Exploring the Effects of Three Modes of Extensive Reading on Vocabulary Gain and Reading Rate

Jeff Peterson and J. Paul Warnick

Department of Asian and Near Eastern Languages, Brigham Young University

Previous extensive reading (ER) studies have focused almost exclusively on English language learners and have tended to be limited by their lack of control over how the ER treatment is conducted and assessed. Furthermore, few studies have investigated the possible effects of different styles of ER, including extensive listening (EL) and audio-assisted extensive reading (AER). Accordingly, the goal of this study was to investigate the possible effects of monitored ER, EL, and AER on the reading rate, comprehension, and vocabulary acquisition of adult learners of Japanese as a foreign language (JFL). Using an experimental design, we completed data collection for the second year of this 3-year project (which currently includes data from 144 JFL learners). Current data indicate mixed results from these three modes of ER. Although the differences were not statistically significant, the AER group showed the greatest gains in reading rate and vocabulary gain, with the ER group slightly outpacing the AER group on the comprehension score. The results reflect a positive impact overall from the different modes of ER, suggesting that incorporating ER-related activities in the curriculum will benefit learners. These interim results indicate that AER-type activities, reading along while listening, tend toward larger gains in vocabulary and reading rate.

Keywords: extensive reading, extensive listening, audio-assisted extensive reading, reading while listening, tadoku, tachō, vocabulary size, reading rate

Extensive reading (ER) continues to be an area of interest for researchers and practitioners, with great potential benefit to foreign language learners who read for pleasure. However, other modes of ER such as audio-assisted extensive reading (AER, also known as ERWL – extensive reading while listening) and extensive listening (EL) are newer concepts in the field of ER research (Tsuda et al., 2023). Although EL may be considered as a separate concept, for our purposes, we are considering it under the larger umbrella of ER, given the similarities in approach and purposes. As ER involves reading large amounts of self-selected, comprehensible texts for pleasure, EL is listening to large amounts of self-selected, comprehensible texts for pleasure. AER combines these two modes as participants read a text while listening along to native speakers narrate that text. Hence, there are various similarities between ER, EL, and AER, but as they involve language processing in different ways, they are treated here as separate modes.

Some studies have investigated the potential effects of AER, while fewer have looked at the potentially differing effects of AER, ER, and EL. This study makes a unique contribution, building on previous work, by investigating the potential effects of monitored ER modes including AER, ER, and EL on learner reading rates, reading comprehension, and vocabulary size. The data reported here have been gathered from the first two years of a 3-year study involving learners of Japanese at the university level.

Literature Review

The ER Approach

ER is an approach to teaching reading in the foreign language context that allows learners to read copious amounts of easy material of their choosing. ER is defined as reading that follows Day and Bamford's 10 principles (Day, 2018; Day & Bamford, 2002). EL and AER are different styles or modes of ER and follow these same principles. For EL, instead of reading, learners listen to audio narrations of easy materials. AER combines ER and EL, allowing learners to listen to audiobooks while reading along with the text.

Theoretical Basis of ER and Vocabulary Acquisition and Reading Rate

The present study was grounded in Nagy and Herman's (1985) incidental vocabulary learning hypothesis and in Rauding Theory (Carver, 2000). The incidental vocabulary learning hypothesis proposes that incidental vocabulary learning "will occur primarily through regular, sustained reading" (Nagy & Herman, 1985, p. 20). Rauding Theory proposes a hierarchy of five reading processes: scanning, skimming, rauding, learning, and memorizing (Carver, 2000; Yamashita, 2015). The theory posits that as one moves from scanning to memorizing, cognitive processes become more involved and reading rates slow. Research suggests that the process of ER aligns best with the concept of rauding, which is reading at a good pace—faster than activating the learning process but slower than skimming (Peterson, 2022a; Yamashita, 2015).

ER Research on Vocabulary Acquisition, Reading Rate, and Comprehension

Many studies have looked at the effects of ER on vocabulary acquisition among English language learners. However, general research examining the development of vocabulary among adult learners of Japanese as a foreign language (JFL) is limited (Matsushita, 2012a). Moreover, ER studies exploring gains in vocabulary size or vocabulary growth in the JFL context are even fewer (Banno & Kuroe, 2016; Rothville, 2019; Senoo & Yonemoto, 2014). JFL studies investigating vocabulary gains have shown mixed results: greater vocabulary gains through intensive reading (IR) than through ER (Senoo & Yonemoto, 2014), small but greater vocabulary gains through ER compared to IR (Fukumoto, 2004) and compared to not reading at all (Rothville, 2019), high levels of immediate recall of new vocabulary read in graded readers during ER (Mikami & Harada, 2011), and incidental vocabulary acquisition through ER (Leung, 2002).

A number of articles have been published in recent years on the significant improvements language learners have made in reading rate and reading comprehension through engaging in ER (Bui & Macalister, 2021; Peterson, 2022a; see Peterson (2019) for an extensive list). Of these recent articles, very few have examined a population other than English language learners (Peterson, 2022a; Senoo & Yonemoto, 2014; Tabata-Sandom, 2017). An evaluation of these studies reveals many limitations in how the research was conducted and how each study determined what constitutes ER. Among those limitations is that, in almost all recent published studies, ER was completed unmonitored outside of class and participants self-reported their ER to their course instructors (Beglar et al., 2012; Beglar & Hunt, 2014; Bui & Macalister, 2021; Huffman, 2014; Hunt, 2014, 2015; McLean & Rouault, 2017; Park, 2017; Suk, 2017). Performance on the reading rate assessments (i.e., reading rate) was also self-reported by participants in most cases (Beglar et al., 2012; Beglar & Hunt, 2014; Bui & Macalister, 2021; Chang & Millett, 2015; Huffman, 2014; Kao, 2013; McLean & Rouault, 2017; Park, 2017; Suk, 2017). In other cases, the articles were unclear how participants' reading rates were timed or recorded (Hunt, 2014, 2015; Imamura, 2012; Tabata-Sandom et al., 2023).

In a first step to overcome these limitations and fill the gaps of the most recent research in this area, Peterson (2022a) investigated the effects of ER on the reading rate and comprehension of JFL learners. Peterson monitored participants engaging in ER following strict adherence to ER principles over a period of 2.5 to 4 months. Peterson found that participants' reading rates increased significantly and that their comprehension abilities were not hampered by an increase in their reading rates. The present study builds on Peterson's work and is a larger study investigating multiple modes of ER and involving a large number of JFL learners. Thus, the present study is an essential work within a more comprehensive research agenda, which involves gathering data over a three-year period and is looking at the various effects of ER, EL, and AER on overall language proficiency gains, in addition to reading rate, reading comprehension, and vocabulary gains.

Research Question

How do three modes of ER (AER, ER, and EL) affect 3rd- and 4th-year university JFL learners' reading rate, reading comprehension, and vocabulary size?

Methods

Participants

The participants in this study are 144 JFL learners from three 3rd-year courses and one 4th-year course at Brigham Young University, located in the United States. Following are descriptions of the four courses:

- Japanese 301 Japanese Reading and Culture—Reading and writing emphasizing essential characters, vocabulary, grammar, and culture.

- Japanese 321 Advanced 1: Current Events—Using Japanese to describe and formulate opinions about current events reported in Japanese media.

- Japanese 322 Advanced Japanese: Modern Literature—Readings in modern short fiction, emphasizing grammar, reading comprehension, vocabulary building, and stylistic analysis.

- Japanese 443 Toward Superior Japanese 1—Using Japanese to debate on abstract topics related to current events reported in Japanese media.

Participants were drawn from these courses over a two-year period, a total of four semesters. The treatment and control activities were part of the curriculum in each of these courses, and enrolled students were invited to participate in the study. Each student received an institutional review board consent form outlining the purpose and nature of the research, and the data from those who chose to participate were included in the analysis for this paper.

Study Design, Data Collection, and Analysis

The study used a randomized pretest-posttest experimental design (see figure 1). Participants in each course were randomly assigned to one of four groups—one of the three experimental treatment groups (AER, ER, or EL) or the control group—in such a way that there was a cross-section of the four groups in each course. Over a series of fourteen 50-minute in-class activity sessions, participants were monitored as they engaged in their assigned activity and did not switch between or mix activities at any point in the study. As noted above, with many ER research studies, the participants engage in ER on their own time, and self-report regarding the time on task, and so forth. The current study included monitored activity. The instructor was with the participants in the classroom and observed them as they engaged in the given activity – ER, EL, AER, and culture video watching. If a participant seemed to become distracted or drowsy, for example, the instructor was able to intervene to ensure that the full time was spent as intended.

Figure 1.

Research Procedure

Participants randomly assigned		Fourteen 50-minute in-class sessions	
ER Group	Pretests	ER Treatment	Posttests
EL Group	Pretests	EL Treatment	Posttests
AER Group	Pretests	AER Treatment	Posttests
Control Group	Pretests	Control	Posttests

During the 50-minute in-class activity sessions, control group participants watched episodes of the Japanese television programs *Begin Japanology* and *Japanology Plus*, which explore aspects of traditional and contemporary Japanese life and culture. These programs are aired in English on NHK World. Control group participants selected videos of interest and watched them individually during our in-class activity sessions. For each video they watched, they wrote a one-paragraph summary on what they learned about Japanese culture. This activity was selected in order to provide a meaningful educational activity which would not involve reading or listening to Japanese in order to avoid overlap with any of the three treatment activities.

During these activity sessions, participants in the experimental treatment groups engaged in AER, ER, or EL following Day and Bamford's (2002) ER principles. Participants in these three groups reported completion of each assigned activity using a Google spreadsheet. They recorded the date, start time, and end time for each text and copied information about the text from their personalized list (see below), including the title, graded level, character count, and word count. Participants gave a brief assessment indicating their reaction to the text and added any other comments they chose to share. In cases where they did not finish the given text by the end of the session, they recorded the point at which they finished reading or listening when the time expired, and the researchers calculated the actual number of characters and words read or listened to during each session. The participants were then able to start again the next session where they left off in the text.

Additional data were collected using a series of pretests and posttests. These tests included five short reading passages, for which reading rate was measured, and each was accompanied with five comprehension questions. The series also included a vocabulary size test. The pretest and posttest reading passages were adapted fiction and non-fiction texts. Each set of five texts had an equal average jReadability score (see Lee & Hasebe, 2016) and nearly equal average lengths, and each individual passage had a 98% headword level of 4,000. Reading rate was precisely measured automatically using the learning management system through which the assessment was completed. The learning management system was created in-house by the university and has the capability to measure the duration of time between when the participant opened the given reading passage and when it was closed. Participants were instructed to exit immediately upon completion of the reading. The system thus provided a measurement of the elapsed time taken for the participant to read the given text. Comprehension questions (five per reading passage) were created by the authors and assessed general understanding. The vocabulary size test used was Matsushita's (2012b) 150-item assessment, which indicates a vocabulary size of up to 15,000 headwords. This assessment has a 30-minute time limit, so participants did not necessarily respond to all 150 items. To analyze gain scores on the assessments, an analysis of covariance (ANCOVA) was used.

Based on the vocabulary size pretest score, each participant in the three experimental treatment groups was given a personalized list of reading or listening material,

as applicable, to be used in the in-class sessions, selected such that the participant would be expected to understand at least 95% of the vocabulary appearing in the given text. Details of the materials on the personalized lists, including headword levels, were taken from Peterson's (2019) Japanese ER resources database, which contains detailed information such as difficulty level and character counts for 462 books and passages, including nearly 300 graded readers. Books in print were available in class for participants to access during the activity sessions, and the texts were also available online.

Results

To assess the effects of AER, ER, and EL on reading rate gains, comprehension gains, and vocabulary size, participants' gain scores, as determined by the pretests and posttests, were analyzed using an ANCOVA. Prior to conducting the analysis, it was determined that the assumptions for the ANCOVA had been met.

Reading Rate and Comprehension

Tables 1–3 summarize the results of the ANCOVA for reading rate gain scores in characters per minute (CPM), adjusted for the reading rate pretest and number of sessions attended. The data show the effect of group assignment on participants' reading rate improvement. Table 1 shows the estimated marginal means of the average reading rate gain scores. Figure 2 shows the differences in mean reading rate gains. Table 2 shows the pairwise comparisons of the groups and Table 3 shows the results of the ANCOVA. The results show that all treatment groups outperformed the control group, and the AER group had the highest reading rate gain, although the differences between groups did not reach statistical significance, $F(3, 138) = .168$, $p = .918$.

Figure 2.

Mean Reading Rate Gain (CPM)

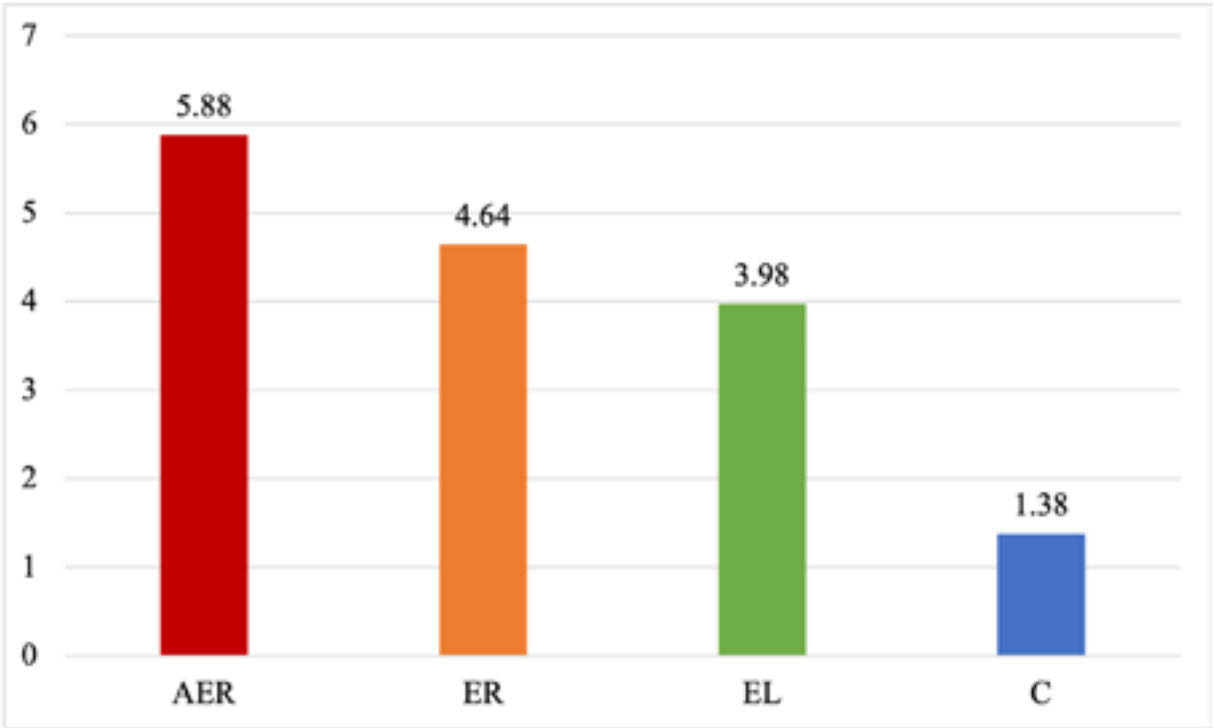

Table 1.

Reading Rate Gain Scores (CPM)

Group	N	Mean	Std. error	95% Confidence Interval	
				Lower bound	Upper bound
AER	36	5.880	4.606	-3.227	14.988
ER	36	4.640	4.608	-4.471	13.752
EL	37	3.976	4.553	-5.027	12.978
C	35	1.376	4.672	-7.862	10.614

Note. Covariates appearing in the model are evaluated at the following values: Pretest Average Reading Rate (CPM) = 154.40, Sessions Attended = 13.84.

Table 2.

Pairwise Comparisons of Reading Rate Gain Scores (CPM)

Comparison groups		Mean difference	Std. Error	*p*	95% CI for difference	
				Lower Bound	Upper Bound	
AER	ER	1.240	6.530	.850	-11.672	14.151
	EL	1.904	6.492	.770	-10.933	14.742
	C	4.504	6.545	.492	-8.438	17.447
ER	AER	-1.240	6.530	.850	-14.151	11.672
	EL	.664	6.471	.918	-12.132	13.460
	C	3.264	6.573	.620	-9.732	16.261
EL	AER	-1.904	6.492	.770	-14.742	10.933
	ER	-.664	6.471	.918	-13.460	12.132
	C	2.600	6.544	.692	-10.340	15.540
C	AER	-4.504	6.545	.492	-17.447	8.438
	ER	-3.264	6.573	.620	-16.261	9.732
	EL	-2.600	6.544	.692	-15.540	10.340

Table 3.

Results of ANCOVA for Reading Rate Gain Scores (CPM)

	Sum of squares	*df*	Mean square	F	*p*
Group	382.751	3	127.584	.168	.918
Error	104887.386	138	760.054		

Table 4 indicates the pretest and posttest average reading comprehension scores for the reading rate assessment passages. With average scores at or near 4 out of 5 points, results indicate a high or close to high level of comprehension on the reading rate passages for all groups. Results also indicate that all groups saw an increase in reading rate passage comprehension scores from pretest to posttest.

Vocabulary Size

Tables 5–7 summarize the results of the ANCOVA for vocabulary size gain scores (in hundreds) adjusted for the vocabulary size pretest and number of sessions attended. The data show the effect of group assignment on participants' vocabulary size progress. Table 5 shows the estimated marginal means of the vocabulary size gain scores. Figure 3 visually represents these gain scores. Table 6 includes the pairwise comparisons of the groups, and Table 7 shows the results of the ANCOVA. Results indicate that the AER, ER, and control groups performed similarly with average gains of around 1,444 headwords. These three groups outperformed the EL group, which saw a gain of only 1,181 headwords. However, these differences did not reach statistical significance, $F(3, 138) = .558$, $p = .643$.

Table 4.

Reading Rate Passage Comprehension Scores

Group	Pretest		Posttest		Mean Difference
	Mean	SD	Mean	SD	
AER	3.811	.679	4.028	.564	0.217
ER	3.810	.831	4.057	.611	0.247
EL	3.559	.999	3.685	.812	0.126
C	3.766	.849	3.897	.863	0.131

Figure 3.

Mean Vocabulary Size Gain (Hundreds)

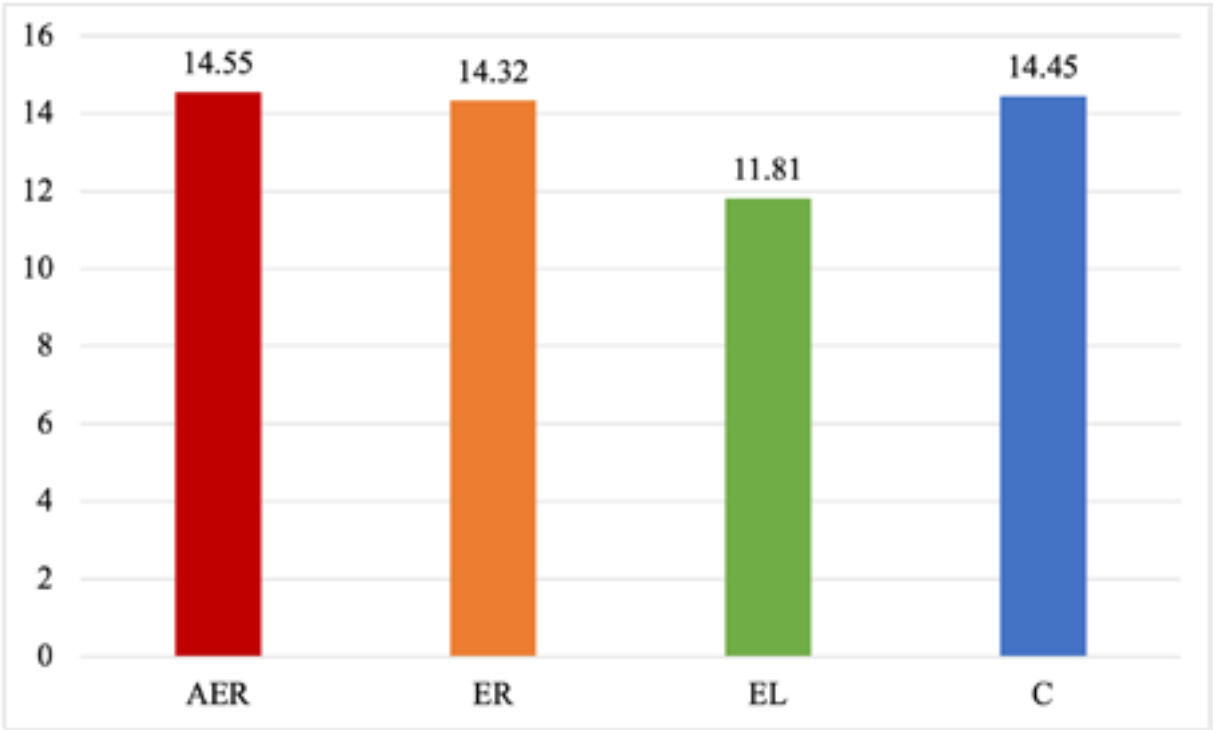

Table 5.

Reading Rate Passage Comprehension Scores

Group	N	Mean	Std. error	95% Confidence Interval	
				Lower bound	Upper bound
AER	36	14.549	1.770	11.049	18.048
ER	36	14.322	1.767	10.828	17.816
EL	37	11.808	1.753	8.341	15.274
C	35	14.451	1.795	10.902	18.000

Note. Covariates appearing in the model are evaluated at the following values: Pretest Vocabulary Size = 52.85, Sessions Attended = 13.84.

Table 6.

Pairwise Comparisons of Vocabulary Size Gain Scores (Hundreds)

Comparison groups		Mean difference	Std. Error	*p*	95% CI for difference	
					Lower Bound	Upper Bound
AER	ER	.226	2.504	.928	-4.725	5.178
	EL	2.741	2.500	.275	-2.203	7.685
	C	.098	2.515	.969	-4.875	5.071
ER	AER	-.226	2.504	.928	-5.178	4.725
	EL	2.515	2.487	.314	-2.404	7.433
	C	-.129	2.521	.959	-5.113	4.855
EL	AER	-2.741	2.500	.275	-7.685	2.203
	ER	-2.515	2.487	.314	-7.433	2.404
	C	-2.643	2.519	.296	-7.624	2.338
C	AER	-.098	2.515	.969	-5.071	4.875
	ER	.129	2.521	.959	-4.855	5.113
	EL	2.643	2.519	.296	-2.338	7.624

Table 7.

Results of ANCOVA for Vocabulary Size Gain Scores (Hundreds)

	Sum of squares	*df*	Mean square	*F*	*p*
Group	187.944	3	62.648	.558	.643
Error	15485.514	138	112.214		

Discussion

The statistical analyses show that each group improved across all three measurements of reading rate, comprehension, and vocabulary size. Differences between groups did not reach statistical significance when adjusted for pre-test reading rate and sessions attended.

The changes to reading rate, however, were particularly evident among the treatment groups, which performed much higher than the control group (M = 1.38 CPM). The changes also showed a trend of greater gains in the AER group (M = 5.88 CPM), followed by the ER (M = 4.64 CPM) and EL (M = 3.98 CPM) groups. This trend suggests that AER may lead to greater reading rate gains than the other treatments. This difference may be due to the bimodal (audio and text) nature of AER, in which learners follow along and read the book's text while listening to the native speaker narration. This bimodal approach thus may lead to greater automaticity in reading processing and language identification skills, resulting in higher reading rate gains. While the EL group outperformed the control group, it did not reach the same level of improvement as the other two treatment groups. It is possible that the EL group saw the smallest gains due to a lack of visual input. The lack of visual input may have led to less productive activity engagement, including times when EL participants were not as focused as their peers in the AER or ER groups.

The gains participants saw in this study are somewhat lower than those previously found in similar studies. ER participants in Peterson's (2022b) study averaged a 1.6 CPM gain per 50 minutes of time spent reading. This would be the equivalent of a 22.3 CPM gain for fourteen 50-minute reading sessions, a gain almost five times greater than the 4.64 CPM average gain of ER participants in the current study. One reason for this difference may be that the eight participants in Peterson (2022b) completed an average of 42 reading rate assessments, while participants in the current study completed a total of only 10 (five reading rate passages each on the pretest and the posttest). The frequent reading rate assessments in Peterson (2022b) may have acted as a form of fluency development practice, which may be one reason for the difference in reading rate gains across these studies. This possible reason seems to bolster the argument made by Nation and Waring (2019) that fluency gains are likely to be much more substantial when fluency development training is included as part of ER programs.

Significantly, the current study shows that increases in reading rate did not hamper participants' reading comprehension. On the contrary, reading comprehension improved over the course of this study. This finding aligns with those of recent studies, including Peterson (2022a) and Tabata-Sandom et al. (2023).

The results of the vocabulary size pretest and posttest did not show the same trend as the results of the reading rate assessments. The AER, ER, and control groups all performed similarly, with an average increase in vocabulary size of around 1,444 headwords. While this type of gain is impressive, the fact that the control group participants saw similar gains means that these gains likely came as a result of participants' other course activities or as a result of their completing the same vocabulary size test in both the pretest and the posttest, rather than as a result of the activities from the study. Alternatively, perhaps the assessment was not sensitive enough to measure precise changes in vocabulary size.

This finding contrasts with that of Rothville (2019), who found that JFL learners who engaged in ER had greater vocabulary gains than participants who did not read at all. The vocabulary size of the EL group participants in the current study increased by only 1,181 headwords on average. While differences between the four groups were not statistically significant, it is unclear why more comparable gains were not seen by the EL group. Future research should consider in more detail the potential gains or lack thereof from EL activities.

Major Findings

To summarize, in terms of reading rate, the AER group showed the greatest gain, followed by the ER group and then the EL group, with all three treatment groups showing gains notably higher than that of

the control group. The differences between these groups were not statistically significant. The apparent trend, however, suggests that AER may lead to greater gains in reading rate than ER or EL alone.

As for reading comprehension, all groups demonstrated gains. Each group averaged between 3.5 and 4 (out of 5) on the pretest, and both the AER and the ER averages were slightly over 4 on the posttest. The ER group showed a slightly higher gain than the AER group. It is notable that each group showed an increase in comprehension while also showing gains in reading rate. The increase in rate did not impede comprehension.

In the case of vocabulary gain, the AER, ER, and the control groups all had notable and similar gains. The EL group showed an increase, but to a lesser degree. The results were not statistically significant.

Pedagogical Implications and Suggestions

These interim results reflect a positive impact from different modes of ER. The data are somewhat mixed in terms of the relative effect of the specific styles of AER, EL, and ER, and the data to this point do not show statistical significance, but the results suggest that the intentional incorporation of these activities into the curriculum leads to clear gains in reading rate. The relative degree of vocabulary gains as a result of these activities is less clear. Overall, AER resulted in the most gain, followed by ER and then EL. This indicates that activities where learners listen as they read along tend to bring more growth in these specific language skills than ER or EL alone do.

Limitations and Future Research

These data show trends, but the fact that the differences between the groups were not statistically significant suggests that additional research involving more participants or covering a longer period of treatment may be warranted. Additionally, given previous research, perhaps incorporating a greater number of reading sessions during a semester or having longer sessions, resulting in more time on task, might lead to significant differences between the three treatments. It is also important to note that the inclusion of the third and final year of data from this study, with additional participants, may show more clearly the benefits of AER in promoting gains in reading comprehension as well, and perhaps reveal statistical significance in the various results.

The findings regarding the EL group were somewhat counterintuitive, and further investigation is warranted. Despite these sessions all being monitored, some of the participants evidently had difficulty staying focused at times. A closer inspection of actual engagement on the part of the EL group might explain the unexpected results, and more assistance in facilitating engagement with the texts would likely lead to even greater gains from EL. For example, having the EL group write a short summary of each text while listening or having them later retell the story might prompt greater engagement and focus.

Conclusion

This study investigated the effect of various modes of extensive reading (AER, ER, EL) on reading rate and vocabulary acquisition. A total of 144 participants were randomly assigned to one of the treatment groups (AER, ER, or EL) or to the control group. The study used a randomized pretest-posttest experimental design. The results reflect data from the first two years of an ongoing three-year study.

In summary, the study suggests that AER may be the most effective form of ER, leading to gains in reading rate, reading comprehension, and vocabulary acquisition, suggesting that teachers would be well advised to consider providing audio narrations for some course reading materials and to incorporate AER into class activities or provide AER opportunities outside of class.

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