The effect of a timed reading activity on EFL learners:
Speed, comprehension, and perceptions

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Abstract

To develop reading fluency, a 13-week timed reading activity was integrated into a normal curriculum with the aim of improving students' reading rates. Participants were 84 college students divided into an experimental and a control group. The test instruments involved pretests and posttests on reading speed and comprehension. Students' perceptions were based on a final written report toward the end of the course activity. Results show that students doing the timed reading activity increased their reading speed on average by 29 words per minute (25%) and comprehension by .63 (4%). The differences across two time periods for the experimental group were statistically significant but not so for the control group. Students who did the timed reading activity became more confident in their reading and were impressed with the amount of the reading they had done without the teachers' guidance. Limitations and factors contributing to the outcome are discussed.

Keywords: reading rate, reading fluency, reading speed, timed reading, reading perceptions

For many foreign or second language (L2) learners, reading is performed to obtain meaning from a text, from which vocabulary and grammatical structures are acquired at the same time. Many studies have shown that L2 learners read much more slowly in L2 than in their native language (L1) (Haynes & Carr, 1990; Segalowitz, Poulsen, & Komoda, 1991; Fraser, 2007). This is because as L2 learners read, they often do so laboriously word by word and check unfamiliar words as they encounter them (Coady, 1979), implying that they lack automaticity of word recognition. By reading in this way, attention is divided into decoding the word meaning and comprehending the content, and gradually the habit of reading slowly is formed. By reading slowly, such students' exposure is limited, comprehension can be poor, and reading for pleasure nearly unthinkable. Yet, as Nuttall (1996, p. 127) put it, "speed, enjoyment, and comprehension are closely linked with one another." A successful L2 learner not only has to master the target language knowledge but must also be able to apply the knowledge in an appropriately fluent manner (Davies, 1982; Segalowitz, 2007). However, to read fluently in a second language is by no means easy, and Nation (2007) suggests that fluency development should be included as one of the four strands of a language course (meaning-focused input, meaning-focused output, language-focused learning, and fluency). This would provide L2 learners with opportunities to

process and produce the language with ease based on the linguistic knowledge they have already acquired.

Despite the importance of fluency development having become prominent in the past few decades in L1 settings, this issue has not received much attention in L2 settings and more research is called for in L2 fluency development (Grabe, 2004, 2009; Taguchi, Gorsuch, & Sasamoto, 2006; Fraser, 2007). The current study therefore intends to include training in reading fluency within the normal instructional curriculum in the hope of shedding more light on this area.

Literature Review

This section first looks at the underlying theory on the fluent reading process, then reviews the effectiveness of reading fluency activities in improving reading rates in both first and second language contexts, and finally poses the research questions for this study.

Fluent Reading Process – Theory

Fluency, regardless of whether in reading, speaking, listening, or a musical performance, often refers to three components: accuracy, speed, and fluidity (Segalowitz, 2000; Kuhn & Stahl, 2003). In the case of reading, fluency has been widely characterized as "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). Well-established previous research on reading (e.g., Grabe, 2004, 2009; Koda, 2005; Perfetti, 1999; Pressley, 2006) shows that fluent reading generally involves lower-level and higher-level processes (Laberge & Samuels, 1974; Stanovich, 2000). The former represents the more automatic linguistic processes and are typically viewed as more skills-oriented, including word recognition, syntactic parsing, meaning proposition encoding, and working memory activation. This means a fluent reader must have the ability to "recognize the word forms, the graphic form and phonological information, activate appropriate semantic and syntactic resources, recognize morphological affixation in more complex word forms, and access her or his mental lexicon" (Grabe, 2009, p. 27). Lower-level skills must be processed rapidly and automatically and the automation of these lower-level skills is a requirement for fluent reading. Added to these lower-level processes are the higher-level processes, so-called comprehension processes, which involve understanding text meaning, interpreting the ideas represented by the text, using reading strategies if necessary, making inferences, drawing on background knowledge, and evaluating the information being read. For fluent readers, all of these processes need to work in parallel, quickly and efficiently, in other words, automatically. "Automaticity" is then at the heart of fluent reading ability, referring to "the absence of attentional control in the execution of a cognitive activity" (Segalowitz & Hulstijn, 2005, p. 371), and arises through constant practice of a routine procedure, like playing a piano or driving a car.

While automaticity of lower-level processing is considered essential to fluent reading abilities, working memory in fact is the locus of this processing activity (Grabe, 2004). Working memory is composed of a limited-capacity attentional control system—limited storage, limited abilities to

carry out multiple processes simultaneously, and holding information for just very brief periods. Due to the constraints of working memory, in reading processes if one expends too much attention on lower-level processing (e.g., word decoding), then less attention will be available for comprehending content (Laberge & Samuels, 1974; Samuels, 1994).

Reading fluency is seen as primarily achieved through automatization of word recognition, which allows one to have more attentional resources to focus on the meaning of the text rather than on decoding words. Reading fluency is usually measured by reading rate, calculated by words per minute (wpm). Research in L1 reading shows that in silent reading a normal reader reads at approximately 250 to 300 wpm (Carver, 1990; Rayner, 1998). However, many second language college students perform well below these figures (Cushing-Weigle & Jensen, 1996; Taguchi, Takayasu-Maass, & Gorsuch, 2004; Nation, 2005). Although automaticity in word processing alone is not sufficient to determine reading comprehension, which can be profoundly affected by many other factors (Fraser, 2007), such as reading purposes, tasks, text difficulty (involving grammatical structure and vocabulary), as well as topic familiarity, or even readers' physical condition (e.g., being tired or unable to concentrate), it is a good indicator of reading fluency because fluent readers usually have fast word recognition abilities.

Methods of Improving Reading Rates

As mentioned earlier, reading is an important skill for L2 learners to develop, but mastering the skill to a degree of fluency is by no means easy; therefore, implementing some activities to develop learners' reading fluency is suggested as an essential component of L2 teaching. This study thus focuses on improving reading rates through a timed reading activity integrated into a formal instructional curriculum. Reviewing the literature, several ways exist that can help learners overcome reading too slowly or improve reading rates (e.g., repeated reading, extensive reading, and timed reading activities).

Repeated reading refers to when learners read the same text many times until they become familiar with all the vocabulary and grammatical constructions. Repeated reading (or the rereading method) emerged mainly from the pedagogical implications of the theory of automatic information processing in reading (Laberge & Samuels, 1974). It was developed by Samuels (1979) as a pedagogical application to use with beginning L1 readers. This method provides beginning readers with an opportunity to practice a very basic skill (word recognition) and helps them move from the non-accurate stage to the accurate stage and eventually to the automatic level. Although this method has been widely used in L1 instruction with reading aloud (see Kuhn & Stahl, 2003 for a comprehensive review) and has been found to have the potential to develop fluency among beginning L1 readers, it is not so popular in the teaching of L2 (Taguchi, Gorsuch, & Sasamoto, 2006). The reasons could be that "fluency" has just emerged in L2 as an instructional goal, and repeated reading, as pointed out by Samuels (1979), is not a method for teaching all beginning reading skills but is a supplement in a developmental reading program. However, empirical research conducted in an L2 context by Taguchi and associates (Taguchi, 1997; Taguchi & Gorsuch, 2002; Taguchi, Takayasu-Maass & Gorsuch, 2004) have shown some positive effects on improving reading rates and comprehension.

Another way of enhancing reading speed is to extensively read a great number of graded readers,

which has been found to have a positive role in learning to read fluently and leads to enhanced language acquisition. Reading a large quantity of easy texts allows learners to meet the same patterns of letters, words, and combinations of words again and again; learners then become quicker and more accurate in processing words, and develop a large sight vocabulary (Day & Bamford, 1998). Sight vocabulary refers to those words that readers are able to recognize automatically. However, as Stanovich (1992, p. 4) puts it, "efficient word recognition seems to be a necessary but not sufficient condition for good comprehension." Another important component for developing reading fluency is background or topical knowledge (Grabe, 2004). As Samuels (1994, p. 831) states, "Automatic word-decoding skills and prior knowledge of a text's content may interact and strongly affect success in comprehension." When learners are exposed to a large quantity of varying texts, their topical knowledge may be enhanced (Grabe, 2004). With much sight vocabulary and resourceful background knowledge, a learner's reading rate should improve. This notion has been supported by several extensive reading studies exploring reading rates after reading abundantly in the L2 (Bell, 2001; Iwahori, 2008; Sheu 2003; Taguchi, Takayasu-Maass, & Gorsuch, 2004), all showing a positive effect.

Timed Reading Activities

Now let us look at the main focus of the current study—implementing a timed reading activity. The theoretical framework of the idea that timed reading improves reading fluency is based on research on working memory (i.e., short-term memory), referring to the information that is activated or given mental stimulation for immediate storage and processing, and is characterized by having limited capacity and the fact that its content fades very quickly. These characteristics pose serious limitations during the reading process, a complex cognitive activity, because meaning construction or comprehension is mediated via the short-term working memory (Smith, 2004). If a reader reads too slowly (below 200 wpm), they may be reading word by word and forget what is being read, and the result is poor comprehension. To minimize the functional limitations of short-term memory in the reading process, a variety of strategies have been suggested, one of them being timed reading. Timed reading involves having students read under time pressure, the purpose of which is to improve reading speed to an optimal rate that supports comprehension rather than developing speedy readers. In addition, "time limitations may enhance reading comprehension by promoting mindfulness in students, a construct which involves exertion of more effort and motivation" (Walczyk, Kelly, Meche, & Braud, 1999, p. 156).

Many studies have shown that increasing the reading rate will improve reading comprehension. What then is an optimal reading rate? Carver (1990) made a distinction between five types of reading: scanning, skimming, rauding (just to understand the message), learning (to acquire the information), and memorizing (to be able to recall the facts) and stated that each type is associated with different reading rates. According to Carver, the average reading rate for a college student who is rauding is 300 wpm, 200 wpm for learning, and 138 wpm for memorizing. However, reading at a rate between 250 wpm and 350 wpm allows readers to comprehend a text most efficiently (Carver, 1982).

The Effects of Timed Reading in L1

There are several terms used to refer to ways of helping learners to increase their reading speed. These include paced reading (Cushing-Weigle & Jensen, 1996), accelerated reading (Breznitz & Share, 1992), and class- and self-paced reading (Anderson, 1999). These all involve having students read under some degree of time pressure. In an L1 context, several empirical studies have shown that reading under a moderate amount of pressure resulted in significant gains in reading speed and comprehension. In a series of studies, Breznitz and Share (1992), hypothesizing that increasing the stimulus presentation rate could minimize the functional limitations of short-term memory, investigated the impact of self-paced compared to fast-paced reading on the reading accuracy and comprehension of Israeli pupils reading short passages. In the self-paced reading condition, students were requested to read all texts at their own natural pace as presented on the computer screen, and each text was erased immediately after reading was completed. Times spent for each text were recorded by a computer. In the fast-paced reading condition, the whole text appeared on the screen, and as soon as the participants started to read, material was erased letter by letter at the maximum per-letter rate calculated by the highest per-letter reading rate achieved on the six texts in the self-paced reading condition. A series of STM-sensitive tasks (e.g., recognition and wording recall, forward and backward sentence and order recall, recency versus primacy effects, and probed recall) all showed large gains in the fast-paced manipulation. The results of these experiments were consistent with Breznitz's earlier study (1987), showing that with texts presented at the students' maximal normal reading rates, they averaged fewer reading errors and higher comprehension scores than in the self-paced conditions. However, with tests presented at their slowest reading rates, students' decoding accuracy improved, but significantly decreased in their comprehension. Another study by Walczyk et al. (1999) of university freshmen demonstrated comparable results, in which it was found that fluency improves comprehension scores and has a stronger relation to reading ability when students read under time pressure. However, some contradictory findings were shown in an experiment by Meyer, Talbot, and Florencio (1999), who explored the effects of time constraints on reading comprehension with college students under three conditions: no time pressure (90 wpm), mild time pressure (130 wpm), and severe time pressure (300 wpm). The results were that participants' performances on the three recall tasks uniformly improved as the speed decreased and they achieved best at the speed of 90 wpm. However, in a second experiment with younger and older adults, the best comprehension result was observed under mild time pressure. Overall, most of the above studies show that a moderate pressure facilitates reading rates and comprehension.

The Effect of Timed Reading in L2

As previously mentioned, reading fluency has not received as much attention in L2 as in L1 (Grabe, 2004; Nation, 2001, 2007) and most weight has been given to the training of accuracy (Davies, 1982). Very few L2 reading studies, therefore, look at the effect of reading fluency training on the improvement of reading rates. In a typical timed reading activity, learners read a number of texts that are carefully controlled for vocabulary and length, time their reading speed for the text, and then answer comprehension questions. A recent study conducted by Chung and Nation (2006) with a group of 49 Korean university students shows that nearly all students made some advance and most learners made gradual improvement rather than a sudden jump in speed. Their students read a total of 23 texts over a period of nine weeks, varying from two to four texts a week, with 19 being read in class and five outside class. Their study shows that students'

improvement ranged from 73 wpm (the average speed of the first three scores minus that of the last three) to 97 wpm (the highest rate minus the lowest one) to 132 wpm (the 20th passage reading rate minus the first one) using different scoring methods. However, this study involved no control group, comprehension was assessed but not reported on in the study, and some reading was done outside the class, which may have affected reliability. Another study by Cramer (1975) with 30 Malaysian elementary pupils also showed a great enhancement in reading speed in both their native language and English after reading eight passages in timed reading activities over four weeks. Although reading comprehension was assessed, no details were given. Despite some flaws in the two studies, they suggest that L2 readers can be trained to read faster through rate-building activities.

Another two studies integrated reading fluency training as part of the English proficiency curriculum in an English-speaking country. Cushing-Weigle and Jensen (1996) looked at reading rate improvement in university ESL classes. The reading rate development activities involved paced and timed readings, instruction in eye movement as well as reading strategies. Students first read 400-word paced readings at an imposed rate that increased by 25 wpm weekly which was then followed by 1000-word timed readings at their own rate. Cushing-Weigle (1990, cited in Cushing-Weigle & Jensen, 1996), reported that in the first year her students gained an average of 110 wpm over a 10-week course without decreasing comprehension. In their later studies (conducted in Spring 1994 and Fall 1994), Cushing-Weigle and Jensen (1996) found that their students (n = 64) *perceived* a significant improvement in their reading speed and comprehension. In their actual performance, the 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. 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. In addition, a carryover effect from simpler readings to more difficult academic texts was found for more proficient readers.

A more recent study by Macalister (2008) also involved a timed reading activity integrated within an English proficiency program. This study investigated changes in reading rate from the start to the end of a rate-building activity and from the end of a rate-building activity to the end of the language course to see whether students could maintain the reading rate gained. A total of 17 texts were read. The findings were that 25 out of 29 students increased by five to 143 wpm after reading 17 texts, and only four students did not improve in their reading speed. Fourteen students showed further gains from the end of the rate-building activity to the end of the language course. While the results were comparable to Chung and Nation (2006), Macalister cautiously observed that the gains in reading speed may be due to a "practice effect." Practice effect here refers to the increase in reading rate at the end of a speed reading course being the result of students' having practiced reading the type of texts in the course. When they stop the practice, their gains in reading rate falls away from a peak. Macalister's claim is supported by evidence that some student gains in reading rates were not maintained when reading speed was reassessed at the end of the language course, with half of the students showing a decrease after stopping the speed reading training.

Is comprehension sacrificed while reading fast in L2? With the exception of Cushing-Weigle and Jensen (1996), no studies measure and report on student comprehension levels. It is very likely

that learners may read at too fast a speed if comprehension is not assessed. In an L1 study by Just and Carpenter (1987), it was reported that speed readers could skim a text at 600-700 wpm but could only answer questions about the gist of the passage not the details. This highlights how purpose can affect reading rate and comprehension (Carver, 1990). Nation (2005) states that for careful silent reading, readers should score seven or eight out of ten on a comprehension test, comprehending approximately 70 percent to 80 percent; if not, learners should slow down and read more texts at a similar level until comprehension improves. How to balance speed and comprehension is of importance to educators.

The studies by Chung and Nation (2006), and Macalister (2008) did not look into students' perceptions, which is a gap in this area of research (Macalister, 2008). Therefore, to explore the effect of a timed reading activity on EFL students in terms of speed, comprehension, and perceptions, this study investigated the following three research questions:

RQ1. Did students who received a timed reading intervention read faster than those who did not? If yes, by how many words per minute did they increase?

RQ2. Did students who received a timed reading intervention comprehend better than those who did not? If yes, by how much did they improve?

RQ3. How did students who received the timed reading treatment perceive the intervention?

Method

Participants

The participants in the current study were 84 college students from two intact classes, with 46 and 38 students in each. The former served as the experimental group, the latter the control group. Unlike many L2 reading fluency studies, this one involves a control group, which can be considered as a unique feature of the study.

The participants were enrolled in a required English course, the purpose of which was to assist students to achieve a higher score on TOEIC (Test of English for International Communication), which measures their competence in communication in the workplace. Most of the students had formerly taken this kind of official test at least once before the current research was undertaken, and their language levels were between high beginning to intermediate, with scores ranging from 325 to 500. About 10 students scored above 500. Examining these students' previous TOEIC test performances, the researcher found that their reading scores were lower than those of listening, and many of them reported that they could not finish the test within the allotted time. It was hypothesized that if their reading speed improved, students should be able to complete the test and achieve a higher overall score. Before the course began, the five levels (1st, 2nd, 3rd, 5th, and academic words, a total of 150 items) of the Vocabulary Levels Tests (Schmitt, Schmitt, & Clapham, 2001) were administered to evaluate whether the two groups had a similar level of vocabulary knowledge. The results showed the two groups had average scores of 95.54

(experimental) and 92.37 (control) out of 150. A one-way ANOVA analysis showed no significant difference between groups, $F (1, 83) = .89$, $p = .35$.

The baseline of the two groups was that they took exactly the same courses with the same amount of credit hours. The classes met for one two-hour session per week, for a total of 26 hours over 13 weeks. The class schedule for both groups started at 8:20 am, one on Wednesdays, the other on Thursdays. The teaching content of the two groups focused on preparing for TOEIC tests except that the experimental group spent 15 minutes of their session on timed reading while the control group reviewed content taught the previous week (e.g., idioms and usages for TOEIC tests and TOEIC reading passages).

Study Materials

Reading for Speed and Fluency by Nation and Malarcher (2007), Book 2, was adopted for the timed reading activity. It is part of a four-book series designed for individual or classroom use to practice accelerated reading. Book 1 is written at the 500-word level, Book 2 at the 1000-word level, Book 3 at the 1500-word level, and Book 4 at the 2000-word level. Books 1 and 2 have passages which are 300 words long, and Books 3 and 4 have passages which are 400 words long. The books are written in familiar high frequency vocabulary to avoid the slowing effect of unfamiliar words. Some difficult vocabulary is listed in front of each unit for reviewing before reading the passages. Based on students' TOEIC test results, VLT scores, and the researcher's teaching experience, Book 2, at the 1000-word level, was considered suitable for the participants. The content involves eight familiar topics: art, money, communication, health, nature, people, space, and transportation, each of which contains five texts making 40 texts all told. Each text was of approximately equal length, 300 words, followed by five comprehension questions.

Pretests and Posttests on Reading Speed and Comprehension

To assess the effect of the program on students' reading speed, a reading speed test was administered to the participants in both groups before (i.e., week 1) and after (i.e., week 15) the experiment. Reading speed was assessed based on two texts taken from the same series of *Reading for Speed and Fluency*, one taken from Book 1, which is at the 500 word level, and the other from Book 3, which is at the 1500-word level. A reading comprehension test followed after finishing each text. The former text contained five multiple choice (MC) questions, the latter eight, with a total of 13 MC questions. Each question contained three options and most of the questions focused on global understanding rather than detailed information (e.g., the topic of the reading, or the purpose of the passage). The same reading speed test was repeated at the end of the course. When the students took the pretest, they were unaware that the same test with the same reading texts would be given again, and most importantly, none of the test papers were retained by the students.

Final Written Report

The students in the experimental group were asked to write an anonymous report regarding the effectiveness of the timed reading activity. This course of action was not new to them because many of their teachers ask students to give feedback at the end of a course and 20 to 30 minutes

were allotted for them to write in the class. To narrow the scope of their feedback, the researcher asked them to focus on three areas: the benefits (if any) of the program, the difficulties they encountered, and suggestions for future programs.

Scoring

Reading speed was measured in words per minute by the formula—total words divided by total seconds times 60. When the reading speed of each article was calculated, the two reading speeds were added and then divided by 2. Reading comprehension was calculated by the total of correct items, one point for each correct item.

Procedures

Before the experiment began, students were given an introduction to the course, then a timed reading practice test using a passage taken from the textbook, followed by the pretests. The students then read three texts each week for a total of 13 weeks (from week two to 14), excluding week one for the pretest and week 15 for the posttest for 15 minutes each week. Every week, a research assistant came to the classroom to help with timing, writing the time on a whiteboard while the researcher supervised students in following instructions (e.g., no referring back to the text, and no moving on to the next passage until all the students finished the same text). Students wrote down the time on the page they read, and then turned to the next page to answer the comprehension questions. When the students finished the three passages, they checked their answers and recorded their reading speeds and comprehension scores. It took about 15 minutes to finish reading three texts. The same measures of reading speed and comprehension used in the pretest were then repeated at the end of the experiment.

Data Analysis

SPSS 15.0 for Windows was employed for the statistical analysis. The mean score of the pretest for the experimental group was lower than that of the control group, but a preliminary check found the difference was not statistically significant, so repeated measures ANOVA were performed to compare differences between the groups instead of using ANCOVA. The dependent variables were student reading speed and comprehension scores measured at two different times. The independent variable was group (two levels: experimental versus control) and time (Time 1: pre-intervention and Time 2: post-intervention). The students' final written reports were analyzed manually, focusing on how the students perceived the speed reading program. The analysis of the data began with reading through all students' written reports and leaving out irrelevant information. Specific units of information from each individual were classified, and then similar information was placed in the same category and translated into English. The frequency of the student reports was tallied for each category but otherwise this analysis was qualitative in nature.

Results

Reading Speed

RQ 1. Did students who received the timed reading intervention read faster than those who did not? If yes, by how many words per minute did they increase?

The means of students' reading speed at Times 1 and 2 are presented in Table 1. As shown, the reading speeds of both groups were comparable at Time 1 (118 vs. 124 wpm). At Time 2, the experimental group improved more than the control group (147 vs. 131 wpm), or 29 (25%) and 7 (5%) words per minute, respectively. Since the improvement of the timed reading group was the focus of the current study, Table 2 provides some more detailed information about the changes of reading speed. This shows that at Time 1, 24% of students read at less than 100 wpm, and nearly half of the students' reading speed was between 101 and 129 wpm, with only 10% reading above 150 wpm. However, at Time 2, 39% of the students could read above 150 wpm and only 11% were below 100 wpm. In addition, 42 (93%) of the 46 students gained from 3 wpm to 108 wpm, and only four students showed a slight drop (-5 to -15). It is apparent that the majority of the students' reading speed improved. To test whether the improvement was significant between groups, further repeated measures ANOVA were performed.

Table 1. *Means and standard deviations of students' reading speed measured by words per minute at Times 1 and 2*

Group		Time 1	Time 2	Gain
Experimental	*Mean*	118	147	29 (25%)
n = 46	*SD*	29	41	26
Control	*Mean*	124	131	7 (5%)
n = 38	*SD*	23	32	33

Table 2. *Range of changes in speed by student percentage in the experimental group (n = 46)*

Speed ranges (wpm)	Time 1	Time 2
Below 100	24%	11%
101-129	47%	28%
130-149	19%	22%
Above 150	10%	39%

The analysis of repeated measures ANOVA is set out in Table 3. For within-subjects effects, an interaction effect was found to be significant for Time and Group (1, 82) = 11.16, $p < .05$, with a moderate effect size ($\eta^2 = .12$), suggesting the two variables account for the variance for the reading speed score (see Figure 1). A significant main effect was detected for Time, F (1, 82) = 29.03, $p < .005$, and the effect size was very large ($\eta^2 = .26$). The time effect indicates that both groups improved their reading speed from pretest to posttest as seen in Table 1. However, for between-subjects effects, no main effect was found for Group (1, 82) = .61, $p = .44$, implying that the 13-week intervention did not make a significant difference in reading speed between the experimental group and control group.

Table 3. *Summary of repeated measures ANOVA for reading speed for the variables of Group and Time*

Source	SS	df	MS	F	η²
Within-subjects effects					
Time	12732.5	1	12732.5	29.03***	0.26
Time * Group	4895.99	1	4895.99	11.16**	0.12
Error	35969.24	82	438.65		
Between-subjects effects					
Group	1008.11	1	1008.11	0.61	0.01
Error	136471	82	1664.28		

Note. *** $p < .001$; ** $p < .001$; η² = partial eta squared calculated the effect size by % of variance explained.
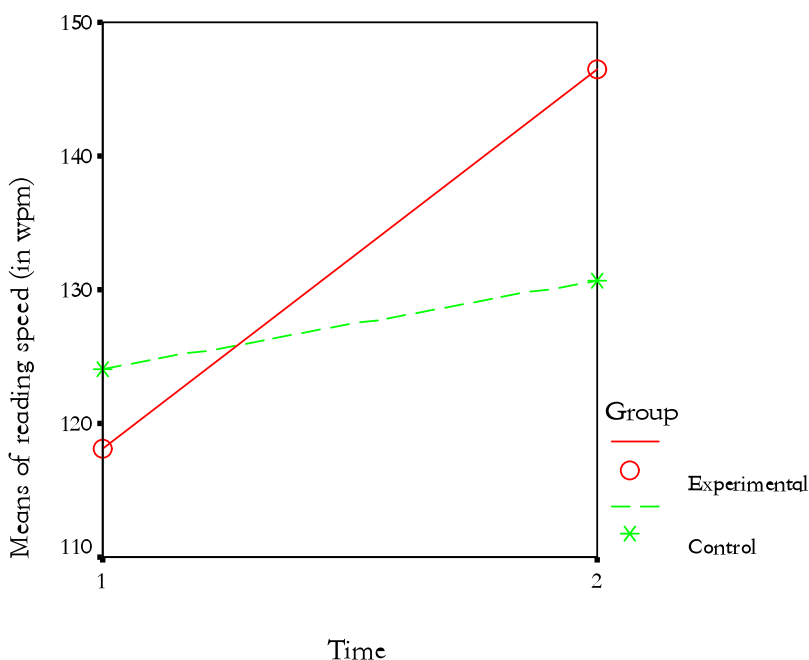

Figure 1. Reading speed for the experimental and control groups at Times 1 and 2 (in wpm)

Due to the interaction effect being significant, paired samples *t*-tests were further performed to test each group on the pretest and posttest measures. The results presented in Table 4 showed that for the experimental group, improvement from Time 1 to Time 2 was significant, $t(45) = -7.27$, $p < .0005$, the effect size ($d = .80$) just reaching the benchmark of being large, but no marked improvement was found for the control group, $t(37) = -1.24$, $p > .05$. To compare the reading rates between groups before and after the intervention, an independent samples *t* test was conducted and the results (see Table 5) did not show any significant difference between groups at either the pretest or posttest. Despite there being no difference between groups in reading speed, it is important to note that the experimental group was slower than the control group in the

pretest but faster in the posttest.

From the above analysis, the answer to the first question is that the group with the timed reading intervention increased their reading speed more than the group without the treatment; however, this difference was not statistically significant. The experimental group increased by 29 words, approximately 25%, whereas the control group gained 7 words, increasing by only about 5%.

Table 4. *Comparisons of reading speed between pretest and posttest for each group*

Group	M	df	SD	SEM	t	d
			Paired differences			
Experimental	-28.34	45	26.43	3.9	-7.27[***]	0.8
Control	-6.64	37	33.08	5.37	-1.24	0.24

Note. [***]$p < .001$; d = Cohen's d calculated the effect size by standard deviation units

Table 5. *Comparisons of reading speed between groups at pretest and posttest*

	t	df	MD	SE Diff	d
		Paired differences			
Pretest	-0.96	83	-5.56	5.81	0.21
Posttest	1.93	82	-15.77	8.16	0.43

Reading Comprehension

RQ 2: Did students who received the timed reading intervention comprehend better than those who did not?

The descriptive statistics of students' comprehension scores are set out in Table 6. The results show that students in both groups gained only marginally in their comprehension. Repeated measures ANOVA were again performed and the results show that for within-subjects effects a significant main effect for Time was detected, $F (1, 82) = 6.86$, $p < .01$, with a medium-sized effect ($\eta^2 = .08$). In other words, both groups had higher comprehension scores in the posttest. No significant interaction effect was found. A paired samples t test showed that the experimental group scored significantly higher at Time 2 than at Time 1, but the effect size was small ($d = .27$). There was no marked difference for the control group between Time 1 and Time 2. For the between-subjects effects, no main effect was found for Group $(1, 82) = .47$, $p = .50$. Therefore, the answer to the second question is that the group with speed reading intervention gained only marginally in their comprehension score compared to the control group. No significant difference between groups was found.

Table 6. *Means and standard deviations of students' comprehension scores (max = 13) measured at Times 1 and 2*

Group		Time 1	Time 2	Gain
Experimental	*Mean*	8.13	8.76	0.63
n = 46	*SD*	2.27	2.4	2.14
Control	*Mean*	7.84	8.42	0.58
n = 38	*SD*	2.07	2.62	2.06

Table 7. *Summary of repeated measures of ANOVA for comprehension scores for the variables of Group and Time*

Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Within-subjects effects						
Time	15.22	1	15.22	6.86	0.01	0.08
Time * Group	0.03	1	0.03	0.01	0.91	0
Error	181.99	82	2.22			
Between-subjects effects						
Group	4.11	1	4.11	0.47	0.5	0.01
Error	719.91	82	8.78			

Note. Paired samples *t*-test for the comprehension scores between pretest and posttest of the experimental group, $t(45) = -2.00^*$; $d = .27$; the control group, $t(37) = -1.73$; $d = .25$.

Students' Perceptions

RQ3. How did students who received the timed reading treatment perceive the intervention?

The researcher instructed the participants in the experimental group to focus on three perspectives when they wrote their reports:

   1) The benefits (if any) they obtained from the timed reading program.
   2) The difficulties they encountered.
   3) The suggestions they wished to offer for future speed reading courses.

The frequencies for the most commonly mentioned items were tallied and are presented in Table 8. Table 8 shows the students gave more positive comments than negative ones. As shown, 38 out of 46 students reported their reading speed had improved, and 34 students also wrote that speed reading forced them to concentrate better in case they answered the comprehension questions poorly. Twenty-seven students expressed that their confidence in reading was enhanced because they did not believe that they could read so many texts without the teacher's help.

Other relevant benefits were that 19 out of 46 students reported that they obtained a great deal of knowledge through reading, which they considered one advantage of reading faster. Another 16 students also mentioned that they became more skilled in searching for main ideas by scanning

within a limited time. However, five students wrote that the texts were too easy for them, and asked to be given more difficult texts in the future. These comments, however, suggest that the texts were at the right level for the timed reading fluency practice because no students complained that the texts were too difficult and only 5 students for being too easy. Some scholars (Hudson, Lane, & Pullen, 2005) even recommend that texts used for practicing reading fluency be at an independent level (95-100% accuracy).

Table 8. *Reported perceptions of timed reading activity by number and percentage of the participants*

Comments	Number of students (*n* =46)
Increased reading speed	38 (83%)
Help concentrate better while reading	34 (74%)
Increased reading confidence	27 (59%)
Obtain a lot of knowledge	19 (41%)
Improved reading skills	16 (35%)
Class schedule being bad (too early in the day)	9 (20%)
Reading texts being too easy	5 (11%)

Note. The students were allowed to give as many comments as they wished, so the total frequency is larger than the number of participants.

Discussion and Conclusion

The study examined the improvement of students' reading speed through a timed reading activity. The results showed that the group with the timed reading intervention improved 25% or 29 wpm in speed and .63 in comprehension, whereas the control group increased 5% or 7 wpm in speed and .58 in comprehension. Although the statistical analysis showed no significant differences between the groups at each testing time, when the comparison was done within the group, observable improvement was found in both speed and comprehension for the experimental group but not for the control group. Regardless of the differences between groups being insignificant, when we compare the results with Cushing-Weigle and Jensen's (1996) study, the one conducted in 1994, the two studies are similar in that students in both studies perceived a large gain from the rate-building activities, but their actual improvement in reading rate was modest (29 in the present study and 40 wpm in Cushing-Weigle & Jensen's) with marginal changes in their reading comprehension. Despite there being many differences between the two studies (e.g., the learning context—second and foreign environment, or reading materials—academic versus general), the results of the present study indicate that including a timed reading activity in the normal curriculum, even one lasting only 15 minutes a week, can improve learners' reading speed and reading confidence.

However, if we further compare this study with previous studies by Cramer (1975), and Chung and Nation (2006), the students in this study made smaller improvements. Two major reasons may explain these outcomes:

1. The learners received the treatment only once a week in the classroom, each time for 15 minutes, making a total of only 195 minutes for the whole period. Many studies have shown that time distribution does affect learning effectiveness (Spada & Lightbown, 1989; Netten & Germain, 2004; Serrano & Munõz, 2007). Millett (2008) suggests that reading fluency practice should be done frequently or at least three times a week (Nation, 2005), otherwise the speed increase will not be significant.

2. Another reason for the average improvement being small was that not every student completed all 39 texts. According to the researchers' calculation, only 15 students completed 36 texts or above and these students increased by 41 wpm. Sixteen students read 30 to 35 texts, and they improved by only 24 wpm. Another 15 students finished less than 30 passages, and their improvement was 20 wpm. From the amount of text being read, we noticed that the more texts students read, the more improvement they made. Although it is still unclear whether the improvement was due to reading more or reading more with time pressure, those students who read fewer than 30 texts (missing the class up to three times) may also have low motivation in enhancing their reading skills.

On the whole, it is likely that the low frequency of the weekly meetings and varied quantities of reading were the most important factors in the results. If these two main issues are overcome, the effectiveness of timed reading should be enhanced. In addition to these reasons, two other factors may have affected the overall results; the class schedule for doing timed reading and lack of repeated practice. Regarding the schedule issue, the course started at 8:20 in the morning, the first session of the day, and students were not ready to do a task that required full concentration. According to some students' written reports, they were still half asleep and could not get right into the activity until the second or third reading. Perhaps this should be considered as a learner factor. As for repeated practice, after reading three texts each week, students did not have the chance to reread the texts because the students handed in their books after each treatment for the researcher to check their reading speeds and comprehension. Due to this course of action, the students did not have the opportunity to read the texts repeatedly until they were quite familiar with text structure and vocabulary. However, this might be only significant for some levels of students because few students reported that there was any unfamiliar vocabulary.

Although reading comprehension in the current study improved only marginally, the results of the current study in fact support the theory of automatic information processing because these students increased their reading rates, but their comprehension did not decrease. An explanation of the limited comprehension improvement is that students' current reading rate had not reached the optimal level to improve comprehension. Although "the relation between reading rate and comprehension remains confusing" (Meyer et al., 1999, p. 303), the most optimal reading rate for L1 readers is between 250 and 350 wpm; readers reading at this rate comprehend the message with most efficiency (Carver, 1982). As for reading in L2, there are no conclusive findings as yet, but some studies have shown that L2 learners read much slower in L2 than in L1 (Fraser, 2007; Segalowitz, Poulsen, & Komoda, 1991; Raymond & Parks, 2002). The limited understanding of the relationship between L2 reading rate and comprehension deserves future research to shed light on this link.

Apart from reading speed and comprehension, this study also looked at students' perceptions of the timed reading activity. The following excerpts show that many students believed that their reading speed had improved.

- "In the first few weeks, I felt that my reading speeds had remained the same, improving very little, but at about halfway, I suddenly felt that I could read faster. I guessed it was because I noticed the writing structures of those texts, which are all very similar. Overall, I am sure that my reading speed has improved and I will continue to read a bit higher level texts."

- "Timing the reading speed did give me a lot of pressure. I was used to reading slowly because I worried I could not answer the comprehension questions, but now I know I can read faster as long as I pay attention. In addition, I have learned many new things through these texts."

- "The timing made me go faster. I didn't know that I could read fast."

The above excerpts by students were similar to those reported by Cushing-Weigle and Jensen's (1996) students who perceived gain from reading speed at the same time as feeling a great pressure, in particular for paced readings. In addition to reading faster, students also reported that timed reading improved their concentration, which seems to support Walczyk et al. (1999) that time restriction promotes concentration and thus leads to better performance. Below are two example excerpts:

- "When we had finished reading the texts, we were not allowed to read back, which made me pay more attention to the content."
- "I have learned better reading skills and how to find key words. The activity helps me concentrate better."

The timed reading activity not only improved students' reading skills but also brought unexpected gains, including obtaining more knowledge and feeling confident.

- "I have gained a lot of knowledge through reading so many different texts. Also, this is the only course that I never skipped once."

- "I think my reading speed became faster after each training. I also acquired some new vocabulary despite reading fast."

- "I cannot believe that I can read independently without the teacher's assistance, feeling great now."

The above excerpts show that students considered the timed reading activity helpful. Before ending the paper, some limitations of the study are worth mentioning. First, the pretests and posttests of reading speed adopted the same texts; students might have been familiar with the texts, so the improvement might be partly due to a practice and/or memory effect. Future research could measure students' reading speed with different texts. Second, students'

motivation in improving their reading speed was unknown before the experiment. In all the studies reviewed, including the present one, there were students whose reading speed was slower at the posttest. It is possible that such reverse progress might be due to low motivation. Future research may conduct a survey before the intervention begins to compare improvement between highly motivated students and those who have low motivation. With such issues taken into consideration, the results would be more robust.

Though the quantitative data did not reveal any clearly marked difference between groups in reading speed and comprehension, this does not mean that including rate-building activities in a reading class is not worthwhile because an important gain from the activity was enhancing students' reading confidence, as they believed that they could read faster and more independently. Although rate-building activities seem to be difficult for many EFL college students to do intensively as they do not have an English class every day, students can do the reading fluency practice at home or through a self-access learning center under the guidance of their language teacher.

Acknowledgments

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