



Effects of Reading-While-Listening and Reading Only on Reading Comprehension of Japanese High School EFL Learners

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This study investigated the effects of reading while listening (RWL) and reading only (RO) modes on learners' reading comprehension and perceptions. A total of 157 Japanese high school learners of English as a foreign language (EFL) participated in this study. All the participants read four reading passages: two passages with RWL mode and two passages with RO mode. The participants were also divided into three different proficiency groups based on their vocabulary levels test score. The findings showed that the high and medium proficiency groups scored higher, regardless of having audio support or not. By contrast, the low proficiency group scored higher with RWL mode than with RO mode. The results of a questionnaire related to learners' perceptions supported the view that the low group benefitted more from RWL mode compared to the other two groups. These findings indicated that learners' vocabulary levels and two reading modes affected their reading performance differently. Furthermore, the findings show that the simultaneous reading and listening mode is an effective method to develop reading skills and motivation toward reading, especially for low proficiency learners.

本研究は、音声ありと音声なしの読解が学習者の読解力と認識にどのような効果を与えるのかについて調査したものである。英語を外国語として学んでいる157名の日本人高校生が本研究に参加した。全ての参加者は、2つの音声ありパッセージと2つの音声なしパッセージを読んだ。調査の結果、上位群と中位群は音声サポートの有無にかかわらず、高い得点を取ることができた。一方で、下位群は音声なしよりも、音声ありの読解問題で高い得点を取った。学習者の認識に関するアンケート結果では、下位群が他の2つのグループよりも音声ありモードからより多くの利益を得ていたことが明らかになった。これらの結果は、学習者の語彙レベルと2つのモードが学習者の読解力に異なる影響を与えることを示唆している。さらに音声ありの読解活動は、特に、下位群学習者の読解力と読みの活動の動機付けを高めるための効果的な方法であることを示している。

Keywords: reading fluency, reading while listening, audio-assisted reading, reading comprehension, English as a foreign language (EFL), high school learners, input

Introduction

Acquiring reading fluency skills—for instance, decoding words into phonologically appropriate sounds and recognizing the meaning of encountered words accurately and rapidly—is necessary for language learners to become autonomous readers. Researchers have been exploring effective ways of improving learners' reading fluency skills, such as extensive reading, repeated readings, and reading while listening (RWL) mode. In recent years, the RWL mode in a second language (L2) has been recognized as an effective method for enhancing learners' reading fluency skills (Chang, 2019; Renandya & Jacobs, 2016; Teng, 2016; Webb & Chang, 2012). The RWL approach literally means that learners read the passages with support



from audio-recordings. According to previous research, this approach helps learners improve the bottom-up reading processing skill (Amer, 1997), acquire a natural reading behavior (Kadota et al., 2010), and gain motivation to read autonomously in a foreign language (Chang, 2009). While reading and listening simultaneously, learners can also acquire English intonations as this approach delivers grammatical structure, emotions, and sequences of clauses and sentences (Cheetham, 2017). Since audio-assisted reading supports learners in many ways, researchers have recommended the use of bi-modal input in EFL and ESL settings (Chang, 2019; Wells, 2006). In Japan, where there is a recognized lack of reading fluency practice in English classrooms, adopting such techniques could be particularly beneficial. This kind of training, known as RWL, enables students to synchronize words and audio, thereby enhancing not only their reading fluency but also their motivation towards English learning as they gain a deeper comprehension of the passages being read.

As indicated above, the RWL approach encourages learners to acquire a natural reading behavior; however, no studies have investigated when it works best or when learners can read independently without audio-assisted reading. Additionally, previous studies have primarily examined the effects of simultaneous reading and listening on vocabulary acquisition. In contrast to research on vocabulary acquisition (Brown et al., 2008; Chang, 2019; Teng, 2016; Webb & Chang, 2012), few studies have covered reading comprehension (Chang & Millett, 2015).

With careful attention to the experimental design, the present study investigates whether or not the different modes of reading affect learners' reading comprehension and their perceptions. Moreover, this study examines at which level of proficiency learners still need to depend on audio-assisted reading by dividing the participants into different groups according to proficiency levels. Answering these questions will contribute to better understanding the effects of simultaneous reading and listening on reading comprehension.

Literature Review

Reading fluency development is one of the most important considerations in contemporary English education in Japan (Grabe, 2010; Kanatani, 2008; Takase, 2010). Nation (2013) pointed out that reading courses should devote one-quarter of instruction to reading fluency development. However, the development of reading fluency skills tends to be overlooked in the L2 classroom compared to language-focused learning (Grabe & Stoller, 2002; Nation, 2013). Reading fluency is defined as "the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing" (Grabe, 2009, p. 291). According to Kuhn and Stahl (2003), reading fluency ability consists of (a) accuracy in decoding, (b) automaticity in word recognition, and (c) the appropriate use of prosodic features such as stress, pitch, and juncture. According to these definitions, fluent readers can read smoothly while maintaining reading comprehension. Additionally, fluent reading requires the integration of multiple processing skills, which contributes to learners' reading fluency development (Grabe & Stoller, 2002). It is widely accepted that increasing the amount of words learners encounter will enhance their reading fluency efficiently (Grabe, 2009; Nation, 2013). Automatizing reading fluency skills reduces learners' attentional resources of decoding words, enabling them to focus more on better reading comprehension.

Researchers have explored effective ways of improving learners' reading fluency skills by introducing extensive reading (Beglar & Hunt, 2014; Pigada & Schmitt, 2006), repeated reading (Chang, 2012; Taguchi & Gorsuch, 2002; Webb & Chang, 2012), narrow reading (Chang & Millett, 2017), and audio-assisted reading (Brown et al., 2008; Teng, 2016). Although the teaching method is different for each, one common point among these approaches is that learners are exposed to a large quantity of comprehensible input to enhance their reading fluency skills. These approaches strengthen word form and meaning connections through encountering vocabulary and grammar items repeatedly, which, in turn, develop learners' word recognition and reading processing skills. Day and Bamford (1998) also suggest learners should practice reading with very easy materials at the $i - 1$ level to improve their reading fluency skills. Furthermore,

the positive experiences of reading within their linguistic ability eventually build learners' positive attitudes toward independent reading. Such experiences increase their motivation to read as well (Nuttall, 2005).

Audio-assisted reading is an effective approach in supporting learners' reading fluency development. The number of studies on this topic has gradually increased, which has led to this approach being recognized as a way to develop learners' reading fluency skills. Audio-assisted reading can help improve various aspects of English proficiency, such as learners' listening skills (Chang, 2009; Chang et al., 2018), vocabulary knowledge (Brown et al., 2008; Chang & Millett, 2015; Chang, 2019; Teng, 2016; Webb & Chang, 2012), and reading rate and comprehension (Chang & Millett, 2015; Taguchi et al., 2004). The concurrent reading and listening approach stimulates learners' English proficiency as well as their motivation toward English learning (Chang, 2009). To the best of the present researcher's knowledge, a relatively large amount of research on vocabulary acquisition through audio-assisted reading has been explored and has shown positive gains, compared to research in other topic areas, such as the improvement of reading speed and comprehension, grammar acquisition, and listening skills.

As for the effects of RWL and RO on the improvement of vocabulary knowledge, Brown et al. (2008), investigated the rate at which English vocabulary was acquired from the three input modes: reading only (RO), reading while listening (RWL), and listening only (LO) to stories. They assessed the effects with two test formats: 1) a multiple-choice recognition test and 2) a meaning-by-translation test. The findings showed that more repetitions were needed in listening, followed by the RO mode, and the RWL mode for substantive improvement in incidental learning. Moreover, according to the questionnaire, RWL was the mode most preferred by the majority of participants, while no one preferred the LO mode. Teng (2016) also investigated the effects of both the RO and RWL modes on vocabulary acquisition, and the RWL group had the best results. These findings concord with those of Brown et al. (2008), who found that the RWL mode required less word exposure than the RO mode did for learners to acquire new vocabulary. In the case of RWL, learners can follow the text with their eyes while listening to the audio. This bi-modal input provides learners a deeper understanding of the reading materials, which may also enhance their vocabulary knowledge.

In addition to examining the effects of RWL and RO on learners' vocabulary knowledge, researchers have also investigated the effects of RWL and RO on reading speed and comprehension. Chang and Millett (2015) compared two groups of participants—audio-assisted and silent reading groups—and found that both groups improved their reading speed and reading comprehension levels after the 26-week intervention period. However, the improvement of the audio-assisted reading group was substantially higher than that of the silent reading group. The learners' reading speed improved approximately twice that of the reading only group from the pre-test to the post-test and from the pre-test to the delayed post-test. As for reading comprehension, the audio-assisted reading group improved significantly from the pre-test to the post-test and from the pre-test to the delayed post-test. On the other hand, for the silent reading group, the score did not improve significantly from the pre-test to the post-test, but there was a statistically significant gain from the pre-test to the delayed post-test. Both groups retained the gains in reading speed and reading comprehension at the delayed post-test conducted three months after the intervention. From these results, Chang and Millett (2015) concluded that a simultaneous reading and listening mode is more beneficial than a silent reading mode for improving learners' reading speed and reading comprehension skills.

The studies introduced above support the effectiveness of audio-assisted reading. Researchers have explained why RWL is effective in the enhancement of learners' reading skills as follows. For example, audio-assisted reading helps learners move beyond the bottom-up reading style and develop positive attitudes toward reading (Amer, 1997; Kadota et al., 2010). According to Kadota et al. (2010), one of the purposes of audio-assisted reading is to learn a natural reading behavior that does not require going back and forth to understand reading passages. Since the audio does not stop while learners are reading, they are able to afford more attentional resources to comprehension. Wells (2006) also suggests that a simultaneous reading and listening approach should be conducted more often in the EFL and ESL settings as it facilitates learners' acquisition of English intonation. According to Wells (2006), intonation delivers grammatical structures, attitudes and emotions, and how sequences of clauses and sentences go together in speech. This

allows learners to concentrate more on understanding reading passages. Moreover, Cheetham (2017) recommends that learners should engage in ample supplementary reading using a multi-dimensional approach since it helps them enhance their reading skills and eventually improve their general English learning motivation. Cheetham (2017) also notes that continuous practice using audio-assisted reading supports learners in reducing input overload compared to using mono-modal input, and improves their reading ability over time. These accumulated improvements facilitated by RWL contribute positively to learners' reading skills.

Audio-assisted reading motivates learners to read and enhance their language abilities as indicated above. The questionnaire conducted by Chang (2009) also showed the positive psychological impact of the approach on learners regardless of their English proficiency. For example, the learners felt the story was shorter, interesting, and comfortable. The questionnaire results revealed that audio-assisted reading plays an important role in motivating learners to read. However, considering that the ultimate goal in foreign language reading is to become an autonomous reader, learners should not depend heavily on audio support. In other words, learners need to become independent readers gradually, without depending on audio support. Moreover, long-term use of bi-modal input might prevent them from learning to read independently. When learners reach the point where they can read faster than the audio recordings, they must attempt reading without audio to acquire a natural reading behavior. Previous studies have not demonstrated when audio-assisted reading works best, who benefits most from this approach, and when learners are able to read by themselves without audio assistance. Investigating these unexplored areas is the goal of the present study.

Based on the areas unexplored in previous studies, the present study examines the effects of the RWL and RO modes on learners' reading comprehension, and explores learners' perceptions of both the RWL and RO modes.

Research Questions

1. Which mode facilitates reading comprehension better: RWL or RO?
2. Do the two modes of input have different effects on three different English proficiency groups?
3. Which mode do learners prefer: RWL or RO? Are there any differences in perceptions among the English proficiency groups?

Materials and Method

Participants

A total of 168 Kosen students aged 15 to 16 years participated in this study. A Kosen is a specialized institution for early engineering education in Japan, with a five-year educational program that is equivalent to a combination of high school and junior college. The participants in this study were all first-year Kosen students, equivalent to high school freshmen. They had received three years of formal English education in junior high school before entering the Kosen. These types of students are seldom very motivated to learn English. Rather, they tend to be more focused on mathematics and science. The Kosen students are not required to take university entrance exams because the Kosen curriculum provides a five-year educational program. Since they do not take the exams, students may be further disincentivized to learn English. Kosen students tend, therefore, to differ from most other high school students in terms of their English language learning motivation. According to Common European Framework of Reference for Languages (CEFR), their average English proficiency levels are considered to be at the A1 level.

The participants attended three 90-minute English classes a week during the intervention period of this study: one intensive reading class, one listening class, and one extensive reading class. The researcher taught all the participants in an extensive reading class in which this study was conducted. Four classes were randomly assigned to either group A (n=85) or group B (n=83). All participants experienced two

different reading conditions: two reading passages with audio support and two without to compare which mode they scored higher in and preferred. The detailed procedure is explained in section 3.3.

Experimental Materials

This study employed a vocabulary levels test and four reading passages as experimental materials. More details about the experimental materials are provided in sections 3.2.1 and 3.2.2 below.

Vocabulary Levels Test

A New Vocabulary Levels Test (NVLT) developed by McLean and Kramer (2015) was administered to all the participants. The results of the NVLT showed that group A (n=85) scored a total of 48.59 / 72 (SD = 6.15), with 20.69 / 24 (SD = 1.74), 15.81 / 24 (SD = 2.94), and 12.08 / 24 (SD = 3.03) in the first 3,000 NVLT in order, whereas group B (n= 83) scored a total of 47.95 / 72 (SD = 6.63), with 20.89 / 24 (SD = 1.67), 16.17 / 24 (SD = 3.37), and 10.90 / 24 (SD = 3.53), respectively (Table 1). The receptive vocabulary knowledge in each level was 86%, 66%, and 50% for group A and 87%, 67%, and 45% for group B, respectively. When a total score was calculated as the learners' vocabulary size, group A scored 2040.71 (SD = 259.82) and Group B scored 2013.98 (SD = 280.21). The result of the t-test between the total scores of each group showed no statistically significant difference between the two groups ($t(166) = .64, p < .52$), implying that the groups are comparable in terms of their receptive vocabulary levels.

TABLE 1
Results of NVLT 1,000 to 3,000 Levels for Groups A and B

	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
	1,000	2,000	3,000	Total	Level
Group A	20.69 (1.74)	15.81 (2.94)	12.08 (3.03)	48.59 (6.15)	2040.71 (259.82)
Group B	20.89 (1.67)	16.17 (3.37)	10.90 (3.53)	47.95 (6.63)	2013.98 (280.21)

Reading Materials

Four reading passages were used as reading materials (Table 2). The passages were chosen from True Stories, part of the Enjoy Simple English Readers series by Takayama and Stewart (2015). Each passage consists of approximately 500 words (between 469 and 513), followed by five multiple-choice questions. Each question item has four options that test learners' global understanding rather than detailed information of the passages. The words used in these materials were typed into a computer program called RANGE (Nation & Heatley, 2002). The results are shown in Table 2. The text analysis revealed that the reading materials contain high frequency vocabulary words, mostly from the first 1,000-word list (Table 2). As explained above, the participants' vocabulary knowledge was at the 2,000-word level. Therefore, the reading materials chosen for this study were appropriate for their levels.

TABLE 2
Text Analysis of the Four Reading Passages Used to Measure Learners' Reading Comprehension

Title	1. Pig	2. Father	3. Marathon	4. Hero
	token / %	token / %	token / %	token / %
1,000	374 / 79.74	416 / 85.07	449 / 87.35	429 / 85.97
2,000	37 / 7.89	31 / 6.34	17 / 3.31	31 / 6.21
3,000	8 / 1.71	5 / 1.02	17 / 3.31	16 / 3.21
Not in the list	50 / 10.66	37 / 7.57	31 / 6.03	23 / 4.61
Word counts	469	489	514	499
Audio duration	0:04:12	0:03:49	0:04:30	0:03:57
WPM	110.00	124.00	114.67	124.30

Procedure

The reading comprehension tests with and without audio support were administered to all the participants. Groups A and B were assigned the same materials but different modes to compare the effects of the RWL and RO modes on reading comprehension. Group A read *An Amazing Pig* (*Pig*) and *Daily Marathons* (*Marathon*) with audio support and *Father's Day Present* (*Father*) and *A Hero above New York* (*Hero*) without audio support, whereas Group B read *Father* and *Hero* with audio support and *Pig* and *Marathon* without audio support (Tables 3 & 4). When participants finished reading one passage with either the RWL or RO mode, they turned the page over and answered five multiple choice questions with four options provided at the back of the paper. As instructed, they answered all questions without referring to the reading passages. On the last day of the treatment in week 3, the participants also answered a short questionnaire with four questions and one open-ended question about their perceptions of both the RWL and RO modes.

TABLE 3

Research Design

Reading passages / Mode	Reading While Listening (RWL)	Reading Only (RO)
1. <i>Pig</i>	Group A	Group B
2. <i>Father</i>	Group B	Group A
3. <i>Marathon</i>	Group A	Group B
4. <i>Hero</i>	Group B	Group A

TABLE 4

Summary of the Treatment Procedure

Week / Group	Group A	Group B
Week 1	A New Vocabulary Levels Test	A New Vocabulary Levels Test
Week 2	1. <i>Pig</i> (RWL) 2. <i>Father</i> (RO)	2. <i>Father</i> (RWL) 1. <i>Pig</i> (RO)
Week 3	3. <i>Marathon</i> (RWL) 4. <i>Hero</i> (RO) Questionnaire	4. <i>Hero</i> (RWL) 3. <i>Marathon</i> (RO) Questionnaire

Results

RQ1: Which Mode Facilitates Reading Comprehension Better; RWL or RO?

In response to the first research question, the reading comprehension test score was analyzed using a t-test (Table 5). First, the result of two reading passages, *Pig* and *Marathon*, was analyzed to observe the effects of both modes: Group A read them with the RWL mode and Group B read them with the RO mode. Table 5 shows the reading comprehension scores. Group A scored 6.72 (SD = 1.94) with the RWL mode and Group B scored 6.51 (SD = 2.30) with the RO mode. No statistically significant difference was observed between the two groups ($t(166) = .72, p < .47, d = .09$), implying that neither mode influenced learners' reading comprehension test score.

The other two passages, *Father* and *Hero*, were also examined to observe the effects. Group A read two reading passages with the RO mode and Group B read them with the RWL mode (Table 5). Group A scored 8.34 (SD = 1.70) with the RO mode and Group B scored 8.46 (SD = 1.51) with the RWL mode. Similar to the result of *Pig* and *Marathon*, there was no statistically significant difference between the two groups ($t(166) = .37, p < .71, d = .07$), implying that neither mode influenced learners' reading comprehension test scores (Table 5).

TABLE 5

Result of the t-test on the Four Reading Passages with and without Audio Support for Groups A and B

Group Reading Passages	RWL			RO				<i>t</i> (166)	<i>p</i>	Cohen's <i>d</i>	
	<i>M</i> (SD)	<i>Min</i>	<i>Max</i>	<i>Group</i>	<i>M</i> (SD)	<i>Min</i>	<i>Max</i>				<i>Group</i>
1. <i>Pig</i>	6.72	2	10	A	6.51	2	10	B	.72	.47	.09
3. <i>Marathon</i>	(1.94)			(<i>n</i> =85)	(2.30)			(<i>n</i> =83)			
2. <i>Father</i>	8.46	4	10	B	8.34	3	10	A	.37	.71	.07
4. <i>Hero</i>	(1.51)			(<i>n</i> =83)	(1.70)			(<i>n</i> =85)			

Note. For Cohen's *d*, an effect size of 0.2 to 0.3 is considered a small effect, around 0.5 a medium effect, and 0.8 and above a large effect.

RQ2: Do the Two Modes of Input Have Different Effects on Three Different English Proficiency Groups?

In response to the second research question, 168 participants were divided into three different proficiency groups based on the results of the NVLT (Table 6). Grouping was done based on their NVLT scores, using the following formula: mean score \pm 0.5 \times standard deviation (SD). The result of the grouping is shown in Table 6. Subsequently, a one-way ANOVA was conducted to see if the three different proficiency groups were statistically different. The result of the one-way ANOVA revealed statistically significant differences among the groups in terms of their receptive vocabulary knowledge ($F(2, 165) = 261.91, p < .00$). A post-hoc Tukey test also confirmed statistical differences between the groups (Between High and Medium, between High and Low, and between Medium and Low) with a significance level of 5%, the result of which allowed the comparison of the effects of the two modes on the different proficiency groups.

TABLE 6

Results of the One-way ANOVA for All Participants: High, Medium, and Low Groups

<i>Group</i>	<i>M</i>	<i>Min</i>	<i>Max</i>
High (<i>n</i> =53)	2307.62 (119.08)	2184	2646
Medium (<i>n</i> =69)	2033.65 (68.86)	1932	2142
Low (<i>n</i> =46)	1695.52 (205.33)	840	1890

In the next step, a two-way ANOVA (two modes: RWL and RO, and three proficiency groups: high, medium, and low) was performed to explore whether the two modes of input have different effects on three different English proficiency groups. Table 7 shows the results of the reading comprehension test scores for Pig and Marathon of different proficiency levels. Group A read them with the RWL mode and group B read them with the RO mode. Regarding Group A, the high proficiency group scored 7.66 (SD = 1.95), the medium proficiency group scored 6.74 (SD = 1.71), and the low proficiency group scored 5.45 (SD = 1.57) with the RWL mode. As for group B, on the other hand, the high proficiency group gained 7.38 (SD = 1.97), the medium proficiency group gained 6.43 (SD = 2.20), and the low proficiency group gained 5.75 (SD = 2.52) with the RO mode. As described in Table 8 and Figure 1, there was no main effect on the modes ($F(1, 162) = .10, p < .76$). Moreover, no interaction effect with groups and modes was found to be statistically significant ($F(2, 162) = .36, p < .70$). The results imply that learners' reading comprehension did not change either with or without audio support. Moreover, the findings indicate that no statistically significant differences were observed between the RWL and RO modes in the three different English proficiency groups. In other words, no groups received benefits of the RWL or RO mode when comprehending the reading passages.

TABLE 7
Reading Comprehension Test Scores for Time 1 of Different Proficiency Levels

Group	Group A (n=85)				Group B (n=83)			
	M (SD)	Min	Max	N	M (SD)	Min	Max	N
High	7.66 (1.95)	2	10	28	7.38 (1.97)	5	10	24
Medium	6.74 (1.71)	3	10	34	6.43 (2.20)	5	10	35
Low	5.45 (1.57)	2	8	23	5.75 (2.52)	4	10	24

Note. Time 1 = The participants read *Pig* and *Marathon*.

TABLE 8
Results of ANOVA at Time 1 of Different Proficiency Levels

Source	Sum of Squares	df	Mean Square	F	Sig.
Proficiency	89.71	2	44.85	11.09	.00**
Mode	0.38	1	0.38	0.10	.76 n.s.
Proficiency & Mode	2.91	2	1.46	0.36	.70 n.s.
Error	655.32	162	4.05		
Total	8097.00	168			
Corrected Total	749.85	167			

Note. Time 1 = The participants read *Pig* and *Marathon*.

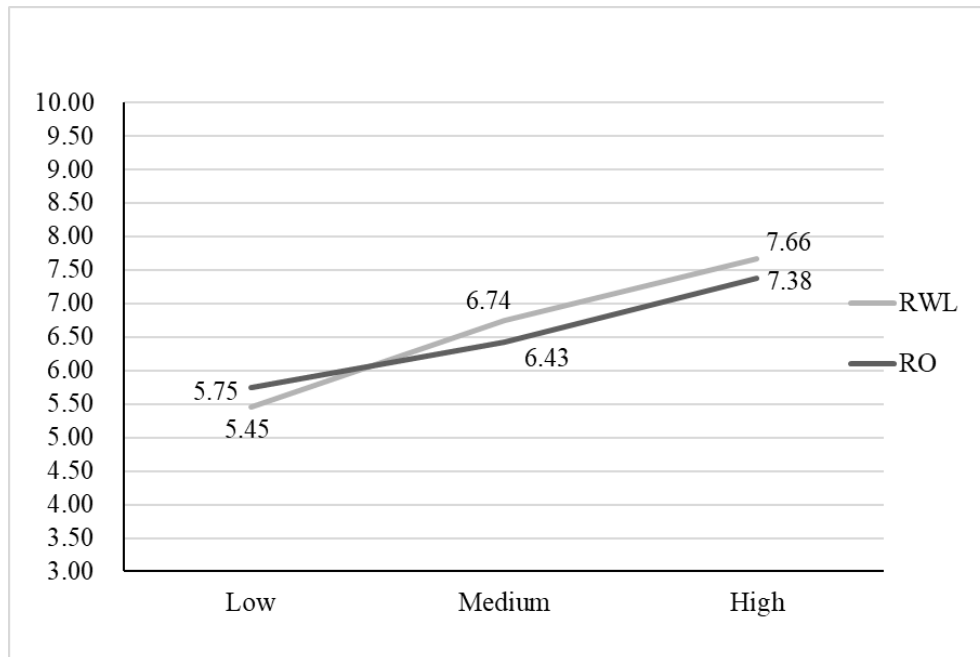


Figure 1. Comparison of three different proficiency groups on the reading scores at time 1.

The reading comprehension test scores of the other two passages, *Father* and *Hero*, were also examined in a similar manner to *Pig* and *Marathon*. A two-way ANOVA (two modes: RWL and RO, and three proficiency groups: high, medium, and low) was conducted again to observe the effects of RWL and RO on different proficiency groups. Table 9 shows the results of the reading comprehension test scores for *Father* and *Hero* of different proficiency levels. Group A read them with the RO mode and group B read them with the RWL mode. As for group A, the high proficiency group scored 8.97 (SD = 1.09), the medium proficiency group scored 8.68 (SD = 1.66), and the low proficiency group scored 7.00 (SD = 1.75) with the RO mode. Regarding group B, the high proficiency group gained 9.08 (SD = 1.18), the medium proficiency group gained 8.34 (SD = 1.57), and the low proficiency group gained 8.00 (SD = 1.56) with the RWL mode.

As shown in Table 10 and Figure 2, there was no main effect on the modes ($F(1, 162) = 1.25, p < .26$). Furthermore, no interaction effect with groups and modes was found with these reading materials ($F(2, 162) = 2.77, p < .07$), and the findings show no statistically significant differences between the RWL and RO modes in the three different English proficiency groups. The results imply that learners' reading comprehension did not change either with or without audio support. However, as shown in Table 10, the p value of interaction effects with proficiency and mode approached a significance level of .05 ($p < .07$). Since the low proficiency group scored higher on the reading comprehension test with RWL than with RO, we could say that the participants in the low proficiency group may depend more on audio support than the other groups do when comprehending reading passages.

TABLE 9
Reading Comprehension Test Scores for Time 2 of Different Proficiency Levels

Group	Group A (n=85)				Group B (n=83)			
	M (SD)	Min	Max	N	M (SD)	Min	Max	N
High	8.97 (1.09)	6	10	28	9.08 (1.18)	4	10	24
Medium	8.68 (1.66)	4	10	34	8.34 (1.57)	2	9	35
Low	7.00 (1.75)	3	10	23	8.00 (1.56)	2	10	24

Note. Time 2 = The participants read *Father* and *Hero*.

TABLE 10
Results of ANOVA at Time 2 of Different Proficiency Levels

Source	Sum of Squares	df	Mean Square	F	Sig.
Proficiency	58.50	2	29.25	13.16	.00**
Mode	2.78	1	2.78	1.25	.26 n.s.
Proficiency & Mode	12.32	2	6.16	2.77	.07 n.s.
Error	360.13	162	2.22		
Total	12281.00	168			
Corrected Total	460.28	167			

Note. Time 2 = The participants read *Father* and *Hero*.

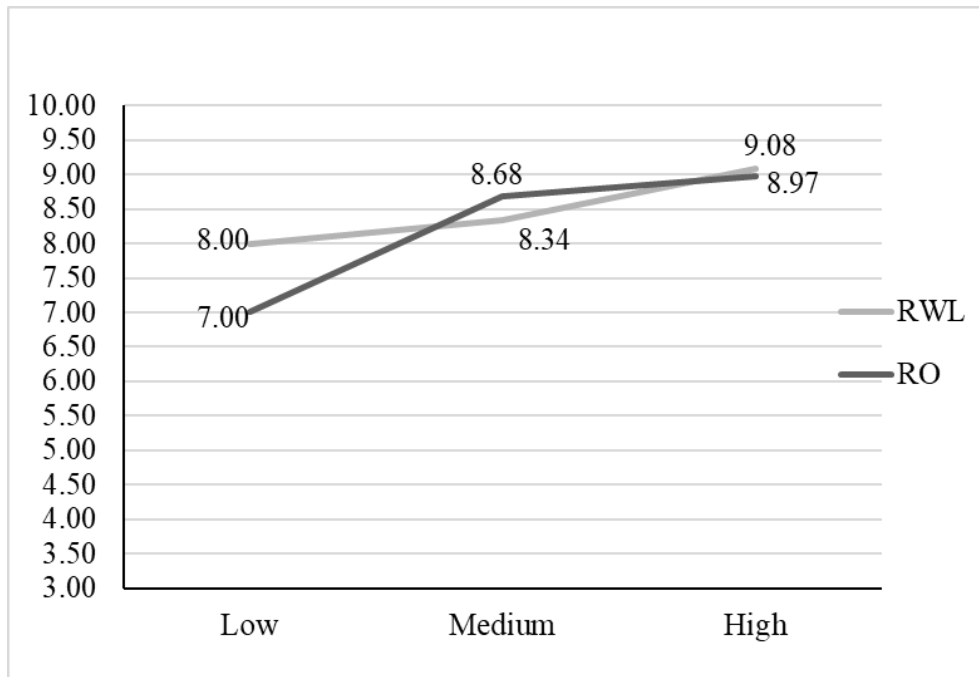


Figure 2. Comparison of three different proficiency groups on the reading scores at time 2.

RQ4 Which Mode Do Learners Prefer: RWO or RO? Are There Any Differences in Perceptions Among the English Proficiency Groups?

In response to research question 3, the questionnaire with four question items was administered to all the participants on the last day of the treatment. The purpose of the questionnaire was to explore learners' perceptions of the RWL and RO modes on reading comprehension by dividing participants into three different proficiency groups.

Question item 1 concerns learners' preferences in understanding the reading passages. The result shows that 60.84% of the learners prefer the RWL condition when comprehending reading passages, while 39.16% of students responded that they better understood the passages with the RO mode (Table 11 and Figure 3). A close examination of the responses of the three different proficiency groups reveals that the number of participants in the low proficiency group (69.57%) is larger than the number of participants in the high and medium proficiency groups (58.82% and 56.52%, respectively). This result implies that those in the low proficiency group tend to depend more on audio support while comprehending the passages compared to those in the other two proficiency groups.

TABLE 11
Students' Responses to Question 1: Which mode do you prefer, RWL or RO? Are There Any Differences in Perceptions Between English Proficiency Groups?

	1 (RWL)	2 (RO)
High (n=51)	30 (58.82%)	21 (41.18%)
Medium (n=69)	39 (56.52%)	30 (43.38%)
Low (n=46)	32 (69.57%)	14 (30.43%)
Total (n=166)	101 (60.84%)	65 (39.16%)

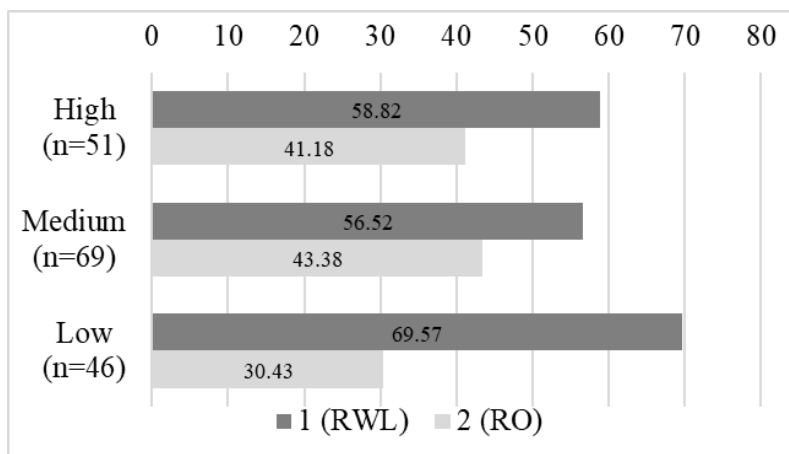


Figure 3. Comparison of the three groups on the mode preference.

Question item 2 asks the learners if the audio speed was appropriate to follow. The result shows that 54.90% of the learners in the high proficiency group felt the audio was very fast (50.98%) or a bit fast (3.92%) to follow, whereas approximately 38.80% of the medium and 40.00% of the low proficiency groups answered that the audio was very fast (25.37% and 33.33%, respectively) or a bit fast (13.43% and 6.67%, respectively). Additionally, over half of the participants in the medium and low proficiency groups (53.73% and 57.78%, respectively) considered the audio speed appropriate to follow, whereas less than half of the participants in the high proficiency group (37.25%) considered it appropriate to follow. These

results reveal that more participants in the medium and low proficiency groups felt the audio speed was easy to follow than participants in the high proficiency group did.

TABLE 12
Students' Responses to Question 2: Do You Think the Audio Speed Was Appropriate to Follow?

	1 (Very slow)	2 (A bit slow)	3 (Appropriate)	4 (A bit fast)	5 (Very fast)
High (n=51)	0 (0%)	4 (7.84%)	19 (37.25%)	2 (3.92%)	26 (50.98%)
Medium (n=67)	1 (1.49%)	4 (5.97%)	36 (53.73%)	9 (13.43%)	17 (25.37%)
Low (n=45)	0 (0%)	1 (2.22%)	26 (57.78%)	3 (6.67%)	15 (33.33%)
Total (n=163)	1 (0.61%)	9 (5.52%)	81 (49.69%)	14 (8.59%)	58 (35.58%)

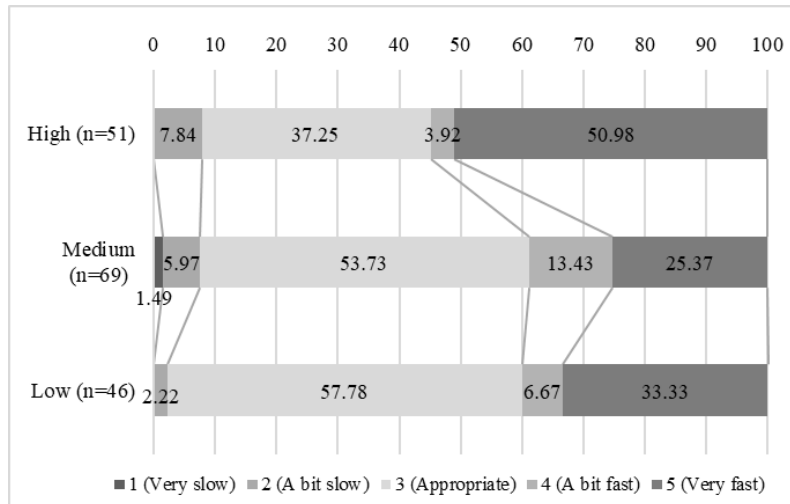


Figure 4. Perceptions of audio speed by the three proficiency groups

Question item 3 asks how much learners think they could understand the reading passages with the RWL mode. An overall result showed 87.20% of the participants responded that they could understand over 60% of the passages with audio-assisted reading (Table 13 and Figure 4). The responses by three different proficiency groups revealed that 94.12% of the participants in the high proficiency group could understand the reading passages with audio support, whereas 85.29% and 82.22% of the participants in the medium and low proficiency groups, respectively, understood over 60% of the passages (Table 13 and Figure 4).

TABLE 13
Students' Responses to Question 3: How Much Do You Think You Could Understand the Passages with Audio Support?

	1 (100%)	2 (80%)	3 (60%)	4 (40%)	5 (20%)	6 (0%)
High (n=51)	6 (11.76%)	33 (64.70)	9 (17.65%)	0 (0%)	3 (5.88%)	0 (0%)
Medium (n=68)	5 (7.35%)	34 (50.00%)	19 (27.94%)	7 (10.29%)	3 (4.41%)	0 (0%)
Low (n=45)	1 (2.22%)	21 (46.67%)	15 (33.33%)	5 (11.11%)	3 (6.67%)	0 (0%)
Total (n=164)	12 (7.32%)	88 (53.66%)	43 (26.22%)	12 (7.31%)	9 (5.49%)	0 (0%)

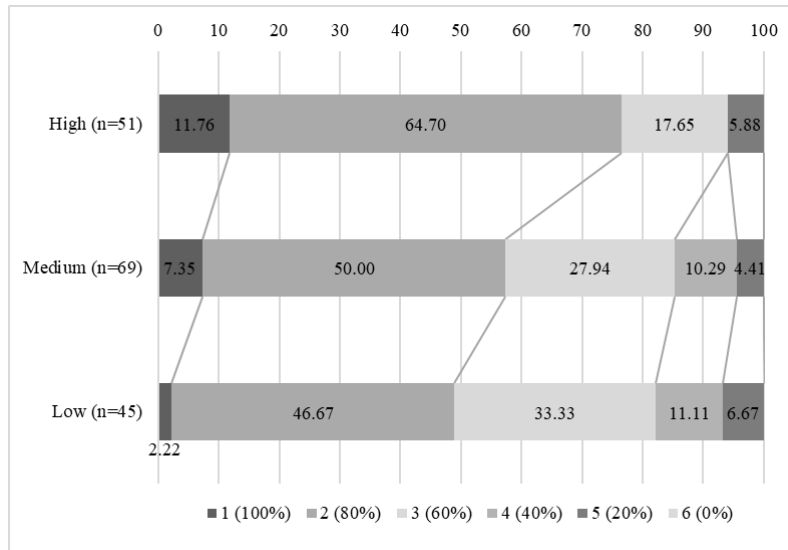


Figure 4. Comparison of the three proficiency groups on the understanding levels with RWL.

Question item 4, on the other hand, explores learners’ perceptions of comprehension level with the RO mode. Overall, 74.53% of the participants responded that they could understand over 60 percent of the reading passages without depending on audio support (Table 14 and Figure 5). When the responses of the three different proficiency groups were examined, 91.49% and 80.87% of the participants in the high and medium proficiency groups, respectively, answered that they could understand the reading passages without audio support. However, regarding the low proficiency group, only 47.82% of the participants answered that they could understand over 60% of the reading passages (Table 14 and Figure 5). The degree of their confidence in reading comprehension with the RO mode drops dramatically compared to that of the high and medium proficiency groups. As presented in Figure 4, regardless of the participants’ proficiency level, their confidence level with the RWL mode is higher than that with the RO mode. Moreover, when the RWL and RO modes were compared in the low proficiency group, the findings clearly verified they comprehended more with the audio support. In other words, this group lacked confidence when reading without audio support.

TABLE 14

Students’ Responses to Question 4: How Much Do You Think You Could Understand the Passages Without Audio Support?

	1 (100%)	2 (80%)	3 (60%)	4 (40%)	5 (20%)	6 (0%)
High (n=47)	11 (23.40%)	19 (40.43%)	13 (27.66%)	4 (8.51%)	0 (0%)	0 (0%)
Medium (n=68)	8 (11.76%)	23 (33.82%)	24 (35.29%)	9 (13.24%)	4 (5.88%)	0 (0%)
Low (n=46)	1 (2.17%)	10 (21.74%)	11 (23.91%)	13 (28.26%)	11 (23.91%)	0 (0%)
Total (n=161)	20 (12.42%)	52 (32.30%)	48 (29.81%)	26 (16.15%)	15 (9.32%)	0 (0%)

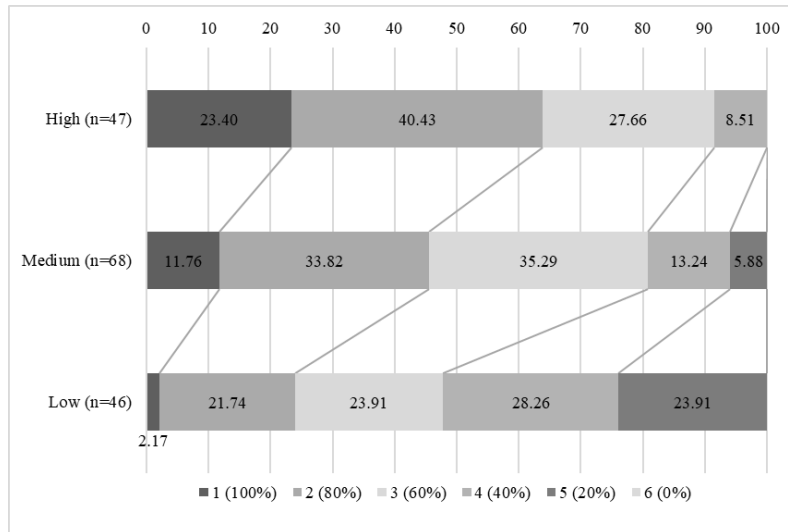


Figure 5. Comparison of the three proficiency groups’ levels of understanding with the RO mode.

Discussion

RQ1: Which Mode Facilitates Reading Comprehension Better; RWL or RO?

In response to the first research question, the different modes of reading did not influence the participants’ reading performance. The present study partially concurs with the findings of Chang and Millett (2015) because the participants of both studies improved their reading comprehension scores from the pre-test to the delayed post-test, although no delayed post-test was administered to the participants in the present study. There are several possible explanations for why no difference in performance was found between the RWL and RO modes on learners’ reading comprehension. First, they benefitted differently from both the RWL and RO modes. In the case of the RWL mode, for example, the participants did not need to decode the written words into aurally appropriate sounds as the audio recording does this work. In this respect, it may be easy for some learners, especially those whose reading speed was faster than the audio recordings, to follow and understand the passages. Whereas the other learners, whose reading speed was slower than the audio recordings, may find it difficult to construct the meaning by simultaneous reading and listening due to the audio recording speed. As for the RO mode, on the other hand, the learners were able to read back and forth the sentences they could not understand, which may have facilitated their understanding more effectively. There is another possibility that the learners faced difficulty decoding the written words into appropriate sounds, which may have prevented them from understanding the passages. Hence, it could be concluded that the way of understanding the passages with and without audio assisted reading is different from learner to learner (e.g., learners’ preferences and their proficiency levels). It should also be noted here that since few studies have investigated the effects of simultaneous reading and listening on reading comprehension (Chang & Millett, 2015), it is difficult to compare the results of the present study with those of past studies. Increasing studies of this kind will generalize the ideas revealed in the present study.

Compared to research on reading comprehension, more studies have been conducted on vocabulary acquisition research examining the effects of simultaneous reading and listening. As mentioned above, different modes of reading did not affect the participants’ reading comprehension test scores; however, previous studies on vocabulary acquisition reported that the learners benefitted from the simultaneous reading and listening to learn new words (Brown et al., 2008; Chang, 2009; Teng, 2016; Webb & Chang, 2012). The findings of these studies showed higher vocabulary gains from the RWL mode than from either the RO or LO modes. In particular, Brown et al. (2008) and Teng (2016) found that the ratios of word form

acquisition, which is the first step necessary to learn new words, were higher than those of meaning recognition. In this respect, it is assumed that effects of the RWL transfer more easily to vocabulary acquisition than to reading comprehension. While reading, learners need to construct meanings by understanding each encountered word or sentence. From this perspective, there is a possibility that some learners struggle to understand reading passages in the RWL mode, as learners cannot control the audio speed by themselves.

Another possible explanation for the response to the first research question is that the experiment was conducted in the EFL context where learners usually listen to the audio recording together in their classroom. The learners had no opportunity to adjust the listening speed to a comfortable pace. In this manner, some learners benefitted from audio-assisted reading because the speed was appropriate for them; however, other learners felt uncomfortable with the RWL mode because the audio speed was slower than their reading speed or the audio speed was faster than their reading speed. Lastly, as there was no time limitation in this study, some learners might have had a chance to re-read a passage when they engaged in the RO condition. Therefore, the lack of a time limitation in this study might have enhanced their reading comprehension scores with the RO mode. If another measurement other than no time limitation had been applied to the present study, the participants might have performed differently.

RQ2: Do the Two Modes of Input Have Different Effects on Three Different English Proficiency Groups?

In response to the second research question, the participants were divided into three different proficiency groups. As indicated above, it is assumed that some learners benefitted from simultaneous reading and listening while others benefitted from the RO mode. Comparing the different proficiency groups reveals a clearer picture of the effects of the RWL and RO modes when participants comprehend the reading passages. In the present study's experiment, there was no main effect except for learners' proficiency or the interaction effects between modes (RWL and RO) and learners' proficiency level (high, medium, and low). However, when looking at the result of two passages, *Father* and *Hero* (Table 10 & Figure 2), there was a slightly close interaction effect for learners' proficiency and two modes. The high and medium proficiency groups with a vocabulary size of 2307.62 (ranges from 2,184 to 2,646) and 2,033.65 (ranges from 1,932 to 2,142) words, respectively, scored over 80% on the reading comprehension test with and without audio-support. By contrast, the low group with a vocabulary size of 1695.52 words (ranges from 840 to 1,890) scored 80% with the RWL mode and 70% with the RO mode. This indicates that the different modes of reading did not affect reading performance in the high or medium proficiency groups, but they did affect the performance of the low proficiency group. To be more specific, the low proficiency group scored higher with the RWL mode than with the RO mode (Table 10 & Figure 2). The results indicated that the learners in the low proficiency group depended more on audio support while reading compared to those in the high and medium proficiency groups.

There are several reasons why the low proficiency group depended more on the audio recordings than the high and medium groups did. Previous research has shown that when beginner learners read passages, they afford more attentional resources to decoding the written words, but not to reading comprehension (Amer, 1997; Dhaif, 1990). They tend to suffer from the bottom-up reading style while reading. In other words, such learners still struggle from converting the written words into appropriate sounds. The present study also found that the learners in the low proficiency group still face difficulty reading the passages by themselves as they scored higher with the RWL mode than with the RO mode. The beginner learners in this study also depended more on the audio speech while reading. This is not a natural reading behavior, but accumulating this kind of experience may accelerate the ability to read autonomously by improving the bottom-up reading processing skill, which also motivates learners to read by themselves. This is the reason the low group gained an additional point with the RWL mode.

RQ3: Which Mode Do Learners Prefer: Rwl or RO? Are There Any Differences in Perceptions Among the English Proficiency Groups?

In order to give a more detailed description of the effects of the RWL and RO modes, the learners' perceptions were examined using a questionnaire. Question item 1 was about their mode preferences. The result showed that, despite their proficiency level, 60.84% of the participants preferred the RWL mode, while the other 39.16% preferred the RO mode to comprehend reading passages. However, this was particularly noticeable for the low proficiency group (Table 11 & Figure 3). Approximately 70% of the learners chose RWL as the preferred mode. The questionnaire included an open-ended question that asked them why they preferred the mode they had chosen. The participants who preferred the RWL mode made comments such as the following:

Participant 1: I can better understand what the words sound like.

Participant 2: I can better understand the meaning of the words by listening to the audio.

Participant 3: By listening to the audio, I did not need to read the passage by myself.

Participant 4: It is hard to understand without knowing how to pronounce words, but listening to the audio gives you appropriate sounds; therefore, it is easy to understand the meaning of a passage.

Participant 5: Information from listening to the audio tends to remain more in my memory than without audio support.

On the other hand, the participants who preferred the RO mode made comments such as the following:

Participant 6: I can take the time to read a passage at my own pace.

Participant 7: I can re-read a passage until I understand.

Participant 8: There is no time to think while reading with the listening mode, as the audio does not stop. However, with the reading only mode, I can take time and go back to unknown words or sentences again and guess their meanings.

Participant 9: I can read something again that I could not understand well.

Participant 10: I can read at my own pace.

Based on their comments, students who preferred the RWL mode faced difficulties decoding written words into phonologically correct sounds. They felt comfortable listening to the audio recording of the passage while reading along. However, Participant 3 mentioned that he did not need to read it by himself, which indicates that some students may just listen to the audio without reading the passages. On the other hand, most of the learners who preferred the RO mode answered that they liked it because they could read at their own pace. Their comments indicate that some of them might have read back and forth repeatedly to comprehend the passages, while others read faster than the audio recording, which prevented them from reading at their own pace.

Question items 3 and 4 are related to learners' confidence level, and asked them how much they think they could understand the passages with either the RWL or RO mode. The learners' perceptions are different from one group to another. As pointed out in the Results section, the number of learners in the low proficiency group with a lack of confidence in the RO mode was much higher than the number of

learners in the high and medium proficiency groups. In addition to the learners' reading comprehension test scores in the low proficiency group, their confidence level also supports the view that the learners in the low proficiency group still need audio support during reading. We could also say that the low proficiency group with a vocabulary size of 1,695 words on average still need more phonological support to read 1,000-word level reading passages. Using the audio support might help them learn how to read more quickly and improve their reading fluency skills. By contrast, the participants in the high and medium proficiency groups with a mean vocabulary size of 2,307.62 and 2,033.65 words, respectively, should practice reading passages without audio support since they have good comprehension and high confidence with both modes. Moreover, they should train themselves by reading passages higher than the 1,000-word level.

In the questionnaire, learners were also asked if the audio speed was appropriate to follow (Table 12 & Figure 4). The interesting point was that the participants in the medium and low proficiency groups tended to overestimate themselves, answering that it felt easy to follow the passages with the RWL mode. On the other hand, the learners in the high proficiency group underestimated themselves, answering that the audio speed was faster than they had expected. From this perspective, it seems that the smarter the students are, the stronger their desire to understand every single word accurately. However, Nation (2009) suggests that having a 70% level of understanding is sufficient when learners are developing their reading fluency skills. Therefore, educators must recognize this phenomenon, and instruct learners about the importance of understanding the passage overview, rather than every detail written in the passage. This kind of suggestion from teachers may encourage learners to improve their reading behavior.

Study Limitations

This study has some limitations. First, the experiment was conducted through self-paced reading as the researcher gave top priority to the learners' natural reading behavior. As a result, some of them may have taken advantage of this and may have read the passage back and forth or repeatedly to understand unknown words or sentences and the meaning of the passages. This may be one reason why no strong evidence for the effects of RWL on reading comprehension was found in this study. If there was a time limitation, for example, in how much time can participants read a passage with the RO mode, the study may have produced different outcomes. Second, the study did not measure learners' reading speed. If the study compared learners' reading speeds in addition to reading comprehension, it may have been possible to provide a more accurate description of the effects of RWL and RO modes on reading comprehension. Finally, the learners read only two passages with each mode in this study. According to previous studies, however, it takes time for learners to transfer the benefits of simultaneous reading and listening to their linguistic skills (Chang, 2019; Cheatham, 2017). Thus, learners can encounter words and sentences through a large quantity of inputs in various contexts, which help them improve their linguistic knowledge further. Overcoming such limitations in future studies will unveil a clearer description of the effects of audio-assisted reading.

Conclusion

The findings of the present study showed that two different modes of reading affected learners' reading comprehension and their perceptions differently. The participants in the low proficiency group tended to depend more on audio-assisted reading compared to those in the other groups. This indicated that the low proficiency group still struggled with decoding the written words into phonologically appropriate sounds. In this case, the audio-assisted reading helped them construct the meaning by understanding each word, which develops learners' reading skills. Since learners were able to comprehend the reading passages better with the RWL mode, this approach enhances their motivation toward reading as well.

Future studies should modify the experimental design to generalize the idea of the effect of the RWL and RO modes on reading comprehension (e.g., setting time limitations for reading passages, extending the

length of the intervention period, and increasing the number of test items). These revisions would also produce a more detailed concept of the simultaneous reading and listening approach. There are some experimental limitations in this study; however, considering that few previous studies have examined the effects of audio-assisted reading on reading comprehension, the present study still contributes positively to the simultaneous reading and listening research as an effective method to develop learners' reading fluency skills. The findings may deserve inclusion in EFL reading programs.

Acknowledgements

I am grateful to Dr. Tadimitsu Kamimoto of Kumamoto Gakuen University for his insightful comments on this study. I would also like to thank the anonymous reviewers for their feedback on my manuscript. Their advice and suggestions expanded my research knowledge and improved this paper. This study was supported by Grant-in-Aid for Scientific Research (C) 21K02536.

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(Received November 30, 2023; Revised March 8, 2024; Accepted March 10, 2024)