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Improving reading rates and comprehension through timed repeated reading

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Abstract

Thirteen English as a foreign language students read 26 passages during a 13-week period. Each passage was read five times, and students answered comprehension questions after the first and the fifth reading. Another 13 students read the same number of passages but without repetition and only answered the comprehension questions once. All students were tested based on two practiced texts and one unpracticed text before and after the intervention. The results of reading rates showed that the repeated reading students increased 47 words and 45 words per minute in the practiced and unpracticed texts respectively, but the non-repeated students increased 13 and 7 words only. The comprehension levels of the repeated reading students improved 19% and 17% for the practiced and unpracticed texts, but this was 5% and 3% for the non-repeated reading students. Possible reasons for the higher gains compared to previous studies are discussed.

Keywords: reading fluency; repeated reading; timed reading; reading rate; reading speed

The present study looks at the effects of repeated reading (RR) on developing second language learners' reading fluency. Reading fluency in foreign or second language (L2) contexts has not yet received as much attention as reading fluency in the first language (L1). One of the main reasons for this is that much more emphasis has been put on how accurately rather than how fluently L2 learners read (Davies, 1982; Grabe, 2009). Another reason could be that reading in L2 education has been considered as mainly a vehicle for developing lexical and syntactic knowledge (Bernhardt, 1991), so that when L2 learners read, they often read carefully and look up unfamiliar words as they encounter them (Coady, 1979) and gradually a habit of reading slowly is formed. However, with the advent of the computer era, it is difficult to cope with the abundant information available on the Internet if one is not equipped with good reading skills, hence, some researchers have stressed the need for more research in this area and more attention to fluency in reading instruction (Grabe, 2010; Millett, 2008; Nation, 2007).

Fluency in the Reading Process

Reading fluency has been defined as readers having the ability "to read text rapidly, smoothly, effortlessly, and automatically with little attention to the mechanics of reading such as decoding" (Meyer, 1999, p. 284), and the ability to combine information from various sources while reading under fairly intense time constraints (Grabe, 2010, p. 72). Reading fluency also depends on maintaining a good reading speed for long periods of time and on generalising across texts (Hudson, Lane, & Pullen, 2005). It seems that a general consensus of reading fluency comprises three primary components: automaticity in word recognition, accuracy in decoding, and rapid reading rates (Kuhn & Stal, 2003, Grabe, 2009). These components in reading processing are closely linked with one another. However, the role of automatic word recognition is considered the foundation or heart of fluent reading (Segalowitz & Hulstijn, 2005), and is assumed to arise from constant and regular practice. Accuracy in decoding words or texts is another essential component in reading fluency. Without accuracy in decoding words and text, comprehension is likely to become degraded. These two processes must occur at a reasonable speed throughout an extended text. On the whole, a high level of reading comprehension is not possible without automatic and accurate word recognition of a large amount of vocabulary at a rapid rate.

Well-established reading research indicates that reading involves lower- and higher-level cognitive processes (cf. Grabe, 2009; Perfetti, 1999; Pressley, 2006). Lower-level processes refer to word recognition, syntactic parsing, meaning proposition encoding and working memory activation (Anderson, 2000; Koda, 2005). All of these are fundamental elements and they must be processed rapidly and automatically. With the automation of these low-level skills, readers are able to devote their attention to higher-level processes (LaBerge & Samuels, 1974), such as drawing on background knowledge, using strategies to understand text meaning, interpreting ideas, making inferences, and evaluating the information being read. While one is reading, the two processes are posited to support each other rather than working serially.

Reading Rate and Comprehension

For L2 readers, lower-level processing seems to be more problematic than higher-level processing because these readers are unable to carry out lower-level processing in an efficient way (Grabe, 2009). According to Carver (1982), the optimal silent reading rate for L1 university students is between 250 and 300 words per minute (wpm), but this depends on the purpose of the reading, normally 300 wpm for rauding (a combination word from reading and auding, meaning just to understand the message), 200 wpm for learning, and 138 wpm for memorizing (Carver, 1982). However, many L2 university students read well below these figures (Fraser, 2007; Nation, 2005), at around 100-150 wpm. This is further supported by recent empirical reading fluency studies (Chang, 2010, 2012; Chung & Nation, 2006; Gorsuch & Taguchi, 2008; Macalister, 2010; Yen, 2012). The inefficiency of low-level processing may prevent L2 readers from using cognitive resources for meaning construction (Grabe, 2009). Because of this, assisting L2 readers to develop low-level processing seems to be key to turning them into effective readers.

Good reading fluency usually also indicates a high level of comprehension and some statistical

indices have confirmed this claim. According to Fuchs, Fuchs, & Hosp (2001), correlations between oral reading fluency and comprehension are reported as high r = .81 to .90. Another meta-analysis study based on 99 comparisons by the U.S. National Reading Panel (NRP, 2000) also shows a moderate effect size of .41. The above discussion of fluency is based on L1 settings.

In L2 reading research, faster reading rates seem to come at the expense of comprehension or the other way around. For example, Cushing-Weigle & Jensen (1996) found that their students' reading rate improved about 40 wpm, from 158 to 195, but their comprehension scores decreased from 6.59 to 5.80 out of 10. Chang's (2010) study, however, showed that students' reading rate improved without deteriorating comprehension but the comprehension level remained unsatisfactory, at only 67%. Similar results were found in the studies by Taguchi and his associates (1997, 2002, 2004) and Gorsuch and Taguchi (2008). Research by Chang (2012), however, is rare in that it demonstrates improved reading rates also enhancing comprehension levels. Some studies only focused on reading rates and did not include students' reading comprehension levels (Chung & Nation, 2006; Macalister, 2008, 2010). If comprehension is not assessed, learners may simply scan a text. For example, Just & Carpenter (1987) reported that L1 readers could skim a text at 600-700 wpm but could understand no more than the gist of the passage. This highlights how purpose can affect reading rates and comprehension (Carver, 1990). Nation (2005) notes that for silent reading speed practice, readers should comprehend approximately 70% to 80%, if not, learners should slow down and read more texts at the same level until comprehension improves. How to balance speed and comprehension is of importance in L2 reading instruction. Due to the scant and inconclusive evidence concerning reading rates and comprehension levels in L2 studies, more research involving reading comprehension in relation to reading rates is needed.

Approaches to Improving Reading Rates

There are a number of approaches that have been found to be effective in helping L1 readers improve their reading rates. These include *oral reading* - oral translation of text with speed and accuracy (see Fuchs et al, 2001; Kuhn & Stahl, 2003 for comprehensive reviews), *reading while listening*—reading assisted with oral rendition of the text (Beers, 1998; Carbo, 1978; Rasinski, 1990), *timed reading*—calculating reading time or reading within a specific time limit (Breznitz & Share,1992; Meyer, Talbot, & Florencio,1999; Walczyk, Kelly, Meche, & Braud, 1999), *extensive reading*—reading a large quantity of books within readers' language competence (Krashen, 2004 ; Stanovich, 2000), and *repeated reading*—rereading short passages several times until a satisfactory rate is reached (see NRP, 2000; Kunh & Stahl, 2003 for extensive review). As previously mentioned, fluency remains at the developing stage in the L2 learning context, so little is confirmed about whether these approaches are beneficial to L2 learners. For example, Chang (2012) compares the effects of oral rereading and timed reading on EFL learners' reading rate improvement and found that oral rereading had a smaller effect than timed reading on enhancing L2 learners' reading fluency development. More importantly, and different from L1 studies, Chang's students did not consider oral rereading an approach to improve silent reading fluency but mainly to improve their oral production and pronunciation. Taguchi and associates (1997, 2002, 2004) conducted a series of repeated reading studies with Japanese college students, but only small effects were found across the three studies, which are somewhat contradictory to those studies with native English speakers. Inspired by the studies of Taguchi

and his associates on repeated reading with Japanese students, the present study thus intends to extend RR to a different L2 learning context to look at whether repeated reading has strong effects on reading fluency by using different study materials and treatment procedures.

Effects of RR in an L1 Context

RR was originally developed by Samuels (1979) as a remedial approach for L1 children who have reading difficulties. It consists of "rereading a short, meaningful passage several times until a satisfactory level of fluency is reached" (Samuels, 1979, p. 404). The theory underlying RR is based on the Laberge-Samuels' (1974) model of automatic information processing, in which a fluent reader decodes texts automatically. If too much effort is paid to decoding word meanings, then little remains for overall meaning construction. Therefore, RR is used as a means to assist unskilled readers to practice the lower-level processing elements. The practice procedure may be varied in a number of ways, for example RR may be practiced orally or silently, or with or without modeling. In addition, the modeling may be live, such as listening to a teacher reading aloud, or, pre-recorded.

Research into RR has demonstrated substantial empirical evidence on its effects on developing oral reading fluency in an L1 context, the results of which have been extensively reviewed by Chard et al. (2002), Fuchs et al. (2001), Kuhn and Stahl (2003), NRP (2000), and Rasinski and Hoffman (2003); however, selective findings that are relevant to the present study are summarized below:

1. Repeated reading has been generally found to be effective in promoting student reading rates and comprehension (Carver & Hoffman, 1981; Rashotte & Torgesen, 1985; Young, Bowers, & Mackinnon, 1996), but RR with assistance (e.g., listening to teacher's reading aloud or prerecorded oral rendition of the texts) tends to be more effective than without it (Rose, 1984; Rose and Beattie, 1986; Smith, 1979).
2. Rereading helped students with reading difficulties break out of word-by-word reading to reading larger chunks of meaningful phrases (Dowhower, 1987).
3. Mixed effects have been shown for the reading rate and accuracy gained from rereading passages being transferred to new or unpracticed passages (Carver and Hoffman, 1981; Faulkner & Levy, 1994; Herman, 1985; Rashotte & Torgesen, 1985).
4. Reading small quantities of texts repeatedly did not show any better effect than reading a large amount of texts without repetition (Kuhn, Schwanenflugel, Morris, Morrow, Woo, Meisinger, Sevcik, Bradley, & Stahl, 2006; van Bon, Boksebeld, Font Freide, & van den Hurk, 1991), so to enhance the effectiveness of RR, readers have to read a series of texts for a period of time (Dowhower, 1987).
5. Whether the effects of RR came from instructional features or increased exposure to print are unclear (Kuhn and Stahl, 2003).

Effects of RR in an L2 Context

The use of RR to improve reading fluency in the teaching of L2 is more limited (Taguchi, Gorsuch, & Sasamoto, 2006). In an English as a foreign language (EFL) context, Taguchi and his associates conducted a series of studies with Japanese college students on the effects of RR

on reading fluency (1997; Taguchi & Gorsuch, 2002; Taguchi, Takayasu-Maass, & Gorsuch, 2004). Their studies are summarized in Table 1. As shown in Table 1, treatment materials used for RR were graded readers divided into different lengths of segments, ranging from approximately 300 words to 600 words. Students were asked to read the segments five or seven times. In their first three studies, the overall results show that reading rates and comprehension levels at the end of the study showed no statistically significant difference between the RR group and the NRR group. No transfer effect was found across the three studies. Despite there being some reasons pointed out by the researchers themselves regarding the not so encouraging results, one of the main reasons could be the pretest, posttest, and treatment passages not being equivalent in difficulty. For example, in the 2002 study, the treatment passages calculated using the Flesch-Kincaid reading ease scale were between 4.20 and 4.30; however, the pretest was 6.20, and the posttest 7.20. If so, it is not possible to determine the treatment effects. Another reason could be that segmenting a book into several portions and then each segment being read *seven* times might have bored the students or even spoiled the pleasure of reading. As well, if students forgot the content read previously, they could not possibly understand the scenarios of the story, which might have led to poor comprehension or even loss of interest in reading.

Though the above three studies conducted in Japan did not demonstrate that the students who received RR treatment read significantly faster than those who read at their own pace or read extensively, on the whole, students who had RR treatment improved their reading rates more than those who read without repetitions. However, this limited number of studies is insufficient to conclude that RR has only a small effect on improving reading rates. To extend their RR research to other L2 learning contexts, Gorsuch and Taguchi (2008) worked with 50 Vietnamese junior university students for 9 weeks. Mixed results were found. The RR group increased 55 words per minute on the treatment texts (first reading of session 1 and session 16); however, the gain rate was not transferred to the unpracticed passage from another source, and the comprehension levels were very low, not reaching the suggested 70% satisfactory level (Nation, 2005).

Table 1. *Summary of repeated reading (RR) in L2 context*

Studies (by year)	Participants/ Context	Treatment materials/quantity	Measures	Treatment times per week/period	Results
Taguchi (1997)	16 Japanese University students (RR only)	28 sections taken from graded readers*: Born to Run, Away Match,* and *Poor and Rich Little Girl*	Rate & Comprehension	3 times per week/10 weeks	RR: + 21 wpm (127–148) Comprehension: not available
Taguchi & Gorsuch (2002)	18 Japanese University students (RR = 9 ; CL = 9)	28 segments taken from *The Missing Madonna* and *Away Match.*	Rate & Comprehension	3 times per week/10 weeks	RR: + 40 wpm (113–153) CL: + 11 wpm (115–126) Comprehension (short answer questions):maximum score is 18 RR:+ 1.89 (7.44–9.33) CL: + 2.77 (5.67–8.44)

Table 1. continued

Taguchi Takayasu-Mass & Gorsuch (2004)	20 Japanese University students (RR = 10; ER= 10)	42 segments taken from *The Missing Madonna* and *Away Match.*	Rate, Comprehension & transfer effect	3 times per week/17 weeks	Rate: RR: - 3 wpm (85–82) ER:- 17 wpm(81–64) Comprehension(open-ended questions): maximum score: 16 RR: + (1.6–3.90) ER:+ (1.90–4.50) No transfer effect
Gorsuch & Taguchi (2008)	50 Vietnamese University (RR = 24; CL= 26)	16 segments taken from graded readers: *Scandal in Bohemia, The Red-head League*, and *The Boscombe Lake Mystery*	Reading speed, Comprehension & transfer effect	2 times per week/11 weeks	Mixed results, Rates (short answer questions/ recall) RR: -18 (149–131)/+ 20 (124–144) CL: +1 (122–123)/-2 (132–130) Comprehension(short answer questions/ recall): in % RR: + 27 (14–41)/ + 16(9–26) CL: +7 (22–29)/ -3(22–19) No transfer effect
Chang (2012)	35 Taiwanese University students (oral RR = 17; TR= 18)	26 (oral RR) versus 52 (TR) 300-word passages specially written for developing reading fluency	Reading speed, Comprehension, & Transfer effect (all including delayed posttests)	1 time per week/13 weeks	Results Rates (posttest/delayed posttest) TR: +50 wpm (102–152)/ +45 (102–147) Oral RR: +23 wpm (83–102)/+19 (83–102) Comprehension (30 MC questions): (posttest/delayed posttest):maximum score 30 Oral RR: +2/30 (16–18)/+0/30 (16–16) TR: +4/30 (16–20)/+2/30 (16–18)

Note. RR: repeated reading group; CL: control group; ER: extensive reading group; TR: timed reading; oral RR: oral repeated reading

The above studies in two L2 learning contexts show that RR has some facilitative effect on improving reading fluency, rates varying from 21, 40, -3, and 55 wpm in each study. The common characteristics of these studies were that the treatment passages as well as the pre and posttest texts were segments taken from graded readers. Whether these study materials were suitable for L2 reading fluency training purposes may have to be reconsidered along with the equality of text difficulty between pre and posttest. Therefore, to address the first issue the present study adopts materials that are particularly designed for L2 learners to develop their

reading fluency. The books that focus on developing reading fluency are written in familiar high frequency vocabulary to avoid the slowing effect of unfamiliar words. Complicated sentences and complex noun groups are avoided. Each passage in each level contains approximately equal word counts, which makes it easier for students to calculate and compare their reading speed (personal communication with the first author). There are also five similar passages on each topic (e.g., five on animals, five on computers). Each passage is independent from the others, so the students do not have to worry about forgetting previous content when they read the next passage. To avoid the second issue, the same test measure used in the pretest will be reused in the posttest. Two research questions (RQ) were raised:

1. Did students who receive RR treatment read significantly faster than those who did not receive the RR treatment? If yes, could the rate gained from the intervention be transferred to reading an unpracticed passage?

2. Did students who receive RR score higher in their comprehension tests than those who did not receive the RR treatment? If yes, could the improvement be transferred to reading an unpracticed passage?

Method

The participants

The participants were 26 eighteen to nineteen years old college students in Taiwan, selected from a class of 40 students for their unfailing attendance throughout the whole treatment period. All the participants had received formal and compulsory English instruction for seven years. Students were from different majors but the majority were studying accounting, finance, or tourism. They had only one three-hour English course, meeting once a week with their English instructor, and their learning of English had been limited to the prescribed content – normally commercially published textbooks were used in the classroom for formal instruction. On the first meeting with the researcher, a Vocabulary Levels Test[1] (VLT, Schmitt, Schmitt, and Clapham, 2001) was administered to the class in order to assess the participants' high frequency word knowledge. The overall VLT results were 23, 19 and 10 out of 30 in the 1st, 2nd, and 3rd 1000 words respectively, indicating that they might know 1732 individual words[(23 + 19 + 10) x 33.3],which allowed the researcher to select reading materials appropriate for the students' vocabulary knowledge level.

The RR activity was included as a part of the three-hour English course; however, students' participation in repeated reading was fully voluntary. Twenty-two students took part in the RR activity at the beginning, but nine students either dropped out or were absent from the activity during the intervention period. The students who did not take part in the RR were classified in the non-repeated reading (NRR) group. The NRR group read the passages that the experimental group read, recording the time they spent reading each passage, and answering the comprehension questions, but they did all these activities *only once*, and then they studied the content of their course book for an average of 15 minutes (mainly reviewing the vocabulary taught in the previous session). At the end of the semester, 13 students in each group had

participated in all sections of the activity, and their performance data were used for this study.

Study materials

Reading for Speed and Fluency by Nation & Malarcher (2007), Book 1 was adopted for the reading fluency activity. Book 1 is written in expository style in familiar high frequency vocabulary, approximately at the 500 word level. Each passage is of approximately equal word count, 300 words, followed by five multiple-choice comprehension questions. Each question has three options and most of the questions focus on global understanding (e.g., the topic of the reading, or the purpose of the passage) rather than detailed information (e.g., specific dates or places). There is a total of eight topics (animals, books, computers, music, places, medicine, plants and learning) in the book, each topic contained five passages, forty passages all told in the book; however, due to the constraint of the treatment period, only 31 passages were used. Amongst the 31 passages, passage 1 was used as RR practice before the pretests, passages 2 & 3 as the pretest 1, 4–29, the treatment passages, and 30–31 the posttest 1 (also see the section on dependent measures). The RR group read treatment passages five times in contrast to the NRR group reading them only once.

Dependent measures

Reading rate: Students' reading rates were measured through two pretests and two posttests (named pretest 1, pretest 2, posttest 1, and posttest 2, hereafter). Pretest 1 was based on the first reading rates of two passages (passages 2 and 3), and pretest 2 was based on a 2058-word story, *The Girl with Green Eyes*, taken from a graded reader, *One-Way Ticket* (Bassett, 2000, Oxford Bookworm Series). The purpose of using the 2058-word story was to examine whether students' improved reading rate (if any) can be transferred to reading an unpracticed passage (a text taken from a different source than those used in the instructional treatment). Posttest 1 was based on the first reading rates of the last two passages (passages 30 and 31), and the passage for posttest 2 was the same one as in pretest 2. The texts for dependent measures were analysed and found to be comparable in terms of vocabulary levels, the total percentage of 1000 and 2000 words being about 94%, 96%, and 95% for pretest 1, posttest 2, and pretest 2 and posttest 2 respectively (see Table 2)[2]. However, the average number of words in each T-unit for the unpracticed passage is lower than the average number of words in both pretest 1 and posttest 1, which may suggest that the syntactic structure of the unpracticed passage is easier than the practiced ones[3]. Apart from vocabulary and syntax, the plot of the unpracticed passage is more complicated, containing more characters and many proper nouns, in particular, the names of places. These features may balance out the shorter length of overall sentences, making the text difficulty of practiced and unpracticed passages more comparable.

Reading comprehension: Students' reading comprehension levels were also measured through two pretests and two posttests. Pretest 1 and posttest 1 contained a total of 10 multiple-choice questions taken from the original reading materials, five questions from each passage. The 10 questions for pretest 1 were based on passages 2 and 3, and another 10 questions for posttest 1 from passages 30 and 31. Nineteen multiple-choice questions were constructed by the researchers for pretest 2 and posttest 2 based on the story *The Girl with Green Eyes*. The 19 questions were piloted twice, each time with six same year students from different classes (there

were 20 items; one item was deleted after the first piloting). An example of a question in pre and posttest 2 is: *Where are these people*? Students had to choose from one of four options: o*n a train, on a bus, in a cafeteria, and on a boat*. A full score was 19 if all the questions were answered correctly. The differences between the treatment passage questions and those developed by the researchers are the density of questions and answer options. There were three answer options for the questions taken out from the treatment passages with one question every 60 words; however, there were four answer options per question for the questions developed by the researchers and one question every 108 words.

Table 2. *Texts analysis for dependent measures*

	Pretest 1 (passages 2 & 3)	Posttest1 (passages 30 & 31)	Pretest 2 & Posttest 2 *(The Girl with Green Eyes*)
1st 1000	502/83.81%	568/94.04%	1790/86.98%
2nd 1000	64/10.68%	15/ 2.48%	171/8.31%
3rd 1000	2/ .33%	3/ .50%	0/0%
Not on the list	31/ 5.18%	18/2.98%	97/4.71%
Total words	599	604	2058
Total T-units	54	48	257
A/W per T-unit	11.13 (*SD* = 5.06)	12.65 (*SD* = 6.47)	7.80 (*SD* = 4.78)

The Treatment

Prior to the treatment, both groups were given specific instructions regarding how to do the reading activity. These specific instructions involved getting themselves ready for the reading activity (putting away irrelevant things, going to the toilet if necessary, turning cellular phones to the silent/aviation mode), reading the passages as fast as they could, no referring back to the texts to find answers when they answered questions, and recording the time taken to read each passage. Except the pre and posttests, the students timed themselves using their own cellular phones. The participants were given a RR form (see Appendix A) to record the time they spent reading each passage. The form was collected after students finished each treatment and then returned to them the next time before doing the reading activity. The participants were required to read two passages each week for 13 weeks, a total of 26 passages all told excluding two for pretest 1 and two for posttest 1. The RR group read each passage five times silently, and answered the same comprehension questions twice, once after the first reading and the other after the 5th reading. The NRR group, however, read each passage silently only once and answered the comprehension questions only once. The weekly treatment for each group is outlined as below:

The repeated reading (RR) group

1. Read passage 1 and timed the 1st reading
2. Answered the comprehension questions for the first time (5 items)
3. Read passage 1 and timed the 2nd reading

The non-repeated reading (NRR) group

1. Read passage 1 and timed the reading
2. Answered the comprehension questions (5 items)
3. Read passage 2 and timed the reading

4. Read passage 1 and timed the 3rd reading
5. Read passage 1 and timed the 4th reading
6. Read passage 1 and timed the 5th reading
7. Answered the comprehension question a second time
8. Read passage 2 and timed the 1st reading (then repeated steps 2 to 7)
9. Checked answers

4. Answered the comprehension questions (5 items)
5. Checked answers
6. Reviewed the content of their course book

Procedure

In the first three-hour meeting students were given a vocabulary levels test, followed by instructions of how to do the RR activity. A practice speed reading exercise (passage 1) was given to students prior to the pretests. Students then read passages 2 and 3 once as pretest 1. They then read *The Girl with Green Eyes* (the first story in *One-Way Ticket*, Oxford Bookworm Series, Stage 1) once as pretest 2. An online stopwatch (http://www.online-stopwatch.com/large-stopwatch/) was used to record times. The stopwatch was projected onto a screen in front of the class, so every student could see the time clearly, and all started at the same time when they heard the command 'Go.'

Starting from the second week, students read two passages following the treatment procedure described above. Students used their cellular phones to measure the time they spent on reading and then recorded it on the separate sheet every week. In the fifteenth week, students read passages 30 and 31 once, and the average of the two reading rates was averaged (posttest 1)—the reading rate of the practiced passage. The story, *The Girl with Green Eyes* was also read once (posttest 2)—reading rate of the unpracticed passage. The online stopwatch projected on the screen was again used to time their reading speed. Immediately after the posttests, seven students in the RR group were invited to join one of the researchers for lunch to discuss their perceptions of the RR treatment.

Table 3. *Summary of treatment procedure*

Week 1	Vocabulary levels test→ an instruction of rereading activities → a practice rereading (passage 1) → read passages 2 and 3 once (pretest 1) → read the story of *The Girl with Green Eyes* once (pretest 2)	
Week 2-14	Reading passages 4 to 29, **five times** each (the RR group)	Reading passages 4 to 29, **once** each (the NRR group)
Week 15	Reading passages 30 and 31 once (posttest 1) → Read the story of *The Girl with Green Eyes* once (posttest 2)	

Scoring and Data Analysis

The data collected from the reading rate and comprehension were analysed by SPSS 18 for Windows. The data presented in this study were from those students who had never been absent from the treatment. If they missed out one treatment or gave up the treatment before the course ended, their data was not included. The reading rate of pretest 1 was calculated with the average of the first reading rates of passages 2 and 3, posttest 1 passages 30 and 31. The reading rate of pretest 2 and posttest 2 was calculated with [the total words of *The Girl with Green Eyes* (2058 words)/total seconds] * 60.

Comprehension levels were reported by the raw scores (correct items answered). The maximum scores for pretest 1 and posttest 1 was 10 (total questions items), and 19 for pretest 2 and posttest 2. Because the sampling was small, instead of using repeated measures, *t*-tests were used to compare whether the two groups differed significantly from pretests to posttests, and also the alpha values were set at .01 rather than .05, or .025. Due to the standard deviations increasing sharply after the treatment for the RR group, effect sizes were calculated by Cohen's *d* to examine whether the differences have any theoretical significance. This is because Cohen's *d* calculates the effect size by standard deviation units. Furthermore, due to the small sample size, Hedge's *g* was also calculated to reduce the upward bias of Cohen's *d*. Reliabilities for each test were calculated by using Cronbach alpha to examine the internal consistency of the tests.

Results

Reading Rates

The results in this section are meant to answer the first research question: Did students who received repeated reading (RR) treatment read significantly faster than those who did not receive RR treatment? If yes, could the rate gained from the intervention be transferred to reading an unpracticed passage? The reading rates for both groups are set out in Table 4. As can be seen, the RR and NRR groups read at 103 wpm and 107 wpm in pretest 1, and at approximately the same rates for pretest 2, 100 versus 102 wpm. After the intervention, the RR group increased 47 wpm, whereas the NRR group increased 13 wpm for the practiced passages (posttest 1). For the unpracticed passage, the RR group improved 45 wpm and only 5 wpm for the NRR group. It is apparent that the students reading the same passages repeatedly improved their reading rate more than those who read only once, and also the effect can be transferred to an unpracticed passage of comparable difficulty.

Table 4. *Descriptive statistics of reading rates for the RR and NRR groups reading practiced and unpracticed passages*

		Practiced		Unpracticed	
		Pretest 1	Posttest 1	Pretest 2	Posttest 2
RR (n = 13)	*M* (wpm)	103	150 (+47 wpm or 46%)	100	145 (+45 wpm or 45%)
	SD	19.86	36.98	17.11	37.20
NRR (n = 13)	*M* (wpm)	107	120 (+13 pm or12%)	102	109 (+7 wpm or 7 %)
	SD	17.83	14.54	15.86	12.04

The independent samples *t*-tests were performed to examine whether the two groups differed significantly in their pre and posttests (see Table 5). The alpha levels were set at .01 due to the small sample size. The differences in the reading rates for both RR and NRR groups were not statistically significant, $t(24) = .54$, $p = .60$ in pretest 1 and $t(24) = 3.21$, $p = .75$ in pretest 2. However, after the intervention statistically significant differences were found for practiced passages (posttest 1), $t(24) = -2.76$, $p = .01$, as well as unpracticed text (posttest 2), $t(24) = -3.44$, $p = .01$. The effect sizes were calculated by Cohen's *d* and Hedge's *g*. As shown in Table 5, the effect sizes for the differences between the two groups were large for posttest 1 ($d = -1.07$; $g = -1.04$), and even larger for posttest 2 ($d = -1.37$; $g = -1.33$).

From the above results, the answer to the first research question is the RR group increased 47 wpm and 13 wpm for the NRR group after the intervention, and the difference between the groups resulting from the intervention is statistically significant. For the answer to the supplementary question concerning transfer effect, it is shown that the RR group could read the unpracticed passage at 145 wpm, only 5 wpm slower than reading the practiced passages. The NRR group increased 7 wpm, from 102 wpm to 109 wpm, the change being marginal. Overall, with or without repeated reading makes a significant difference in improving reading rates, and the improved rate gained from practice can be transferred to the unpracticed passage.

Table 5. *Independent samples t-test for reading rates between the RR and NRR groups*

	t	*df*	*p*	*Mean Difference*	*Std Error Difference*	*99% CIF*		*Cohen's d*	*Hedge's g*
						lower	*upper*		
Pretest 1	.54	24	.60	3.98	7.40	-16.73	24.68	.21	.20
Pretest 2	.32	24	.75	2.08	6.47	-16.024	20.18	.12	.12
	1								
Posttest 1	-2.76	24	.01	-30.43	11.02	-61.253	.40	-1.07	-1.04
Posttest 2	-3.44	24	.01	-37.31	10.84	-67.639	-6.98	-1.37	-1.33

Note. For Cohen's *d* an effect size of 0.2 to 0.3 might be a "small" effect, around 0.5 a "medium" effect and 0.8 to infinity, a "large" effect.

Reading Comprehension

The second research question addressed students' reading comprehension levels for both practiced and unpracticed passages. The reliabilities calculated by Cronbach alpha were .73 for pretest 1 and .78 for pretest 2, and .79 for posttest 1 and .83 for posttest 2 indicating satisfactory internal consistency. Students' reading comprehension scores are shown in Table 6. In pretest 1, the RR group and NRR group comprehended about 51% and 49% respectively for the practiced passages, but slightly lower (49% and 44% respectively) for reading the unpracticed passage (pretest2). After the treatment, the RR group improved 19% (1.89 points) in comprehending practiced passages and also 17% (3.23 points) for the unpracticed passage. The improvement for the NRR was 5% (.52 points) and 3% (.69 points) for the practiced and unpracticed passages. The results indicated that students who received RR intervention improved their comprehension levels much more than those who did not and the effect gained from better comprehension of practiced passages could be transferred to the unpracticed passage.

Independent *t*-tests were further performed to compare whether the two types of intervention made any significant differences in comprehension levels. As shown in Table 7 , there were no significant differences between the two groups at the two pretests, $t(24) = -.30$, $p = .77$ (pretest 1), and $t(24) = -1.28$, $p = .21$(pretest 2). After the intervention, the RR group scored higher than the NRR group in both practiced passages and unpracticed passage, but significant difference was only found in the unpracticed passage (posttest 2), $t(24) = -5.53$, $p < .001$. The effect sizes are large ($d = -2.43$ and $g = -2.35$) for posttest 2.

Table 6. *Descriptive statistics of comprehension levels for the repeated reading (RR) and non-repeated reading (NRR) groups reading practiced and unpracticed passages*

		Practiced		Unpracticed	
		Pretest 1	Posttest 1	Pretest 2	Posttest 2
RR	Mean	5.08 (51%)	6.97 (+1.89, 70%)	9.23 (49%)	12.46 (+3.23, 66%)
(n = 13)	*SD*	1.55	2.07	1.71	1.60
NRR	Mean	4.92 (49%)	5.44 (+.52, 54%)	8.31 (44%)	9.00 (+.69, 47%)
(n = 13)	*SD*	1.04	1.18	1.70	1.22

Note. Pretest 1 and posttest 1 contained 10 items respectively, and 19 items in pretest 2 and posttest 2.

From the above results, the answer to the second main research question is that the RR group significantly improved their reading comprehension, about 19% (from 51% to 70%) for the practiced passages, but the significant difference was found only within the group. The improvement gained from the practiced passages was also transferred to comprehending the unpracticed passage, increasing 17%, (from 49% to 66%), significantly higher than the NRR group.

Table 7. *Independent samples t-test for reading comprehension between RR and NRR groups*

	t	*df*	*p*	*Mean Difference*	*Std Error Difference*	*99%CIF*		*Cohen's d*	*Hedge's g*
						lower	*upper*		
Pretest 1	-.30	24	.77	-.15	.52	-1.22	.92	-.12	-.12
Pretest 2	-1.28	24	.21	-.92	.72	-2.94	1.09	-.54	-.52
Posttest 1	-2.33	24	.03	-1.54	.66	-2.90	-.18	-.91	-.88
Posttest 2	-5.53	24	.00	-3.46	.63	-5.21	-1.68	-2.43	-2.35

Discussion and Conclusion

The effects of RR versus NRR on L2 students' reading rates, comprehension levels and transfer effect can be summarized as below:

1. After reading 26 passages five times each, the RR group increased their reading rates on the practiced passages 47 wpm or 46% whereas the NRR group increased 13 wpm or 12%. For the unpracticed passage, the RR group increased 45 wpm (45%) but only 7 words (7%) for the NRR group. The initial reading rates between the two groups were comparable, but after the intervention the RR group read 30 and 36 wpm faster

than the NRR group for reading practiced and unpracticed passages respectively; therefore, the RR intervention did have a facilitative effect on enhancing L2 learners' reading rate, and the effect gained from the practice was transferred to the unpracticed passage.

2. While the RR group increased their reading rates on practiced and unpracticed passages by 46% and 45% , their comprehension performance was also enhanced 19% and 17% respectively for practiced and unpracticed passages. It is evident that the improvement of comprehending practiced passages can be transferred to the unpracticed passage. The NRR group, however, had only marginal improvement (5% and 3%) on their comprehension of practiced and the unpracticed passages.
3. Overall, through RR, students not only read faster but also comprehend better, with comprehension levels moving from an unsatisfactory level (51% and 49% in the pretests) to a higher and acceptable level (70% and 66% in the posttests).

The effects of RR on reading rates

This study has demonstrated the potential for RR to improve reading rates among adult EFL learners. The students receiving RR treatment increased 47 wpm from the pretest 1 to posttest 1. Even though 47 wpm is not an astounding figure, it has to be mentioned that they just did the activity once a week for about 40 minutes. Table 8 shows that nearly half (6 out of 13) of the students read under 100 wpm at pretest 1, and none read above 150 wpm; however, after the 13-week treatment, no one read under 100 wpm, 6 read between 130 and 149 wpm, and 3 above 150 wpm. The transfer effect to the unpracticed text was also confirmed in the present study. The main reason may be that the vocabulary level for the unpracticed passage was nearly the same as those practiced passages (refer back to Table 2), but the average number of words in each T-unit was lower, only 7.80 words (11.13 words in the pretest 1, and 12.65 words in the posttest 1), which implies that the grammatical structures for the unpracticed passage were easier. This may be one of the reasons that students were able to read as efficiently as reading the practiced passages. Despite this, it has to be noted that the word count of the unpracticed passage was more than 2,000 words, nearly seven times more than their treatment passages. As well, the narrative unpracticed passage involved more individuals and objects than the expository practiced passages. These two factors require higher and longer concentration while reading.

Table 8. *Range of changes in speed in the RR and NRR groups by student number (n = 13 in each group)*

Speed Ranges	Pretest 1 RR/NRR	Posttest 1 RR/NRR	Pretest 2 RR/NRR	Posttest 2 RR/NRR
Below 100	6/5	0/1	6/6	0/4
101-129	6/6	3/9	7/7	5/9
130-149	1/2	6/2	0/0	5/0
Above 150	0/0	3/1	0/0	3/0

Compared to the studies by Taguchi and his colleagues with Japanese students (1997, 2002, 2004), students of the present study seemed to gain twice as much as the 1997 and 2004 studies, and also slightly more than the one in 2002. There are many differences between the present study and those by Taguchi and his associates (e.g., repetition times, assisted or unassisted

reading, test measures, treatment period, and treatment frequency), which make comparison almost impossible. However, the most salient difference lies in the materials used for the treatment and the measures used for pre and posttest. In this study, the materials are specially written for L2 students to develop their reading fluency and comprehension. That means that vocabulary levels and grammatical complexity are tightly controlled. The content of each passage was independent from the others, implying that students did not have to worry about forgetting the content or plot that they previously read. Moreover, the word count of each passage is approximately the same—300 words—which allows students to calculate their own reading speed for each passage when they finish, so students are able to monitor their progress (one of the researchers' observation in class). Perhaps this is one of the reasons that the increased reading rate of the present study is somewhat higher than Taguchi's (1997, 2004).

Another issue concerning whether the reading rate can be improved depends on whether the materials are at the appropriate level for the readers. In this study, students reflected in the interview that the materials were suitable for them. This position was supported by the recent study by Gorsuch and Taguchi (2008). In the Vietnamese context, graded readers (readability on 2.8 on the Flesch-Kincaid Grade Level) were read by the junior university students whose English proficiency was the *highest* among their peers. The reading rate increased 55 wpm on the first reading between the first and last RR session. Even though the researchers attributed the increase of reading rate to the improvement of sensitivity in their pre and posttest measures, it is also likely that the higher gain in reading rate was due to the fact that the study materials were at the right level for their students. The materials used in Taguchi and his associates' previous studies (2002, 2004) were 4.20 or 4.30 on the Flesch-Kincaid Grade Level. The materials used for the pretest and posttest in the 2002 study were even higher, 6.20 and 7.20. Whether the participants in Japan and in Vietnam were comparable in their language proficiency level is unknown, but it is evident that the materials used in 2002 and 2004 were more difficult than those in the 2008 study. Leaving this issue aside, according to Nation's (2007) guidelines for developing fluency, there should be little or no unfamiliar language, content, or discourse features. If these Vietnamese students encountered few unknown words and less complicated grammatical structures while reading, they might have been able to read faster, and eventually became used to faster reading speeds. Therefore, reading rate is more likely to improve when the materials suit their language proficiency level and practice is done regularly over time.

The above quantitative data show the students read faster after receiving RR treatment and the speed gained was transferrable to the unpracticed passage. In the informal interview with the RR students, they did not particularly report that their reading speed had improved, but they said that recording the time spent on reading each passage made them concentrate better and that they could not stop whenever they wanted because of time pressure. Moreover, they could not stop to check any unfamiliar words and had to guess the meanings from the text. One of the students reported that the RR activity was very useful and challenging because she had never believed/realized that she could read a passage within three minutes. Students' perceptions in this study seemed to conform to the timed reading study by Chang (2012), whose students read a total of 52 passages without repetition but reported that timing promoted their concentration and made them read faster. Despite some positive comments, two of the seven students questioned the value and necessity of reading fast. They thought reading a passage five times was boring, and suggested that three times would be sufficient.

The effect of RR on comprehension

In this study, the RR group comprehended around 50% in both pretests and after the treatment their comprehension levels were at 70% and 66% for practice and unpracticed passages. The carryover effect from practiced to unpracticed passages was confirmed. However, the transfer effect was not found in the studies by Taguchi and his associates. The test formats (short answer questions and recall tasks) used for measuring comprehension in their studies tended to be more difficult than those used in the present study. The test measures and practiced passage questions used in the present study, however, were all multiple-choice (MC) questions, which are usually considered conceptually easier than short-answer questions or recall tasks, which require test-takers to construct their answers. As well, because our foci in the fluency training were on reading speed and global comprehension and not on learning about the details of the reading passages, the use of MC questions allows students to check their answers quickly and efficiently, which seems to meet the guideline of practicing reading fluency (Millett, 2008). In terms of comprehension measured by MC questions, Nation (2005) suggests that 70% comprehension is considered satisfactory in fluency training programs. Therefore, that the RR group in the present study comprehended 70% for the practiced passages and 66% for the unpracticed passage in their posttests can be considered acceptable. Apart from the varying test difficulty between the present study and those by Taguchi and his associates, another problem, as commented on by the researchers themselves (Taguchi & Gorsuch, 2002), was the equality of difficulty between the pre and posttests. If the posttest is more difficult than the pretest, or vice versa, the transfer effect cannot be shown. A similar outcome can be found in the study by Cushing-Weigle and Jensen (1996). Their students' reading rate improved about 40 wpm, but their comprehension scores decreased. The authors explained the decreased comprehension score as being due to more difficult academic texts being used in the pretests and posttests rather than the simpler readings practiced in class. From the above, it is likely that the transfer effect not found in previous studies might be due to the lack of equality of test difficulty between pre and posttests. The same measure used in the pre and posttests may avoid the problem of inequality of test difficulty but whether there is a practice effect for using the same measures is another issue. In this study, the practice effect did not seem to be problematic because students were unaware that the test would be repeated after 13 weeks.

Despite it being difficult to measure comprehension performance in the fluency training program, it is desirable to include it because if a reader reads too fast but comprehends little, then they have to slow down and vice versa. So long as students' reading rates increase, and their comprehension does not decline or just improves marginally, it may suggest that improvement is going on.

Another issue that has to be pointed out in the present study and those by Taguchi and his associates is that RR was not used alone during the treatment. Calculating the time students spent on each reading might have enhanced the effects of repeated reading because some recent studies on improving reading fluency through timed reading (speed reading) activities have confirmed the effectiveness(Chang, 2010, 2012; Chung & Nation, 2006; Nation, 2005; Macalister, 2008, 2010; Walczyl, 2000; Yen, 2012). A similar report was found in Walczyl et al (1999). Due to the dual treatment, it is difficult to justify how much each treatment contributes to the effectiveness.

However, dual treatment is not unusual in learning (e.g., reading while listening—one single treatment may not be effective and has to rely on the other to enhance its effectiveness). Nonetheless, future research may look at whether RR without timing will produce similar results or not.

Pedagogical Implications and Applications of RR

The results of the present study shed additional light on the effect of RR on improving reading rates, comprehension levels and potential transfer effects. The results also suggest that L2 learners' reading rates can improve more with materials that are specially written for training reading fluency. However, while interpreting the results, caution should be taken because in this study the participants in the RR group were self-selected and therefore might be potentially more highly motivated than those in the NRR group, which might have affected the outcome.

In addition to RR, there are many other approaches, such as self-paced reading or class-paced reading, that can be used in class or at home to enhance reading speed (see Anderson, 1999, and Nation, 2005 for examples). To enhance the effectiveness of fluency-building activities, it is important to follow some guidelines such as those provided by Millett (2008): quick (a few minutes a day), easy (little or no unknown language, nothing to stop readers in their tracks), intensive (every day or as often as possible), isolated (do not use the speed reading passage for a follow on activity because the speed focus will be lost), and motivating (record the results). However, in tertiary educational streams, many L2 language learners may not have language class every day, like the students in the present study, but it is worthwhile to include a rate-building activity in the curriculum because it may at least raise students' awareness of the importance of fluency (Gorsuch & Taguchi, 2008) or it may have some effect if the activity continues for a longer period of time. Alternatively, L2 students may choose a series of reading fluency books and read one or two passages per day. Those books that focus on developing L2 reading fluency are usually written under tight control for vocabulary and each passage has an equal word count, making reading speed very easy to calculate. Some practice examples may be downloadable from http://www.victoria.ac.nz/lals/about/staff/publications/paul-nation/Speed-reading-whole.pdf. Whether the materials and guidelines mentioned in this study are feasible and effective for L2 learners to develop their reading fluency may rely on future research conducted in different learning contexts and with different levels of language proficiency learners.

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Notes

1. The 1st 1000 word level was developed by Professor Paul Nation, Victoria University of

Wellington, New Zealand.

2. The vocabulary was analyzed with the Range program, with the GSL/AWL List downloaded from Professor Paul Nation's website: http://www.victoria.ac.nz/lals/staff/paul-nation.aspx. T-units measure the overall syntactic complexity and refer to a sentence including all subordinate clauses. The tool for T-unit analysis is from Professor Tom Cobb's website, http://www.lextutor.ca/tools/ex_sentences/.

3. In fact, all passages used in the pre and posttests had not been read by the students. The term "practiced passages" simply refers to passages taken from their reading fluency training book. It is assumed that students were familiar with the writing style.

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Appendix A

The RR form

Passage	Time1	RC-1*	Time 2	Time 3	Time 4	Time 5	RC- 2	Average
1								
2								
3								
4								
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Note. RC: reading comprehension

Appendix B

Changes in word per minute from pretests to posttests

Student code	Pretest 1	Posttest 1	difference	Pretest 2	Posttest 2	difference
The RR group						
A	94	143	+49	89	137	+48
B	116	138	+22	111	135	+24
C	107	108	+1	107	109	+2
D	124	171	+47	113	165	+52
E	89	142	+53	86	122	+36
F	116	134	+18	115	133	+18
G	81	205	+124	79	187	+108
H	123	171	+48	119	145	+26
I	67	121	+54	75	129	+54
J	97	137	+40	98	120	+22
K	134	237	+103	129	248	+119
L	103	130	+27	100	133	+33
M	82	113	+31	81	119	+38
N	112	128	+16	100	116	+16
O	136	153	+16	124	122	-2
P	124	131	+7	127	127	+0
Q	77	120	+43	79	100	+21
R	109	120	+11	109	109	+0
S	113	116	+4	92	100	+8
T	92	103	+11	93	95	+2
U	88	97	+9	89	95	+6
V	114	118	+4	106	113	+7
W	91	123	+32	85	97	+12
X	131	132	+1	127	126	-1
Y	93	108	+15	95	97	+2
Z	105	107	+2	103	100	-3

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