

# Reading Speed & Reading Comprehension: Department of English Education

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*Abstract: This study examined the reading speed and comprehension level of 1<sup>st</sup> and 2<sup>nd</sup>-year university participants (N = 28) in Japan over a 13-week period. The results suggest a statistically significant reading speed increase of 26 words per minute with no reduction in reading comprehension. Further, the reading speed gain was realized within the first 6 weeks of the investigation. Findings are consistent with similar studies on this topic. Recommendations for increasing reading speed in the classroom context and improvements in future research design are offered while questions of reading comprehension persist.*

## I. Introduction

Research has suggested various mental processes occur during the act of reading. Lower- and higher-order cognitive activities, which are managed by working memory seem to offer a suitable explanation (Baddeley, 2012, 1986; Grabe, 2009, 1991; Baddeley & Hitch, 1974). Lower-order processes include word recognition, syntactic parsing, and meaning/semantic-proposition encoding, while higher-order reading processes include text-model formation: what the text is about, situation-model building: how we decide to interpret the text, inference-making, executive-control processing - how we direct our attention, and strategic processing (Schmitt, et. al.,

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2011; Grabe, 2009, p. 21). For high-functioning readers, the lower-order processes have become automatic because of the development of an underlying set of reading skills (Grabe, 2010, 2004; Kuhn, et. al., 2010; LaBerge & Samuels, 1974), which can be cultivated with purposeful instructional methods and materials (Grabe, 2004).

Reading speed is the rate at which individuals decode and comprehend written information. This rate is affected by a number of factors such as working memory capacity, background knowledge, text lexical and syntactic complexity (Sörqvist & Marsh, 2015; Baddeley, 2012, 1986; Grabe, 2009, 2004). Though reading fluency and speed reading share the lower- and higher-order processes listed above, the constructs are distinct in other respects. On the one hand, reading fluency is the result of extensive exposure to the L2 where decoding and comprehending long strings of 'chunked' information has become automatic, stress-free, enjoyable and empowering (LaBerge & Samuels, 1974; Kuhn, et. al., 2010). Speed reading, however, is a short-term, intensive and problem-solving endeavor. It invokes conscious effort, has comprehension rate assessment, and is time constrained (Chung & Nation, 2006; Quinn, Nation, and Millet, 2007).

At present, there are relatively few studies on L2 fluency and even fewer on the impact that speed-reading programs within reading courses have on reading speed and comprehension in EFL contexts. However, in the opinions of the authors, there is consistency in the general outcome: time-constrained reading activities result in statistically significant gains in reading speed within a typical university semester (15 weeks) and not at the expense of reading comprehension. This paper will present reading speed change data of participants in a reading and vocabulary course that has integrated speed-reading activities.

## II. Literature Review

Research studies on reading speed are short-term and relatively simple in design. Spanning only a few weeks, studies employ treatments defined as timed readings, repeated readings, repeated timed readings, and timed or repeated readings with oral components. For the studies investigated, lexical items were identified to be within participant capabilities as determined by various vocabulary assessment tools such as the Vocabulary Levels Test (Nation, 1983), and the Vocabulary Size Test (Nation & Beglar, 2007) among others. In addition, reading length and/or time on task were commonly controlled variables.

For timed readings studies, the reading passages are engaged one time only. In other words, new reading passages are introduced for every treatment. In one timed reading study, Chung & Nation (2006) created various scoring methods to determine reading speeds of participants in a Korean university (N=46). They presented data suggesting a 52% (73 WPM) increase in speed over nine weeks and 23 readings. In another study, Chang (2010) reported a reading speed increase of 25% (29 WPM) and slight comprehension rate gain of 4% (.63) over a 13-week period. Tran (2012, 2014) conducted two studies showing gains in reading speed with the latter study producing an average increase of 48 WPM over 20 readings and 62% of participants raised their reading comprehension rate. Lastly, in a study on EFL learner reading speed achievement by Swanson and Collet (2016), reading speed increased after timed reading practice. There were no quantitative declines in comprehension, and participants reported having increased confidence in their reading abilities as a result of the speed-reading activities.

Repeated reading, as the name states, is where text passages are read on more than one occasion within a research study. Vocabulary items

met repeatedly should reduce lexical burden, thus allowing for attentional resources to be directed, or shifted back and forth, between lower- and higher-order processes (Schmidt & Carter, 2000). In one such study, Taguchi, et. al. (2004) found an average gain in reading speed of 31 WPM with 42 repeated reading sessions over 17 weeks.

In other variations of reading speed investigation, Chang (2012) reported the effect of 52 timed-reading, and 26 repeated oral reading tasks on 35 adult students of English as a foreign language over 13 weeks. The timed reading group increased 49% (50 WPM), and the repeated reading group increased 27% (23 WPM). Reading comprehension levels were comparable between groups measuring 55 – 65% from pre-test to post-test. Leroux (2016) compared efficacies of timed reading treatments to repeated reading treatments with the latter being hypothesized as more efficacious. Results presented no group differences but yielded statistically significant within group reading speed gain. Moreover, neither treatment impacted reading comprehension rate. Armagan and Genc (2017) also compared timed and repeated reading efficacies and found results similar to Leroux (2016) recording reading speed gains of 44% in both treatment groups with no loss in comprehension. Notably, the Armagan and Genc (2017) study lasted only 5 weeks. Chang and Millet (2013) investigated timed repeated readings and their sway on reading speed, comprehension, and reading speed transfer to unpracticed text with 26 university students. Consistent with previous L2 research, results indicated a timed repeated reading speed gain of 46% (47 WPM) in the practiced text and a 45% (45 WPM) gain in the transfer to unpracticed text. Additionally, the reading comprehension rate of the timed repeated reading group increased 19%.

A comprehensive study by Shimono (2018) using timed reading and timed repeated reading with an oral component and chunking practice

treatments produced results of reading speed gain for both groups compared to a control group. In addition, the research design attended to methodological shortcomings found in other studies. For example, the use of standard words per minute, reporting on text readability statistics as well as the application of robust statistical methods create a high level of confidence in the results obtained. One unique finding in this study was that reading comprehension rate presented statistically significant gain in two of the four scoring methods applied.

### **III. Methodology**

#### **(1) Participants & Setting**

In an introductory, textbook-based, reading and vocabulary course, 28 participants had reading speed and reading comprehension measured over one semester (13 x 90-minute classes). These participants consisted of 14 – 1<sup>st</sup> year and 14 – 2<sup>nd</sup> year students in the Department of English Education (Childhood Education and English majors). TOEFL scores of the participants ranged from 330 – 470 points. The course was pillared by instruction directed at reading with specific purpose: applying different reading strategies based on task requirements, type of text engaged, author's purpose or plan and so on. In addition, this course encouraged extensive reading and required three graded readers at Level 1 or Level 2, associated book reports, and a poster presentation. Finally, contextualized vocabulary was addressed through exercises in the textbook while general vocabulary development received attention via decontextualized items likely met in high school English classes. Vocabulary was assessed through form-meaning-use constructed quizzes. However, students in the course were regularly reminded to look for opportunities for productive use of new vocabulary when completing book reports and making presentations.

## (2) Instrumentation

Multiple instruments were employed in this study. First, the Vocabulary Levels Test (VLT) was used to determine vocabulary levels for study focus in the course itself and to validate use of the benchmark instrument: the Modified Asian and Pacific Speed Reading Programme (Quinn, Nation, & Millet, 2007). The speed-reading program was developed using the 1<sup>st</sup> – 1000 words of the General Service List (West, 1953) containing 20 passages of 550 words (500 standard words) each with simplified grammar structures. Third, the treatments chosen were short passages because of the need for reading time flexibility. As such, Rate Builder passages from the Science Research Associates (SRA) Reading Laboratory Level 2a were used. From the company website:

These short, timed reading selections improve fluency by helping students read faster while maintaining comprehension. Students get exactly three minutes to read a selection and answer the questions that follow. Rate Builders are organized into color-coded levels[.]

These rate builder reading cards were followed by six comprehension questions. This study used, SRA Level 2a; colors ‘Purple’ and ‘Lavender’, which had 15 readings each. A recording sheet was provided along with instructions on how to complete the form.

## (3) Procedure

The VLT was administered during the first lesson. Results of the VLT validated the use of the Modified Asian and Pacific Speed Reading Programme to determine initial reading and benchmark reading speed. Prior to this initial reading, a key instructional point was supplied to the participants: Do not try to pronounce unknown words such as new vocabulary, names of people or places with odd spellings. This instruction

was introduced based on the cultural nature of the benchmark passages used. It was perceived that attempts at pronouncing names of people such as *Jayaprana or Rapindranath Tagore* would considerably hinder participant reading speed thus tainting the results. The following benchmark instructions were provided to the participants:

1. Read fast.
2. Skip unknown words such as people's or place's names (do not try to pronounce).
3. Read the text only one time.
4. Write down the reading time on the recording sheet.
5. Do not hope to score 100% correct for the answers.
6. Do not return to the text while answering comprehension questions.
7. Do not worry about getting all the comprehension questions correct.
8. Try your best.

Following the first benchmark, reading treatment instructions were issued to the participants, and the treatment for increasing reading speed was initiated (SRA Rate Builders).

1. Read fast.
2. Do not hope to score 100% correct for the answers.
3. Do not return to the reading passage when answering questions.
4. Use your personal timer and write down reading time when complete.
5. Answer comprehension questions.
6. Check answers.
7. Comprehension goal is four to five correct answers out of six.
  - a. If six correct answers, then reading is too slow. Read faster.
  - b. If four of five correct answers, try to read slightly faster.

c. If less than four correct answers, then read a little slower.

8. Repeat process.

Approximately ten minutes of class time was used for reading speed development with three reading cards on average completed. Participants would record their times and number of comprehension questions answered correctly after each reading. The research plan was to have every participant complete 15 treatments between benchmarks. However, due to random absences or internships, participants in the study had completed between 13 – 17 treatment passages prior to Benchmark 2 and 3 (Figure 1).

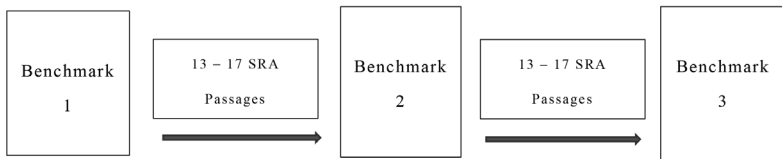


Figure 1: Research design used for reading for speed program.

In essence, the procedure used in this study was intervention-free. Of interest was the change in participant reading speed and comprehension level when engaging speed-reading activities that were embedded in a reading and vocabulary course. The following research questions were asked:

1. Would participants show statistically significant reading speed gain at each benchmark?
2. Would participants maintain reading comprehension rate at each benchmark?



#### IV. Results

RQ 1: Paired-sample  $t$  tests were conducted to evaluate whether reading speed increased from Benchmark 1 to Benchmark 2 and from Benchmark 2 to Benchmark 3. The paired-samples  $t$  tests suggest that significant mean differences exist between Benchmark 1 and Benchmark 2 (Figure 2) but not between Benchmark 2 and 3. Specifically, there was a significant difference in the reading speed from Benchmark 1 ( $M = 110.54$ ,  $SD = 29.66$ ) to Benchmark 2 ( $M = 136.5$ ,  $SD = 30.01$ ), conditions;  $t(27) = -4.45$ ,  $p = .05$ . Furthermore, the observed effect size  $d$  is large, 0.84. However, reading speed gain between Benchmark 2 and 3 was not significant ( $M = 144.54$ ,  $SD = 50.73$ ), conditions;  $t(27) = -1.16$ ,  $p = .05$  (Figure 2). The normality assumption was checked based on the Shapiro-Wilk Test  $\alpha=0.05$  and suggested a normal distribution of data. As a result of these findings, the null hypothesis is rejected: participants did not show a statistically significant reading speed increase at each benchmark.

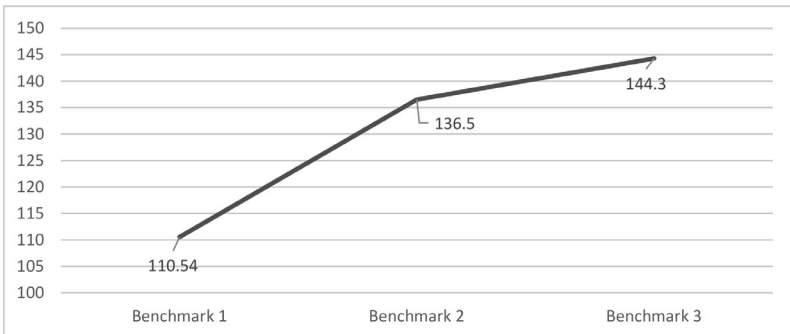


Figure 2: Benchmark reading speed mean score in words per minute (N = 28).

Regarding RQ 2: Paired-samples  $t$  tests were conducted to evaluate differences for reading comprehension at each benchmark (Figure 3). However, the Shapiro-Wilk Test assumed the data to be not normally

distributed at  $\alpha=0.05$  at Benchmarks 1 and 2. Thus, a Wilcoxon Signed-Ranks Test determined that the reading comprehension rate of Benchmark 2 is not significantly different from the reading comprehension rate of Benchmark 1,  $Z = -1.63$ ,  $p = .0128$ . The paired samples  $t$  tests for Benchmarks 2 and 3 presented a normal distribution and suggested that there was no statistically significant difference for reading comprehension rate at Benchmark 2 ( $M = 0.61$ ,  $SD = 0.15$ ) and Benchmark 3 ( $M = 0.62$ ,  $SD = 0.13$ ), conditions;  $t(27) = -0.43$ ,  $p = .05$ . The results indicate that the null hypothesis should be accepted: participants maintained their reading comprehension rate at each benchmark.

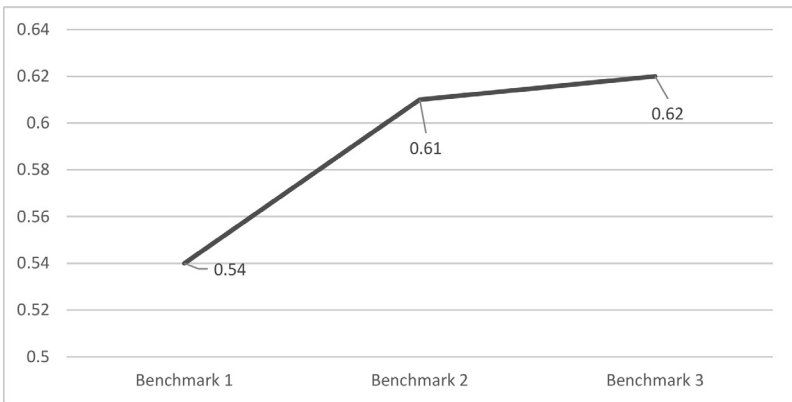


Figure 3: Benchmark reading comprehension mean scores in percent of correctly answered questions ( $N = 28$ ).

## V. Discussion

(1) RQ 1: Reading speed gain was realized during the study and without use of an intervention. However, after only a few weeks, there were diminishing returns in the growth rate of reading speed. Though a logical expectation, the insertion of a non-skill-based intervention after Benchmark 2 may mitigate the flattening of the growth curve. To clarify,

the use of a non-skill-based intervention is targeted at the speed-reading program directly while the development of the set of skills that underlie fluency will receive direct attention in the activities and exercises of the vocabulary and reading course. As such, one possible non-skill-based intervention would be to reduce the allowable reading time. In fact, time control is central to the notion of speed reading. For reasons linked to a reader's level of concentration, time pressure, among other factors, is an influence. Specifically, concentration mitigates distraction, and when readers focus on their reading task, "the locus of attention becomes more steadfast. [T]he same mechanisms should also shield against internally generated distraction" (Sörqvist & Marsh, 2015, p. 269). Furthermore, concentration level while reading is not a latent construct though electroencephalograms (EEG) are not present in classroom settings. In laboratory conditions, however, brain waves oscillating at 13 – 15 Hz (Beta) were determined to be optimal for concentration when reading. Below that level, relaxation, surrounding awareness and distractibility occurs; while above that level, concentration is high but so is anxiety potential (Rahma & Nurhadi, 2017). Naturally, even though empirically driven, time allowance reductions would require some guesswork by the researcher regarding when and how much time should be reduced. Formative data review would assist in decisions in this area. In short, tying concentration research data to the application of step-down time limits for the reading passages is a plausible intervention aimed at attenuating the flattening of the curve of reading speed increase. In closing, it should be reiterated that decreasing the time available for a reading passage as an intervention does not impact the attention paid to the building of the skills that underlie fluency because direct development occurs in other aspects of the reading and vocabulary course itself. Indeed, alerting students to the benefits of controlling attention as well as offering

opportunities to practice this form of self-regulation may also contribute to a positive feedback loop and reap rewards beyond the confines of a short-term, reading speed development program.

(2) RQ 2: Reading comprehension was not impacted by reading speed. In fact, there was no exploratory correlation found in this study's data. There appeared general agreement in the L2 literature that reading comprehension does not decline when reading speed increases, but nor is it enhanced, at least in short-term studies. Though Chang & Millet (2013) presented results of a 19% gain in reading comprehension, it did not receive statistical validation. Tran (2014) produced data indicating that 62% of participants gained in comprehension rate, but measures of statistical significance were not listed. In contrast, Grabe (2010) believes that reading speed and reading comprehension are positively correlated. He offers that reading comprehension is a gradual process supported by a set of reading skills largely developed through implicit learning. Further, in one study referenced, employing repeated oral readings contributed a large amount of the shared variance (42%) of what was constructed to be reading comprehension (p. 74). In addition, "... most of the gains made with repeated readings, both in terms of accuracy and automaticity, occur between the third and the fifth repetition." (Kuhn, et. al., 2010, p. 235). In other words, short-term investigations such as the current study may not detect increases in reading comprehension because increases are incremental, and the result of repeated and extended exposures to texts.

Then, do the snapshot reading comprehension rates found at each benchmark in this study reach a satisfactory level? Though the results are similar to other studies reviewed, Nation (2005) proposes that 70 – 80% comprehension of a text is appropriate for silent reading. Shimono (2018)

instructed the participants in his study to this end, and comprehension level grew to approximately 70% as the study progressed. This is slightly higher than what was observed in the extant literature and suggests weaknesses in the treatment of past studies as well as within this present study. Specifically, the authors' study did not include two treatment elements, which are believed to promote reading comprehension. First, context-driven comprehension may facilitate rapid implicit learning (Grabe, 2009); and second, the inclusion of an oral component to boost reading prosody may result in comprehension gain (Kuhn, et. al., 2005). Starting with context-driven readings, some form of narrow or narrow-type reading treatment may be appropriate. For example, the treatment passages used by Shimono (2018), *The Diamond Family*, is a story-based, out of publication reading for speed treatment. The characters of the story are introduced and developed from one scene to the next. At some point, background knowledge may be accrued and subsequently assist in text comprehension as it also does when narrow reading (Chang & Millett, 2017; Cho, et. al., 2005; Schmidt & Carter, 2000). Indeed, the repetition of vocabulary and ideas should facilitate comprehension as well as the skills that promote fluency (Grabe, 2010) though this has not been categorically borne out by research of L2 repeated reading studies. The second absent element in the treatment of this study was the lack of an oral component (Shimono, 2018; Grabe, 2010). As evidenced in Shimono (2018), oral chunking practice was included as one treatment feature, and there was growth in reading comprehension as the study progressed. This offers support for reading prosody as an important indicator of comprehension development (Kuhn, et. al., 2010). In sum, the absence of an oral component along with the timed reading treatment used may have contributed to lower than desired comprehension rates in the current investigation. Furthermore, given the

incremental nature of comprehension rate growth (Grabe, 2010), this type of study must span two academic semesters. There are design and logistical issues to be addressed though an extended research study of 25 – 30 weeks would better illuminate details of comprehension growth rate. In any event, according to the expectations established by Nation (2005), the reading comprehension scores in this current study seem a little low even if the gains presented had reached statistical significance, which they did not.

## **VI. Conclusion**

This study showed reading speed gain using timed readings over the period of one academic semester. In actuality, the gain was found early in the study: the first six weeks. Reading comprehension rate increased; however, the increase was not statistically significant. The results presented are somewhat consistent with prior research. Suggested are two investigation modifications: an intervention dealing with reading speed, and/or treatment modifications addressing reading comprehension. Preferred would be to add an intervention focusing on increasing participant concentration level by stepping down the allowable reading time for each treatment passage. Increasing concentration level would reduce distractibility, and thus increase reading speed. Furthermore, a gradual increase in reading speed has not been shown to decrease comprehension rate. Next, to address the shortfall in reading comprehension rate, treatment modifications are suggested and possible though they are somewhat difficult to apply. First, adding an oral component with chunking practice has shown its effectiveness (Shimono, 2018) though this would likely require the retyping of treatment passages as well as obtaining a principled method for chunking text. Hence, researchers need time to

prepare these changes. Second, replacing the current treatment with repeated readings or narrow readings is the most plausible amendment if a treatment amendment were to occur. Finally, an extended research design that would span two academic semesters is recommended in order to better understand changes in reading comprehension.

## **VII. Limitations**

To provide proper context for the limitations of this study, it should be stated that the reading and vocabulary program in which the reading-speed program took place has two required classes. Because of this, the speed-reading programs embedded within each reading and vocabulary course should be seamlessly connected to create a longer-term study as opposed to limiting it to the short-term study that currently exists. That is, the treatments, the interventions, and the process applied in the speed-reading program should be mirrored across semester-long studies. This would result in many of the students taking both reading and vocabulary courses back to back, thus becoming the participants of extended investigation. Consequently, the current lack of insight into the pace of reading comprehension change would have a higher likelihood of yielding meaningful data. In addition, there was no control group. Naturally, control groups reduce the number of confounding factors. In this research investigation, it would have eliminated the possibility of reading speed gain being attributable to general reading, or even general L2 improvement over the course of one university semester. Next, the sample size of this study was small (N=28). Expanding the research initiative to other teachers in the department would increase the sample size, which would increase the confidence in detecting statistical significance in the results. Finally, study expansion would also provide an opportunity for the inclusion of an

entirely different treatment group for efficacy comparison. Future research endeavors should address these limitations.

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