Text to Memory: A Study on Comprehension and Oral Reading Fluency

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Research was conducted to test the hypothesis that there is a reciprocal relationship between reading comprehension and oral reading fluency. Previous research indicates that oral reading fluency can aid reading comprehension. However, more recent models have questioned the uni-directionality of this relationship. This research examines this hypothesis by analyzing second grade students’ oral reading of connected texts. A summary previewing condition was manipulated in an experiment and the effects on students’ passage reading times were evaluated. Grade level students were randomly assigned to one of two groups, an experimental group and a control group. Analyses of Covariance were performed to test the effects of prosodic modeling on oral reading fluency as measured in correct words per minute (CWPM) and prosodic reading, while controlling for students overall achievement in reading as measured by the common state test score. The results showed differences in CWPM indicating the summary preview over the no-preview condition for students at lower levels of fluency performance.

Keywords: Reading, at-risk readers, comprehension, struggling readers, prosody, rate and accuracy, automaticity, oral reading fluency, theories

For over 30 years, I taught in the government schools on a small island in the Bahamas. One year I was the designated homeroom teacher to the highest achieving twelfth grade class in the only high school on this island. Time spent in homeroom varied from 30 minutes to 3 hours or more per day depending on planned school activities or unexpected community interruptions. Insisting my students utilize this time productively, I established a “book club” in which the class could read and discuss a novel rather than flit away valuable time chatting and catching up on community gossip.

The first selection, To Kill a Mockingbird, was chosen because it was one of the required texts for the international General Certificate of Education Literature Examination from England. Since very few students opted to write this exam, I felt this was an adventitious opportunity to expose all of my students to a Pulitzer Prize award-winning piece of classic literature. To stimulate interest and motivation I read the first chapter aloud to the class. To

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ensure students understood the passage, the class discussed the material through teacher-guided questioning. After introducing the vocabulary for the next section, the students enthusiastically stated that they couldn’t wait to read the second chapter for the home activity. However, subsequent questioning and discussion of chapter two made it apparent that they did not understand the assigned text.

The immediate explanation was to assume they had not done the reading, so I decided the students would take turns reading the chapter aloud in class. I asked Maria, an outstanding student who was constantly called upon to read at school assemblies because of her fluent reading, to begin reading the section which contained a lot of dialogue. She had no problem reading the words but her oral reading of the passage was uncharacteristically void of expression. Once again my students were incapable of responding to questions posed after Maria’s reading. I, then, prosodically reread the same section. When I stopped, one of the students immediately remarked, “We understand it so much better when you read it to us!” The majority of the class concurred. These very capable students did not struggle with decoding or accuracy in word-identification; they struggled to read fluently. More interestingly, they struggled to understand the content of the text as presented in Maria’s rendition. In light of this incident I began to question the relationship between oral reading fluency and reading comprehension which then became the catalyst for this research study.

Statement of the Problem

Fluent reading has received intensified attention after the publication of the Report of the National Reading Panel (National Institute of Child Health and Human Development [NICHD], 2000), which identifies fluency as one of five critical components of reading instruction. Currently recognized as a crucial skill in the attainment of reading comprehension, oral reading fluency (ORF) has been elevated from the ‘neglected goal’ (Allington, 1983; NICHD, 2000), to “the bridge that the reader must traverse to get from word recognition to comprehension” (Armbruster, Lehr, & Osborn, 2001, pp. 22-23).

The number of students with disabilities in United States receiving additional services in 2001-2002, was approximately 2.9 million which is a 64 per cent growth increase since 1977. More than 50 per cent of these students were identified as having specific learning disabilities. The most common area is that of reading. (24th Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act, 2002). Also, Torgesen and Hudson (2006) indicated that dysfluency issues in reading is problematic and extremely challenging to overcome in struggling readers past the 4th grade.

Significance of the Study

With the adoption of Common Core State Standards for English Language Arts (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) fluency was identified as a foundational skill for reading. It was also noted that students are required to “read grade-level prose and poetry orally with accuracy, appropriate rate, and expression” (p.17).
Most research on fluency reports a link between fluency and reading proficiency (Anderson, Hiebert, Scott, & Wilkinson, 1985; Chard et al., 2002; Dowhower, 1994; Kuhn & Stahl, 2004, NICHD, 2000; Rasinski & Hoffman, 2003; Strecker, et al. 1998). Current research demonstrates oral reading fluency to be a predictor of reading comprehension (Fuchs, Fuchs, Hosp & Jenkins, 2001; NICHD, 2000; Wood, 2006). The NAEP study (Pinnell, et al., 1995; 2002) conveyed that the three components of ORF were strongly related and these had a strong impact on reading comprehension as measured by the NAEP (2002; 2010) reading assessment. Typically, the students who had the highest scores in reading performance were the students who achieved the maximum level on the NAEP oral reading fluency scale. Until presently, most experiments that tested the influence of oral reading fluency to reading comprehension were comprised only of decoding and listening comprehension assessments (Dowhower; 1991; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Hudson, Lane, & Pullen, 2005; Hudson, Pullen, Lane, & Torgesen, 2008; Kuhn et al., 2010). Fluency measures administered in these studies consisted of the Gray Oral Reading Test (GORT; Wiederholdt & Bryant, 2011). These measures lack the assessment measure to evaluate prosody. Most of the past research scrutinized or adapted the simple view of reading (Hoover & Gough, 1990) which perceives skill in reading to be the product of two psychological processes: decoding ability and listening comprehension. Some later studies included the theories of processing speed (Joshi & Aaron, 2000; Tiu, Thompson, & Lewis, 2003; Wolf & Bowers, 1999) or ORF (Jenkins et al, 2003) to the equation of the simple view of reading. Although the effect of processing speed produced mixed results, ORF was found to significantly predict reading comprehension.

Furthermore, existing research mainly comprises co-relational and or clinical studies (Jenkins, 2001; Torgesen, 1986; Breznitz, 1987; Schwanefflueg, Hamilton, Kuhn, Wisenbaker & Stahl, 2004) which created many questions to the theory and methodological issues involved with ORF. To compound the issue, McGuinness (2004) indicated that these correlational studies were conducted on slow readers whose reading was integrated with many errors.

Many publishers of basal readers are now assimilating fluency c into curriculum development as a result of the report from the National Reading Panel ([NRP], 2000) identifying reading fluency as one of the major components of reading growth which warrants instructional and assessment attention in Kindergarten through third grade. According to Torgesen (2005), many of these programmes are being marketed as a tool that will not only target growth in ORF, but will promote gains in reading comprehension of complex text. Furthermore, policy makers, working on the assumption that ORF will improve comprehension, are mandating benchmark assessments of ORF to guide high-stakes educational decisions. Results from these assessments are used to identify and classify at-risk students and to determine eligibility for special education services (Wood, 2006). For instance, with the enactment of Public Law 108-446 (Individuals with Disabilities Education Improvement Act of 2004 [IDEA 2004]) many local agencies have implemented a Response to Intervention programme. One approach has been the development of a three-tiered intervention model to prevent reading difficulties. Tier 2 and Tier 3 have been designed to provide additional
instruction to those students who do not make adequate progress in the general education classroom, Tier 1. Data from fluency assessments are being used to determine qualification and exit criteria for Tier 2 and Tier 3 instruction.

The goal of this study is to explore the relationship between reading fluency and comprehension. Data acquired will contribute to a greater understanding of the rather new and perhaps counterintuitive perspective that characterizes the relationship between ORF and reading comprehension as one that is reciprocal. This study intends to design a direct test of this hypothesis in order to address issues of causality and direction. Therefore, the significance of this research is limited to a theoretical contribution to the study of the relationship between reading fluency and reading comprehension.

**Literature Review**

**Components of oral reading fluency**

For the past four decades the terminology of reading fluency is abundant in the; however, there is no agreement on the definition of reading fluency. Regardless, most researchers agree that fluency is a cumulative effect of three discrete components which generate a distinct process: (i) accuracy of word recognition (ii) speed of word recognition, and (iii) prosody. Also, most all of the current definitions of fluency tend to regard the components of fluency as outcomes of learned skills (Wolf and Katzir-Cohen, 2001). Once the reader masters skills in lexical, phonological and syntactical processes, the by-product is effortless reading with good comprehension.

Speed and accuracy of oral reading fluency (ORF) have received the main attention in the research since the LaBerge and Samuels (1974) published their work on automaticity. These two components are measurable as reading rate per minute (WPM) and words read correctly from a passage per minute (WCPM).

Prosody is much more difficult to measure. Very little is known about the nature of prosody because of the dearth of research examining oral reading prosody. Prosodic reading is considered to be synonymous with expressive reading of the text through use of oral language features such as pitch, stress and intonation (Allington, 1983; Dowhower, 1987; Schreiber, 1980, 1991; Schwanenflugel, et al., 2006) and is considered to be one of the hallmarks of fluent reading (Schwanenflugel, et al., 2004). The multiple components of ORF offer insight to the complications involved in fluent reading. Therefore, it is feasible that there can exist more than one area of dysfluency (Wolf & Katzir-Cohen, 2001). Two models try to explain these differences.

**Theoretical Framework**

Two predominant theoretical frameworks, model of automaticity and model of prosody and reading have developed to explain the importance and effect of ORF. Each model institutes different components of ORF, but both propose fluency is needed to assist comprehension.
Fluency Aids Comprehension

The first theory assumes fluency is a result of accuracy and immediate word recognition. This then, expedites reading comprehension as presented by LaBerge and Samuels’ theory of automaticity. The theory of automaticity plays a fundamental role in fluent reading. Automaticity describes how early readers depend on substantial cognitive resources on lexical processes but with practice the reader progresses to a level of proficiency where word recognition becomes rapid and automatic. During this stage cognitive resources are not totally consumed at the word recognition phase and can be channeled to be utilized for gaining meaning from the text. Furthermore, Posner and Snyder (1975) showed how automatic priming mechanism creates a semantic priming effect so that not only are the meanings of words automatized but also those of closely associated words in memory. There are alternative theories of this model which include the theory of automaticity (LaBerge and Samuels, 1974), theory of expectancy (Posner and Snyder, 1975), verbal efficiency theory (Perfetti, 1985); rauding theory (Logan, 1988), or the interactive model (Stanovich, 1980), but these researchers all agree that without speed and accuracy in decoding of text, little interpretation and understanding can take place. However, research (Anderson, Wilkinson, & Mason, 1991; Carver, 1990) points out that when the instructional focus is to increase reading rate, one outcome could be a decrease in comprehension. Even the connectionist model (Adams, 1990; Foorman, 1994) incorporates features of speed and accuracy through pertaining and mapping of phonological skills. These models account for phonological awareness and fluency as the access to comprehension; however, they negate the role of syntax, lexical knowledge and semantics that facilitates comprehension and can affect the rate of fluency.

The next model that explains how fluency aids comprehension is prosody and reading. Reading prosodically, or reading with expression, is indicative the reader comprehends the text so is able to read in a style comparable to oral language (Dowhower, 1991). It is incorporates both decoding and comprehension skills. Schreiber (1987, 1991) postulates that regardless of a reader’s ability to decode words, the difficulty in the acquisition of fluent reading lies in the fact that written text lacks the presence of prosodic cues that are clearly demarcated in oral language, such as stress, pitch and intonation. Even though this model targets a different component of reading fluency, it also views ORF as a moderator of reading comprehension.

Reciprocal Relation between Fluency and Comprehension

Present studies are now investigating the probability that ORF is a prerequisite for reading comprehension. In these studies fluency is defined as rapid speed of word identification. Researchers are presently querying the roles of the various components of fluency in comprehending text and the possibility of a causal and reciprocal relationship between fluency and comprehension (Allington, 1983; Jenkins, Fuchs, van den Broek, Espin and Deno, 2003; Kuhn & Stahl, 2003; Logan, 1997; Massey, 2008; Pikulski & Chard, 2005; Schwanenflugel, et al., 2006). The area of investigation incorporates the rate of access to words is increased due to reader comprehension of the passage as opposed to rate of reading of the words which increases comprehension. A recent study (Jenkins, et al., 2003) supports that word recognition skills contribute more to fluency at lower levels while comprehension contributes relatively more to fluency at higher levels. Current research is also beginning to query the concept that comprehension can be considered a function of fluency through the effect of rate and accuracy of word recognition and also that prosody can be considered a
function of comprehension (Schwanenflugel, Hamilton, Kuhn, Wisenbaker, & Stahl, 2004). The NRP’s (2000) examination of the literature reported that fluency is directly associated with the process of comprehension because it allows for “preliminary interpretive steps” (3-6). They acknowledge that when reading rate increased, comprehension increased. However, there is no absolute reaction with regards to the directionality of the association. The question arises whether or not multiple readings of a passage increase both reading rate and comprehension because of the several opportunities to interact with the text or does multiple readings prompt understanding of the written text which, in turn, facilitates speed of word recognition. If this is the case, comprehension could directly facilitate rapid word recognition through spreading activation as suggested by Posner and Snyder (1975).

**Research Methodology**

The purpose of this study is to investigate the relationship between reading fluency and comprehension with the goal of understanding the direction of the effects of one on the other. The goal of this research was to demonstrate the immediate effects produced by the summary priming condition on ORF. It is expected that passage summary condition will assist in content comprehension and this in turn, will lead not only to expressive oral reading, but an increase in speed and accuracy.

**Participants.** The number of participants was 90 second grade students from two elementary schools (School A and School B) in an urban school district in southeastern Florida. The school district’s demographics are as follows: 60 per cent of its students are of Hispanic origin, 28 per cent African American and less than 3 per cent non-white of other minorities. The district’s Limited English Proficiency (LEP) population is composed of ninety-four languages with Spanish (85 per cent), Haitian/Creole (12 per cent) and Portuguese (1 per cent) being the top three.

**Participant Demographics (Gender):** There were 90 students in the total sample, with 68 in School A and 22 in School B. The distribution between both schools was 47 per cent male and 53 per cent female.

**Age.** Of the 90 students the mean age of the sample was 7.74 and standard deviation of .392. In School A the mean age was 7.68 with a standard deviation of .364, while School B had a mean age of 7.86 and a standard deviation of .425.

**Ethnicity.** African American 38.1 per cent, Hispanic 30.9 per cent, Caucasian 19.3 per cent, other 6.1 per cent, and mixed 5.5 per cent. However, the schools were dissimilar in terms of ethnic distribution, not only from each other, but also from the district’s demographics.

A stratified random assignments in a single factor, experimental design that varies comprehension priming through summary effect under which readers are presented with a concise and coherent summary of the passage on a CD was used. The No Preview group was presented with the same passages as the experimental group with the exception of a concise preview.

Measures include curriculum-based measurement of ORF and the National Assessment of Educational Progress (NAEP) Prosody Scale (see Figure 1). The main analysis involved the application of an ANCOVA to estimate the effects of one between subjects’ factor: summary condition on control of students’ overall oral reading fluency as measured by the STAR-R (Version 2.2, 1996-2002). The STAR-R is an individually administered computer-adaptive reading test and data base allowing teachers to assess students’ reading abilities in a classroom setting for grades 1-12.
The construct of ORF was the focus of the outcome measure which consisted of separate scores for rate, accuracy and prosody. Curriculum based measurement (CBM), through the use of reading passages, measured rate and accuracy. Prosody was measured by application of the National Assessment of Education Progress Prosody Scale score (Pinnell et al., 1995) to the participants’ oral reading on grade level passages. Three grade level reading passages were used as probes to obtain the measurements for rate and accuracy. Measurements were taken at the 60 second and words from the entire passage for words correct per minute (WCPM).

The participants in this experimental group were presented with a concise and coherent summary of the passage by the researcher. Immediately following the summary they were asked to read the passage. After the reader finished reading the passage, the timer was stopped. Two additional stories were presented in the same manner. Reading of passages was digitally recorded for coding. The same procedure was implemented for the control group with the exception of listening to a concise summary of the passage. Coding of passages was completed by four independent raters with a .99 correlation for inter rater reliability.

The initial set of analysis tested the effects of differences across passages, differences across schools, and differences across the experimental and control group. A separate analysis was carried out for each of the three dependent variables used in the study, namely: WCPM at 60 seconds, Total WCPM and the NAEP prosody score. Each analysis was run as a Repeated Measures ANCOVA that included passage as a within-subject factor with three levels (Passage 1, Passage 2, Passage 3) and two between-subject factors: school (School
A and School B) and condition (Summary Preview and No Preview). Performance on the STARS-R was entered as the covariate in the overall analysis.

**Results**

The descriptive statistics of the two dependent variables (Table 1) summarizes the data on three time points of WCPM for each school. Passage 2 had the greatest variance in mean differences and the students in School A outperformed the students in School B across all passages. Differences in School can be seen in Figure 2 at the 60-second interval and Overall Words read (figure 3). Results of the ANCOVA (Table 2) shows significant difference on WCPM variables and the NAEP Prosody score by Passage, School and preview condition with $F(1, 172) = 111.0$, $p < .001$, $F(3, 172) = 100.8$, $p < .001$ and $F(3, 172) = 100.8$, $p < .001$ respectively. There was a variance of means between the two schools in the No Preview condition in which there was a difference of 14.3 points. The greatest variance occurred at the 60-second interval in School B in which the No Preview condition had an average mean of 78.5 compared to the average mean of 105.4 for the summary condition.

![WCPM 60 Second](image1)

**Figure 2: Average performance on WCPM 60 seconds by school**

![Descriptive statistics for WCPM at 60 Seconds over average mean per passage by condition by school](image2)

**Figure 3: Descriptive statistics for WCPM at 60 Seconds over average mean per passage by condition by school**
Table 1: Means and Standard Deviations on WCPM variables and NAEP prosody score as a Function of Passage, School, and Condition

<table>
<thead>
<tr>
<th>School A</th>
<th>Summary Preview</th>
<th>No Preview</th>
<th>Total Average N = 123</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Passage 1</td>
<td>110.0</td>
<td>24.3</td>
<td>110.5</td>
</tr>
<tr>
<td>Passage 2</td>
<td>101.9</td>
<td>26.8</td>
<td>101.1</td>
</tr>
<tr>
<td>Passage 3</td>
<td>109.7</td>
<td>25.9</td>
<td>106.8</td>
</tr>
<tr>
<td>Total</td>
<td>107.2</td>
<td>25.7</td>
<td>106.1</td>
</tr>
<tr>
<td>Passage 1</td>
<td>92.3</td>
<td>27.0</td>
<td>92.0</td>
</tr>
<tr>
<td>Passage 2</td>
<td>96.0</td>
<td>27.0</td>
<td>97.6</td>
</tr>
<tr>
<td>Passage 3</td>
<td>92.1</td>
<td>27.3</td>
<td>87.6</td>
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<tr>
<td>Total</td>
<td>93.5</td>
<td>27.1</td>
<td>92.4</td>
</tr>
<tr>
<td>Passage 1</td>
<td>101.0</td>
<td>28.0</td>
<td>98.5</td>
</tr>
<tr>
<td>Passage 2</td>
<td>96.6</td>
<td>26.0</td>
<td>97.7</td>
</tr>
<tr>
<td>Passage 3</td>
<td>100.3</td>
<td>26.3</td>
<td>96.2</td>
</tr>
<tr>
<td>Total</td>
<td>99.3</td>
<td>26.2</td>
<td>97.5</td>
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<table>
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<tr>
<th>School B</th>
<th>Summary Prev</th>
<th>No Preview</th>
<th>Total Avg</th>
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<tr>
<td>N = 14</td>
<td>N = 14</td>
<td>N = 14</td>
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</tr>
<tr>
<td>Variable</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Passage 1</td>
<td>104.8</td>
<td>26.7</td>
<td>81.2</td>
</tr>
<tr>
<td>Passage 2</td>
<td>101.9</td>
<td>28.2</td>
<td>74.1</td>
</tr>
<tr>
<td>Passage 3</td>
<td>109.6</td>
<td>22.0</td>
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<td>Total</td>
<td>105.4</td>
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<td>78.5</td>
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<tr>
<td>Passage 1</td>
<td>88.0</td>
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<td>Passage 3</td>
<td>87.7</td>
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<td>Passage 3</td>
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<td>Total</td>
<td>99.8</td>
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</tr>
<tr>
<td>Passage 1</td>
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<tr>
<td>Passage 2</td>
<td>3.07</td>
<td>.70</td>
<td>2.86</td>
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<tr>
<td>Passage 3</td>
<td>3.13</td>
<td>.68</td>
<td>3.19</td>
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<tr>
<td>Total</td>
<td>3.14</td>
<td>.73</td>
<td>2.97</td>
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Table 2: Results of ANCOVAs on WCPM variables and NAEP prosody score by passage, school and condition

<table>
<thead>
<tr>
<th></th>
<th>DF</th>
<th>WCPM 60 Seconds</th>
<th>WCPM 120 Seconds</th>
<th>WCPM All Passages</th>
<th>NAEP Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F-value</td>
<td>Partial Eta²</td>
<td>F-value</td>
<td>Partial Eta²</td>
</tr>
<tr>
<td>R-R Score</td>
<td>F (1, 172)</td>
<td>111.0 ***</td>
<td>.392</td>
<td>100.8 ***</td>
<td>.369</td>
</tr>
<tr>
<td>Passage</td>
<td></td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>School</td>
<td></td>
<td>7.02 **</td>
<td>.039</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Condition</td>
<td>.064</td>
<td>.041</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>R STAR-R</td>
<td>F (3, 172)</td>
<td>--</td>
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<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>R School</td>
<td>--</td>
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<td>-------</td>
</tr>
<tr>
<td>Passage * School</td>
<td>--</td>
<td>--</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Condition</td>
<td>3.09 *</td>
<td>.051</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>R School *</td>
<td>--</td>
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</tr>
<tr>
<td>Condition</td>
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</tr>
</tbody>
</table>

*p < .05  
**p < .01  
***p < .001

The main findings established that there were differences in the rate of correct word reading as a function of summary preview condition over the no preview condition. The students in School B in the Summary Preview outperformed the students in the No Preview condition by a mean average of 23.75 words. This suggests that prior exposure to information about the overall gist of the passage aided students' ability to read the words in the passage at a faster rate. These differential effects make it possible to be more definitive with regards to the link between ORF and reading comprehension. The results of this study suggest there is evidence to illustrate a reciprocal relationship between the components of oral reading fluency and comprehension processes. This was evident on a particular population as illustrated by the significant results among students who were at the low end of the scale for fluency proficiency. It is believed that these students were able to increase their word processing speed due to the effect of increased comprehension.

With regard to the third component of fluency, prosody, results did not reveal any statistically significant effects of prosody from priming condition. The mean average for both the experimental group and the control group in both schools and conditions indicates that the mean averages are similar, with only a 0.06-point difference between the two schools. The NAEP Oral Fluency Scale was identical with an average score of 3.2 points on the four point scale. After the completion of this study Benjamin, Schwanenflugel, Meisinger, Groff, Kuhn
and Steinger (2013) have piloted a study that evaluated the validity of a new scale for assessing children’s reading fluency skill. Their study’s developed a reading expression subscale “by examining spectrographically measured prosodic differences in oral reading skills of children with varying fluency skill” (p 105). Using their Comprehensive Oral Reading Fluency Scale (CORFS) could possibly have resulted with different data as spectrographic measures were shown to be valid in the assessment of reading fluency.

**Limitations**

The first limitation is that there was an effect for only one school in the study. It was found that the effect was not generalizable to both schools. In addition, the participants in this study were all second grade students. Results may vary for older students or younger students since the literature designates the developmental trajectory of ORF to have the greatest growth in primary grades.

The sample of this study was limited to students who were on grade-level readers. However, the results indicate stronger effects for the summary condition for the participants whose performance in reading fluency was slightly lower than the performance of those students who were more proficient with respect to ORF. It has been demonstrated that ORF is facilitated by a Summary Preview Condition for on-grade level readers, so these results are generalizable only to this specific population. Without further studies, it is unknown if this previewing condition would facilitate enhanced ORF to students who are below level readers.

Another limitation to this study involves the readability of the passages utilized. All passages were selected based on Lexile levels (Schnick & Knuckelbine, 2000) within the range of L500 and L600. Houghton Mifflin has rated these passages to range from late grade 2 to early grade 3. As the results indicated, the fluency performance of students in School A was well within the range of average and above average fluency scores. However, student performance in School B was in the lower range of fluency performance. It is unknown what, if any, a summary previewing condition may affect the interaction between comprehension and ORF for the students in School A, if the text level of the passages were more challenging.

Furthermore, there are potential limitations to the interpretation of the data with regard to prosody. The constrictions of the NAEP Oral Reading Fluency Scale measure prohibited subtle differentiation of scoring procedures. The four-point scale offered little room to differentiate performance among the students’ renditions. I would recommend that the expressive reading of passages in this study be reevaluated using a different measure. It is highly recommended that less subjective and more precise measures be implemented as the prosody measure. Recent developments of speech technology make it possible to implement an objective measure that is far more precise in measuring the expressive characteristics of prosody which include pitch, timing, and velocity. This new technology should be used to evaluate prosody to determine different nuances and thus, possibly note major distinctions in the oral reading of passages.

Additionally, the findings of this study are limited to second grade students who were native English speakers. Therefore, it is not known if similar results would occur for students
who are older or who are younger based on the developmental trajectory of ORF (Jenkins & Jewell, 1993). Also, it is unknown whether or not these findings would be replicated with a population of English language learners.

Implications
There are both theoretical and practical implications as a result of this study. Implications can also be included as to the impact of technology on ORF.

Theoretical Implications
Even though many researches have reported findings to substantiate the importance of ORF as a predictor of reading comprehension (Fuchs, Fuchs, Hosp & Jenkins, 2001; NICHD, 2000; Wood, 2006), there still remains the question of directionality. As previously mentioned, research has reported on two differing theories on the relationship of ORF and reading comprehension. The first is that ORF is a prerequisite to reading comprehension with the existence of two predominant models in this theory: automaticity and reading (La Berge & Samuels, 1979; Posner & Snyder, 1975; Stanovich, 1980; Perfetti, 1977, 1985; 1988; Logan, 1988; Carver, 1977, 1985, 1992, 1993, 2000) and Prosody and Reading comprehension (Schreiber, 1987; Dowhower, 1991).

As reported earlier the second theory states that there is a reciprocal relationship between the processes of oral reading fluency and comprehension as investigated by several researchers including (Allington, 1983; Fuchs, van den Broek, Espin & Deno, 2003a; Kuhn & Stahl, 2003; Logan, 1997; Massey, 2008; Pikulski & Chard, 2005; Schwanenflugal, et al., 2006) but were correlational studies. This study’s results, implicating the role of comprehension processes as a function of reading fluency, validates the establishment of a new theoretical model to identify the reciprocal effect of the interrelationship of the components of ORF and comprehension processes.

Practical Implications
The findings of the present study have significance for practices in reading instruction. This study demonstrates that prior to reading, if students are presented with a brief summary of the text it may assist with ORF. It is possible that this practice can activate relevant knowledge about the text and assist with speeding up the acquisition of vocabulary and propositional encoding.

Therefore, the results of this study further suggest that for students who are challenged with fluency, front loading a lesson rather than having students summarize a section of text at the end of the reading, would be more beneficial to ORF. Notwithstanding, students with reading difficulties vary with regard to reading skills, the current study suggests that providing students with a summary prior to being instructed to read passages in the content areas, may be an effective accommodation procedure. The summary preview appears to be an effective procedure that may be a viable instructional technique. Its viability is enhanced by the ease with which it may be incorporated into any lesson with minimal demands on time and preparation.
Text to Memory: S R Massey

Technological Implications

The technological revolution and the digital culture are presenting a new medium for student learning and will play a critical role in the acquisition of reading skills. The results of this study could have implications not only for at-risk readers but for second language learners as well, with the adoption of current technological devices. Present programmes that have shown to be effective in assisting oral reading fluency with repeated readings (see RED 180, IREAD (I Record Education Audio Digitally), CD-ROM storybooks, ROSS (Reading with Orthographic and Speech Support) and Read Naturally) might improve rate of reading simply by inserting a brief summary passage at the beginning of the reading task. In addition Chatel (2005) has identified several websites that were established to assist in developing oral reading fluency. With the addition of the new theoretical model that was derived from this study, all websites can make simple additions that might assist at-risk readers to become more fluent.

Conclusion and Recommendations

Consistent with the literature (i.e., Anderson, Heibert, Scott, & Wilkinson, 1985; NRP, 2000; Pinnell, et al, 1995) on ORF and reading comprehension, the findings of this study support the evidence of a strong relationship between reading comprehension and reading fluency, as well as fluency scores being highly correlated with reading comprehension.

This research offers a greater understanding into oral reading fluency and provides tentative evidence that comprehension processes feedback to fluency by increasing the rate of oral reading fluency. Results show that by enhancing some aspect of comprehension prior to reading, fluency is elevated. However, these results were evident only for students who have limited proficiency in ORF and who also possess sufficient reading skills to be able to tap into the resource of comprehension priming.

Due to the imprecise measure for prosody, only rate of reading and accuracy could be used as variables to determine this relationship.

Future Research

Future studies should include an examination of all the components of reading fluency within the context of exploring the relationship between ORF and reading comprehension. Furthermore, research should also attend to text difficulty as a variable that may affect the interaction between comprehension processing and ORF. The passages implemented in this study consisted of approximately the same text level difficulty and contained approximately the same number of words. Future research should utilize texts of varying lengths and text difficulty, since text difficulty has been shown to differentially affect the performance of skilled and less skilled readers on oral reading errors. This study should be replicated using different grade levels, including struggling readers in middle and high school.

It is highly recommended that computerized technology be utilized to evaluate prosody to accurately determine the six markers as identified by Dowhower (1991) which include pausal intrusions, length of phrases, appropriateness of phrases, phrase-final lengthening, terminal intonation contours, and stress. Schwanenflugal’s et al. (2013) created a valid rubric.
for measuring the three components of oral reading fluency. The reading expression scale was based on grounding in the spectrographic structure of reading prosody. The component of prosody could be reevaluated using this measurement tool.

References


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