Developing reading fluency: A study of extensive reading in EFL

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Abstract

Due to the great interest of practitioners on reading fluency in first language (L1) and
second language (L2) English classroom settings, fluency has become a hot topic. A
number of studies have suggested that an extensive reading (ER) program can lead to
improvement of L2 learners' reading rate; however, studies about high school students
are scarce. Inspired by current issues in reading and previous ER investigations, this
study examined the effectiveness of ER on reading rates of high school students in Japan.
In this study, students were provided with graded readers and comic books as reading
material they would find enjoyable. Pretests and posttests of reading rate and language
proficiency were administered and a *t* test was used to compare means of the rates and
language proficiency within groups. Results indicate that ER is an effective approach to
improve students' rate and general language proficiency.

Keywords: extensive reading, reading rate, reading fluency, automaticity, 1-minute reading probe,
t test, C-test

Characterized with the motto "reading gain without reading pain" (Day & Bamford, 1998, p. l21),
extensive reading (ER), an approach to second language (L2) reading instruction, aims to make
covering large amounts of reading material enjoyable for students. The goal of ER is
straightforward: to help students become fluent, independent, and confident readers (Day &
Bamford, 1998). ER is one way that L2 learners are exposed to English, especially in an
environment of English as a foreign language (EFL). According to Day and Bamford (2002), ER
promotes reading fluency and increases reading speed (p. 138). As students are assigned to read
a large amount of comprehensive materials, speed becomes important as it facilitates the
enjoyment and comprehension of materials.

A number of experimental and quasi-experimental studies have been conducted to examine the
effectiveness of ER and to provide support for the use of ER in English as a second language
(ESL) and EFL classroom settings. In studies on reading rate, for example, ER has been shown
to increase learners' reading speed (see Table 2 for a list of the studies). Samuels (2006) and
Blevins (2005) claimed that ER is an effective approach to improving learners' reading fluency.
However, research has been limited to junior high schools and tertiary educational institutions,
and little attention has been given to it in high schools in EFL environments. Many practitioners
in Japan have used ER in their classes, suggesting that they intuitively know that their students

need a large quantity of English input (Schmidt, 1996). The lack of studies has in part reflected the difficulty in administering experimental or quasi-experimental studies at high schools in Japan.

Extensive Reading

Day and Bamford (1998) credited Harold Palmer as the first to use the term *extensive* in referring to a large amount of reading with a focus on the meaning of the text. For Palmer, reading extensively has the advantage of being both informative and pleasurable. In other words, ER has real-world purposes in reading. Day and Bamford (2002, pp. 137–140) posited 10 principles of ER: The reading material is easy; a variety of reading material on a wide range of topics must be available; learners choose what they want to read; learners read as much as possible; the purpose of reading is usually related to pleasure, information, and general understanding; reading is its own reward; reading speed is usually faster rather than slower; reading is individual and silent; teachers orient and guide their students; and the teacher is a role model of a reader.

Table 1. *Results of selected L2 ER studies with junior high school, high school, university, and adult learners of English*

Study	N	Population	Results
Vocabulary			
Cho & Krashen, 1994	4	ESL; adults; USA	Gains
Horst, 2005	21	ESL; adults; Canada	Gains
Pitts, White, & Krashen, 1989	51	ESL; adults; USA	Gains
Writing			
Hafiz & Tudor, 1990	25	EFL; high school; Pakistan	Gains
Tsang, 1996	48	EFL; junior high school, high school; Hong Kong	Gains
Reading comprehension			
Masuhara, Kimura, Fukuda, & Takeuchi, 1996	46	EFL; college; Japan	Gains
Reading comprehension and speed			
Bell, 2001	14	EFL; young adults; Yemen	Gains
Robb & Susser, 1989	(About 62)	EFL; university; Japan	Gains
Sheu, 2003	65	EFL; junior high school; Taiwan	Gains
Taguchi, Takayasu-Maass, & Gorsuch, 2004	10	EFL; university; Japan	No gains
Reading comprehension, writing, and speed			
Lai, 1993	266[a]	EFL; junior high school; Hong Kong	Gains
Reading comprehension, writing, and attitude			
Mason & Krashen, 1997	20, 71, 76 (3 studies)	EFL; university; Japan	Gains

Note. N = the number of participants in the ER treatment groups.
[a]The actual number of participants whose reading speed was analyzed was 207.

In addition to these principles, Ono, Day, and Harsch (2004) provided some tips for teachers.

They suggested that teachers have students avoid using dictionaries and train them to skip unknown words. This is in contrast to the traditional practice in English language teaching pedagogy, which encourages students to try to guess words in context as much as they can. Furthermore, teachers should encourage students to simply stop reading if texts they are reading are not interesting. Following these principles and tips, ER studies have shown that their participants improved in areas such as reading comprehension, expanding vocabulary knowledge, and enhancing writing skills (see Table 1). Moreover, the studies reported that students who engaged in ER gained positive attitudes toward reading and increased their motivation to read. Some of the results of experimental and quasi-experimental ER studies are summarized in Table 1. The studies presented in the fourth and fifth rows are the most directly relevant in designing the methodology for the study, because the focus of the present study will be on the relationship between ER and reading rate. These will be discussed in more detail later.

The theoretical frameworks supporting ER include *input hypothesis* (Krashen, 1985, pp. 2–3) and *pleasure hypothesis* (Krashen, 2004). According to Krashen (1982, 1985, 1989), language learners acquire languages by understanding messages in a low anxiety context. Specifically, Krashen (1989) explained the hypothesis in this way: "comprehensible input is the essential environmental ingredient—richly specified internal language acquisition device also makes a significant contribution to language acquisition" (p. 440). Following the predictions of the hypothesis, when the language acquisition device is involved, learners subconsciously acquire target languages (Krashen, 1989). By focusing on meaning rather than form, learners are less conscious of language acquisition and achieve what is called *incidental learning* (Krashen, 1989, p. 440). If the hypothesis is correct, the more comprehensible aural and written input is provided, the more language acquisition occurs. A number of ER studies yielded results that support this hypothesis (see Table 1). In ER programs, L2 learners can choose reading texts whose levels are appropriate for them. Therefore, they get a so-called flood of comprehensible input. Since the English proficiency among participants in these studies is heterogeneous, it is quite clear that comprehensible input is effective on any level of language learners.

Krashen's (2004) pleasure hypothesis proposed that pedagogical activities which help language acquisition are those that are enjoyable, "but enjoyment does not guarantee language acquisition" (p. 28). He noted that there is evidence that voluntary reading outside the classroom is pleasing. For example, the participants in ER studies in Mason and Krashen (1997) indicated growth of positive attitudes toward reading.

Reading Fluency

Paran (1996) claimed that "if L1 readers possess attributes in reading which L2 readers do not, then it is the task of the language teacher to develop ways of encouraging the development of these attributes" (p. 30). He also stated that if automatic word decoding is a major attribute of L1 reading, a way of fostering automaticity should be found. The most widely accepted theory for reading fluency is the *automatic information processing* (hereafter "automaticity theory"), proposed by LaBerge and Samuels (1974; see also Kuhn & Stahl, 2003; Mathson, Allington, & Solic, 2006; Rasinski & Hoffman, 2003). Although many learners are able to recognize words accurately, they spend excessive time and energy in the process of word identification, which

may lead to a breakdown of comprehension. When learners are able to recognize words accurately and rapidly, they have greater capacity for attention leading to comprehending a text. To explain automaticity theory, Samuels (1994) discussed two types of attention: external attention and internal attention (p. 817). Internal attention is central to the theory of automaticity in reading. It has three characteristics: alertness, selectivity, and limited capacity (pp. 818–819). Alertness refers to the active attempt to come in contact with the source of information. Selectivity is the ability to select individual processes used at any given moment. For example, while reading these sentences, the process of selective attention enables you to choose which line you will process, though you can see the lines above and below. Limited capacity means that the human mind has a limited capacity to perform difficult tasks. For example, a novice car driver must focus his or her attention on driving. An experienced driver, however, can drive a car while listening to music, talking to someone, and sometimes even watching TV. Samuels' (2006, p. 8) made four assumptions to explain the automaticity theory for reading: The human mind has a limited capacity to perform difficult tasks; in performing difficult tasks, such as decoding words and comprehending a text, people make efforts and as a result consume their limited mind capacity; through practice over time, the amount of effort needed for the tasks becomes less; and eventually, the effort required for performing the tasks drops drastically.

According to the automaticity theory, two steps are involved to get meaning from printed words: decoding and comprehension. In reading, decoding is a process wherein printed words are translated into spoken words (Samuels, 1994). Eskey (1988) claimed that decoding is believed to play a major role in the reading process. He also argued that the rapid and accurate decoding of words is crucial to any kind of reading, especially L2 reading.

In comprehending a sentence, words must be interrelated and combined to construct meaning. Samuels (1994) stated that "comprehension is a constructive process of synthesis and putting word meanings together in special ways, much as individual bricks are combined in the construction of a house" (p. 820). Even if a sentence is easy, attention is still needed for comprehension to occur. When learners' language proficiency is limited, they may exhaust their attention finishing the decoding. As a result, they have little attention remaining for comprehending the text.

Components of Reading Fluency: Accuracy and Speed

As explained above, the most widely accepted understanding of reading fluency is the automaticity theory. Samuels (2006) argued that the essence of reading fluency is the ability to decode and comprehend a text simultaneously. In dealing with components of reading fluency, Martinez, Roser, and Strecker (1999) suggested that fluency depends on "appropriate rate, accuracy, phrasing, and expression" (p. 327). Reutzel (2006) claimed that major elements of fluency are speed of reading, accuracy, and proper expressions (p. 63). Blevins (2005) noted that a fluent reader is one who can read rapidly, recognize words automatically, and interpret phrases correctly (p. 13). He stated that recognizing words automatically represents accuracy or smoothness of word decoding. Rasinski (2004) argued that there are three dimensions in reading fluency: accuracy in word decoding, automatic processing, and prosodic reading (p. 46). He claimed that learners' automatic processing in decoding can be assessed by looking at their reading speed. Although some researchers mentioned the components of oral reading fluency or

prosodic reading, such as appropriate or correct phrasing and expression, most researchers and practitioners seem to agree on the following two components of silent reading fluency: (a) accuracy of word recognition, and (b) speed of reading.

Relationship Between ER and Reading Fluency

Decoding words automatically is essential for fluency in reading. Words that learners can recognize rapidly, accurately, and automatically have been called sight vocabulary. When learners encounter the same words a number of times, these words may enter their sight vocabulary (Day & Bamford, 1998; Ehri, 1995; Grabe, 1988; LaBerge & Samuels, 1974). Sight vocabulary is elemental for improving reading fluency. When learners have a large sight vocabulary, they decode more words automatically. As a result, they can save their finite cognitive resources to comprehend a text. It is crucial that learners have opportunities to keep seeing the words that they have seen before. Thus, a number of researchers recommend ER to increase sight vocabulary (Renandya & Jacobs, 2002; Samuels, 2006).

According to Samuels (1994), "automatic word-decoding skills and prior knowledge of a text's content may interact and strongly affect success in comprehension" (p. 831). Due to the fact that learners read a number of different kinds of texts in ER programs, it can be an effective approach to increase the learners' variety of topical knowledge (Renandya & Jacobs, 2002). That knowledge can facilitate learners' reading comprehension (Bernhardt, 1991; Harris & Sipay, 1985; Taylor, 2006). Several ER studies indicate the effectiveness of the treatment for syntactic knowledge (e.g., Elley & Mangubhai, 1983; Nassaji, 2003). Nation (2001) claimed that when learners read, they not only learn new words and enrich known ones, but they can improve their syntactic knowledge. A number of ER studies show participants' improvement in the number of vocabulary items (see Table 1). Learners can develop their knowledge of the world, syntactic knowledge, and general vocabulary by reading extensively.

Some studies on ER rate in EFL contexts are presented in the fourth and fifth row in Table 1. In these studies, participants' reading rate and comprehension were measured. However, the reading rate is the main focus. A summary of the main findings and methodological features for the ER studies in EFL contexts are presented in Table 2. This table shows participants' reading rate differences in before and after treatments. It also displays how researchers measured rate and decided the readability of the rate texts (the texts used to measure rate).

Bell (2001) conducted his study over two semesters to determine if young adult students' reading rate could be increased through ER in Yemen. He used an intensive reading (IR) class as a control group. The participants' English proficiency was at a beginning level. The mean rate in the posttests of the treatment group improved from 68.10 to 127.53 words per minute (wpm) and the control group showed gains from 78.45 to 92.54 wpm. He used *t* tests on pretests and posttests to compare means between groups and found that the differences were statistically significant. To measure rate, participants first read two different texts for 3 minutes. Next, their rates were calculated by looking at the number of words they were able to read per minute. To measure texts' readability, the researcher used Fry's readability evaluations. The number of the books that participants in the ER group read was not mentioned.

Table 2. *Results and measurement of selected rate studies in ER*

Study	*N*	Pretest (wpm)	Posttest (wpm)	Results	Texts for pretests and posttests; measurement	Readability of texts for pretests and posttests
Bell, 2001: EFL; young adults; Yemen						
Treatment (ER)	14	68.10	127.53		Two identical texts; time for reading for 3 minutes	Fry's readability evaluations
				Sig (BG)		
Control (IR)	12	78.45	92.54			
Lai, 1993: EFL; junior high school; Hong Kong						
Treatment 1 (ER)	86	165	226	Sig (WG)		
Treatment 2 (ER)	88	85	181	Sig(WG)	Two different texts; time for reading an entire text	Not mentioned
Treatment 3 (ER)	33	106	121	Not Sig (WG)		
Robb & Susser, 1989: EFL; university; Japan						
Treatment (ER)	62[a]	79.31	86.55		Not mentioned	Not mentioned
				Sig (BG)		
Control (IR)	62[b]	78.50	76.75			
Sheu, 2003: EFL; junior high school; Taiwan						
Treatment (GR)	31	59.7	95.8	Sig (WG)		
Treatment (BNESC)	34	98.6	136.0	Sig (WG)	Two different texts; time for reading an entire text using Nuttall's assessment	Flesch-Kincaid readability formula
Control	33	85.2	118.6	Sig (WG)		
Taguchi, Takayasu-Maass, & Gorsuch, 2004: EFL; university; Japan						
Treatment (ER)	10	80.88	64.48		Two different texts; time for reading an entire text	Flesch-Kincaid, Fog, and Fry formulas
				Not Sig (BG)		
Control (RR)	10	84.84	82.28			

Note. ER = extensive reading; IR = intensive reading; GR = graded readers; BNESC = books for native English-speaking children; RR = repeated reading; BG = between groups; WG = within groups; Sig = statistically significant.
[a]The authors did not mention the exact number of participants in the treatment group and control group. Thus, this number is approximate. [b]The same as the above.

Lai (1993) conducted a study over 4 weeks on lower secondary students aged 11 to 15 in Hong Kong. There were three treatment groups, no control group,[1] and the students' English proficiency was heterogeneous. Participants took pretests and posttests, and the researcher used a *t* test to compare means within groups. The mean rate in the posttests in Treatment 1 improved from 165 to 226 wpm, in Treatment 2 from 85 to 181 wpm, and in Treatment 3 from 106 to 121 wpm. The differences between the pretests and posttests of the two treatment groups were statistically significant, but not in the third treatment group. The participants in the treatment groups read an average of 16.2 books every 4 weeks. To measure the rate, the participants first

read a text, and when they finished reading they recorded the time they spent. Their rates were then calculated by wpm. In the rate test, the participants knew there were eight true or false questions after reading. The readability of the rate texts was not mentioned.

Robb and Susser (1989) conducted a study over two semesters, on freshmen, at a university in Japan. The participants' English proficiency was not mentioned. They were divided into two groups: an ER group and IR group. They took pretests and posttests, and researchers conducted an analysis of covariance (ANCOVA) to compare the means between the groups. The mean rate of the posttest in the treatment group (ER) improved from 79.31 to 86.55 wpm, but not in the control group (IR), which fell from 78.50 to 76.75 wpm. They found that the mean differences in the posttest were statistically significant. Readability of the rate texts was not mentioned.

Sheu (2003) conducted a study on junior high school students in Taiwan. The participants' English proficiency was at a beginning level. There were two treatment groups and one control group in this study. The participants in the first treatment group read graded readers, and the participants in the second treatment group read books for native English-speaking children. There was no mention of the duration of the study. The participants in the treatment groups read books during classes, but not outside of school. Sheu used *t* tests to compare mean differences between the pretests and posttest within groups. The mean rate in the posttests improved from 59.7 to 95.8 wpm in the first treatment group, from 98.6 to 136.0 wpm in the second treatment group, and from 85.2 to 118.6 wpm in the control group. The mean differences of all three groups were statistically significant. For measuring rate, he adopted Nuttall's assessment. In this assessment, calculating wpm was done by dividing the number of words in the text by the number of 10-second intervals the participants spent in reading the text. Following this, the number from the formula was multiplied by six. To check the readability of the texts, the researcher used the Flesch-Kincaid readability formula.

Taguchi et al. (2004) conducted a study on university students for 17 weeks in Japan. Their English proficiency was at a beginning level. The participants were divided into two groups: an ER group and a repeated reading group. The total amount of time the participants in the ER group spent on sustained silent reading was from 733 to 901 minutes, and the number of pages they read was from 147 to 337 with an average of 205 pages. To measure rate, the participants read an entire text, measured the time they spent, and calculated their wpm. They read the passage 5 times, and their rate was measured each time. To compare means, only their first reading rate was targeted. Researchers used the Mann Whitney *U* tests to compare means between the groups. The mean rate decreased from 80.88 to 64.48 wpm in the treatment group (i.e., the ER group) and from 84.84 to 82.28 wpm in the control group (i.e., the repeated reading group). The mean difference between groups in the posttest was not significant. Researchers used Flesch-Kincaid, Fog, and Fry formulas to check the readability of the rate texts.

The present study focused on the reading rate of ER for Japanese high school students. It also examined the improvement of students' general language proficiency through a C-test because other ER studies (see Table 1) reveal the effectiveness of various ER treatments. Taking these purposes into account, the following two research questions were addressed in this study:

    1. Do high school students' reading rates improve through ER, and if so, to what degree?

2. Do high school students' general language proficiency improve through ER, and if so, to what degree?

Method

Subjects

This study was conducted for 7 weeks from June to August 2006. The participants were public high school students in Japan. They were drawn from an average-level coeducational high school. Thirty-three students, who were in the 2nd year of high school, were selected. Their ages were 16 to 17, and there were 19 female and 14 male students. The students' native language was Japanese, and they were learning English as a foreign language. They had attended 4, 50-minute English reading classes and 2 writing classes per week. Japanese was the medium of instruction in these classes, and the translation method was used with a focus on memorization and knowledge accumulation. In these classes, they did not engage in any kind of ER follow-up activities, grammar classes, or special grammar treatment during this study. The study lasted 4 weeks during the semester and 3 weeks during the holiday because the students began their summer holiday when it was conducted. They had already studied English for 4 to 8 years, with a mean of 7 years. Based on reports from the Society for Testing English Proficiency (STEP) test,[2] the participants' English proficiency was at a beginning level. Eighteen participants were able to report their STEP Test levels, and their levels ranged from 4 to 2.[3] One participant had lived in the US for 6 years because of their father's work.

Treatment

The students were provided with graded readers as homework for 7 weeks. Following Day and Bamford (1998), who suggested that students need to be motivated to achieve goals, the amount of reading assigned was 28 books. This set number of books for them to read in 7 weeks was the goal. When the same researcher conducted an ER pilot test in the spring of 2006, the participants read 13 books, on average, with the goal of 16 books during the 4-week research period.[4] Reading 28 books would be a challenging but feasible number for the students to achieve. Therefore, the number was determined with the hope that the students' would feel more confident in themselves and in their reading abilities after achieving success. Graded readers usually show readability levels and are controlled for syntax, sentence length and complexity, and vocabulary (Bamford, 1984). In the present study, graded readers were chosen from publishers such as Macmillan, Oxford University Press, and Pearson Longman, with a range of basic vocabulary from 200–1,000 words. In addition to graded readers, students were supplied with comic books, such as *Archie, Richie Rich*, and *Casper*.[5] One hundred seven graded readers and 30 comic books, totaling 137 books, were provided for the 33 students. Thus, students could choose books from a range of topics that they were interested in.

Measurement of Reading Rate

The studies listed in Table 2 show that although three of the researchers used the entire text

method,[6] it is not clear whether there is an agreed-upon method by which L2 researchers and practitioners should use for measuring silent reading rate. The entire text method may be described as an authentic reading measure because students read a whole text just as people do in the real world (Rasinski, 2003). However, this method takes longer than a 1-minute reading probe, and it is uncertain how to determine the appropriate length of a text. Therefore, this study turned to the L1 literature for a method of operationalizing reading rates. To measure silent reading rates in L1 classroom settings, researchers and practitioners use two methods: 1-minute reading probe and entire text method (Harris & Sipay, 1985; Ream, 1977; Rial, 1977). In the present study, I chose the 1-minute reading probe to measure rate.

Materials for Reading Rate and Text Readability

To measure the reading rate, the students read a text extracted from Spargo (1989a) that had content at a level similar to what high school students usually read (see Appendix A). According to Harris and Sipay (1985) and Rasinski (2003), a passage for measuring rate should be at the student's grade level. In order to check readability of the rate text, the Flesch-Kincaid Grade Level was used. The Flesch-Kincaid Grade Level is one of the most commonly used measures (Readability formulas, n.d.). The readability of a text is measured based on factors such as the number of words in the sentences and the number of letters or syllables per word. Some texts that the students read in classes were measured by the Flesch-Kincaid Grade Level, with a mean of 6.2. The rate text measured by the Flesch-Kincaid Grade Level was 6.1. The students were told that they would be asked three comprehension questions about the text after the rate test so that they should read the rate text at their normal speed (Cziko, 1980; Rasinski et al., 2005). Questions were drawn from the first 120 words of the rate text. The students answered the questions; however, their comprehension was not being tested. The students were given a time limit of 1 minute for reading before answering the questions. Immediately following the reading period, they answered the questions. They read the same text for both the pretest and posttest.

C-Test Design

To measure general language proficiency, the students took the C-test. The C-tests, invented by Klein-Braley and Raatz, were based on the cloze test (Jafapur, 1995). A number of researchers claim that the C-tests are thought to be an effective measure of overall language proficiency (e.g., Dörnyei & Katona, 1992; Eckes & Grotjahn, 2006; Grotjahn, 1986; Klein-Braley, 1997). Klein-Braley stated that the C-tests are useful for FL learners for research purposes. The cloze test is made from one text and can bias results for those who already know the subject matter of the text. To solve this problem, the C-tests usually include four to five different texts. Each text contains 20–25 items and deals with a different topic with around 75 to 100 words (Norris, 2006). Words in the first sentence are not deleted for participants' comprehension. After the first sentence, the second half of every other word is deleted, but words with only one letter are skipped (Connelly, 1997). If a word has an odd number of letters, the larger half is deleted. Every deleted letter was replaced by a dash (Jafapur, 1995). In this study, a 100-item C-test was designed by the researcher following these rules (see Appendix B), with texts selected from Krahnke (1996), Morizumi (2003), and Spargo (1989a, 1989b).

The readability of the texts was set at a level that students were expected to attain at the end of

the study. The order of the 4 texts went from easy to difficult levels (Connelly, 1997): Flesch-Kincaid Grade Level from 5.6 to 7.3 with a mean of 6.6. Taking the texts' readability into consideration, the C-test in the present study was slightly more difficult than the texts that the students read in classes. Since the students were taking the C-test for the first time, they were given a sample C-test before the pretest to become familiar with the test format (see Appendix C). The C-tests were then administered as pretests and posttests for all students. The time needed for working through each text is generally 5 to 7 minutes (Connelly, 1997). The C-test with 100 items from four texts took 24 minutes.[7] Students took the same C-test for the pretest and posttest.

Procedure

Before the tests and questionnaire were administered, students read a consent form that explained the purpose of the study and they agreed to participate. Following the tests, students filled out a questionnaire on which they recorded their gender, age, past experience of English education, living abroad, and English level based on results from the STEP Test. Students took the pretest in June and the posttest in August.[8] Graded readers and comic books were placed on a book shelf in their classroom, and when students borrowed books they wrote their name and the title of each book taken in the loan notebook. Students were asked to write a book report as a way of verifying the amount of reading completed. In this report, students wrote the title of the book and a very brief comment in either English or Japanese (see Appendix D). Based on their book reports, the researcher interviewed all the students after school in the middle of the study period so that their progress could be checked and advice given.

Analyses

In this study, there were two dependent variables (reading rates and C-test) and one independent variable (a 7-week ER treatment). To compare means of each test within the group, a paired *t* test was used. There are four assumptions for a *t* test: (a) independence of groups, (b) independence of observations, (c) normality of the distributions, and (d) equal variances (Brown, 1992, pp. 644–645). Although the results of the pre-C-test exhibited skewness and kurtosis, there was still space for two or three standard deviations on either side of the mean, and no outliers. Therefore, the distribution can be described as normal (Brown, 1992). All of these assumptions for this statistic were met. In this calculation, the null hypothesis of no difference within group means was chosen. A Bonferroni adjustment was made to the alpha level to account for the two separate *t* tests. The alpha level was set to .025.

Results

Reading Rates

Descriptive statistics for the reading rates are presented in Table 3. The mean reading rate from the pretest to the posttest improved from 84.18 to 112.82 wpm. Similar improvements in the median and mode scores were also found. The standard deviation (SD) remained stable (28.76 and 29.39), but the range widened from 106 to 148. The two distributions had neither significant skewness nor kurtosis problems. The reliability of reading rates was $\alpha = .76$ (Cronbach's alpha).

Table 3. *Descriptive statistics of pre- and post-reading rates in wpm (N = 33)*

Test	*M*	Median	Mode	*SD*	*SE*	Range	Min	Max	Skew	Kurtosis
Pre-rate	84.18	80.00	52.00	28.76	5.01	106	45	151	0.74	0.20
Post-rate	112.82	113.00	130.00	29.39	5.12	148	52	200	0.85	1.67

Figure 1 displays the comparison of differences of each student's pre- and post-reading rates in wpm. It indicates that most of the students' posttest reading rates increased. Seven students in particular (4, 8, 9, 13, 21, 22, and 23) were able to boost their rate from 50 to 70 wpm.
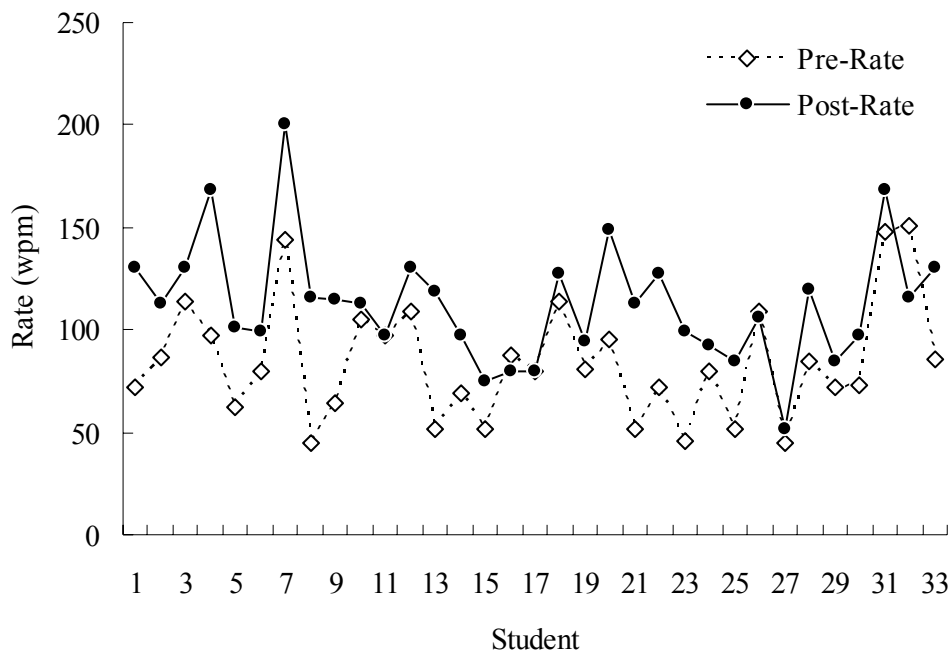

Figure 1. Comparison of pre- and post-reading rates in wpm.

C-Tests

Descriptive statistics for the C-test results are presented in Table 4. The means on the post-C-test improved somewhat from 47.58 to 51.00. Similar small-sized improvements in the median and mode scores were also found. The standard deviation (SD) and range remained stable (going from 11.06 to 11.50, and from 55 to 57, respectively). The distributions in the pre-C-test were positively skewed; that is, many students scored low. The kurtosis statistic was positive, suggesting that the distribution may be too peaked (Tabachnick & Fidell, 1996). The reliability of the C-test was $\alpha = .92$ (Cronbach's alpha).

Table 4 *Descriptive statistics of pre- and post-C-test results (N = 33; k = 100)*

Test	*M*	Median	Mode	*SD*	*SE*	Range	Min	Max	Skew	Kurtosis
Pre-C	47.58	46.00	35.00	11.06	1.93	55	28	83	1.03	2.09
Post-C	51.00	52.00	52.00	11.50	2.00	57	27	84	0.35	1.04

Figure 2 displays the comparison of the differences of each student's scores on the pretest and posttest of C-test. The scores on the posttest of the C-test exhibit the same histogram as those of the pretest, and those of the posttest are slightly better than the pretest.
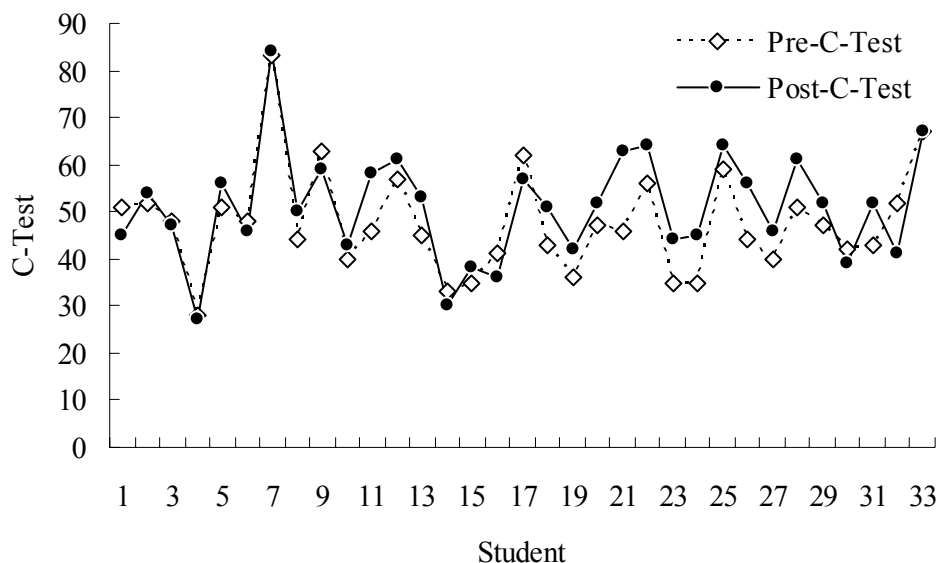

Figure 2. Comparison of pre- and post-C-test results.

Paired t Test

The results of a paired *t* test of reading rates (*M* = -28.636,[9] *SD* = 25.58, at a 99 % confidence interval of the difference, [-40.83, -16.44]) showed that the difference was statistically significant, *t*(32) = -6.43, *p* < .0005, 2-tailed. Therefore, the null hypothesis of no difference within group means was rejected. That is, the average difference of 28.64 wpm between reading rate in June (pretest) and August (posttest) was statistically significant. This suggests that the students increased in their reading rate to a statistically significant degree in the 7-week period, during which they engaged in ER.

The results of paired *t* test of C-test (*M* = -3.42, *SD* = 6.22, at a 99 % confidence interval of the difference, [-6.39, -0.46]) showed that the difference is statistically significant *t*(32) = -3.16, *p* = .003, 2-tailed. Therefore, the null hypothesis of no difference within group means was rejected. However, the actual mean difference of less than 4 points on a test with a total of 100 suggests that the growth in general proficiency is very small, although statistically significant.

Discussion

The results of the present study showed that high school students' reading rates improved after a 7-week ER treatment. According to the pretest and posttest results, students' C-test scores also improved. However, to appropriately address the results of reading rate, they should be interpreted with caution.

Differences in Reading Rates

The differences in students' reading rates of pretest and posttests are meaningful because the differences are large. According to Robb and Susser (1989) and Taguchi et al. (2004), the average reading rate of Japanese university students is from about 65 to 90 wpm. Nuttall (1982) estimated that secondary school students' average reading rate in ESL may be from 120 to 150 wpm and university students' rate in ESL may be at about 200 wpm (p. 35). In comparison, students' rates in the present study are within a similar range. Nuttall claimed that improvement of students' rate by about 50 percent or doubling the rate is not uncommon after training; however, she did not explain the length of the training, particularly when their rate is limited, such as 40 wpm (p. 35). Although in the present study the participants' rate in the pretest was not so slow, reading rates were shown to increase by about 30 percent in the ER treatment period. The results of the present study support the research question that high school students' rates would improve through ER.

Possible explanations for the differences within a group may be found by considering the following three factors: (a) participants' expectations, (b) participants' readiness to be exposed to English, and (c) measurement. First, students may have expected some improvement in their rates and general language proficiency after the treatment. This is because the purposes of the study and of ER were explained to them before the treatment. In addition, the consent form they read was translated from English into Japanese, and thus they understood the purpose of the study.

Second, it was possible that students were ready to be exposed to English. Due to the prevalence of the grammar-translation method at Japanese junior and senior high schools, students have accumulated a fundamental English syntactic and lexical knowledge (LoCastro, 1996). In other words, participants in the present study may have been ready to be exposed to comprehensible flood of English to expand their potential abilities. The number of the books that students read in the treatment period ranged from 1 to 10, with an average of 4 books. Despite reading a small amount of books, their reading rates increased.

Third, the rate results could be different depending on the way they were measured. In this study, a 1-minute reading probe was adopted. A 1-minute reading probe is an efficient form of rate assessment (Rasinski, 2003), but this method differs from those used by other researchers to measure rate (see Table 2). For example, one researcher utilized Nuttall's assessment. In this assessment, students' reading rate is counted at 10-second intervals without single figures; hence their accuracy rate is not measured. Other researchers utilized an entire text method.

Differences in C-Test

The difference in the pre- and post-C-test results is statistically significant, despite the difficulty in achieving rapid improvement of general language proficiency. Since the difference between the pre- and post-C-test results was only 3.42 points, the results of the present study somewhat support the research hypothesis that high school students' general language proficiency would improve through ER. The overall low means and the positive skewness suggest that the C-test was difficult for the students. Although a number of ER studies have revealed its effectiveness in

ESL and EFL contexts (see Table 1) and many advantages are presented by several researchers, the results of this study are less robust. Whereas the results indicate students' improvement in English skills, it was not clearly established that they experienced language learning in areas such as spelling, vocabulary, grammar, and text structure.

Limitations of the Study

There are some limitations in this study. First, there was no control group. Unfortunately, it was not allowed to test students who were not participating in the treatment. Not having a control group at the same institution hinders the evaluation of ER studies in high schools. Generally, without a control group, it is rather difficult to claim conclusively that improvements were the result of the ER treatment. Second, it is difficult to measure different kinds of proficiency, such as knowledge of the world, vocabulary, grammar, spelling, and text structure using a C-test. Hence it is hard to determine what the students learned through the ER program. Third, they had the ability to decode faster at the end of the study period; however, it is not clear whether students were decoding and comprehending the text at the same time. In terms of automaticity theory, the ability to decode and comprehend a text at the same time is the essence of reading fluency (Samuels, 2006). Fourth, there is a possible practice effect on the result of posttests because students took the same reading rate and C-test as a pretest and posttests. Finally, there is a limitation in the context of the population, which included only Japanese high school students whose English proficiency was at a beginning level. Learning behavior is different in each culture, and because of this, the background at this particular group must be taken into account.

Despite these limitations, the results of this study show that ER improves one aspect of reading fluency and general language proficiency of Japanese high school students with a few books and short treatment period. Based on these results, it is recommended that ER as fluency instruction be incorporated into English class curriculums. ER provides a possible way for students to become fluent readers by being exposed to English, to increase their vocabulary size, syntactic knowledge, and knowledge of the world.

For fluency reading, vocabulary plays an important role. Thus, further research will be needed on how much participants increase their vocabulary in ER in addition to their reading rate. Although a number of studies prove effectiveness of ER treatment, to my knowledge, no studies have been conducted to measure vocabulary and rate in the same study.

To most effectively measure reading rate, establishing a unified measurement is essential for both achievement and analytic purposes. This study adopted a 1-minute reading probe to measure rate. However, there is no consensus among L2 researchers on how to measure reading rate, much less reading rate texts' readability. Although this method only measured one aspect of fluency, it is necessary to develop reliable and valid methods to measure reading rates in the ESL and EFL contexts.

One test developer created a test, the Reading Fluency Indicator,[10] for the purpose of measuring oral reading rate, accuracy, comprehension, and prosody. Another test for measuring reading fluency is under development by another test developer (Samuels, 2006). However, these tests are for oral reading fluency. In terms of text readability, researchers selected grade-appropriate

texts from the Lexile Framework for Reading (n.d.) for a large-scale assessment of reading fluency in L1 context (Johnston, 2006). To enhance future research, it should be possible to use the materials that these test developers make. Once researchers adopt the same test materials and the same measures, it will be more feasible to compare results and accurately determine the effectiveness of ER treatment.

Acknowledgments

Notes

1. The researcher conducted the study on the first treatment group in 1988, on the second treatment group in 1989, and on the third group in 1991. Participants in three groups were from three different schools.

2. The STEP Test is the most popular English proficiency test among high school students in Japan. Every year, about 2,500,000 people, including test takers who take the test abroad, take the STEP Test (Eiken, n.d.). There are seven proficiency levels in this test, and the first is the most advanced level.

3. According to the STEP information, the 4th and 3rd levels of the STEP are equivalent to the English proficiency of Japanese junior high school students, and pre-2nd and 2nd levels are equivalent to that of high school students (Eiken, n.d.). In this study, four students were in 4th level of the STEP, 10 were in 3rd, three were in pre-2nd level, and one was in 2nd.

4. The pilot test was conducted in the US. There were 4 participants who were international students studying English in the US. They volunteered to participate in the pilot study. Their motivation to read books seemed strong since they were in the US to study, and for the reward they would receive after the study period.

5. Krashen (2004) claimed that comic books help readers' comprehension with pictures without negative effects on school accomplishment and language development. In addition, comic book readers tend to have more positive attitudes toward reading.

6. In the entire text method, students read an entire text. The number of words in the text and the number of seconds it takes them to read are subjected to the following formula:

$$\frac{\text{\# words read}}{\text{\# of seconds to read}} \times 60 = \text{reading rate in words per minute}$$

7. In the pilot test, the participants were given 28 minutes for the 100-item C-test. The C-test was

the same test that was administered in this study except one text. It was found that there was ample time for participants to finish the C-test; therefore, the time for the C-test was set for 24 minutes in this study.

8. It is rather muggy in August in Japan, but the posttest was conducted under the same conditions as the pretest because air-conditioners were equipped in all the classes.

9. This mean is the d-value. The formula of the d-value is

$$\text{d-value} = M_{\text{pre-rate}} - M_{\text{post-rate}}$$

10. Pearson AGS Globe (2006) developed this oral reading fluency test for children aged 5 to 8.

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Appendix A

Reading Rate Sheet
(Extracted from Spargo, 1989a)

Do you plan to visit Italy someday? If so, it's a good idea to know about the country and its people. Italy has two very different areas. The business centers and large cities of the North hum with noise. The South, on the other hand, enjoys the sleepy charm of the country. People of the North like the bustle of city life. They enjoy all the things a city has to offer. Those from the South like a slower pace. They like their rural surroundings. One thing all Italians have in common is their zest for life.

The climate of Italy is like that of California. It is sunny and warm all year in the South. Except in the mountains, summers are warm all over the country. Winter brings snow, sleet, cold rain, and fog to the North. Central Italy is mild in winter.

Many Italians are happiest when in groups. Wherever they gather, you are likely to hear fine singing and happy laughter.

A building boom is going on in the cities of Italy. Steel and glass skyscrapers tower over ancient ruins. Italy throbs with life and color. Talk on the street corners is lively. The background music coming from open windows could be classical or the latest hit tune. Donkeys and street peddlers sometimes add to the color and noise.

The city streets are busy. Here you will see well-dressed people. These people are going to work in new office buildings. The street traffic includes different kinds of cars. You can even spot some motor scooters and bicycles.

Italians also like food. They are good cooks. Each city and region has its own specialties. Bologna, for

instance, is known for its sausages. Olive oil, garlic, and tomatoes are used more freely in cooking in the South than in the North. Some Northerners use butter instead of olive oil. You will see rice on their plates instead of pasta.

An Italian dinner begins with appetizers and ends many courses later with a fine dessert. In the course of a dinner, you can sample some of Italy's fine cheeses. There are many to choose from. There are also many fine wines, and they are reasonably priced.

You may never visit Italy. Still, it's nice to read about its lively and colorful personality. Maybe someday you will be lucky enough to see part of this wonderful land.

Appendix B

C-Test

TEXT 1: A Message From Forty Years Ago
(Extracted from Morizumi, 2003)

Here is a picture of Japanese killifish or medaka. Not lo _ _ ago w _ saw a l _ _ of th _ _ in lit _ _ _ streams al _ _ _ rice fie _ _ _ _ in t _ _ country si _ _. But mo _ _ of th _ _ are go _ _ now. W _ _? One o _ the rea _ _ _ _ is th _ _ farm insect _ _ _ _ _ _ _ we us _ _ on t _ _ fields ma _ _ the wa _ _ _ _ of t _ _ streams unsui _ _ _ _ _ for kill _ _ _ _ _ to li _ _ in. As time goes on, they may die out completely. We are now in the age of ecological crisis.

TEXT 2: Sleeping Through the Winter
(Extracted from Spargo, 1989a)

To survive, animals learn how to adjust to changes in their world. Some ha _ _ learned h _ _ to li _ _ through co _ _ winters wh _ _ food i _ in sh _ _ _ supply. Th _ _ _ secret i _ a win _ _ _ sleep cal _ _ _ hibernation. Wh _ _ temperatures dr _ _, these ani _ _ _ _ go t _ sleep. T _ _ best-known hiber _ _ _ _ _ is t _ _ bear. A _ _ bears c _ _ hibernate. B _ _ mainly i _ is th _ _ _ that li _ _ in col _ _ _ climates that do.

TEXT 3: Computer and Communication
(Extracted from Krahnke, 1996)

Our great-grandparents communicated face-to-face or by writing notes and letters to each other. If th _ _ were sepa _ _ _ _ _ by mo _ _ than a f _ _ miles, commun _ _ _ _ _ _ _ had t _ wait un _ _ _ they co _ _ _ travel t _ _ distance a _ _ see ea _ _ other o _ until som _ _ _ _, a mess _ _ _ _ _ _ or pos _ _ _ service wor _ _ _, could del _ _ _ _ the no _ _ or let _ _ _ . Much h _ _ changed i _ the la _ _ hundred ye _ _ _ . The tele _ _ _ _ _ became com _ _ _ in much of the world by the 1930s, and it allowed instant voice communication over wires.

TEXT 4: Water, Water Everywhere
(Extracted from Spargo, 1989b)

Most people know that water is unevenly distributed over the earth's surface in oceans, rivers, and lakes. Few rea _ _ _ _, however, h _ _ very une _ _ _ the distri _ _ _ _ _ _ actually i _ . It i _ important t _ think o _ the to _ _ _ amount o _ water o _ the pla _ _ _ Earth, t _ _ areas wh _ _ _ _ the wa _ _ _ occurs, a _ _ the lo _ _ -term impor _ _ _ _ _ of t _ _ findings. T _ _ oceans o _ the wo _ _ _ cover 140 mil _ _ _ _

square mi _ _ _ of t _ _ Earth's surface. The average depth of the ocean basins is about 12,500 feet. If the basins were shallow, seas would spread far onto the continents.

Appendix C

Sample C-Test

Directions: The following tests have been developed by removing the second half of every second word in a text. You are supposed to reconstruct the texts.

Example Text
(Extracted from Morizumi, 2003)

Kina Shokichi is one of my favorite musicians. He w _ _ born i _ Okinawa i _ 1948. H _ began t _ play mu _ _ _ when h _ was i _ junior hi _ _ school.

Example Answers

Kina Shokichi is one of my favorite musicians. He <u>was</u> born <u>in</u> Okinawa <u>in</u> 1948. <u>He</u> began <u>to</u> play <u>music</u> when <u>he</u> was <u>in</u> junior <u>high</u> school.

Appendix D

Book Report
(Adapted from Bamford, 1984, p. 220)

Title of Book: (   ):   I read all.   /   pages of the book. (circle one) 途中で読むことをやめた時のページ数を記入
How did you like the book? (circle one)   1. Great! (I loved it)   2. Good (I liked it)   3. OK (I didn't mind reading it)   4. Boring/Stupid (I wish I hadn't read it)

Write your feeling about the book: 英語でも、日本語でも記入可（どちらか片方で感想を書いて下さい）
    This book was very interesting and easy to understand the story.
    非常におもしろかった、また内容も簡単に理解できた。

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