considered in future implementation of shadowing practice, with regard to how to adjust the speed progression.

Another outstanding difference between the groups is the comment regarding the

time-consuming aspect of shadowing by HP participants (*n* = 3). This indicates the causal relationship between the amount of time and the shadowing proficiency of these participants: that they maintain high shadowing performance because they spend time. However, the fact that they commented on this time-consuming aspect as negative is either because they simply require more time than other peers, or because feel that they are making no or little progress while practicing shadowing. It is probable that it is the latter scenario in this case: capable students tend to focus on the deduction from 100%, and develop more anxiety from the discrepancy. So-called perfectionist participants may have seen their shadowing performance more from a fear of failure than from a feeling of success, because 95% accuracy is still a 5% deduction from their ideal result (Gregersen & Horwitz, 2002). However, as is suggested in the shadowing improvement to hit the ceiling point after four or five times (Shiki et al., 2010), it is of crucial importance to indicate the goal at the peak of the progress: in other words, practitioners are strongly recommended to remind students to practice shadowing six times but not more than eight times, because little or no progress with greater effort would result in demotivation.

Similar to the comments on the speed of shadowing, understanding of the content also plays an important role in shadowing, since this appears in both positive and negative aspects. The same number of participants made comments on this aspect in the HP group (positive: *n* = 4, negative: *n* = 4) and more negative in the LP group (positive: *n* = 2, negative: *n* = 5). The increase in the number of comments in the LP group in this aspect is considered to be because there were more participants who were not capable of utilising their brain resources enough to comprehend the content, hence, shadowing practice without understanding the content is perceived as negative. The fact that there were an equal number of comments expressing frustration/stress against shadowing in HP group (*n* = 5) and LP group (*n* = 5) is a reflection of the afore-mentioned negative aspects such as speed, being time consuming, and having content without comprehension, among other possible aspects.

As for the third open-ended question, ‘How do you think shadowing practice can be

improved?', most participants responded with comments (89%, *n* = 31) with various suggestions. The most common comments (*n* = 6) were regarding the frequency of shadowing, to increase the total number of shadowing weeks (HP-2), or re-submission after the feedback to observe improvement on the same material (LP-7, LP-8, LP-33); or more shadowing opportunities to reduce the pressure per submission (HP-16, LP-35). These suggestions represent a positive attitude towards shadowing, in that participants are more motivated to practice shadowing than the current shadowing frequency. However, the challenge is the actual practicality of the shadowing administration of feedback marking system by the teaching staff, with regard to the required workload for marking. The most feasible adjustment is to shift the marking system onto the learners' side as a self-study by the student him/herself; but this can occur only after sufficient scaffolding has been provided so that students become able to self-assess and observe the accurate discrepancy between the model audio and their shadowing performance.

Next to the shadowing frequency, four comments were made regarding the content of the shadowing materials. Two participants (LP-26, HP-28) wished to have English translations along with the script, in order to assist comprehension; and the others (HP-5, HP-25) suggested that shadowing content be more interesting. The realization of the former suggestion, an English translation, is fairly simple and possible to provide. However, it may be even more interesting to have learners translate themselves before releasing the translation as an answer, for more effective learning of shadowing materials in enhancing the comprehension of the content. This is closely related to the latter suggestion, to use more interesting content for shadowing to attract learners' attention to the meaning of the materials. In this viewpoint, authentic materials can be used for shadowing such as media clips from movies, TV dramas, and anime, which would certainly add other prosodic features to shadowing performativity besides accuracy. In addition, using drama performance in the language curriculum would encourage students to appropriately consider the context of language usage and to apply what they learn in the activity to real-life situations (Hewgill,

Noro, & Poulton, 2004). However, the selection criteria of shadowing materials must be based on the objectives and learning outcomes of the curriculum. As an introduction of shadowing for first timers, in order to develop a solid foundation of the shadowing technique, monologic script in a steadily paced model audio is considered ideal to meet the accuracy-based objective.

Conclusion

The results of this study indicate that the majority of participants perceive shadowing as effective for both listening and speaking skills. Responses in the open-ended questions also support this point. In addition, all the participants agree on the usefulness of feedback, and believe that more shadowing practice will improve speaking/listening skills. However, individual differences were found in how they favor the shadowing materials at fast speed, especially at a speed that their comprehension cannot process appropriately. This implies the following possible improvement in shadowing administration in class. In order to encourage content shadowing, it is important to establish a checking system that allows participants to review the degree of comprehension of the content. The method would vary depending on the level of engagement required from the participants, from as simple a task as a small quiz on the content (e.g. multiple choice, fill-in-the-blank, open-end questions, etc.) to translation of the entire script. As for the speed progression, it is the principal reason for the negative attitudes towards shadowing in this study, because of the speed being too fast for certain participants to keep up with. However, it is also true that others perceive the speed to be adequate and positively challenging. In solving this dilemma, it is suggested to create two or even three versions at different speeds to meet the levels of participants' shadowing proficiency. In doing so, participants' performance must be closely monitored, and the most appropriate speed could be assigned: for instance, the feedback could include the instruction as to which suggested version of the shadowing material to download for the following week; or it could be self-assigned: students choose depending on level of challenge/frustration.

It is a limitation of this study that the number of participants was small, especially for factor analysis, to generalize the results. This is because the study was conducted on an advanced-level language unit, where the population is usually smaller than in lower levels. Therefore, more research based on the findings of this study is recommended at different levels, such as intermediate and/or introductory levels, where a much larger population is usually expected.

Appendix

Shadowing Survey

Section 1: General information

Name:_____ Student ID number:_____

Please tick an appropriate box for the following questions:

1. Sex: 1. □ Male 2. □ Female
2. What is your first language? : 1.□ English 2.□ Chinese 4.□ Korean 5.□ Other
3. Your Age: 1.□ 16-24 2.□ 25-34 3.□ above 35
4. Born in Australia? : 1.□ Yes 2.□ No (how old when you came to Australia? ____years old.)
5. Japanese Major? 1. □ Yes 2. □ No 3.□ Other (please specify): _____
6. Study mode: 1.□ Full-time 2.□ Part-time
7. Languages you can speak except for English and Japanese (and your native language):
8. How well you can speak above language? :
   1. □ Beginner 2. □ Intermediate 3. □ Advanced 4. □ Native
9. Do you have any previous experience of shadowing before this unit? 1.□ Yes 2.□ No
10. If your answer is Yes, please briefly explain your experience of shadowing (e.g., class, institution, etc) _____
11. Which shadowing speed do you think was most appropriately challenging for you? :
    1. □ W02 (275) 2. □ W04 (300) 3. □ W06 (325) 4. □ W08 (350)
    5. □ W09 (375) 6. □ W10 (400)

Section 2 Questionnaire Items

Please read the following statement and tick the most appropriate answer among SA (Strongly agree), A (Agree), PA (Partly agree), SD (Partly disagree), D (Disagree), and SD (Strongly disagree) for each statement.

(Sp3) 1. I think I can improve my speaking skills the more I practice shadowing.

(Lt4) 2. I think I became better at listening after practicing shadowing.

(Ct2) 3. I cannot start working on shadowing easily.

(Pf2) 4. I think it is important to practice shadowing at a faster speed.

(Sp4) 5. I think my pronunciation became better after practicing shadowing.

(IM1) 6. I like shadowing because it is challenging for me.

(Pf5) 7. The shadowing feedback is very useful because I can find my mistakes.

(EM5) 8. I'm satisfied if I get more than 90% on a shadowing task because it is already a high mark.

(Sp1) 9. I think shadowing is effective in improving my pronunciation.

(Sf2) 10. Shadowing practice did not assist my learning in Japanese language.

(IM3) 11. The most satisfying thing for me in shadowing practice is trying to understand the content as thoroughly as possible.

(EM1) 12. I think shadowing should be marked by the submission, but not by the accuracy of the performance.

(Lt2) 13. I think my listening skills will improve if I improve my shadowing performance.

(Sf1) 14. Overall, shadowing practice provided me with a valuable learning experience.

(EM4) 15. I practice shadowing so that I can perform well in shadowing when I'm selected during the class.

(Sp5) 16. I don't think shadowing is a good exercise for speaking skills.

(IM2) 17. I think correcting my mistakes after receiving the feedback is important to improve my shadowing skills.

(Pf3) 18. I think it is not necessary to practice shadowing at a speed faster than I can speak.

(Ct3) 19. I usually wait to start shadowing until the submission due date is approaching.

(Pf1) 20. I think I have become better at shadowing week after week.

(Lt3) 21. I think I can improve my listening skills the more I practice shadowing.

(Sf5) 22. I don't think shadowing helps improve conversation skills in Japanese.

(Ct5) 23. Shadowing is not painful.

(IM5) 24. I practice shadowing because I want to sound like a native Japanese speaker.

(Sf3) 25. I would recommend shadowing practice to my friends who are learning foreign languages.

(Lt5) 26. I don't think shadowing is a good exercise for listening skills.

(EM2) 27. I think it is not necessary to practice shadowing after receiving the feedback and correct mistakes because the marks are already given.

(Sp2) 28. I think my speaking skills will improve if I improve my shadowing performance.

(Ct4) 29. I get frustrated easily when I cannot catch up with the shadowing speed.

(EM3) 30. If I can, I want to get better marks in shadowing than most of the other students.

(Pf4) 31. I believe in myself that I can become better at shadowing if I practice more.

(Ct1) 32. Practicing shadowing makes me tired.

(Lt1) 33. I think shadowing is effective in improving my listening skills.

(IM4) 34. If I have the opportunity to choose shadowing materials, I choose the ones that I can learn from even if they don't guarantee a good grade.

(Sf4) 35. I will continue practicing shadowing even after completing this unit.

Notes: The order of the items is the same as the actual survey, and the item codes in brackets did not appear on the actual survey.

Section 3 Open-ended Questions

1. What do you think are positive aspect(s) of shadowing practice?
2. What do you think are negative/difficult aspect(s) of shadowing practice?
3. How do you think shadowing practice can be improved?

Please tick: ☐ You may quote my response above in your research project.

☐ You may NOT quote my response above in your research project.

Authors' Contributions

HS developed the design of the study, carried out the teaching, performed the statistical analysis, and drafted the manuscript. CS participated in the design of the study and helped to revise the

manuscript critically for important intellectual content. All authors read and approved the final manuscript.

Competing Interests

The authors declare that they have no competing interests.

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References

Aida, Y. (1994). Examination of Horwitz, Horwitz, and Cope's construct of foreign language axiety: The Case of students of Japanese. The Modern Language Journal, 78(2), 155-168. doi:10.1111/j.1540-4781.1994.tb02026.x

Baddeley, A. D. (1992). Working memory. Science, 255(5044), 556-559.

Dörnyei, Z. (2002). The motivational basis of language learning tasks. In P. Robinson (Ed.), Individual Differences in Second Language Acquisition (pp. 138-158). Amsterdam: John Benjamins.

Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dornyei & E. Ushioda (Eds.), Motivation, language identity and the L2 self (pp. 9-42). Bristol: Multilingual.

Deci, E., Vallerand, R., Pelletier, L., & Ryan, R. (1991). Motivation and education: The self-determination perspective. Educational Psychologist, 26(3 & 4), 325-346. doi:10.1080/00461520.1991.9653137

Gardner, R. C. (1985). Social Psychology and Second Language Learning: The Role of Attitudes and Motivation. London: Edward Arnold.

Gardner, R. C. (2001). Integrative motivation and second language acquisition. In Z. Dörnyei & R. Schmidt (Eds.), Motivation and Second Language Acquisition. Honolulu: University of Hawaii Press.

Gregersen, T., & Horwitz, E. (2002). Language learning and perfectionism: Anxious and non-anxious language learner's reactions to their own oral performance. The Modern Language Journal, 86(4), 562-570.

Hamada, Y. (2011a). Improvement of listening comprehension skills through shadowing with difficult materials. The Journal of Asia TEFL, 8(1), 139-162.

Hamada, Y. (2011b). Psychological aspects of shadowing training. The Japan Association for Developmental Education, 6(2), 60-71.

Hamada, Y. (2012). An effective way to improve listening skills through shadowing. The Language Teacher, 36(1), 3-10.

Hamada, Y. (2015). Uncovering shadowing as an EFL teaching technique for listening: Learners' perceptions, self-confidence, and motivation. Akita University Annual Research Report on General Education, 9(22), 9-22.

Hamada, Y. (2016). Shadowing: Who benefits and how? Uncovering a booming EFL teaching technique for listening comprehension. Language teaching research, 20(1), 35-52. doi:10.1177/1362168815597504

Hewgill, D., Noro, H., & Poulton, C. (2004). Exploring drama and theatre in teaching Japanese: Hirata Oriza's play, Tkyo Notes, in an advanced Japanese conversation course. Sekai no Nihongo Kyoiku, 19, 227-252.

Horwitz, E., Horwitz, M., & Cope, J. (1986). Foreign language classroom anxiety. The Modern Language Journal, 70(2), 125-132. doi:10.1111/j.1540-4781.1986.tb05256.x

Kadota, S. (2007). Shadowing to Ondoku no Kagaku [Shadowing and the Science of Oral Reading]. Tokyo: CosmoPier Publishing Company.

Kadota, S. (2012). Shadowing, Ondoku to Eigo Shutoku no Kagaku (The Science of Shadowing, Oral Reading and English Acquisition). Tokyo: CosmoPier Publishing Company.

Kadota, S., & Tamai, K. (2004). Ketteiban, Eigo Shadowing (The Definitive Edition English Shadowing). Tokyo: CosmoPier Publishing Company.

Kurata, K. (2007). A fundamental study on the cognitive mechanism of shadowing in Japanese - From the view point of oral reproduction, memory span and sentence structure -. Bulletin of the Graduate School of Education, Hiroshima University, 56(2), 259-265.

Kyo, H. (2012). Nihongo gakushū ni mirareru shadowing no kōka [The effect of shadowing observed in Japanese learning]. Meikai Nihongo, 17, 103-111.

Lambert, S. (1992). Shadowing. Meta, 37(2), 263-273.

MacIntyre, P. D., & Gardner, R. C. (1991). Methods and results in the study of anxiety and language learning: A review of the literature. Language Learning, 41(1), 85-117.

Markee, N. (1992). The diffusion of innovations in language teaching. Annual Review of Applied Linguistics, 13, 229-243.

Mochizuki, M. (2006). On the application of shadowing method to Japanese language education : With special reference to relevance of learners' Japanese competence to their self-assessment of the effects of shadowing. Kansai University Audio-Visual Education, 29, 37-53.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ). Michigan: The Univercity of Michigan.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 25, 54-67. doi:10.1006/ceps.1999.1020

Saito, Y., Nagasawa, Y., & Ishikawa, S. (2011). Effective instruction of shadowing using a movie. JALT Conference Proceedings, JALT 2010, 139-148.

Sakeda, M., & Kurata, N. (2016). Motivation and L2 Selves: A study of learners of Japanese at an Australian university. Electronic Journal of Foreign Language Teaching, 13(1), 49-67.

Sasaki, M. (2007). The 150-year history of English language assessment in Japanese education. Language Teaching, 25(1), 63-83.

Shiki, O., Mori, Y., Kadota, S., & Yoshida, S. (2010). Exploring differences between shadowing and repeating practices: An analysis of reproduction rate and types of reproduced words. Japan Society of English Language Education, 21, 81-90.

Spiller-Bosatra, E., Darò, V., Fabbro, F., & Bosatra, A. (1990). Audio-phonological and neuropsychological aspects of simultaneous interpretation: Role of auditory shadowing. Scandinavian Audiology, 19, 81-87.

Tamai, K. (1992). "Follow-up" no chōkairyoku kōjō ni oyobosu kōka oyobi "follow-up" nōryoku to chōkairyoku no kankei. [The effect of follow-up on listening Comprehension]. STEP Bulletin, 4, 48-62.

Tamai, K. (1997). Shadowing no kōa to chōkai process ni okeru ichizuke [The effectiveness of shadowing and its position in the listening process]. Current English Studies, 36, 105-116.

Toda, T., Okubo, M., Kamiyama, Y., Konishi, R., & Fukui, K. (2012). Shadowing de Nihongohatsuon Lesson [Japanese Pronunciation Practice through Shadowing] (T. Toda Ed.). Tokyo: 3A Network.

Tseng, W., Dornyei, Z., & Schmidt, R. (2006). A new approach to accessing strategic learning: The case of self-regulation in vocabulary acquisition. Applied Linguistics, 27(1), 78-102.

Vallerand, R. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. Advances in Experimental Social Psychology, 29, 271-360. doi:10.1016/S0065-2601(08)60019-2

Watanabe, A., Oba, R., Shimizu, T., Sugiyama, M., Nohara, Y., & Sakuta, N. (2013). Japanese

Language Proficiency Test N2 - Complete Mock Exams. Tokyo: J Research Publisher.

Chapter 6

Conclusion

6.1 Introduction

The present study was initially motivated by my experiences as an L2 learner of English in Japan, and as an instructor of Japanese language at an Australian university. With reference to the experiences of classroom shadowing conduct accumulated prior to the commencement of my PhD candidature, I have developed four relevant projects that are centred on shadowing method and integrated as one body of the thesis. Each project focuses on a different aspect of language skills, and specific measuring instruments and/or assessment tools for the collected data were devised. Each project had a study period of one semester; and the equipment used for shadowing conduct was common to general language classroom setting, and learners were required to use recording devices to create their shadowing reproduction audio files. All the shadowing procedures, including recruitment method of participants, in this thesis were approved by the university's Ethics Committee (see Appendix 1); therefore, the shadowing conduct in this study is highly versatile for future implementation into classroom L2 teaching.

This chapter presents an overview of the findings of this thesis, and then the implications for implementing shadowing into L2 pedagogy. It also briefly presents the study's contributions to shadowing research, as well as some of its limitations and recommendations for further directions.

6.2 Overview of the findings

This present research has investigated four main research questions, or four different aspects of language learning using shadowing method. This section presents an overview of the project's key findings.

Research Question 1: What is the most effective shadowing model audio speed to improve sound recognition ability? (Chapter 2)

The analysis of the pre- and post-shadowing pinpoint dictation quiz undertaken by 29 participants indicates that shadowing model audio speed of 400m/m and faster was effective in improving sound recognition ability for L2 Japanese learners at proficiency equivalent to JLPT N2 level.
The analysis also reveals that shadowing model audio speed of 370m/m and slower did not have an effect on participants' sound recognition ability. The sharp decline in the shadowing reproduction accuracy from 430m/m to 440m/m (91.5% to 83.4%) suggests that the most effective shadowing model audio speed range is between 400m/m and 430m/m for this particular L2 proficiency group.
The quasi-experimental research design of this project, recruiting participants from two different Japanese courses in order to divide participants into the experimental and the control groups, reveals two limitations. Firstly, the number of the participants was unequally distributed between the experimental group (with shadowing, enrolled in both courses: $n = 9$) and the control group (without shadowing, enrolled in only one course: $n = 20$). Secondly, the total number of the participants was small, which may not have been sufficient to perform statistical analyses to validate the results for more appropriate interpretation.

Research Question 2: How does content shadowing competence relate to listening comprehension strategy use? Is there any difference in the strategy use at different speech speeds? (Chapter 3)

The analysis of the pre- and post-shadowing pinpoint listening quiz conducted by 22 participants in Advanced Japanese shows that content shadowing is potentially effective for listening comprehension, especially for the top-down strategy. Comparative analysis was performed between

High and Low groups (participants were divided based on their shadowing content quiz scores) on two different listening strategies (bottom-up and top-down) at two different speech speeds (slow: 300m/m and fast: 400m/m). The results suggest that the High group showed improvement in all parts (bottom-up and top-down x slow and fast), while the Low group only showed improvement in top-down strategy at slow speed. The analysis also reveals a limitation of the project in that it does not have a control group and thus lacks generalizability. The small number of the participants, which became even smaller than the original population after the screening process of the completion of all the necessary tasks for analysis, limits the validation of the results of the statistical analysis.

Research Question 3: Is shadowing effective in improving high-low pitch-accent in learners' speech production? (Chapter 4)

The analysis of shadowing reproduction conducted by 20 participants in Intermediate Spoken Japanese shows that the participants improved the accuracy of pitch-accent in their shadowing reproduction over the study period. The analysis also reveals that there were learner variables in which a few participants did not improve pitch-accent accuracy. Responses to survey questionnaires show an overall positive orientation towards shadowing, but those with negative growth in their pitch-accent accuracy responded to all the questionnaires with lower scores than the mean. This suggests that the improvement in pitch-accent accuracy in shadowing reproduction is one of the crucial indicators that represent learners' perceived attitude towards shadowing. Open-ended questions reveal that pronunciation was the most common response for which shadowing was perceived most effective, followed by pitch-accent and fluency at the same rate. The scope of this project was limited to pitch-accent accuracy due to the available assisting computer applications for visualised intonation curves for judging high-low pitch-accent, but an objective measuring method

of pronunciation has not yet been developed even with today's technological advancement.

Research Question 4: How do learners perceive shadowing, and what are the influential factors that encourage them to continue shadowing? (Chapter 5)

The analysis of responses to the survey questionnaires completed by 36 participants in Advanced Japanese reveals that the majority of participants perceived shadowing as effective for both listening and speaking skills. While all the participants agreed on the usefulness of the feedback, individual differences were found in how they favour the shadowing model audio at fast speed. Open-ended questions reveal that the fast speed shadowing materials were perceived as positive, because to some participants, the speed can be adequate and positively challenging. However, as a negative aspect to others, the speed was too fast to keep up with, and they were not able to process comprehension appropriately. These findings reveal implications for future shadowing conduct, to offer different shadowing model audio speeds for the same material for learners to be able to choose for themselves the appropriate challenge. It is also suggested to incorporate a checking system of the content which would enable learners to review the degree of comprehension of the shadowing material.

6.3 Implications

6.3.1 Implementation of shadowing into classroom teaching

While the primary focus of this thesis is to investigate the effect of shadowing in the JFL context at an Australian university, it is also intended to introduce implementation of shadowing method into classroom L2 teaching pedagogy. As a possible reference for the implementation of shadowing method into the future curriculum, the common information on shadowing conducted throughout this thesis is summarised in Table 1.

Table 1. Shadowing method conducted in this thesis

	Item	Summary
1	Classroom facility	Conventional classroom with whiteboard and front speakers (equipped with computer and interactive whiteboard)
2	Assignment type	Homework
3	Shadowing method	Submission: audio file Practice period: 5 days Study period: 6-8 weeks
4	Feedback	Manual marking by the instructor, accuracy-based 100% scale Marking workload: approx. 3 hours for 50 submissions
5	Shadowing model audio	Distribution: audio file via online course module Type: textbook CD audio, online texts, NHK news Speed: gradual increase (speed range varies depending on proficiency level, research objectives)

The ideal classroom facility for conducting shadowing is a type of simultaneous interpretation institution, according to the author's experience, where audio jacks are installed at each learner's desk corner which are connected to the instructor's audio device. Learners bring their own headphones and plug into the jack and participate in the shadowing training. This type of classroom allows the instructor to play, pause and repeat the model audio while the learners are listening to the same audio, which is considered especially beneficial when it comes to detecting and practicing difficult parts of the model audio common to many/some learners in the classroom. This unique facility illustrates the importance of the use of headphones during shadowing in order to enable learners to focus on the incoming sound without any distraction from the utterances of other peers and even the learner's own voice.

However, many, if not most, language classrooms are not equipped with audio device/audio jacks for each learner. Therefore, most common shadowing practice in a classroom is to use the front speakers and shadow all together, but it is likely that the effect of shadowing is inhibited due to distraction from the noise of others and thus a minimal focus on the model audio. It may be possible

to have learners use their own mobile device with headphones, but this is likely to cause a mess, since each learner is shadowing different parts at different timings, and most likely no one could hear the instructor's cues/instructions.

Regardless of the type of the classroom facility, it is highly recommended to conduct shadowing as a homework assignment because the in-class shadowing activity may likely be insufficient by itself to achieve the expected practice effect, and also the time required to make progress of the week's shadowing model audio may well be different for individual learners. It is also reasonable to assume that the shadowing-as-homework-assignment would encourage learners to engage more in this task because it is part of the final grades. In the past when the author first introduced shadowing into his classroom teaching, he offered shadowing as an optional activity not as an assignment task included as part of the final grades. As a result, the submission rates, which were nearly half in the earlier weeks of the semester, dropped to only a few submissions at the end. However, since including shadowing as part of the final grades in the following year, the submission rates remained at high level throughout the semester due to the apparent enforceability under the course grading system.

In incorporating shadowing as homework, it is necessary establish a checking system, as it reflects part of the final grades. In this thesis, learners were required to upload shadowing files via the online course module, and the submission due was set two days before the week's class so that the instructor could mark the submissions before the class. This makes the weekly shadowing cycle one in which learners have five days to practice the week's shadowing model audio. There are various scoring methods conceivable, for instance: from a simple submission counting method where a submission itself is worth the full mark; to a detailed marking method as applied in this thesis to mark the accuracy of the entire texts. In the former case, while there is less/no marking workload for the instructor, the learner engagement may become less since an effort-free submission can be worth full marks. On the other hand, the detailed marking method is

advantageous in that the learners' shadowing skills can be closely monitored, and learners can become more aware of their mistakes/errors; however, it requires the instructor's extra workload. For example, the marking hours may depend on the length and difficulty of the model audio: it took approximately three hours to mark about 50 submissions of one-minute shadowing reproduction, each week. This marking method was to highlight and correct each mistake by mora unit, which is the most detailed method which requires the longest marking hours. Other marking methods can be applied depending on the instructor's available workload, such as marking per word or cloze unit, which would presumably take less working hours while enabling one to monitor learners' shadowing skills.

Finally, the model audio selection for this thesis was based on the purpose of measuring listening ability and accuracy of the prosodic feature of high-low pitch-accent. A monologue format with constant speed was considered the most suitable material for the research objective, as it does not contain differences by the interlocutors typically seen in a dialogue format, such as gender, individual tone difference, dialects and the like. The simplicity of monologue was also considered appropriate for introducing to learners who have no prior experience of shadowing method. By contrast, it would be interesting to use audio media from various genres for learners who are already accustomed to shadowing. In any case, it is recommended for the speed of the model audio to start slower than the instructor may assume is appropriate, especially for the first time at the shadowing attempt, then to gradually aim to reach the target speed towards the end of the study session. The true value of shadowing can be said to lie in the progress achieved by repeating the same model audio, which is somehow similar to the process of practicing a song such as in a case of karaoke, especially fast songs such as in rap music which require more practice than slower songs. In other words, mastery of more shadowing model audio leads to the development of a wider repertory of L2 use.

6.3.2 Future directions

The present study opens up space for further explorations in terms of a number of directions. Firstly, the shadowing procedures proposed in this study are not exhaustive. The study leaves aside numerous options adaptable depending on the objectives of curriculum design. The shadowing procedures are now open to be revised, with an aim to further refine according to specific teaching contexts. Secondly, the marking and feedback method applied in this study offers a number of advantages in that: it allows the investigator to monitor learners' progress of shadowing skills; it enhances learning effect, since learners are informed of their detailed mistakes/errors for further improvement; and above all, it plays a crucial role as scaffolding to develop shadowing method as a new learning technique. Chapter 5 investigated learners' perceived motivation towards shadowing on a basis of 'intention to continue shadowing' after the completion of the course. In order for learners to become continuous users of shadowing method, it is considered necessary to become autonomous learners who are intrinsically motivated in shadowing, rather than extrinsically regulated by assignment tasks for grade points. To that end, learners need to seek for possible shadowing materials by themselves, but these are not difficult to find in today's online age, in fact, there are abundant available media materials suitable for shadowing method.

The premise of shadowing materials is that the audio needs to be attached with written texts that are exactly the same as each word at morpheme level. This is because learners must be able to check and learn with the written texts where they have difficulty in listening, reproducing, or recognising unknown words, which is the first milestone of shadowing (prosody shadowing), to reproduce the model audio as accurately as possible. With regard to the length of the model audio, approximately one minute is considered suitable for shadowing. If the material is 30 seconds in length, the content is likely to be insufficient for a comprehension exercise; by contrast, if it is longer than one minute, the cognitive load becomes too heavy and may lead to demotivation. In fact, the textbooks used for shadowing materials (read aloud textbook: Chapters 2 and 3; and

pronunciation textbook: Chapter 4) mostly contain audio materials of approximately one minute in length. This suggests that one minute is appropriate for L2 learners for listening and speaking practice. Furthermore, online NHK news video clips (Chapter 2) usually contain around a one-minute running time, which suggests that the length of one minute is also appropriate for a native audience in delivering a sufficient amount of information.

In this sense, online news video clips are recommended shadowing materials for advanced learners, as many such online video clips provide written texts that news anchors utter in the video, almost exact matched by word to word. In addition, news materials are advantageous in that they deal with the current up-to-date events and terminology of the target language and culture. Similarly, popular media such as movies, anime and drama in DVD and/or Blu-ray format can be suitable sources for shadowing materials, as they provide subtitles in the target language (almost the same as the utterances by the actors/characters), which can be switched on/off by the subtitle option. In the field of SLA, language learning using drama materials is reported to encourage more authentic L2 communicative use, such as real-life contextual use of the target language (Hewgill et al., 2004), and performativity enhances emotional expression (Bryce et al., 2013). In addition, teaching materials that attract learners' interests can improve motivation and allow them to help themselves to form an autonomous learning environment by active search and selection of shadowing model audio materials.

6.4 Contribution to the field of shadowing research

This present study contributes to the field of shadowing research in that it proposes the application of elaborate speech rates in the model audio and measuring instruments. The speech speeds in Japanese are usually referred to on subjective scales such as "slowly", "near-natural speed", and "natural speed" (Japan Foundation, 2017); however, there is no specific indicator of such speeds for teachers and researchers to replicate the specific speeds in order to develop study materials

according to the JLPT guidelines on the speeds provided as above. In English, speech rates are generally calculated by the number of words per minute (Hausfeld, 1981; Jester & Travers, 1966). While this calculation method offers standardised speech rates in a simple and practical manner, there may be discrepancies between the speech rates and actual speech speeds depending on the words the texts contain, because words consist of different numbers of syllables, which should be considered as the element of the speech length. In Japanese, on the other hand, a simple and practical method may be to calculate by the number of characters per minute. However, in the case of Word documents, punctuation marks are also counted, which is not part of the speech. In addition, the number equally includes kana scripts and kanji characters: the former is a phonetic writing system of one mora per script; but kanji characters are a phonetic-ideographic writing system containing a different number of mora by each character. As a result, the word count does not reflect the number of mora in the texts. In this study, the speech rates were calculated based on the number of kana scripts (mora) by converting kanji characters into kana scripts and removing punctuation marks in Word documents in order to measure accurate speech rate based on the number in the phonetic representation (Marushima, 2009; Suzuki & Ogura, 1970).

This calculation method of speech rate enables the creation of gradual speed increase in shadowing model audio under a standardised measurement. This consistency among the speech speeds is crucial for valid comparisons between the shadowing model audio and measurement instruments. This contributes to further elaboration of the analysis of the collected data based on different speeds; which is entirely new to shadowing research in Japanese as a foreign language (JFL) and Japanese as a second language (JSL).

This study makes another contribution to the field of shadowing research with the detailed marking of shadowing reproduction, in that it proposes a relationship between the shadowing reproduction rates and the shadowing model audio speeds. The speed range was adjusted in consideration of the proficiency level and the research objectives. The reproduction accuracy was

found to decrease as the model audio speed increased in all the projects. This indicates that speech speed is one of the crucial factors that determine the difficulty of the model audio. For example, for intermediate level learners for the speech production project, the speed increased from 220m/m to 305m/m, and the participants' reproduction accuracy rates were 94.3% and 89.5%, respectively; for advanced learners for the comprehension process project, the speed increased from 330m/m to 400m/m with reproduction accuracy rates of 94.6% and 93.7%, respectively; and for advanced learners for the sound recognition ability project, the speed increased from 315m/m to 440m/m with reproduction accuracy rates of 94.1% and 83.4%, respectively. These data are only partial and specific to the group of participants in this study; however, the findings of the relationship between the proficiency level, the reproduction accuracy and speech speeds are a valuable reference for future study and implementation of shadowing method.

6.5 Limitations of the thesis

The author developed and used shadowing materials and measurement instruments according to each research topic over the four semesters from 2016 to 2017 in an Australian university's Japanese language courses. Therefore, the target participants were recruited within the author's teaching Japanese courses during the period of his PhD candidature, which were mostly the advanced Japanese courses. Although higher proficiency language courses allow flexibility to use a wide variety of shadowing materials according to the research topics, the advanced language courses tend to have a smaller number of enrolments compared to lower proficiency levels such as intermediate and introductory courses. Similarly, the second semester tends to have less enrolment numbers than the first semester, due to the fail grades and/or students' majoring options. For instance, in the university where the data for this thesis were collected, there were about 50 students enrolled in the first semester, and about 40 students continued in the second semester on average in 2016 and 2017. The number of participants became even smaller than the above after the screening

process, of participants' consent, shadowing submissions, and pre- and post-tests necessary for analysis. These recruitment conditions resulted in 29 participants in Chapter 2, 22 in Chapter 3, 20 in STUDY 1 and 46 in STUDY 2 in Chapter 4, and 35 in Chapter 5, which participant numbers is one of the limitations of this thesis for generalizability of the statistical analysis, and also small participant numbers tend to obtain non-significant results in statistical analysis (Demidenko, 2015).

Furthermore, as each study was designed under the guidelines of the university's ethics committee, it was extremely difficult to create a control group under the condition where it was not permitted to conduct different tasks in the same course. This can be a crucial limitation for research to investigate the effect of shadowing; however, the Chapter 2 study was able to establish a control group by dividing the participants into two groups of 'with shadowing' (who were enrolled in both the spoken Japanese course and general Japanese course) and 'without shadowing' (who were enrolled in the general Japanese course only), though this quasi-experimental design resulted in different numbers of participants in the experimental and the control groups, which may also limit the generalizability of the results of the study.

6.6 Concluding remarks

While an improvement in listening and speaking skills is one of the most difficult areas of second language learning, there are limited practice methods for learners to develop these skills. Shadowing research in Japan makes a significant contribution to the field of second language acquisition (SLA) by proposing the effective practice method of shadowing for improving these language skills, but the popularity of shadowing is mostly limited to Japan, and very few studies have been reported outside Japan. However, this thesis demonstrates the sufficient practicality of shadowing method in an Australian university, and the possible effects among learners of Japanese as a second language in improving their listening and speaking skills.

Shadowing procedure offers various options in implementing it into L2 classrooms, which is

the merit of a high degree of freedom in development, such as model audio materials, measuring devices, and feedback procedures, which are adjustable according to the learning objectives and teaching contexts. However, the act of simultaneous listening and speaking while shadowing is an unusual act in daily life and imposes a heavy cognitive load onto learners. Therefore, it is necessary for practitioners to take these aspects into consideration in negotiation within their teaching contexts in reference to the items suggested by this study. In addition, since shadowing requires a high cognitive load, it is suggested to set a rather short practice time before learners feel fatigue from the practice. One indicator for reference of the practice time per session may be several repetitions of the shadowing material, since the reproduction rates tend to hit a ceiling point after four or five trials (Shiki et al., 2010). Hence, shadowing method may best be implemented as one of the practice options for listening and speaking, among various practice methods in the curriculum.

References

Aida, Y. (1994). Examination of Horwitz, Horwitz, and Cope's construct of foreign language axiety: The Case of students of Japanese. The Modern Language Journal, 78(2), 155-168. doi:10.1111/j.1540-4781.1994.tb02026.x

Audacity_Team. (2018). Audacity(R): Free Audio Editor and Recorder [Computer application] (Version 2.2.2). Retrieved from https://audacityteam.org/

Ayres, P., & Sweller, J. (2014). The split-attention principle in multimedia learning. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (Vol. 2nd Ed., pp. 206-226). New York: Cambridge University Press.

Ayusawa, T. (2003). Acquisition of Japanese accent and intonation by foreign learners. Journal of the Phonetic Society, 7(2), 47-58.

Baddeley, A. D. (1992). Working memory. Science, 255(5044), 556-559.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? Trends in Cognitive Sciences, 4(11), 417-423.

Baddeley, A. D. (2012). Working Memory: Theories, models, and controversies. Annual Review of Psychology, 63, 1-29.

Beckman, M. E., & Pierrehumbert, J. B. (1986). Intonational structure in Japanese and English. Phonology Yearbook, 3, 255-309.

Bianco, J. L. (2009). Return of the good times? Japanese teaching today. Japanese Studies, 29(3), 331-336.

Boersma, P. (2001). Praat, a system for doing phonetics by computer. Glot International, 5(9/10),

341-345.

Boersma, P., & Weenink, D. (2012). Praat: doing phonetics by computer, version 5.3.35.

Bryce, M., Suzuki, H., Mori, T., Sumiyoshi, H., & Barber, C. (2013). Performing language in Japanese language learning. THE INTERNATIONAL JOURNAL OF LEARNING, 18(12), 85-94.

Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. Cognition and Instruction, 8(4), 293-332.

Chang, J. (2008). The result and prospection in applying shadowing training into Japanese conversation class (2) -Using Wenzao Ursuline College of languages. Department of Japanese as Model-. Taiwan Application Japanese Association, 5, 415-430.

Choen, J. (1992). A power primer. Psychological Bulletin, 112(1), 155-159.

Déjean Le Féal, K. (1997). Simultaneous interpretation with "training wheels". Meta, 42(4), 616-621.

Dörnyei, Z. (2002). The motivational basis of language learning tasks. In P. Robinson (Ed.), Individual Differences in Second Language Acquisition (pp. 138-158). Amsterdam: John Benjamins.

Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dornyei & E. Ushioda (Eds.), Motivation, language identity and the L2 self (pp. 9-42). Bristol: Multilingual.

Darro, V., & Fabbro, F. (1994). Verbal memory during simultaneous interpretation: Effects of phonological interference. Applied Linguistics, 15(4), 365-381.

Deci, E., Vallerand, R., Pelletier, L., & Ryan, R. (1991). Motivation and education: The self-determination perspective. Educational Psychologist, 26(3 & 4), 325-346.

doi:10.1080/00461520.1991.9653137

Demidenko, E. (2015). The p-value you can't buy. The American Statistician, 70(1), 33-38. doi:10.1080/00031305.2015.1069760

Du, Y. (2009). Chokaijugyo ni okeru suisoku sutoratejishido no kokoromi [An attempt to introduce inference strategy in listening lesson]. Journal of Japanese Language and Culture, 5, 167-194.

Ellis, R. (1997). Second Language Acquisition. New York: Oxford University Press.

ETS. (2016). Test and score data summary for TOEFL iBT Tests. Retrieved from www.ets.org/toefl

Fadiga, L., Craighero, L., Buccino, G., & Rizzolatti, G. (2002). Speech listening specificcaly modulates the excitability of tongue muscles: A TMS study. European Journal of Neuroscience, 15, 399-402.

Freeman, D. L. (1986). Techniques and Principles in Language Teaching. New York: Oxford University Press.

Galantuci, B., Fowler, C. A., & Turvey, M. T. (2006). Theoretical and review articles: The motor theory of speech perception reviewed. Psychonomic Buletin & Review, 13(3), 361-377.

Gardner, R. C. (1985). Social Psychology and Second Language Learning: The Role of Attitudes and Motivation. London: Edward Arnold.

Gardner, R. C. (2001). Integrative motivation and second language acquisition. In Z. Dörnyei & R. Schmidt (Eds.), Motivation and Second Language Acquisition. Honolulu: University of Hawaii Press.

Gathercole, S. E., & Baddeley, A. D. (1993). Working Memory and Language. Hove, England:

Lawrence Erlbaum Associates.

Goh, C. (1997). Metagognitive awareness and second language listeners. ELT Journal, 51(4), 361-369.

Goldstein, E. B. (2007). Sensation and Perception. Belmont, California: Thomson Wadsworth.

Gregersen, T., & Horwitz, E. (2002). Language learning and perfectionism: Anxious and non-anxious language learner's reactions to their own oral performance. The Modern Language Journal, 86(4), 562-570.

Hamada, Y. (2011a). Improvement of listening comprehension skills through shadowing with difficult materials. The Journal of Asia TEFL, 8(1), 139-162.

Hamada, Y. (2011b). Psychological aspects of shadowing training. The Japan Association for Developmental Education, 6(2), 60-71.

Hamada, Y. (2012). An effective way to improve listening skills through shadowing. The Language Teacher, 36(1), 3-10.

Hamada, Y. (2014). The effectiveness of pre- and post-shadowing in improving listening comprehension skills. The Language Teacher, 38(1), 3-10.

Hamada, Y. (2015). Uncovering shadowing as an EFL teaching technique for listening: Learners' perceptions, self-confidence, and motivation. Akita University Annual Research Report on General Education, 9(22), 9-22.

Hamada, Y. (2016). Shadowing: Who benefits and how? Uncovering a booming EFL teaching technique for listening comprehension. Language teaching research, 20(1), 35-52. doi:10.1177/1362168815597504

Hasebe, Y., & Lee, J. H. (2015). Introducing a readability evaluation system for Japanese language

education. Proceedings of the 6th International Conference on Computer Assisted Systems for Teaching & Learning Japanese (CASTEL/J), 19-22.

Hausfeld, S. (1981). Speeded reading and listening comprehension for easy and difficult materials. American Psychological Association, 73(3), 312-319.

Hewgill, D., Noro, H., & Poulton, C. (2004). Exploring drama and theatre in teaching Japanese: Hirata Oriza's play, Tkyo Notes, in an advanced Japanese conversation course. Sekai no Nihongo Kyoiku, 19, 227-252.

Horwitz, E., Horwitz, M., & Cope, J. (1986). Foreign language classroom anxiety. The Modern Language Journal, 70(2), 125-132. doi:10.1111/j.1540-4781.1986.tb05256.x

Ishihara, S., Tsurutani, C., & Tsukada, K. (2011). What constitutes "good pronunciation" from L2 Japanese learners' and native speakers' perspectives? A perception study. Electronic Journal of Foreign Language Teaching, 8(1), 277-290.

Isomura, K. (2009). Onsei wo Oshieru [Teaching Speech Sound]. Tokyo: Japan Foundation.

Iwashita, M. (2008). The effectiveness of shadowing training on Japanese leareners - Based on month-long longitudinal study. Bulletin of the Graduate School of Education, Hiroshima University, 2(57), 219-228.

Japan Foundation. (2016). Retrieved from http://www.jpf.go.jp/j/about/press/2016/dl/2016-057-2.pdf

Japan Foundation. (2017). Japanese language proficiency test. Retrieved from http://www.jlpt.jp/e/about/points.html

Kachru, B. B. (1992). The Other Tongue: English across Cultures. Urbana and Chicago: University of Illinois Press.

Kadota, S. (2007). Shadowing to Ondoku no Kagaku [Shadowing and the Science of Oral Reading]. Tokyo: CosmoPier Publishing Company.

Kadota, S. (2012). Shadowing, Ondoku to Eigo Shutoku no Kagaku [The Science of Shadowing, Oral Reading and English Acquisition]. Tokyo: CosmoPier Publishing Company.

Kadota, S., & Tamai, K. (2004). Ketteiban, Eigo Shadowing [The Definitive Edition English Shadowing]. Tokyo: CosmoPier Publishing Company.

Kawaguchi, Y. (1987). Hatsuon Shidō no Ichihōhō [One method of pronunciation instruction]. Bulletin of the Institute of Language Teaching, Waseda University, 23, 48-63.

Klingberg, T., Forssberg, H., & Westerberg, H. (2002). Training of working memory in children with ADHD. Journal of Clinical and Experimental Neuropsychology, 24(6), 781-791.

Kondo, R. (2012). Effects of providing scripts in shadowing practice on learners' Japanese-language acquisition. Japanese Studies Journal, 28(2), 43-57.

Krashen, S. (1985). The Input Hypothesis: Issues and Implications. London: Longman.

Kurata, K. (2007). A fundamental study on the cognitive mechanism of shadowing in Japanese - From the view point of oral reproduction, memory span and sentence structure -. Bulletin of the Graduate School of Education, Hiroshima University, 56, 259-265.

Kurata, K. (2008). The influence of memory span, Types of sentences, and context on the phonological processing and semantic processing during shadowing in Japanese: A focus on Japanese native speakers. Bulletin of the Graduate School of Education, Hiroshima University, 57, 229-235.

Kurata, K. (2009). The influence of memory capacity on performance on text shadowing. Bulletin of the Graduate School of Education, Hiroshima University, 58, 185-193.

Kyo, H. (2012). Nihongo gakushū ni mirareru shadowing no kōka [The effect of shadowing observed in Japanese learning]. Meikai Nihongo, 17, 103-111.

Lambert, S. (1992). Shadowing. Meta, 37(2), 263-273.

Leahy, W., & Sweller, J. (2011). Cognitive load theory, modality of presentation and the transient information effect. Applied Cognitive Psychology, 25, 943-951. doi:10.1002/acp.1787

Levelt, W. J. M. (1989). Speaking: From Intention to Articulation. Cambridge, Mass.: MIT Press.

Liberman, A. M., & Mattingly, I. G. (1985). The motor theory of speech perception revised. Cognition, 21, 1-36.

Long, D. R. (1990). What you don't know can't help you: An exploratory study of background knowledge and second language listening comprehension. Studies in Second Language Acquisition, 12, 65-80.

Lund, R. J. (1991). A comparison of second language listening and reading comprehension. The Modern Language Journal, 75(2), 196-204.

MacIntyre, P. D., & Gardner, R. C. (1991). Methods and results in the study of anxiety and language learning: A review of the literature. Language Learning, 41(1), 85-117.

Maeda, A. (1998). Nichijō kaiwa ni okeru joshi no shōryaku [Particle ommision in daily conversation]. Bulletin of the International Student Center, Nagasaki University, 6, 43-70.

Markee, N. (1992). The diffusion of innovations in language teaching. Annual Review of Applied Linguistics, 13, 229-243.

Matsuura, M., Fukuike, A., Kohno, M., & Yoshida, K. (2014). Maneshite Jōtatsu! Nihongo Ondoku Torēningu [Mimic and Improve! Japanese Reading Aloud Training]. Tokyo: ASK Publishing.

Minematsu, N., Hashimoto, H., Hirano, H., Saito, Y., & D. (2015). Development of a prosodic reading tutor of Japanese -Effective use of TTS and F0 counter modeling techniques for CALL-. Proc. SLaTE, 189.

Mizuta, S. (1996). Dokuwa kikitori ni mirareru mondaishori no sutorateji [Strategy of problem solvong as seen in mnologue listening]. Japanese Language Education around the Globe, 6, 49-64.

Mochizuki, M. (2006). On the application of shadowing method to Japanese language education : With special reference to relevance of learners' Japanese competence to their self-assessment of the effects of shadowing. Kansai University Audio-Visual Education, 29, 37-53.

Mori, Y. (2011). Shadowing with oral reading: Effects of combined training on the improvement of Japanese EFL learners' prosody. Language Education & Technology, 1-22.

Moussa-Inaty, J., Ayres, P., & Sweller, J. (2012). Improving listening skills in English as a foreign language by reading rather than listening: A cognitive load perspective. Applied Cognitive Psychology, 26, 391-402. doi:10.1002/acp.1840

Nakanishi, T., & Ueda, A. (2011). Extensive reading and the effect of shadowing. Reading in Foreign Language, 23(1), 1-16.

Nakayama, T. (2011). Weak forms in shadowing: How can Japanese EFL learners perform better in shadowing tasks? The Society of English Studies, 41, 17-31.

Nakayama, T., Suzuki, A., & Matsunuma, M. (2015). Which aspects of listening comprehension does the shadowing method facilitate? Journal of Learning Science, Hiroshima University Institutional Repository, 8, 203-209.

NHK. (2016). NHK News Web. Retrieved from

http://www3.nhk.or.jp/news/catnew.html?utm_int=all_header_menu_news-new

Northwood, B., & Thomson, K. C. (2012). What Keeps Them Going? Investigating Ongoing Learners of Japanese in Australian Universities. Japanesee Studies, 32(3), 335-355.

Nunan, D. (1996). Learner strategy training in the classroom: An action research study. TESOL Journal, 6(1), 35-41.

O'Malley, J. M., Chamot, A. U., & Kupper, L. (1989). Listening comprehension strategies in second language acquisition. Applied Linguistics, 10(4), 418-437.

Oki, T. (2010). The role of latency for word recognition in shadowing. Japan Society of English Language Education, 21, 51-60.

Onaha, H. (2004). Effect of shadowing and dictation on listening comprehension ability of Japanese EFL learners based on the theory of working memory. JACET Bulletin, 39, 137-148.

Ota, E. (2006). The semantic processing encouragement in passage shadowing. Kantokoshinetsu Association of Teacher of English (KATE), 20, 25-36.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ). Michigan: The Univercity of Michigan.

Rizzolatti, G., & Arbib, M. A. (1998). Language within our grasp. Trends in Neurosciences, 22(4), 188-194.

Rogna, A., & Hayashi, R. (2012). Accuracy of Japanese pitch accent rises during and after shadowing training. Graduate Schol of Intercultural Studies, Kobe University.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 25, 54-67.

doi:10.1006/ceps.1999.1020

Saito, Y., Nagasawa, Y., & Ishikawa, S. (2011). Effective instruction of shadowing using a movie. JALT Conference Proceedings, JALT 2010, 139-148.

Sakamoto, E. (2008). Second language acquisition of Japanese pitch accent by native speakers of Engliish: An experimental perception study. Sophia Linguistica: working papers in linguistics, 56, 139-150.

Sakeda, M., & Kurata, N. (2016). Motivation and L2 Selves: A study of learners of Japanese at an Australian university. Electronic Journal of Foreign Language Teaching, 13(1), 49-67.

Sasaki, H., & Matsumoto, N. (2011). Nihongo Sōmatome N3 Chōkai [Japanese Comprehensive Listening N3]. Tokyo: ASK.

Sasaki, M. (2007). The 150-year history of English language assessment in Japanese education. Language Teaching, 25(1), 63-83.

Seo, K. (2005). Development of a listening strategy intervention program for adult learners of Japanese. International Journal of Listening, 19(1), 63-78. doi:10.1080/10904018.2005.10499075

Shiki, O., Mori, Y., Kadota, S., & Yoshida, S. (2010). Exploring differences between shadowing and repeating practices: An analysis of reproduction rate and types of reproduced words. Japan Society of English Language Education, 21, 81-90.

Spiller-Bosatra, E., Darò, V., Fabbro, F., & Bosatra, A. (1990). Audio-phonological and neuropsychological aspects of simultaneous interpretation: Role of auditory shadowing. Scandinavian Audiology, 19, 81-87.

Strevens, P. (1978). New Orientations in the Teaching English. Oxford: Oxford University Press.

Sumiyoshi, H., & Svetanant, C. (2017). Motivation and attitude towards shadowing: Learners perspectives in Japanese as a foreign language. Asian-Pacific Journal of Second and Foreign Language Education, 2(16), 1-21.

Suzuki, K. (2007). Shadowing wo mochiita eigo chokairyoku kojo no shido nitsuite no kensho [Investigation on the instruction for listening comprehension through shadowing]. STEP Bulletin, 19, 112-124.

Takahashi, E., Fukuda, N., Iwashita, M., & Sakoda, K. (2010). A study of shadowing for advanced language learners - Learners' noticing and instructors' support -. Bulletin of the Graduate School of Education, Hiroshima University, 59(2), 299-308.

Tamai, K. (1992). "Follow-up" no chōkairyoku kōjō ni oyobosu kōka oyobi "follow-up" nōryoku to chōkairyoku no kankei. [The effect of follow-up on listening Comprehension]. STEP Bulletin, 4, 48-62.

Tamai, K. (1997). Shadowing no kōa to chōkai process ni okeru ichizuke [The effectiveness of shadowing and its position in the listening process]. Current English Studies, 36, 105-116.

Tamai, K. (2002). On the effects of shadowing on listening comprehension. Paper presented at the 3rd Annual Conference of JAIS (Japan Association for Interpretation Studies).

Tanahashi, A., Sugiyama, M., & Nohara, Y. (2011). N2 Chōkai Supiido Masutā [N2 Listening Speed Master]. Tokyo: J Research Publisher.

Teeter, J. L. (2017). Improving motivation to learn English in Japan with a self-study shadowing application. Languages, 2(19), 1-27.

Toda, T. (2004). Komyunikeishon no Tame no Nihongo Hatsuon Ressun [Japanese Pronunciation Lessons for Communication]. Tokyo: 3A Network.

Toda, T., Okubo, M., Kamiyama, Y., Konishi, R., & Fukui, K. (2012). Shadowing de Nihongohatsuon Lesson [Japanese Pronunciation Practice through Shadowing] (T. Toda Ed.). Tokyo: 3A Network.

Tseng, W., Dörnyei, Z., & Schmidt, R. (2006). A new approach to accessing strategic learning: The case of self-regulation in vocabulary acquisition. Applied Linguistics, 27(1), 78-102.

Vallerand, R. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. Advances in Experimental Social Psychology, 29, 271-360. doi:10.1016/S0065-2601(08)60019-2

Vandergrift, L. (2002). 'It was nice to see that our predictions were right': Developing metacognition in L2 listening comprehension. The Canadian Modern Language Review, 58(4), 555-575.

Vandergrift, L., & Baker, S. (2015). Learner variables in second language listening comprehension: An exploratory path analysis. Language Learning, 65(2), 390-416. doi:10.1111/lang.12105

Vygotsky, L. S. (1978). Interaction between learning and development. In M. Gauvain & M. Cole (Eds.), Reading on the Development of Children (pp. 29-36). New York: W.H. Freeman and Company.

Watanabe, A., Oba, R., Shimizu, T., Sugiyama, M., Nohara, Y., & Sakuta, N. (2013). Japanese Language Proficiency Test N2 - Complete Mock Exams. Tokyo: J Research Publisher.

Watkins, K. E., Strafellla, A. P., & Paus, T. (2003). Seeing and hearing speech excites the motor system involved in speech production. Neuropsychologia, 41, 989-994.

Wilson, S. M., Saygin, A. P., Sereno, M., & Iaconobi, M. (2004). Listening to speech activates motor areas involved in speech production. Nature Neuroscience, 7, 701-702.

Yang, J. (2008). Motivational orientations and selected learner variables of East Asian language learners in the United States. Foreign Language Annals, 36(1), 44-56.

Zakeri, E. (2014). The effect of shadowing on EFL learners' oral performance in terms of fluency. International Journal of English Language Teaching, 2(1), 21-26.

Appendices

Appendix 1-8 (pages 183-202) removed from Open Access version as they may contain sensitive/confidential content.

Appendix 9 Questionnaire for motivation (Chapter 5)

Dear Student Participants,

Thank you very much for accepting to participate in this study. This questionnaire has 3 sections. The first section is demographic information which includes question about your age, first language, university study, and foreign language. The second section has 35 items about your shadowing experience. The third section has 3 items which are open questions where you can express your opinions freely. Thank you very much for your cooperation!

Section 1: General information **Name:**_____ **Student ID number:**_____

Please tick an appropriate box for the following questions:

Sex: 1. ☐ Male 2. ☐ Female

What is your first language? : 1.☐ English 2.☐ Mandarin 3.☐ Cantonese 4.☐ Korean
5.☐ Other (*please specify*): _____

Your Age: 1.☐ 16-24 2.☐ 25-34 3.☐ above 35

Born in Australia? : 1.☐ Yes 2.☐ No (how old when you came to Australia? → _____ years old.)

Japanese Major? : 1. ☐ Yes 2. ☐ No 3.☐ Other (*please specify*): _____

Study mode: 1.☐ Full-time 2.☐ Part-time

Languages you can speak except for English and Japanese (and your native language): _____

How well you can speak above language? : 1. ☐ Beginner 2. ☐ Intermediate 3. ☐ Advanced 4. ☐ Native

Do you have any previous experience of shadowing before this unit? 1.☐ Yes 2.☐ No

If your answer is Yes, please briefly explain your experience of shadowing (e.g., class, institution, etc)

_____

Which shadowing speed do you think was most appropriately challenging for you? :

1. ☐ W02 (275) 2. ☐ W04 (300) 3. ☐ W06 (325) 4. ☐ W08 (350) 5. ☐ W09 (375) 6. ☐ W10 (400)

Section 2

Please read the following statement and tick the most appropriate answer among ***SA (Strongly agree), A (Agree), PA (Partly agree), SD (Partly disagree), D (Disagree), and SD (Strongly disagree)*** *for each statement.*

Question 1: Perceptions of improvement in listening skills		Your Answer					
		SD	D	PD	PA	A	SA
1	I think I can improve my speaking skills the more I practice shadowing.						
2	I think I became better at listening after practicing shadowing.						
3	I cannot start working on shadowing easily.						
4	I think it is important to practice shadowing at a faster speed.						
5	I think my pronunciation became better after practicing shadowing.						
6	I like shadowing because it is challenging for me.						
7	The shadowing feedback is very useful because I can find my mistakes.						
8	I'm satisfied if I get more than 90% on a shadowing task because it is already a high mark.						
9	I think shadowing is effective in improving my pronunciation.						
10	Shadowing practice did not assist my learning in Japanese language.						
11	The most satisfying thing for me in shadowing practice is trying to understand the content as thoroughly as possible.						
12	I think shadowing should be marked by the submission, but not by the accuracy of the performance.						
13	I think my listening skills will improve if I improve my shadowing performance.						
14	Overall, shadowing practice provided me with a valuable learning experience.						
15	I practice shadowing so that I can perform well in shadowing when I'm selected during the class.						
16	I don't think shadowing is a good exercise for speaking skills.						
17	I think correcting my mistakes after receiving the feedback is important to improve my shadowing skills.						
18	I think it is not necessary to practice shadowing at a speed faster than I can speak.						
19	I usually wait to start shadowing until the submission due date is approaching.						
20	I think I have become better at shadowing week after week.						
21	I think I can improve my listening skills the more I practice shadowing.						
22	I don't think shadowing helps improve conversation skills in Japanese.						
23	Shadowing is not painful.						
24	I practice shadowing because I want to sound like a native Japanese speaker.						
25	I would recommend shadowing practice to my friends who are learning foreign languages.						
26	I don't think shadowing is a good exercise for listening skills.						
27	I think it is not necessary to practice shadowing after receiving the feedback and correct mistakes because the marks are already given.						
28	I think my speaking skills will improve if I improve my shadowing performance.						
29	I get frustrated easily when I cannot catch up with the shadowing speed.						
30	If I can, I want to get better marks in shadowing than most of the other students.						
31	I believe in myself that I can become better at shadowing if I practice more.						
32	Practicing shadowing makes me tired.						
33	I think shadowing is effective in improving my listening skills.						
34	If I have the opportunity to choose shadowing materials, I choose the ones that I can learn from even if they don't guarantee a good grade.						
35	I will continue practicing shadowing even after completing this unit.						

Section 3

1. What do you think are positive aspect(s) of shadowing practice?

_____
_____
_____
_____

2. What do you think are negative/difficult aspect(s) of shadowing practice?

_____
_____
_____
_____

3. How do you think shadowing practice can be improved?

_____
_____
_____
_____

Thank you for completing this survey.

Please tick: ☐ **You may quote my response above in your research project.**

☐ **You may NOT quote my response above in your research project.**