AUTOMATIC WORD RECOGNITION: THE DEFINING FEATURE OF FLUENCY

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AUTOMATIC WORD RECOGNITION: THE DEFINING FEATURE OF FLUENCY

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A Dissertation

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Doctor of Philosophy

Auburn, Alabama
December 19, 2008

AUTOMATIC WORD RECOGNITION THE DEFINING FEATURE OF FLUENCY

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DISSERTATION ABSTRACT

AUTOMATIC WORD RECOGNITION: THE DEFINING FEATURE OF FLUENCY

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Doctor of Philosophy, December 19, 2008
(Ed. S., Auburn University at Montgomery, 2003
M.A., Auburn University at Montgomery, 1999
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95 Typed Pages

Directed by Bruce A. Murray

This study investigated automatic word recognition as the defining feature of fluency, with speed and expression as results. Fluent readers are able to perform more than one task at a time. They are able to recognize words automatically, freeing attentional resources that can be used in other areas such as comprehension and prosody.

In this experimental study, participants from intact classrooms were randomly assigned to one of two reading conditions: passages with considerable word overlap and passages with little or no word overlap. The reading teacher called one group at a time to the reading table and guided their reading, making sure they knew all the words and asked guiding questions to help students focus on meaning. Then, the group went to

practice by themselves or with students in the classroom who were not part of another group. Students read the passage with the goal of reaching 85 words per minute. After each reading, students moved their markers on a chart to mark their progress and motivate them to continue reading. The treatment lasted 6 days. I administered the posttest on the seventh day. I administered the delayed posttest 30 days later.

As I hypothesized, the word Overlap condition made the greatest gains. The word Overlap condition from pretest to posttest produced a statistically significant average gain of 30 correct words per minute (CWPM) ($t(25)=3.053, p< .01$) while the Nonoverlap condition averaged about 7 CWPM. Both groups produced gains of approximately 19 CWPM overall in measures of general fluency. The large gains made by the Overlap group during treatment along with the much smaller gain in general fluency support the hypothesis that automatic word recognition has a direct effect on fluency and is the defining feature of fluency.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to all of those who have given me support and encouragement during my educational career and especially during the dissertation process. I wish to give special thanks to my committee, Dr. Bruce Murray, Dr. Edna Brabham, and Dr. Dave Shannon. This dissertation would not have been possible without the expertise, guidance, patience and support of Dr. Murray, chair of my committee, the statistical guidance of Dr. Shannon, and the guidance, expertise, and open door of Dr. Brabham.

Another group of people without whom this dissertation study would not have been possible are the teachers, students, parents, and administrators in my school system. Thank you all. My heartfelt thanks go out to the teachers who gave of themselves so freely to implement this study with me. Thank you, parents, for allowing us to work with your children. To the students who worked so hard and never gave up, thank you.

To the researchers who have gone before and laid the groundwork for me, I thank you, especially Carol Rashotte, for sharing your dissertation with me. I thank you for your support as I began this process.

Words cannot express the thanks I feel for my family for the never-ending love and support you have given me. Thank you for having such high expectations of me and holding me to them. Bobby, Dee Dee, Rachel, Jackie, Ryan, Chris, Belle, and Blythe, this one's for you! May you always achieve the goals you set and live the dreams you dream.

Style manual used*: American Psychological Association Style Manual*, (5th ed.).

Computer software used: *Statistical Package for Social Sciences 15.0* (SPSS 15.0) for data analysis; *Microsoft Word 2000* for word processing.

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I. INTRODUCTION

Background of the Problem

The National Reading Panel (2000) recognized fluency as a critical component in reading, both in academic and curricular areas. As a result, fluency has gained a prominent place in literacy instruction. This has caused researchers and educators to focus attention on the problem of how to teach and assess fluency. Fluency was defined by the panel as " the ability to read a text quickly, accurately, and with proper expression" (p. 3-5). The problem is whether speed and prosodic features of reading are defining features of fluency, or actually results of fluency. The answer to this question is important in helping teachers of reading efficiently plan instruction. If speed and proper expression are results of fluency, more instructional focus should be on the more salient feature of fluency, which would be automatic word recognition. If speed and expression are results of fluency, we should place more emphasis on building the readers' sight word vocabularies, words they can recognize and access meanings in seemingly instantaneous and simultaneous ways (Ehri, 1998). As a complete study of all the components of reading are not possible in the confines of this study, its focus was the effects of building sight word stores or automaticity on fluent reading.

Statement of the Problem

Fluency is an important aspect of reading instruction. As such, there is a need for a working definition discerning both the features of fluency and the results of fluency.

Clarifying this definition will help guide teachers in choosing the most efficient methods of increasing fluency.

The current trend in fluency assessment, especially in Alabama, has been to have students read from a passage for one minute and record the number of words read correctly in one minute, with no allowance in the computation for accuracy (other than a time penalty). The assessor tells the reader that she may be asked to retell what she has read and encourages her to do her best reading. However, the assessor does not ask the student to retell content from the reading, so there is no comprehension check. This practice has led students and parents to equate reading speed with reading competence. When asked how a student is doing in reading, the parent often answers based on the highest number of words read correctly on the latest assessment. If the student has reached or surpassed the benchmark score for that time of the school year and grade, the parent proudly reports that they are doing well and gives the score as evidence. Likewise, when students are asked how they are doing in reading, they reference their score on the latest benchmark assessment. This mindset, though unintentional, causes parents and students to value speed over all other aspects of reading.

Another consequence of this trend is a lack of concern for accuracy. This problem is twofold. First, the instructions for both weekly progress monitoring and the semester benchmark assessment inform the students that they will be told words they do not know so that they can continue reading. Students, especially strugglers, learn that it is easier to wait three seconds and be given the word than to try to solve it. Second, students can skip as many words as they like. The words are slashed as missed and subtracted from the overall total number of words in the passage up to the last word

called by the student. There are no comprehension questions, and there is no computation of errors in the final score. The only score reported is the number of words the student actually pronounced correctly in that minute of reading. This practice further reinforces the importance of speed over other aspects of reading.

In addition, the practice of fluency assessment includes no measure of the prosodic features of reading. Dowhower (1991) lists six features of prosodic reading. This list includes stress, pausal intrusions, length of phrases, appropriateness of phrases, final phrase lengthening, and terminal intonation. None of these features of prosody are measured in this popular method assessing oral reading fluency.

Our goal as reading educators is to help readers be able to read a passage, either orally or silently, and understand what they are reading. According to Gough and Tunmer (1986), as word reading skill becomes stronger, it is general language or vocabulary skill that that limits comprehension. Fluency is automatic word recognition and is attained by increasing sight word stores. Logically, the definition of fluency as automatic word recognition would focus research and teaching efforts on building sight word stores that would free the attentional and mental resources needed for comprehension as opposed to focusing on reading for speed.

A sight-word definition of fluency may also explain why a reader can be fluent in some areas but not in others. For example, a student may read a science text fluently and struggle with an economics text, suggesting that the student has a sufficient store of automatic sight words found in the science text but not in the economics text which requires the reader to use mental capacity for decoding and solving words instead of for the main goal of reading, which is comprehension.

This study attempts to define fluency as automatic word recognition, which results in speed and accuracy, as well as other prosodic features of reading.

Purpose of the Study

The purpose of this study was to test the automaticity theory of fluency (LaBerge & Samuels, 1974). Reading involves two tasks that are interdependent and should occur at the same time to accomplish the ultimate goal of reading, comprehension (Gough & Tunmer, 1986). One task readers must do is to solve the words in the text and a second is to construct meaning from that same text. Automaticity theory contends that readers have a limited amount of attentional resources to expend during reading. The more this attention is needed to solve words, the less is available for constructing meaning or comprehension. Hence, building a large store of sight words should increase the rate of reading, leaving more attentional and mental resources to be used for comprehending the text.

Rashotte and Torgesen (1985) tested this theory using repeated readings of text with and without word overlap among passages. Their subjects, 12 learning disabled readers, made fluency gains on the passages with word overlap but not on the nonoverlap passages. Findings of fluency gains only on the passages with word overlap implied that repeated reading allows readers to make new sight words that in turn facilitate faster, more expressive reading. This supports the view that fluency is automaticity, or a gain in automatic word recognition. While this was a good study with important results, the sample was limited to a small group of learning disabled students.

The purpose of the present study was to use an experimental design with random assignment of subjects to treatment and control groups as well as pretest-posttest

measures to test the automaticity theory. Specifically, does rereading passages with many shared words produce greater gains in reading speed than rereading passages with few shared words?

I chose repeated reading as the method of delivering the instruction for the passages because it is a practice shown to be effective in increasing fluency (LaBerge & Samuels, 1974; NRP, 2000; and Rashotte & Torgesen, 1985).

Research Question

This study addressed the question: Is fluency automatic word recognition? Do readers rereading passages with many shared words demonstrate greater gains in reading speed than by rereading passages with little word overlap? I hold the view that fluency is automatic word recognition, with accuracy as a prerequisite, that results in fast, expressive reading.

Significance of the Study

The current study examined fluency as automatic word recognition. The definition of fluency influences high stakes assessments and guides instruction and research. When a student is practicing alone with no teacher or peer tutor, she is often faced with unfamiliar words. It is important to know how the student attempts to solve these words, if the student attempts to solve the words, and how long the student attempts to solve the words. This information should guide the instructional process. However, the currently accepted assessment guides instruction toward faster reading instead of word-solving skills that lead to decoding and comprehension in autonomous and independent reading. Redefining fluency as automatic word recognition that leads to expressive reading, with accuracy as a prerequisite, would accomplish this goal. Changes

in teaching and assessment will occur when the research recognizes the importance of increasing sight word stores as opposed to simply increasing the speed of calling known words during one minute of oral reading.

Limitations to the Scope of the Study

The current study is an attempt to support automatic word recognition as the defining feature of fluency. Samuels (2007) suggests that is the multitasking of word identification and comprehension that are needed for fluency. As the focus of this study was automatic word recognition, more emphasis was on measuring the gains in automatic word recognition. Also, in recognition of the importance of comprehension in the reading process, I included the comprehension press of actually asking questions of the reader after reading. Automatic word recognition as the defining feature of fluency was the focus of this study. No measures of comprehension were included. The comprehension questions were asked to keep the reader focused on meaning.

The results of this study may be valuable in future research endeavors. Samuels (2007) calls upon researchers to "develop theoretically and pedagogically sound measures of fluency" (pg. 565). This study is a good start on a framework for studies that examine the theory and pedagogy of fluency instruction and assessment.

Theory and Limitations

Viewing the term fluency as automatic word recognition and restricting this term to the domain of word recognition would allow a more clear picture of fluency. This view holds that fluency is a function of automatic word recognition as words are recognized effortlessly and involuntarily. Samuels (1979) claims that word recognition accuracy is a precondition for fluency. Ehri (1998) claims that words must be stored as

alphabetic mappings to be read accurately and reliably. This is usually accomplished by decoding the words, with a common additional step of crosschecking spellings for odd or irregular elements to be mentally marked in the lexical entry thus making it easier to store them in the lexicon. When reading, students match the spellings to the lexical entries. Correctly spelled words are matched and retrieved as sight words. This process of decoding words, mentally marking odd elements and storing them for sight recognition typically takes only a few decoding trials (Reitsma, 1983).

As students gain fluency or automatic word recognition, resources are freed for other components of reading such as comprehension. Samuels explains, "The decoding barrier to comprehension is gradually overcome" (1979, p. 405). Growth in automatic word recognition allows faster more accurate reading that in turn frees attentional and mental resources need for comprehension and other prosodic features of reading.

Automatic decoding does not automatically improve reading comprehension. Other factors such as vocabulary, background knowledge, familiarity with written syntactic structures, familiarity with text organizations, and knowledge of concepts also effect reading comprehension. Gough and Tunmer (1986) in the simple view of reading hold that reading comprehension is a product of word recognition and language comprehension. This view of reading holds that reading comprehension equals decoding skills X language comprehension (R=DxC). Accordingly, if readers decode words automatically the language comprehension factors are the only limit to reading comprehension.

The present study tests one aspect of this fluency model: That fluency is a function of automatic word recognition. If we can improve automatic word recognition

relative to a passage, then that passage will be read more fluently, as operationalized in terms of reading speed in correct words per minute (CWPM) with comprehension press (Samuels, 2007). Samuels holds that any fluency measure must include both rapid word recognition and comprehension press. Including both components allows the reader to multitask by recognizing words while comprehending a text message.

In this view fluency is thought of as general or specific. General reading fluency is automaticity with a large body of words common to texts at a given reading level. Specific reading fluency is automaticity with words of a particular text. Thus, like readability, specific fluency must be reckoned in terms of a particular text. A text in which most or all of the words have been added to a reader's sight vocabulary is a text that can be read fluently.

We can thus hypothesize that increasing word recognition with a particular text to the point at which most or all the words are in a reader's sight vocabulary will improve fluency with that text, as measured by CWPM with comprehension press. Conversely, since there are nearly 100,000 words in printed school English (Nagy & Anderson, 1984), learning the words in a particular text should have a minimal effect on general fluency.

Definition of Terms

Automaticity – "a general term that refers to any skilled and complex behavior that can be performed rather easily with little attention, effort, or conscious awareness. These skills become automatic after extended periods of training. Examples of automatic skills include driving a car through traffic while listening to the radio, sight reading music for the piano, and reading orally with comprehension. With practice and good instruction, students become automatic at word recognition, that is, retrieving words from memory, and are able to focus attention on constructing meaning from the text, rather than decoding" (National Institute for Literacy, 2008)

Benchmark – the number of correct words per minute read identified by the Dynamic Indicators of Basic Early Literacy Skills tests of Oral Reading Fluency as a competent level of reading fluency for a specific grade level and time in the school year given the student's grade level.

Decoding – using phonological and orthographic cues to translate spellings into speech.

Decodable text – a text including vowel correspondences that have been taught plus high frequency words (Grossen, 1997)

DIBELS – an acronym for Dynamic Indicators of Basic Early Literacy Skills.

DORF – an acronym for DIBELS Oral Reading Fluency subtest.

Fluency –"Freedom from word identification problems that might hinder comprehension" (Harris & Hodges, 1995, p. 85).

Nonoverlap of words – few or no common content words appearing across the passages read, other than high frequency or Dolch words at the subject's present grade level.

Sight words – words for which a reader has stored an orthographic pattern that can be accessed automatically upon seeing the word.

Sight word store – the words a reader has automatized and stored in memory that can be accessed quickly when reading.

Solve words – use of phonological cues or context clues to translate written words into speech; these words are not sight words and thus must be solved

Word overlap – common words appearing a number of times within and between the passages read, other than high frequency or Dolch words.

II. REVIEW OF THE LITERATURE

Introduction

The literature reviewed is drawn from three areas of educational research that are essential to this study. The first area of importance and foundation of this study is fluency theory. Theories reviewed include those considering fluency automatic word recognition and theories including prosodic features of reading as defining features of fluency. A second area of importance is the research on repeated reading as a method of increasing fluency. The final area reviewed is research on effects of reading decodable texts for building fluency.

Fluency Theory

"Freedom from word identification problems that might hinder comprehension" is the definition of fluency in The International Reading Association's (IRA) *The Literacy Dictionary: The Vocabulary of Reading and Writing* (Harris & Hodges, 1995, p.85). Theories supporting this definition and influencing fluency research include automaticity theory (LaBerge & Samuels, 1974) and verbal efficiency theory (Perfetti, 1985). In this section, there is a brief review of these theories along with a review of several studies investigating improving fluency through improved word recognition (Fleisher, Jenkins, & Pany, 1979; and Rashotte & Torgesen, 1985). This section concludes with a review of studies concerning prosodic features of reading (Schwanenflugel, Hamilton, Kuhn Wisenbaker, & Stahl, 2004; and Young, Bowers, & MacKinnon, 1996).

According to automaticity theory, as readers build sight vocabulary – words they recognize and understand without decoding or context – they free up the attentional and mental resources needed for decoding and can devote all their energy to comprehending what they are reading. Related to reading, it is assumed that attention is required for making meaning or comprehending. It is also assumed that decoding or solving words requires attention. Difficult texts may become overwhelming and exceed the limited attentional capacity of the reader in decoding, comprehending, or both. A strategy the reader may use when they find themselves in this situation is "attention switching." This strategy takes time and usurps much of the energy that readers need for comprehension. Another assumption of this theory is that with practice, the fluent reader will be able to decode and comprehend at the same time because decoding and word recognition can be performed with almost no attention.

In verbal efficiency theory (VET), Perfetti (1985) attempts to explain the effects of individual differences on the reading process. According to his theory, readers need to be able to perform lower level skills such as decoding and word identification well before they can reach automaticity. That is, through practice readers learn to decode words well enough to free attentional resources needed for comprehension. As a result, the greater the reader's sight word vocabulary the more attention and working memory are left for understanding the text. VET moves beyond automaticity theory and suggests that processes other than lexical access can be automatized. Perfetti suggests that verbal efficiency is the degree to which readers perform the subskills of reading with speed and accuracy. This theory supports the hypothesis in this study that fluency is automatic word recognition with prosodic features as results.

Fleisher, Jenkins, and Pany (1979) attempted to improve fluency through improved word recognition. Their sample for this study included both normally developing readers and poor readers, defined as those receiving remedial instruction from Title I teachers. The researchers taught fourth and fifth grade students individual words using flash cards. Students practiced with the flash cards until the poor readers could read the words as fast as fluent readers. When the students read passages with the words they had been taught, they could not read the words as fast as they had in practice with individual, isolated words. Their comprehension scores were no better than the control group. One reason for this lack of transfer is that the students practiced individual words rather than connected text. It is possible that they learned the words as visual cues rather than by decoding. Lack of lexical processing may have resulted in the words not becoming sight words, thus failing to increase sight word stores. Another possible explanation of these results is that the materials were above the students' instructional reading level.

Rashotte and Torgesen (1985) also attempted to improve fluency through improved word recognition. They used the method of repeated reading of passages with and without word overlap. Their subjects, learning disabled readers, improved fluency on passages with word overlap but not on passages with little or no word overlap. This significant fluency gain on the overlap passages with a lack of significant gains on the passages that did not share common words suggests that the reader has made new sight words. The results support the automaticity view that fluency gains result from increased sight vocabulary. The fact that the students rotated through all three conditions could have had an effect on the results in that the learning from the first two conditions could

not be unlearned in the third condition. This was an excellent study with important results. However, the relatively small sample of learning disabled readers made the results less generalizable to the general population.

The findings of the study by Pany and McCoy (1988) are consistent with the theory of reducing the amount of attention needed for word recognition, thus allowing more attention for comprehension. The researchers looked at the effects of corrective feedback on both word accuracy and reading comprehension. Learning disabled subjects read passages over an eight-day period receiving different types of feedback during the oral reading: feedback on all errors, feedback on meaning-change errors, and no feedback on any errors. Comprehension and passage word error measures were taken immediately after reading and the passage word error measure was administered again in two or three days. Subjects in the feedback on all errors condition made significantly fewer total errors, meaning-change errors, and passage word list errors both on immediate and delayed tests. On measures of comprehension, the feedback-on-all errors condition scored significantly higher than the no-feedback condition. The meaning-change condition showed no significant difference from the other two conditions. The importance of these findings is twofold. One, corrective feedback during reading does not hinder the comprehension process. Two, this feedback may in fact benefit readers by helping them become more accurate in word recognition, thus freeing attentional resources for other aspects of reading such as comprehension. Three, the restriction of feedback to meaning changes probably limited sight-word building and as a result, obstructed fluency.

An important characteristic of fluent reading is reading with expression or prosodic reading. A group of researchers who examined the role of prosodic features in oral reading was Schwanenflugel, Hamilton, Kuhn, Wisenbaker, and Stahl (2004). Two models that drove this study were "prosody as partial mediator model" and "reading comprehension as predictor of reading prosody model." They looked at both children and adults to test these theories. Prosodic features of oral reading such as intersentential pause length (ISPL) and sentence-final declination (SFD) were examined in this study. ISPL refers to average pause between sentences as measured in milliseconds. SFD refers to the time "from the final pitch peak [not final word] to the end of the sentence" (Schwanenfugel et al., 2004, pp. 122-123). The first model assumes that once readers attain adequate decoding skill, they will read with more prosody, and that the improved prosody will increase reading comprehension. The second model supposes that better comprehension helps readers read more prosodically as opposed to prosody enabling comprehension. It assumes that readers who read with appropriate prosody would be able to understand what they were reading. As a result, they would be able to use the syntactic and semantic cues used while reading to improve comprehension. In both children and adults, Schwanenflugel et al. (2004) found that readers with proficient decoding skill, as evidenced by speed, read with fewer intrasentential pauses and read with appropriate speed and attention to punctuation. This correlation lends support to the importance of decoding speed in both prosodic reading and comprehension. Results indicated that decoding speed predicted only two of the variables, intersentential pause structure and intersentential pause length in this model. This model did not support the predicted relationship between prosody and comprehension. Consequently, these results

are consistent with the claim that prosodic reading is a result of automatic decoding skills not comprehension.

Young, Bowers, and MacKinnon (1996) investigated the question of whether practice with a prosodic model would influence reading rate, fluency, and comprehension more than repeatedly reading intact text. They randomly assigned fifth grade poor readers (n=40) to four treatment groups. One practice group read along with a model. Another practice group read the passages three times with no model of prosody. The third group did not have a model nor did they practice with intact text; instead this group read lists of words scrambled so that they did not resemble intact text. The fourth group listened to the research model prosody in reading. The researcher provided corrective feedback on errors and omissions immediately to each of the three practice groups that read. The fourth condition was listening only and did not require feedback. All groups improved on the measures of rate, fluency, and comprehension after training on the passages. The repeated reading group made significant gains over those who did not practice with connected text. The researchers found no improvement associated with modeling of prosodic reading at posttest. Increased comprehension was somewhat higher for the repeated reading group than the listening group, indicating that the awareness of the prosodic features of reading was probably not responsible for the gain.

Repeated Reading

Reading requires the performance of at least two tasks at once, identifying the words and constructing meaning. As with other skills in which students must coordinate a series of actions to fluently master the targeted behavior, such as problem solving and reasoning to solve a logic puzzle, practice in the development of automaticity. Likewise,

the practice of repeated reading allows the reader to make word reading automatic, thus improving speed and expression.

The method of repeated reading has been generally accepted in the literature as a method of enhancing fluency (Herman, 1985; O'Shea, Sindelar, & O'Shea, 1985; Tingstrom, Edwards, & Olmi, 1995). According to the National Reading Panel (2000), repeated reading was the only method to yield positive and consistent results in increasing fluency. The review of literature on repeated reading below is arranged in chronological order by the year of the publication.

Samuels (1979) studied a method of reading practice for improving reading rate called repeated reading in which students had success in improving speed and accuracy. In this study of repeated reading, students with low intelligence scores read and reread a self-selected passage at their present skill until a criterion rate was reached. Results indicated that student's speed increased and the number of rereadings needed to meet the criterion rate decreased. In addition, error rates decreased over readings. This suggests that practice in reading words in connected text helped the readers to map the orthographic features of the words and store them as sight words. This increase in sight word store allowed the readers to recognize the words faster and increase fluency.

Herman (1985) examined the effect of repeated reading on fluency following the procedures used by Samuels (1979). She measured reading rate, speech pauses, and word recognition accuracy. Her subjects, 8 nonfluent intermediate grade students, practiced the stories and then read them on tape. The treatment ranged from 17 to 24 days. The researcher used these recordings to measure the variables in the study. A computer was used to measure the speech pauses. Among and between passages rate increased

significantly from passage 1 to passage 5. These results indicate that there was not only immediate improvement, but also that the effect carried over to the successive passages. Speech pauses decreased significantly only within the practiced passages and not for successive passages, suggesting no finding of carry over effects without practice. Similarly, miscues decreased significantly only within the practiced passages, with no indication of carryover effects to successive passages. Herman went a step further and looked at combined accuracy, which was the sum of the percentage of words read correctly and acceptable miscues divided by the total number of words in the passage. This calculation indicated that due to the increased rate and accuracy between and within passages, the effect on oral reading was strong and positive with transfer effects over time. Herman concluded that repeated reading produced positive results and automaticity of word recognition.

As mentioned earlier, Rashotte & Torgesen (1985) attempted to improve fluency through the method of repeated reading. This study of 12 reading disabled students showed significant gains in fluency among passages with repeated words. However, general fluency gains were not significant. The gain on word overlap passages and lack of gain on nonoverlap passages suggests the repeated reading is an effective method of making new sight words and improving fluency.

O'Shea, Sindelar, and O'Shea (1985) investigated the effect of attentional cues on reading outcomes. The researchers theorized that fluent readers did not automatically shift attention to comprehension when it was not needed for decoding. They had students repeat readings with the instructions to either read for speed or read for comprehension. Subjects made significant gains in both fluency and comprehension as a result of repeated

readings. Subjects instructed to read for speed read faster, but subjects instructed to read for understanding increased both speed and comprehension.

Sindelar, Monda, and O'Shea (1990) included normally developing readers and learning-disabled readers in another study. They matched 25 pairs of learning disabled with nondisabled students on measures of comprehension and fluency. They examined correct words per minute, errors per minute, and retelling, measured in the number of propositions retold. Subjects read one passage once and a second passage three times. They were prompted to remember as much as they could about the story. Sindelar et al. (1990) found that rate increased significantly on the passages read more than once. Subjects scored higher on recall measures after three readings as opposed to one reading. There were no significant differences based upon level (mastery and instructional) nor ability (learning disabled readers and normally developing readers). The overall conclusion they reached was that the method of repeated readings was effective for both learning disabled readers and normally developing readers.

Rasinski (1990) compared repeated reading and repeated reading-while-listening. Matching pairs of third graders from three ability groups, high, average, and low, listened to or read (according to group membership) one passage for four days. The first day was pretest, the second and third days were either repeated readings or repeated listening, and the fourth day was the posttest. After the first treatment cycle, subjects changed groups and followed the same procedures. Results indicated that both treatments improved fluency but neither condition was significantly better than the other. Again, as in Rashotte and Torgesen (1985) the students participated in both conditions, which fails to isolate treatment and control conditions.

Homan, Klesius, and Hite (1993) investigated the transfer effects of repeated reading and nonrepetitive reading. Subjects were randomly assigned to one of two groups. In the repeated reading group, students read a page four times in succession with no corrective feedback. The nonrepetitive readings were echo reading, unison reading, and cloze reading. In each of these conditions, an adult model pronounced every word either with the reader or before the reader. Hence, there were no unknown words. The researchers found no significant differences in the groups on measures of rate, accuracy, or retelling for comprehension. The lack of corrective feedback may have negatively affected the results of the repeated reading group because the students either did not make new sight words or stored the words incorrectly into their sight word stores. If the students did not know they were practicing the words incorrectly, they were storing their errors as the orthographic features of that word. For example, the student may have stored the word "rate" and store /rat/ /E/ in their lexicon which would decrease both their fluency and accuracy rates.

In two experiments, Faulkner and Levy (1999) explored the idea of word transfer using passages and scrambled versions of the same text with comprehension press. In experiment one, 48 fourth grade students read two 140-word stories, and the reading time for each was measured and recorded. Participants answered comprehension questions following the reading as a way of keeping the participants focused on reading for meaning, although they did not measure comprehension. The second story was always the normal story. The first reading was either the normal story or a scrambled version of the normal story. Researchers patterned the words from the normal story so that no two consecutive words expressed a meaningful message. Researchers told the students that

some of the stories would not make sense but they might help them with the next story, so they should read them carefully. The second reading time, the normal story, was the measure of reliable transfer used to compare to the first reading time. The good readers demonstrated significantly faster reading than the first reading of the normal story, indicating text-level transfer. This did not hold true on the scrambled text, which was indicative of word-level transfer. Poor readers showed significant gains in both conditions. The result that repeated words were sufficient for transfer between readings for the poor readers indicates word-level transfer. In experiment two, the researchers explored the same concept with adults. They followed the same procedures and added easy and difficult texts. The texts were seventh grade for easy and above twelfth grade level for difficult. The researchers arranged the readings in order to allow the testing of every passage at each level in each condition for both groups of readers. Rather than giving the adults the entire passage, they used a computer to introduce the text line by line. The measure of interest in this condition was reading time per line. The adults who were good readers produced results similar to those of the children. They read the normal story significantly faster, indicating text-level transfer; but did not demonstrate word-level transfer when reading the scrambled version. Interestingly, the adults who were poor readers demonstrated reliable transfer in both the easy and difficult text. This indicates that texts that are more difficult cause the reader to focus on recognizing words, drawing attentional resources needed for comprehension. That this phenomenon is found in less skilled readers and not in their more skilled peers suggests nonfluent, word-level transfer.

Transitional readers moving from close attention to alphabetic cues or "intentional decoding" to fluent readers were the focus of the study by Kuhn (2005). Struggling readers were randomly assigned to treatment and control groups by classroom. Each condition (listening only, repeated reading, wide reading, and control) had six members. The repeated reading and wide reading groups made greater gains in word recognition, rate, and prosodic reading than the listening and control groups. The wide reading group was the only group to make gains in comprehension. Indications are that the attention to decoding of new words in repeated and wide reading groups caused the readers to make new sight words. As a result, fluency increased.

Recently, researchers O'Connor, White, and Swanson (2007) investigated whether repeated reading or continuous reading produced greater fluency gains. They also studied nonfluent readers in three different conditions: repeated reading, continuous reading, and untreated control. In the repeated reading condition students read for a total of 15 minutes, reading each page of the text three times. The continuous reading group read the same amount of time but read more pages in the text without repeating any pages. In addition, they monitored two average readers in each class in order to compare results from nonfluent readers with average readers. They used commercial instruments, the Gray Oral Reading Test (GORT) and the Analytical Reading Inventory (ARI), to measure fluency gains. As expected, the average readers made greater gains than the other three groups in the area of fluency. Among the other three groups, both treatment groups outperformed the control group on fluency measures with no significant differences between the treatment groups. There were no differences as a function of

grade or age. The question arises, would a more fine-grained researcher-created fluency instrument with respect to repeated words have been a better measure of fluency gains?

Decodable Text

Decodable texts are composed of words using the correspondences that have been taught along with high frequency words (Grossen, 1997). Decodable texts do not contain content words with irregular spellings. In line with the idea that repeated readings allow the reader to make word reading automatic, participants read decodable texts as practice material in this study. The criteria for decodability is the combinations of sounds and spellings that have been taught in kindergarten and first grade along with a limited number of high frequency words contained on the Dolch Word Lists at the reader's present grade level. For this study, some of the correspondences included in the reading materials were consonants, consonant blends, short vowels, long vowel-silent *e* combinations, vowel digraphs, and hard and soft *g*.

Decodable text is a good choice for repeated reading practice because it allows complete understanding of alphabetic mapping through decoding, to allow for sight recognition (Ehri, 1998). In evaluating texts for beginning reading, Hiebert (1999) ARGUES that readers need to be given opportunities to practice reading text containing the information that is being taught. Decodable text is valuable when it contains practice words that correspond to the correspondences being taught (Mesmer, 1999), thus providing ample practice opportunities.

Mesmer (2005) compared practice of correspondences taught in decodable and less decodable text. Twenty-three first graders were assigned to one of six small groups. The same phonics lessons were taught to all the participants over a 14 day period. The

students who read highly decodable text after the phonics lessons were more apt to apply the correspondences taught. However, Mesmer cautions that even though the students applied what they had learned to decode words, they did not become better at monitoring their reading in the area of self-correction. She suggests that the type of text used for practice may depend upon the level attained by the student as well as the goal of the lesson.

Jenkins, Peyton, Sanders, and Vadasay (2004) randomly assigned first graders to more decodable texts, less decodable texts, and a control group. The decodable texts contained words with phonetic spellings contained in the phonics program used in the classroom; 85% of the words were decodable. The less decodable texts were not matched with the phonics program and contained no "phonetic control", only 11% of the words were decodable. The control group did not receive tutoring in phonics or story reading. Both treatment groups received tutoring in phonics 4 days per week for 25 weeks, with the difference in the groups being the text. Both treatment groups made significant gains over the control group on measures of decoding, word reading, passage reading, and comprehension. However, the more and less decodable text groups showed no difference on any of the posttests. This lack of difference could be owing to the practice in phonetic spellings in both types of text allowing students to complete alphabetic mappings through decoding and allowing for sight recognition (Ehri, 1998) of words at similar rates.

Conclusion

The research has taught us that repeated reading is an effective method of increasing fluency. It has not taught us exactly what it is about repeated reading that

causes a reader to be successful. Research indicates that word recognition rates improve with repeated reading (Herman, 1985; Rashotte & Torgesen, 1985; O'Shea, Sindelar, & O'Shea, 1985; Rasinski, 1990; Sindelar, Monda & O'Shea, 1990; Kuhn, 2005; and O'Connor, White, & Swanson). O'Shea, Sindelar, and O'Shea (1985) suggest the difference might be in the instructions given before reading that makes the difference in comprehension. Other researchers propose the difference may be in the number of readings (Sindelar, Monda, & O'Shea, 1990) or the amount and kind of feedback given on errors while reading (Homan, Lesius, & Hite, 1990). Still others considered the attained level of the reader and its effect on fluency (Faulkner & Levy, 1999 and O'Connor, White, and Swanson, 2007). In addition, there may be differences caused by practice materials. Mesmer compared decodable and less decodable texts and suggested the type of practice depends upon both the level of the reader and the purpose of the reading. Jenkins et al. (2004) concluded that decodable text was the best method of practice, but that the amount of decodability was not the determining factor. The groups that read decodable text outperformed the control group, but there were no significant differences between the more and less decodable groups.

Teachers and researchers know what fluent reading sounds like. We recognize fluent readers when we hear them. We have an intuitive idea of fluency, but we have not specified a definition of fluency in a way that accounts for the data. Nor is there a consensus on how to measure fluency.

Even with all the quality research available to us, there are questions yet to be answered. This study attempts to add clarification to the question of automaticity in reading. I contend that it is the automaticity of word recognition that frees attentional

resources, which can lead to gains in prosodic reading and comprehension. This study asks whether readers will make greater fluency gains when words have been automatized and added to their sight word store. If so, the evidence of this automatization will be revealed in significant specific fluency gains on passages with considerable word overlap when compared to general fluency passages. A significant gain in specific fluency on passages with overlapping words and lack of gain in general fluency will support my view that readers have made new sight words. This automaticity of word recognition with accuracy as a prerequisite will free attentional resources that can be used in other areas of reading such as speed and prosody.

III. METHODS

Introduction

The purpose of this study was to examine automatic word recognition as the defining feature of fluency. In other words, fluency is automatic word recognition from which speed develops with accuracy as a prerequisite. Participants should make new sight words as they read the passages with repeated words. This expanded sight word store should allow readers to read both faster and more accurately on the measures of specific fluency. As a result of this automaticity of word recognition, the reader will unfetter the attentional resources used for decoding words and have it available for speed, expression, and other prosodic features of reading.

This chapter describes the research objectives, research design, participants, instrumentation, and procedures for each group as well as the training of the teacher participants, materials used, and procedures for analyzing the data. The discussion of the participants includes attrition and its effect on the remaining sample. Descriptions of the instrumentation follow the participant section. The next section describes the procedures for each group along with those used for training the teacher participants. The materials used both reading and daily record keeping are laid out before the concluding section. The chapter concludes with the analysis techniques that were used to compute the outcome measures of the study.

Research Objectives

This study was an attempt to extend the work of Rashotte and Torgesen (1985) using a larger number of participants. In addition, by examining normally developing readers, the results should be generalizable to the general population. The participants were normally developing readers in first and second grade. I randomly assigned subjects to either the Overlap group or Nonoverlap group. The Overlap group read passages with 18 content words that were repeated 4 or more times in the text. The Nonoverlap group read passages with only one content word repeated 4 times and three content words repeated 3 times. The hypothesis was that the Overlap group would make significantly greater gains than the Nonoverlap group in specific fluency on a passage using repeated words because the repeated words will have become sight words from the repetitive reading of the passages. The repetition of words in the repeated readings should help the participants to automatize the words and add them to their sight word store. This study attempts to answer the question of whether fluency is automatic word recognition with accuracy as a prerequisite and prosodic features of reading as results of a gain in sight words. Will readers who read passages with repeated words demonstrate greater gains in reading speed than those who read passages with little or no word overlap? If so, then they will have increased their sight word store. This increase in sight word store will help them identify words more quickly. In turn, this automaticity in word recognition will release the attentional resources needed for decoding and make them available for use in comprehension and expressive reading.

I conducted an unpublished pilot study prior to this study. In the first study I

theorized that students would read faster if we first slowed them down to pay attention to the orthographic features of the words allowing them to store these words as alphabetic mappings thus making them easier to retrieve while reading. Students attended one-on-one tutoring sessions for seven consecutive school days with the principal researcher in the Reading Room at the school. Students who were absent read the passage missed on the day they returned to school and continued the sequence. Both groups read the same passages. They each read the first passage twice, answered 5 comprehension questions, then read a paraphrased version of the first passage, and ended each session by reading a list of words that had been repeated in the first 3 readings. Miscues were recorded on all readings. The first reading in each session was not timed, subsequent readings were timed and times recorded. The Slow Down Speed Up (SDSU) group read the first passage with a 5-step scaffolding procedure. The researcher provided a brief cover-up in the second reading of the passage and the paraphrased version of the passage of words the student did not know; if not solved within 3 seconds the word was provided and reading continued. The word list was read with no scaffold for either group. The directions for all the readings for the Read For Speed Group (RFS) were the same which were to read the passage as fast as they could and if they did not know a word the researcher would tell them the word (after 3 seconds) and they were to continue reading to the end of the passage. They were told they would be asked some questions after they finished reading so they should do their best reading.

The results of the Slow Down Speed Up study showed no significant differences in groups in reading speed. There were significant differences between groups on

measures of accuracy. The scaffolding procedures were different for the two groups on words not known. In the Read for Speed group, students were given the word not known after 3 seconds. In the Slow Down Speed Up group students were provided a brief cover-up for words not known. A reliable comparison of the two groups on measure of accuracy was not possible due to these differences. From this study I learned that the press for speed is important in developing fluency.

Research Design

The NRP (2000) study selection criteria favoring experimental designs was an influential factor in the design choice for the study. This study used an experimental research design. The researcher randomly assigned groups ranging from 3 to 7 students from intact classrooms to treatment groups. There were two groups in the study, Overlap and Nonoverlap. The Overlap group read passages containing 18 content words that were repeated at least 4 times in the text. The Nonoverlap group read passages containing only one content word appearing at least 4 times and three content words appearing at least 3 times in the text. There were members of both groups within each reading classroom.

I chose an experimental design to isolate the effect of reading overlapping words. If fluency is a function of automatic word recognition, these words would be added to the readers sight word vocabulary and be recognized automatically on sight, hence increasing fluency. Other variables such as teacher experience, education level, teaching style, and curriculum differences were controlled by randomly assigning participants within classrooms. The reading materials were equated in readability and were written by the

same author. I examined the text to assure a sufficient number of overlapping words for the Overlap group and a lack of overlap for the Nonoverlap group.

Participants

The participants for this study were children from two small town public schools located in the southeastern United States. An average of 63% of the students in these schools received free and reduced lunch. Participants were 27 first and second grade students who were reading between 30 and 83 correct words per minute (CWPM) on measures of Dynamic Indicators of Basic Early Learning Skills (DIBELS) oral reading fluency (Good & Kaminski, 2002). In the Overlap group there were 5 females and 8 males of whom 7 were white, and 6 were African American. The Nonoverlap group consisted of 7 males and females each, of which 9 were white and 5 were African American. There were 11 first graders and 2 second graders in the Overlap group with 10 first graders and 4 second graders in the Nonoverlap group. I randomly assigned participants to one of two groups: Overlap (n = 13) and Nonoverlap (n = 14).

Initially 44 participants were chosen to take part in the study. Attrition of 7 students occurred on the first day of the study when one teacher found the project too overwhelming and withdrew. Another teacher with 3 participants did not follow the guidelines of the study. One student withdrew from the school. In addition, six students were absent a number of days so that their data sets were incomplete. This left 27 participants with complete data sets for analysis.

The original sample included 22 males and 22 females of whom 16 were African American and 28 were white. There were 24 first graders and the remaining 20 were in

second grade. The most attrition occurred in second grade. A second grade teacher with seven selected participants withdrew from the study and another with three did not follow the guidelines in the study. Although attrition rates were high, they were almost even across treatments with 9 Overlap and 8 Nonoverlap participants lost. The difference was probably so even because of the attrition of two entire classroom groups, given participants were randomly assigned by classroom. The other subgroups were within 6 percentage points of the original group membership. Males increased 6%, females decreased 6%, African Americans increased 5%, and whites decreased 5 %.

Even though there were 39% (17) fewer participants than originally planned, attrition occurred in such a manner that the groups were not significantly different in ethnic and gender composition or pretest scores. As seen in Table 1, when comparing the remaining sample to the school population, African Americans were underrepresented by 3% and whites were over represented by 2%. The ethnic distribution was fairly representative of the state at large. In comparison with the state at large, African Americans were underrepresented by 2%, whites were over represented by 7%, and there were no participants from Hispanic or other groups.

Table 1

Comparison of Sample Gender and Ethnicity with Total School Population

	Total Sample	Overlap Group	Non-overlap Group	School Population*	State at Large
Gender					
Male	15 (56%)	8 (30%)	7 (26%)	51.5%	
Female	12 (44%)	5 (18%)	7 (26%)	48.5%	
Ethnicity					
African-American	11 (41%)	6 (22%)	5 (18%)	38%	43%
White	16 (59%)	7 (26%)	9 (34%)	61%	52%
Hispanic	0 (0%)	0 (0%)	0 (0%)	1 %	3%
Other	0 (0%)	0 (0%)	0 (0%)	0 %	2%

*Average of the two schools percentages
Source of school and state at large data: http://www.publicschoolreview.com

Instrumentation

Fluency scores were taken at three different times. The first score was at pretest in CWPM and was a 121-word passage from an informal reading inventory (Woods & Moe, 2007) at the same reading level (primer) as the passages used in the study. A repeated reading posttest and delayed posttest were taken after treatment ended. In addition, I administered a general fluency posttest and a delayed posttest. I estimated fluency by measuring correct words per minute (CWPM). CWPM was computed by counting the total words in the passage, subtracting the total number of deviations from the text (substitutions, reversals, and omissions, whether or not they were self-corrected),

multiplying the result by 60, and dividing this number by the number of seconds it took to read the passage.

Fluency measures included both a more fine-grained or study sensitive passage to assess specific fluency gains and passages for measures of general fluency gains. Chapter 6 from *The Red Gem Mine* (Sims, 1999c) was used to measure specific fluency gains for both groups at repeated reading posttest and delayed posttest. Specific fluency gains were hypothesized to result from learning a specific set of words used repeatedly across readings. There were no changes or adaptations to the text. It was used as written. The researcher measured general fluency gains using passages adapted from the *Analytical Reading Inventory,* 8th edition (Woods & Moe, 2007). General fluency gains were hypothesized to depend on learning a very large number of primer-level words by sight.

One pretest measure of equality of groups was the mid-year DIBELS Oral Reading Fluency (DORF) administered by the school as a part of the assessment routine. DORF is a test using leveled oral reading fluency passages. Readers are timed on three different passages for one minute. The median score measured in correct words per minute on the three passages is recorded as the reader's oral reading fluency score. For example, a student who scores 75 CWPM on the first passage, 110 CWPM on the second passage and 90 CWPM on the third passage would receive an oral reading fluency score of 90 CWPM. Administration time is approximately 5 to 15 minutes per reader. The alternate-form reliability is .94 (Good, Wallin, Simmons, Kame'enui, & Kaminski, 2002).

The passage "The Busy Road," was used as a pretest fluency measure for both overlapping words and general fluency. The posttest passage for general fluency was "The Baseball Star". This passage was 118 words long with a Spache readability (Spache, 1953) of 2.1 and a Flesch-Kincaid of .20. A few punctuation marks were moved, leaving the passage at 118 words with a Spache of 2.0 and lowering the Flesch-Kincaid to 0.0.

As a delayed posttest measure of general fluency, the passage "The Soccer Game" was used. In this 115-word passage with a Flesch-Kincaid grade level 1.3 and a Spache readability of 2.0, several unfamiliar words were replaced with familiar words and some sentences were shortened. These changes yielded a Spache of 1.9 and Flesch-Kincaid Grade Level 0.0. All three passages were classified level 2 in the *Analytical Reading Inventory* (8^{th} ed.)

Repeated words were words found at least four times in the reading materials that were not contained in the preprimer, primer, and level one Dolch Word Lists. There were 18 repeated words in the Overlap group reading and one in the Nonoverlap group reading materials. Both lists can be found in Charts 1 & 2, Appendix B.

Procedures

Students were randomly assigned to groups by putting the names of each participant in a classroom in a bowl and drawing them out one by one. Each participant was given a pseudonym, as agreed in the parental consent form for reporting purposes. The first name to be drawn was placed in group one, the second one drawn was placed in group two, the third one drawn was placed in group one, and so on. Students were randomly assigned to groups within classrooms to control for teacher effects, including

teaching style, education level, number of years experience and other factors that might adversely affect the outcome of the study. Randomly assigning participants by classroom rather than across the entire population allowed each teacher to implemented the study with both treatment and control groups.

Both groups followed the repeated reading procedures described by Samuels (1979). The only difference in the group procedures was the material they read. Each day the Overlap group read the next chapter in a six-chapter book (*The Red Gem Mine*, 1999c). The Nonoverlap group read a new chapter each day from six different books. The books were all by the same author, written for the same company. All the books were on the same Flesch-Kincaid level (0.0). The posttest was the reading of Chapter 6 from *The Red Gem Mine* (Sims, 1999c), the book read by the Overlap group. The Nonoverlap group read chapters from different books each day. However, at posttest the Nonoverlap group read chapter 6 in the book read by the Overlap group. This was the only chapter read by both groups.

Guided reading was chosen as the initial method of instruction because it is a well-accepted method of delivering reading instruction and is the method of instruction currently used in all the classrooms selected. In guided reading, the teacher worked with a small group of children. They read the text together. Then, the teacher had each participant read the text as she listened and gave feedback on errors. The other children in the group read in a very soft whisper as the teacher worked with the other student. This continued until the teacher had worked with every student. The teacher called one of the groups to her table and introduced the day's reading. She guided the reading of each chapter, making sure the students knew all the words. She also asked questions to

make sure they understood what they were reading. Then she sent them back to practice. They could read with a partner or by themselves – as long as that partner was not a member of the other group in the study. Readers continued reading, working to attain the criterion of 85 correct words per minute (CWPM). The students monitored progress by moving a cut-out monkey up a palm tree with a scale marking their CWPM, a copy of which is in Appendix D, Figure 1. The symbolic incentive was to help the monkey to the banana at the top of the tree, which was the 85 CWPM marker. The students marked their progress every time they read. The teacher maintained a comprehension press by asking open-ended questions after each reading. She also cheered them on to practice and help the monkey get the bananas.

All tests, pretest, posttest, and delayed posttest, were administered by the researcher to insure all readings and groups were administered and scored the same to control for the effects of instrumentation (Campbell & Stanley, 1963).

The specific fluency posttest was different from the pretest and the delayed posttest because the students continued reading after the test to try to reach their goal of 85 CWPM. The students read the test to the researcher. They moved the cut-out monkey to mark the CWPM on the folder and returned to the room to practice to reach the fluency goal of 85 CWPM.

Students were given only the day's reading for their group each day. The chapter was taken up after the reading for the day. In order to have the reading be as authentic as possible, students read entire chapters averaging 140 words in length and were asked at least one question after each reading. They were allowed to read only the materials for the day. They were not allowed to read materials from the other group. Nor could they

practice with members of the other group. They could practice with only their own group or students who were not part of the study.

Two 45-minute training sessions for participating teachers were provided. As guided reading was the method of instruction used in all the reading classrooms, much of the time in training was devoted to the repeated reading and record keeping processes. All the teachers were familiar with scoring using DORF (Good & Kaminski, 2002) progress monitoring guidelines. A chart was used comparing and contrasting the present project with the familiar DORF progress monitoring guidelines. A folder of information including the study timeline, procedures for group readings, guidelines for marking deviations from the text, directions for individual readings, and helpful charts to aide in CWPM calculations was given to each teacher. Identical timers with count-up, count-down features were given to each teacher, as well. I observed each classroom at least once a day for a minimum of 5 minutes during the treatment to check for fidelity. In addition to these observations, the researcher was in contact with the teachers by email, telephone, and personal visits to address questions and concerns that arose during the study. On the first day of the study one of the first grade teachers contacted the researcher to report that reading to a criterion of 85 CWPM was taking entirely too long. After discussing the issue with the teachers, it was decided the students would try to read at least four times, if needed, instead of an unlimited number of times.

Material

The reading materials used in the study were decodable chapter books published by High Noon. One entire book was used, *The Red Gem Mine* (Sims, 1999c). One chapter from each of five additional books by the same author and written on the same

reading level were used: *The Sea Foam* (Sims, 2002c), *Jake Makes the Team* (Sims, 2002b), *A Day at the Lake* (Sims, 2002a), *Bass Lake* (Sims, 1999a), and *The Deep Sea* (Sims, 1999b). Access to the reading materials was controlled by copying the individual chapters onto plain white paper from which the students read so that they did not have access to the other chapters in the book. The teacher also had a copy on which she marked the deviations from the text and correct words per minute data. All materials were collected as each student finished reading each day. Participants did not have access to that day's materials again.

Folders for keeping track of the readings were decorated and laminated. On the inside was a palm tree with a bunch of bananas at the top (see Figures 4 & 5, Appendix D). The target number of CWPM was 85. The tree was labeled with a number line in increments of 10 through 80, then 85 at the bananas. Also, in each folder was a cut-out monkey. When the student finished reading, he or she would place the monkey near the number of CWPM reached and set a goal for the next reading. The motivation and symbolic goal was getting the bunch of bananas for the monkey. There was a nametag for the student on the outside along with charts for recording the study data.

Analysis

A repeated measures, pretest-posttest-delayed posttest design was used. The repeated measures design controls for such factors as age, gender, race, personality, etc. Repeated measures designs remove the individual differences from the data, thus reducing sample variance because the same individuals are used in every treatment (Gravetter and Wallnau, 2000). All data measures were administered by the researcher to insure reliability of scores at each time point and from one participant to another.

I analyzed the results using a mixed model analysis of variance (ANOVA), comparing the performance of the two groups at three time points. Follow up analyses of the significant effect of time were examined using paired *t*-tests. The effects of groups at each time were examined using independent-samples t-tests. I repeated these tests for the repeated reading measures and the general fluency measures.

IV. RESULTS

Introduction

The purpose of this study was to examine automatic word recognition as a defining feature of fluency. I hypothesized that repeated readings of passages with word overlap of 18 words appearing 4 or more times in the text would help participants to make words automatic, thereby increasing fluency as measured by greater reading speed. Repeated readings with overlapping words should lead to greater fluency than repeated readings of passages with little or no word overlap. This chapter describes the statistical procedures used to analyze the data collected in the study. Results of the analyses are presented.

Equality of Groups at the Beginning of the Study

Pretest data were examined for the equality of groups. There were no significant differences between groups as shown in Table 2 on measures of midyear DORF. Further, there were no significant differences between the groups on descriptive statistics for gender, ethnicity, and grade.

Table 2

Beginning Equality of Groups

Mid year DORF							
Group	Overlap			Nonoverlap			
	n	MS	SD	n	MS	SD	t
Mid year DORF	13	57.7	16.8	14	58.1	15.3	.07

Variable		Overlap Group	Nonoverlap Group	
		n (%)	n (%)	χ^2
Gender				
	Female	5 (38.5)	7 (50.0)	.36
	Male	8 (61.5)	7 (50.0)	
Ethnicity				
	White	7 (53.8)	9 (64.3)	.30
	African American	6 (46.2)	5 (35.7)	
Grade Level				
	First	11 (84.6)	10 (71.4)	.68
	Second	2 (15.4)	4 (28.6)	

Repeated Reading Comparison of Groups

Using a mixed-model analysis of variance (ANOVA), performance of the two groups at three time points was performed to compare the gain in CWPM on the measure of specific fluency. The assumption of sphericity was checked using Mauchley's test, and the Bonferroni method was used to perform pairwise comparisons following significant results. As shown in Table 3, there was a significant effect of time (F (2, 50) = 92.45, $p < .001$) as well as a group by time interaction (F (2, 50) =12.33, $p < .001$.) The interaction is displayed in Figure 1.

Since there were no pretest differences, further analyses were performed to determine where posttest differences occurred. To examine differences within groups over time, paired t-tests were used. The second follow-up, comparing groups at each time point, was analyzed using independent-samples tests.

Figure 1

Repeated Reading - Comparison of Means

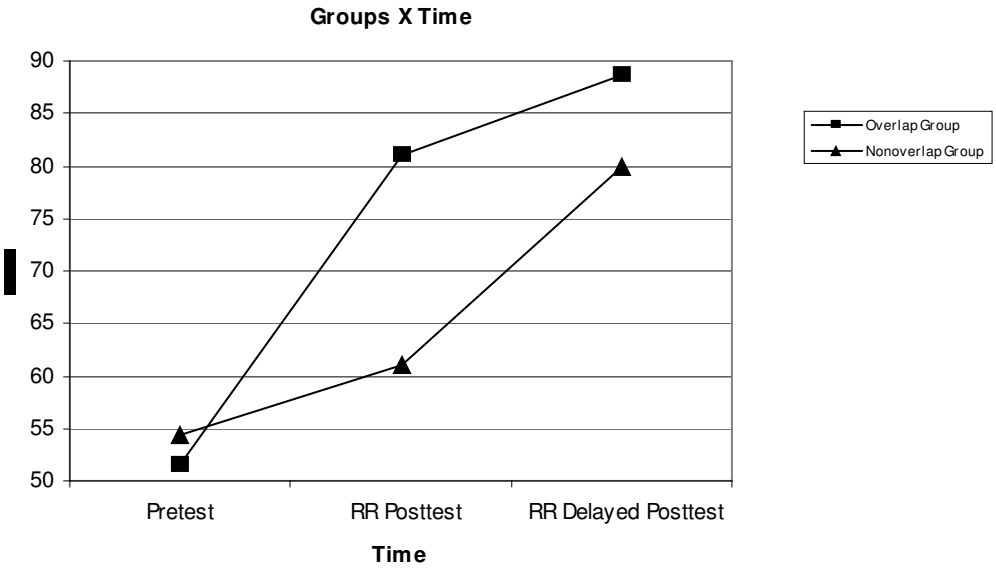


Table 3

Repeated Reading - Performance of Groups X Time

	Pretest	RR Posttest	RR Delayed Posttest
	M (SD)	M (SD)	M (SD)
Group			
Overlap (13)	51.46 (20.17)	81.08 (18.45)	88.62 (17.29)
Nonoverlap (14)	54.36 (17.24)	61.00 (15.69)	79.86 (16.75)

	df	MS	F	Partial eta^2
Between Groups				
Group (A)	1	457.85	.425	.017
Error	25	1076.20		
Within Groups				
Time (B)	2	6669.84	92.45***	.787
Group X Time (AB)	2	889.39	12.33***	.330
Error	50	72.15		

*** $p < .001$

Paired t-tests, listed in Table 4, indicate significant differences for each group comparing pretest and repeated reading posttest, repeated reading posttest and repeated reading delayed posttest, and pretest and repeated reading delayed posttest.

Table 4

Repeated Reading - Paired Samples Tests

	Overlap Group			Nonoverlap Group		
	t	df	p	t	df	p
Pairs						
Pretest & RR Posttest	7.8	12	<.001*	2.5	13	.02*
RR Posttest & RR Delayed Posttest	3.0	12	.01*	6.5	13	<.001*
Pretest & RR Delayed Posttest	10.1	12	<.001*	6.8	13	<.001*

*p < .05

Next, I conducted independent-samples t-tests to determine if the difference was at a particular time point and as seen in Table 5, the statistically significant difference was at the repeated reading posttest.

Table 5

Repeated Reading – Independent Samples t Tests Results X Time

	Overlap	Nonoverlap	
	M (SD)	M (SD)	t
Pretest	51.46 (20.17)	54.36 (17.24)	-.402
RR Posttest	81.08 (18.45)	61.00 (15.69)	3.053*
RR Delayed Posttest	88.62 (17.29)	79.86 (16.75)	1.337

*p < .01

There was a significant difference between the groups at the repeated reading posttest reading ($t(25) = 3.053$, $p < .01$) indicating the Overlap group made significantly greater gains than the Nonoverlap group immediately after treatment. Although both groups made significant gains at each time point, the Overlap group made a significantly greater gain of about 30 CWPM compared to the Nonoverlap group, which gained about 7 CWPM on repeated reading posttest; I have listed these scores in Charts 3 & 4, Appendix C. The significant interaction showing larger gains for the Overlap group confirms the hypothesis that fluency is a gain in automatic word recognition. There is a large effect size of *d* 1.18; with respect to effect size, a *d* of .20 is a small effect, *d* of .50 is a moderate effect, and *d* of .80 or greater is a large effect size (Huck, 2004). I computed and reported this statistic because it is the effect measure used in the NRP Report (2000).

General Fluency Comparison of Groups

My theory that fluency is automatic word recognition is supported by the general fluency gains as well. My hypothesis was that automatic word recognition depends on the amount of word Overlap in passages. Because general gains in fluency depend on a significant increase in sight vocabulary over the entire range of words used in primer-level text, we would not expect significant differences between the groups in general fluency gains. General fluency was measured at all three time points, pretest, general fluency posttest, and general fluency delayed posttest. Results of the analyses are reported in this section.

I found no significant differences in general fluency between groups as measured in CWPM (F=1.92, p = .071) at any of the three time points as demonstrated in Table 6. As seen in Figure 2 there was a gain over time (F=19.75, p < .001) in general fluency. This difference, however, does not depend on group, as the interaction effect was not statistically significant (F=0.30, p = .74).

Table 6

General Fluency - Performance of Groups X Time

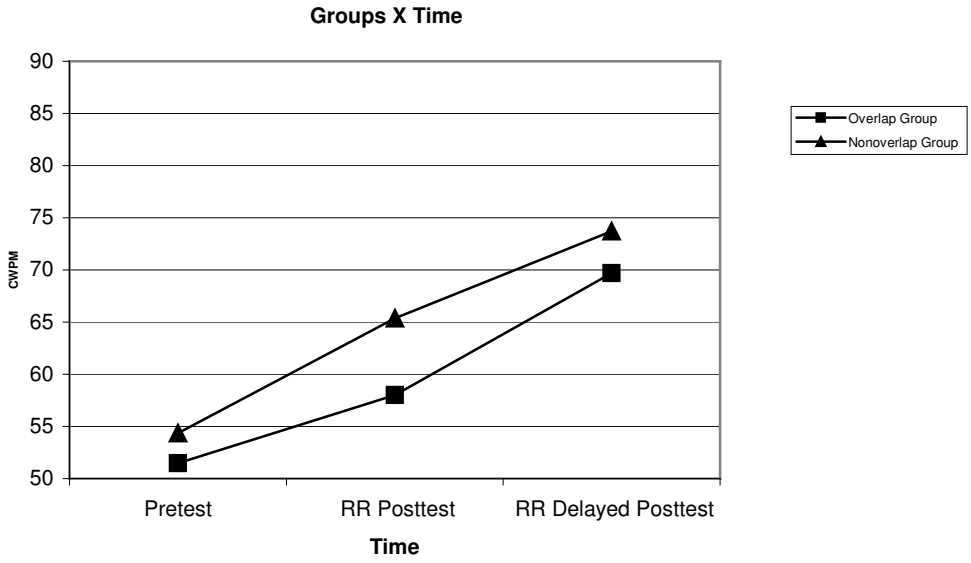
	Pretest	GF Posttest	GF Delayed Posttest
	MS (SD)	MS (SD)	MS (SD)
Group			
Overlap (13)	51.46 (20.17)	58.00 (19.62)	69.69 (26.18)
Nonoverlap (14)	54.36 (17.24)	65.36 (20.18)	73.71 (21.59)

	df	MS	F	Partial eta^2
Between Groups				
Group (A)	1	1511.86	1.92	.071
Error	25	786.27		
Within Groups				
Time (B)	2	2384.46	19.75*	.441
Group X Time (AB)	2	36.29	0.30	.012
Error	50	120.77		

* p = <.05

Figure 2

General Fluency - Comparison of Means



There were no significant differences by group in general fluency. There were, however, significant gains in general fluency by both groups over time. The Nonoverlap group gained 11 CWPM, which was four more than the Overlap group of 7, from pretest to posttest. This disparity did not hold over time. Both groups made similar increases from pretest to delayed posttest; Overlap, 19 and Nonoverlap, 20. The effect size for these gains was small $d = .17$. This significant increase in general fluency indicates that the participants automatized and made new sight words using the practice of repeated reading. This is important because these gains support the hypothesis that the repetition of words in reading practice produced new sight words that in turn increased fluency. Further support for this hypothesis was the gain is specific reading fluency in the condition with many overlapping words.

Summary

As was hypothesized, participants made the greatest gains in specific reading fluency in the word Overlap condition, with much larger differences between pretest and repeated reading posttest for the Overlap group (30 CWPM) than the Nonoverlap group (7 CWPM). While the gains in general fluency were significant over time, there were no group differences. The gains in general fluency between pretest and general fluency posttest were larger for the Nonoverlap group (11 CWPM) than the Overlap group (7 CWPM). However, the gains in general fluency were not statistically different by group. These findings support the theory that repeated reading of overlapping words results in a larger sight word vocabulary, in turn producing specific fluency gains in CWPM.

V. SUMMARY OF RESULTS

Introduction

A discussion of the results of this reading fluency study, its theoretical implications, is classroom implications, and the limitations of this study are contained in this chapter. In addition, at the end of the chapter I provide recommendations for further research.

The purpose of this study was to examine automatic word recognition as the defining feature of fluency and to extend the work of Rashotte and Torgesen (1985). The most salient feature of fluency is a reading in which all or most of the text words have been stored as sight vocabulary. There are two types of fluency, general and specific. General fluency refers to the ability to read all the words in a language that could be contained in any grade appropriate passage rapidly and automatically. Specific fluency refers to the ability to read the words contained in a particular passage rapidly and automatically. I investigated the question of whether readers rereading passages with considerable word overlap would make greater gains in reading speed as measured in CWPM than readers reading passages with few overlapping words. If automatic word recognition is the defining feature of fluency, students reading passages with considerable word overlap would make greater gains than students who did an equal amount of repeated reading with little word overlap.

I used an experimental research design with random assignment of groups from intact classrooms to treatment groups. I assigned students to one of two groups, Overlap or Nonoverlap. The Overlap groups read materials with 18 content words repeated at least 4 times in the text. The Nonoverlap group read materials with only 1 content word appearing 4 times and three content words appearing 3 times in the text. Reading teachers worked with small groups using guided reading techniques as described in the Procedures section of this document. I administered the pretest. The treatment of repeated reading in both groups occurred over 6 days. I administered the posttest on the seventh day. I administered the delayed posttest 30-days later. I analyzed the data and reported the results in Chapter 4 of this document.

There were significant differences in performance in both group membership and time of reading on measures of specific fluency. Although both groups made significant gains at each time point, the Overlap group made significantly greater gains at the specific fluency posttest. Both groups held the gain and added CWPM on the delayed specific fluency posttest, but these differences were not significant by group. Therefore, due to its nature, students made greater gains in specific fluency as measured in CWPM more quickly in repeated reading of texts with many overlapping words. Large gains in general fluency take longer, but students made smaller yet significant gains in this area through repeated reading of passages with both overlapping and nonoverlapping words.

A likely explanation of the gain made by the nonoverlap group in specific fluency could have been the practice they received after the specific fluency posttest. Students practiced reading the chapter with the repeated words in an effort to reach the goal of 85

CWPM on this passage. These additional readings may explain students' gains on delayed posttest 30 days later which assessed fluency with the same passage.

On measures of general fluency, both groups made significant gains over time, but there was no significant group difference. Both groups gained an average of about 19.5 CWPM on general fluency measures from general fluency pretest to general fluency delayed posttest. These gains may have owed to the rereading of texts used to assess general fluency with corrective feedback on errors thus conflating this measure. From the theoretical perspective supported by the specific fluency results, repeated reading practice caused participants to store the sight word mappings in memory, thus allowing readers to retrieve the word automatically while reading.

The large gains made by the Overlap group during treatment, along with the limited gains in general fluency support the hypothesis that gaining sight word recognition has a direct effect on fluency, and are consistent with the theory that automatic word recognition is the defining feature of fluency. The Overlap group with average gains of about 30 CWPM made significantly larger gains in specific fluency than the Nonoverlap group with average gains of about 7 CWPM on pretest-posttest comparisons. The larger gains made in specific fluency by the Overlap along with the smaller gains made by the Nonoverlap group support my hypothesis that rereading passages with considerable word overlap results in the reader increasing sight word stores leading to specific fluency gains and ultimately increasing automatic word recognition for general fluency.

Theoretical Implications

This study extends the findings of Rashotte and Torgesen (1985) by showing that students' gains in fluency as measured in CWPM are increased through repeated reading, and that these gains depend on the amount of word overlap in the passage. Rashotte and Torgesen (1985) hypothesized that fluency gains are caused by automatic word recognition as a result of increased sight word stores. Their contention was that reading passages with many overlapping words would increase fluency as measured in CWPM. In support of this theory, the results of the present study indicate that the Overlap (specific fluency) group, which read text with overlapping words, had the greatest gains in automatic word recognition at posttest. As the present study included both a larger sample of 27 participants who were normally developing readers, these results allow the generalizability to a larger population. Participants in the Rashotte and Torgesen (1985) study were 12 learning disabled students. These results are more useful in intervention settings. Participants in my study were 27 normally developing readers. These results are more indicative of outcomes expected in regular classrooms. Hence, the results are more generalizable to a larger population.

Ehri's (1998) model of word reading suggests that readers use what they know about the alphabetic system to connect spellings to pronunciations and retrieve them from memory using these identities. She cites evidence that reading words as little as one time or a few times is sufficient to make these connections and identities (Reitsma, 1983). In line with this view of automatic word recognition, reading the words at least 4 times allowed the readers to store the alphabetic mappings for the words and retrieve them more automatically in the Overlap group than the Nonoverlap group. Even though

readers made these connections and stored mappings in both conditions, the increases were greater in specific fluency in the Overlap group. The results support the hypothesis that gains in fluency depend on automatic word recognition, consistent with the view that speed and prosody are results of fluency with accuracy as a prerequisite.

This study adds clarification to general and specific fluency. Even though there were gains in general fluency, there were greater gains across passages with repetition of content or specific words. This suggests that there is a general fluency and a specific fluency. As evidenced in the study, specific fluency is improved through repeated reading, freeing attentional resources for use in comprehending the materials read. In addition, this content-specific fluency adds to general fluency at a much slower rate, as evidenced by the smaller gains in general fluency in the study. A highly effective way to learn to read words and free the attentional resources needed to understand and apply this understanding is repeated reading of texts with overlapping words.

Educational Implications: Assessing and Teaching Fluency

Converging findings from this study and others have implications about how students gain fluency and should influence teachers' methodological decisions, moving them away from the read-for-speed practice seen so often in classrooms today to a more sound practice of rereading for automatic word recognition.

Assessing Fluency

Teachers instruct children to read the text. They tell the child if she comes to a word she does not know, they will tell her the word so she can continue to read. The teacher tells the words not known on sight and not solved within three seconds. Even though the teacher tells the child she may be asked to retell what she has just read, in

practice, the child is rarely asked to retell nor is she asked any comprehension questions. In most cases, the child knows exactly how many words per minute are acceptable. As soon as she finishes reading, she asks, "How many words did I get?" Intended or not, these practices are causing students to think of good reading as fast reading. Fluency is more than speed; it is automatic word recognition. With comprehension press, the fluent reader reads words by sight, thus freeing the reader to construct meaning and to monitor reading for speed, expression, and accuracy.

Samuels states, "When the decoding task is automatic, the student can do both the decoding and the comprehension tasks at the same time" (2007, p. 564). He asserts that we need tests that approximate the reading task by including a comprehension press requiring a retelling or asking comprehension questions after the reading. As the DIBELS tests are driving instruction in the direction of reading for speed at the expense of comprehension, new tests requiring students to decode and comprehend as they read should reverse this trend. The effects of this reversal would return the focus to teaching reading with an emphasis on understanding what is read, the ultimate goal of reading.

This study supports the theory that fluency is a gain in automatic word recognition. This automatic word recognition enables readers to marshal more resources for monitoring comprehension and other prosodic features of reading. The popularity of DIBELS oral reading fluency as the "gold standard" for assessing fluency has caused teachers of reading to focus instruction almost exclusively on speed. This focus on speed and supplying the word after three seconds whether attempted by the student or not has

an unintended consequence of facilitating fast word calling to the detriment of sight word learning and reading comprehension.

Teaching Fluency

Repeated reading resulted in significant gains in both the specific and general fluency. However, repeated reading with word overlap produced the large fluency effects hoped for in classrooms today. Consistent with Perfetti (1985), these results indicate competency in the lower skills of decoding, allowing the reader to automatically retrieve the word from memory with little or no conscious effort. This automatic retrieval frees the attentional resources once needed to complete these tasks for the ultimate goal of reading, comprehension. Despite the time constraints in the classroom, there is evidence in this and other research that repeated reading is a valid practice for increasing fluency.

Guided reading with feedback on errors and repeated reading practice yielded significant gains in both specific fluency and general fluency in this study. One of the complaints of the teachers in this study about repeated reading was that it took too much time. Although it was time consuming, performance results were worth the sacrifice. My participants made average gains of 9 CWPM in general fluency in only 6 days. Often, students come into a new grade level reading 30, 40, or more CWPM below benchmark. Conscientious teachers of reading may embrace repeated reading as an instructional method for increasing reading ability and surpassing benchmarks.

Teaching Specific Fluency

Decodable texts are supportive of the development of specific fluency. Decodable texts contain content words with vowel correspondences that the reader has

learned along with high frequency words. Authors often repeat content words in telling a story which provides sufficient practice with their spellings and correspondences. Repeated reading of these texts with word repetition allows the reader to pay attention to the alphabetic features and store mappings of the spellings, thus increasing sight word stores. This increase in sight word store allows more efficient retrieval of the words from memory, leaving more attentional resources available for comprehension.

Whole stories in decodable text often contain some of the same words over and over again. This feature makes them conducive to teaching specific fluency. The reader builds the knowledge of the spellings and maps those spellings in memory as she encounters the same words repeatedly. This repetition along with a predictable framework allows her to crosscheck for meaning. One example of this crosschecking is in *The Red Gem Mine* (Sims, 1999). One sentence in the story is: "When Jake got mad, he would not let Pete ride him." If a student read the word "mad" as "made," she might figure out after reading the entire sentence that she had retrieved the wrong mapping for the word. She might look at again and say, "I mean mad, when Jake got mad." This crosschecking and monitoring is valuable both in building sight word stores and comprehension.

Teaching General Fluency

Our long-term goal as reading educators is to help readers increase general fluency. Some effective practice materials for increasing repeated reading in general are readers' theatre, poetry recitals, plays, and skits. In readers' theatre, students read the scripts over and over as they practice for a performance. No props are required. This type of practice is usually enjoyable for the students. There is an added incentive for

practice, accuracy, and automaticity in that the students want to do well in front of their peers. Plays and skits offer the same benefits of repeated readings, desire to do well in front of peers, and enjoyment in practicing. However, plays are usually a bit more formal and involve props and scenery. Poetry recitals can be as formal as a play or as informal as readers' theatre. These types of practice provide both a larger number of words to practice and repetition of these words over reading.

Acknowledgement of automatic word recognition as a defining feature of fluency will enhance a balanced reading program. Mesmer (2005) concluded that the level of reading attainment and purpose of the lesson determine the type of text most appropriate for reading practice. There are different purposes for reading, and by no means am I advocating that repeated reading of connected text with overlapping words be the only reading in a classroom. However, when the purpose is to increase fluency that leads to fast, accurate, expressive reading, repeated readings of text with word overlap yields greater immediate gains for students.

Limitations

Limitations on this study are related to student participants, teacher participants and the reading abilities of the participants.

Student Participants

One factor that may have affected the results was that the student participants were those meeting the criteria of normally developing readers who returned permission slips to participate. The participants may have felt some pressure to participate to please the teacher. I made every effort to assure both students and parents there would be no repercussions if they decided not to participate.

Teacher Participants

Teacher participants were volunteers. They were responsible for all the normal classroom duties in addition to the study. There is the possibility that the treatment was not as consistent as it would have been had the study been done in a lab setting. Conversely, volunteers may have been more motivated to carry out the arduous procedures more rigorously than non-volunteers; a factor that might affect the generalizability of findings.

Reading Materials

Reading materials may have been more challenging for some students than others, because all the passages were on approximately the same level. This level may have been independent for some participants and instructional for others.

Despite these limitations and others, the significant results achieved by the participants favored the hypothesis.

Recommendations for Further Research

Areas of interest spurred by this research include type of text, scaffolding, comprehension press, and length of studies.

I selected decodable text for this study based upon the amount of word overlap. Mesmer (2005) suggests the use of more decodable and less decodable text should be determined by the reading level of the student along with the specific purpose for reading. Jenkins et al. (2004) suggests there is no difference in reading performance between practice in more and less decodable text. The books read by both groups in this study contained the same level of decodability. In light of the research, what is the value of decodable text? At which grade and or reading levels are decodable text most

appropriate? Given the same level of word overlap, would leveled text be as effective in increasing specific fluency and general fluency?

Students in this study received feedback on errors. Pany and McCoy (1988) found that feedback on errors decreases total errors made by readers with no significance on outcomes between meaning change and no meaning change. This suggests that corrective feedback during reading increases accuracy and does not hinder comprehension. A question worthy of investigation is whether the attention freed when a reader becomes fluent is automatically transferred to comprehension. If not, which types of scaffolding are more beneficial in redirecting this attention to comprehension?

Current assessments in fluency often include a comprehension suggestion of telling the children they may be asked to retell what they have read or answer questions after they have finished reading, yet comprehension is not actually measured. This means that in practice, there is no comprehension press. Interesting research questions include: Is the comprehension press of simply saying you will ask questions after the student has read sufficient to increase fluency? If not, how many questions or how much retelling or discussion of the passage will produce more favorable results as measured by CWPM?

Participants produced significant increases in both general and specific fluency in six days during this study. How would the length of the study effect outcomes? Would the benefits derived with this short study be stronger if implemented over an extended amount of time, 9 weeks, 18 weeks, an entire year, or would returns diminish over time?

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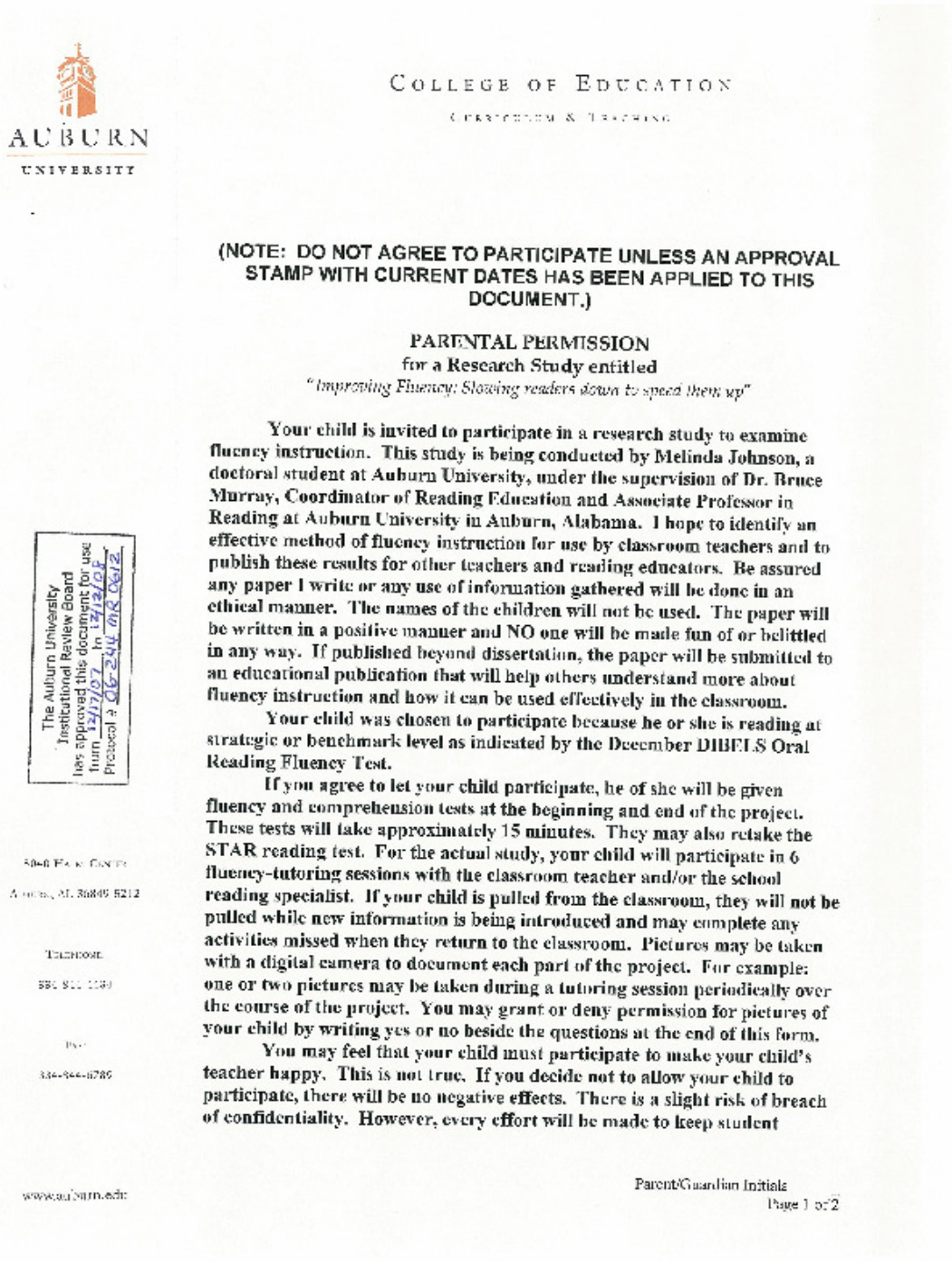
APPENDIX A

Informed Consent

Figure 3. Informed Consent



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The Auburn University Institutional Review Board has approved this document for use from 12/7/07 to 12/6/08 Protocol # 06-244 MR 0612

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

PARENTAL PERMISSION
for a Research Study entitled
"Improving Fluency: Slowing readers down to speed them up"

Your child is invited to participate in a research study to examine fluency instruction. This study is being conducted by Melinda Johnson, a doctoral student at Auburn University, under the supervision of Dr. Bruce Murray, Coordinator of Reading Education and Associate Professor in Reading at Auburn University in Auburn, Alabama. I hope to identify an effective method of fluency instruction for use by classroom teachers and to publish these results for other teachers and reading educators. Be assured any paper I write or any use of information gathered will be done in an ethical manner. The names of the children will not be used. The paper will be written in a positive manner and NO one will be made fun of or belittled in any way. If published beyond dissertation, the paper will be submitted to an educational publication that will help others understand more about fluency instruction and how it can be used effectively in the classroom.

Your child was chosen to participate because he or she is reading at strategic or benchmark level as indicated by the December DIBELS Oral Reading Fluency Test.

If you agree to let your child participate, he of she will be given fluency and comprehension tests at the beginning and end of the project. These tests will take approximately 15 minutes. They may also retake the STAR reading test. For the actual study, your child will participate in 6 fluency-tutoring sessions with the classroom teacher and/or the school reading specialist. If your child is pulled from the classroom, they will not be pulled while new information is being introduced and may complete any activities missed when they return to the classroom. Pictures may be taken with a digital camera to document each part of the project. For example: one or two pictures may be taken during a tutoring session periodically over the course of the project. You may grant or deny permission for pictures of your child by writing yes or no beside the questions at the end of this form.

You may feel that your child must participate to make your child's teacher happy. This is not true. If you decide not to allow your child to participate, there will be no negative effects. There is a slight risk of breach of confidentiality. However, every effort will be made to keep student

Parent/Guardian Initials

Page 1 of 2

identity unknown. Data will be recorded using a randomly assigned number and a made-up name. In the analysis, only the made-up name and the number will be used in reference to any student. Information that identifies students will be destroyed after the completion of my dissertation. You may withdraw your child from participation at any time, without penalty, and you may withdraw any data that has been collected about your child, as long at that data is identifiable.

By participating in this study, your child may improve his or her reading ability during the project by receiving small group tutoring sessions from a qualified reading professional and participating in peer tutoring and partner reading. Moreover, he or she has an opportunity to help investigate an effective method of fluency instruction for young readers. Parents will receive a summary of the research findings in this project. I cannot promise you will receive any or all of the benefits described.

For your child to participate, please fill out the consent form, sign it, and return it to the school.

For more information regarding your rights as a research participant you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by Phone (334)-844-5966 or e-mail at hsubjce@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR PERMISSION FOR YOUR CHILD TO PARTICIPATE.

Please write yes or no by each statement.

_____ My child may participate in the study.

_____ It is okay to use pictures of my child in materials published from this study.

Parent/Guardian Signature Date

Investigator Obtaining Consent Date

Print name

Print name

Child's name (please print)

Please initial the first page of this form. A copy of this form is yours to keep. If you have any questions at any time, you may call Melinda Johnson at 334-749-9986 or contact her by email at johnsonmm@auburn.edu.

APPENDIX B

Lists of Repeated Words by Group

Chart 1 - Overlap Group - List of repeated words, number of times repeated and number of times missed on repeated reading posttest and repeated reading delayed posttest

Chart 2 Nonoverlap Group - List of repeated words, number of times repeated and number of times missed on repeated reading posttest and repeated reading delayed posttest

Chart 1

Overlap Group - List of repeated words, number of times repeated and number of times missed on repeated reading posttest and repeated reading delayed posttest

WORD	Times Repeated in the reading	Times missed on RR Posttest	Times missed on RR Delayed Posttest
buck	5	0	0
day	7	0	0
dig	7	0	0
gem(s)	8	1	1
got	9	0	0
hay	5	0	0
Hume	15	0	4
Jake	30	1	0
kick	5	0	0
mad	6	0	0
mine	15	1	0
Mr.	15	0	0
mule	4	0	0
nice	5	0	0
oats	5	0	0
Pete	33	0	0
pile	4	1	1
rocks(s)	7	0	2
TOTAL	185	4	8

Chart 2

Nonoverlap Group - List of repeated words, number of times repeated and number of times missed on repeated reading posttest and repeated reading delayed posttest

WORD	Times Repeated in the reading	Times missed on RR Posttest	Times missed on RR Delayed Posttest
buck	0	0	0
day	3	0	0
dig	1	0	0
gem(s)	0	77	44
got	4	2	0
hay	0	2	0
Hume	0	78	50
Jake	0	11	4
kick	0	1	3
mad	0	0	0
mine	0	14	13
Mr.	0	15	5
mule	0	0	0
nice	3	0	0
oats	0	1	1
Pete	0	44	13
pile	3	17	5
rocks(s)	2	0	0
TOTAL	16	262	138

APPENDIX C

Gain in Correct Words Per Minute by group

Chart 3

Repeated Reading – Gain in CWPM for Overlap Group

Student	Group	Pre	Posttest CWPM (Gain)	Delayed CWPM (Gain)	Overall
Bridget	Overlap	23	64 (41)	77 (13)	54
Charlie	Overlap	37	80 (43)	92 (12)	55
Chris	Overlap	30	69 (39)	65 (-4)	35
Anna	Overlap	65	112 (47)	113 (01)	48
James	Overlap	30	54 (24)	59 (05)	29
John	Overlap	50	100 (50)	93 (-7)	43
Maria	Overlap	36	66 (30)	86 (20)	50
Belle	Overlap	89	103 (14)	119 (16)	30
Zack	Overlap	80	96 (16)	93 (-3)	13
J R	Overlap	50	59 (09)	79 (20)	29
Darrie	Overlap	63	78 (15)	80 (02)	17
Rick	Overlap	52	79 (27)	91 (12)	39
Mary	Overlap	64	94 (30)	105 (11)	41
		Average Gain	30	8	38

Chart 4

Repeated Reading – Gain in CWPM for Nonoverlap Group

Student	Group	Pre	Posttest CWPM (Gain)	Delayed CWPM (Gain)	Overall
Bernice	Nonoverlap	60	55 (-5)	73 (18)	13
Caldonia	Nonoverlap	69	63 (-6)	73 (10)	4
Bobby	Nonoverlap	46	67 (21)	79 (12)	33
Galene	Nonoverlap	34	53 (19)	81 (28)	47
Kirsten	Nonoverlap	82	84 (02)	123 (39)	41
Gene	Nonoverlap	66	71 (05)	97 (26)	31
Gayle	Nonoverlap	51	69 (18)	77 (08)	26
Josh	Nonoverlap	26	34 (08)	53 (19)	27
Wayne	Nonoverlap	38	55 (17)	76 (21)	38
Beth	Nonoverlap	70	68 (-2)	67 (-1)	-3
David	Nonoverlap	78	85 (07)	92 (07)	14
Tim	Nonoverlap	58	66 (08)	88 (22)	30
Gloria	Nonoverlap	40	32 (-8)	65 (33)	25
Ray	Nonoverlap	43	51 (08)	75 (24)	32
		Average Gain	7	19	26

Chart 5

General Fluency – Gain in CWPM for Overlap Group

Student	Group	Pre	Posttest CWPM (Gain)	Delayed CWPM (Gain)	Overall
Bridget	Overlap	23	35 (12)	64 (29)	41
Charlie	Overlap	37	44 (07)	46 (02)	9
Chris	Overlap	30	44 (14)	66 (22)	36
Anna	Overlap	65	83 (18)	98 (15)	33
James	Overlap	30	43 (13)	30 (-13)	0
John	Overlap	50	62 (12)	76 (14)	26
Mary	Overlap	36	35 (-1)	38 (03)	2
Belle	Overlap	89	87 (-2)	118 (31)	29
Zack	Overlap	80	52 (-28)	88 (36)	8
J R	Overlap	50	45 (-5)	46 (01)	-4
Darrie	Overlap	63	81 (17)	59 (-22)	-4
Rick	Overlap	52	58 (06)	80 (22)	28
Delilah	Overlap	64	85 (21)	97 (12)	33
		Average Gain	7	12	19

Chart 6

General Fluency – Gain in CWPM for Nonoverlap Group

Student	Group	Pre	Posttest CWPM (Gain)	Delayed CWPM (Gain)	Overall
Bernice	Nonoverlap	60	55 (-5)	82 (27)	22
Caldonia	Nonoverlap	69	69 (00)	77(08)	8
Bobby	Nonoverlap	46	51 (05)	96 (45)	50
Galene	Nonoverlap	34	46 (12)	63 (17)	29
Kirsten	Nonoverlap	82	97 (15)	108 (11)	26
Gene	Nonoverlap	66	85 (19)	80 (-5)	14
Gayle	Nonoverlap	51	87 (36)	58 (-29)	7
Josh	Nonoverlap	26	32 (06)	37 (05)	11
Wayne	Nonoverlap	38	59 (21)	89 (30)	51
Beth	Nonoverlap	70	67 (-3)	67 (00)	-3
David	Nonoverlap	78	96 (18)	102 (06)	24
Tim	Nonoverlap	58	74 (16)	78 (04)	20
Gloria	Nonoverlap	40	49 (09)	54 (05)	14
Ray	Nonoverlap	43	48 (05)	41 (-7)	-2
		Average Gain	11	9	20

APPENDIX D

Record keeping folder

Figure 3. Inside of folder, palm tree and cut-out monkey

Figure 4. Outside of folder, record keeping charts

Figure 3. Inside of folder, palm tree and cut-out monkey

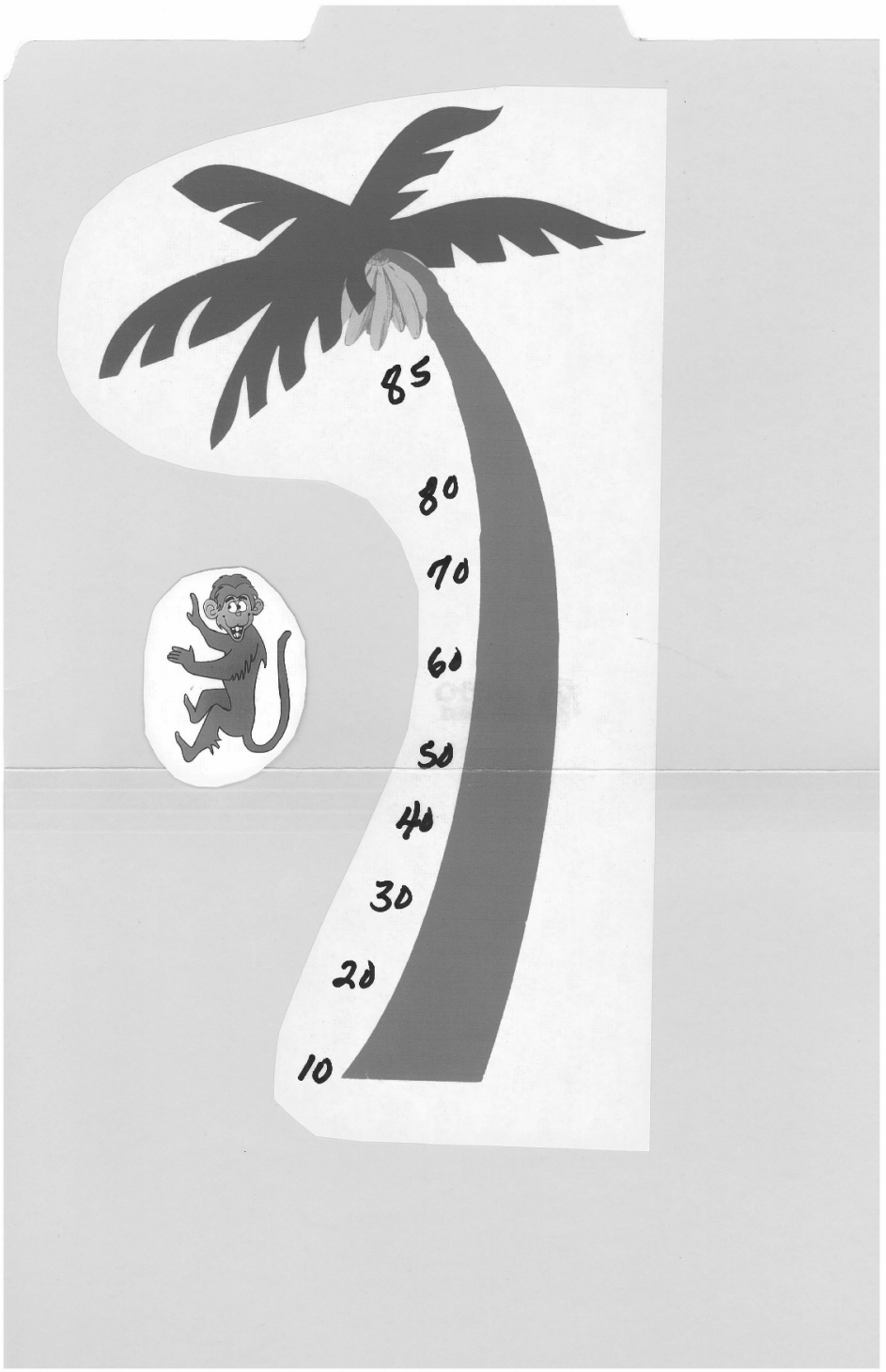

Figure 4. Outside of folder, record keeping charts