

## Georgia State University ScholarWorks @ Georgia State University

---

Educational Psychology, Special Education, and  
Communication Disorders Dissertations

Department of Educational Psychology, Special  
Education, and Communication Disorders

---

Winter 1-6-2012

# Using Empirically Validated Reading Strategies to Improve Middle School Students' Reading Fluency of classroom Textbooks

Amy C. Scarborough  
*Georgia State University*

Follow this and additional works at: [https://scholarworks.gsu.edu/epse\\_diss](https://scholarworks.gsu.edu/epse_diss)

 Part of the [Educational Psychology Commons](#), and the [Special Education and Teaching Commons](#)

---

### Recommended Citation

Scarborough, Amy C., "Using Empirically Validated Reading Strategies to Improve Middle School Students' Reading Fluency of classroom Textbooks." Dissertation, Georgia State University, 2012.  
[https://scholarworks.gsu.edu/epse\\_diss/78](https://scholarworks.gsu.edu/epse_diss/78)

This Dissertation is brought to you for free and open access by the Department of Educational Psychology, Special Education, and Communication Disorders at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Educational Psychology, Special Education, and Communication Disorders Dissertations by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact [scholarworks@gsu.edu](mailto:scholarworks@gsu.edu).

## ACCEPTANCE

This dissertation, USING EMPIRICALLY VALIDATED READING STRATEGIES TO IMPROVE MIDDLE SCHOOL STUDENTS' READING FLUENCY OF CLASSROOM TEXTBOOKS, by AMY C. SCARBOROUGH, was prepared under the direction of the candidates Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Doctor of Philosophy in the College of Education, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chair, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty. The Dean of the College of Education concurs.

---

Laura D. Fredrick, Ph.D.  
Committee Chair

---

Daphne Greenberg, Ph.D.  
Committee Member

---

Robin D. Morris, Ph.D.  
Committee Member

---

Paul A. Alberto, Ph.D.  
Committee Member

---

Date

---

Gwendolyn T. Benson, Ph.D.  
Associate Dean  
Interim Department Chair of Educational Psychology & Special Education

---

R.W. Kamphaus, Ph.D.  
Dean and Distinguished Research Professor  
College of Education

## AUTHOR'S STATEMENT

By presenting this dissertation as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this dissertation may be granted by the professor under whose direction it was written, by the College of Education's director of graduate studies and research, or by me. Such quoting, copying or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involves potential financial gain will not be allowed without my written permission.

---

Amy C. Scarborough

## NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University library must be used in accordance with the stipulations prescribed by the author in the preceding statement. The author of this dissertation is:

Amy Cohenour Scarborough  
1797 Wilshire Lane  
Decatur, GA 30033

The director of this dissertation is:

Dr. Laura D. Fredrick  
Department of Educational Psychology and Special Education  
College of Education  
Georgia State University  
Atlanta, Georgia 30303-3979

## VITA

Amy Cohenour Scarborough

ADDRESS: 1797 Wilshire Lane  
Decatur, GA 30033

EDUCATION:

Ph.D.	2011	Georgia State University Educational Psychology
M.Ed.	1999	Georgia State University Reading, Language, & Literacy Education
B.A.	1996	Mercer University Early Childhood education

### PROFESSIONAL EXPERIENCE:

2011 – Present	Subject Matter Expert: ELearning Development, Atlanta Speech School: Rollins Center, Atlanta, Georgia
2007 - 2011	Cognitive Development Specialist, Georgia State University, Department of Psychology
2005 - 2006	Graduate Teaching Assistant, Georgia State University, EPY 7080, Psychology of Learning and the Learner, Summer & Spring semester. (instructor of record)
2005 - 2007	Annual Graduate Research Assistant, Georgia State University, Department of Educational Psychology and Special Education.
2001 - 2004	Reading Specialist, Social Circle Primary, Social Circle City Schools, Social Circle, Georgia.
1996 - 2000	Reading Specialist, Seaborn Lee Elementary, Fulton County Schools, College Park, Georgia.

### PRESENTATIONS

Cohen, E., Scarborough, A. C., Olutosin, N., Sevcik, R., Morris, R., Wolf, M., & Lovett, M. (2009, July). Research based reading instruction. A presentation presented at the Instructional Strategies Conference for Gwinnett County Public Schools, Lawrenceville, GA

Scarborough, A. C. & Fredrick, L. D. (2009, May). Using empirically validated reading strategies to improve middle school students' reading fluency of classroom textbooks. A poster presented at the 35th Annual Convention of the Association for Behavior Analysis International, Phoenix, AZ.

Scarborough, A. C., & Fredrick, L. D. (2008, February). Are empirically validated reading fluency strategies effective when used with middle school students' content-area textbooks? A poster presented at the Conference on Literacy, Urban Issues, and Social Studies, Atlanta, GA.

- Fredrick, L. D., Scarborough, A. C., Nanda, A. O., & Greenberg, D. (2008, May). Combining direct instruction with the Georgia State University Reading Program in kindergarten through second grade. A poster presented at the 34th Annual Convention of the Association of Behavior Analysis International, Chicago, IL.
- Fredrick, L. D., Scarborough, A. C., Greenberg, D., & Burke, V. (2007, May). Improving reading fluency in adults who have low literacy skills. A poster session presented at the 33rd Annual Convention of the Association for Behavior Analysis, San Diego, CA.
- Fredrick, L. D., Nanda, A. O., & Scarborough, A. C. (2006, May). The impact of language for learning and language for thinking. In J. Austin (Chair), Using direct instruction to improve educational outcomes for children. A symposium presented at the 32nd Annual Convention of the Association for Behavior Analysis, Atlanta, GA.
- Scarborough, A. C. & Fredrick, L. D. (2005, May). Examining approaches to improve oral reading fluency. A poster presented at the 32nd Annual Convention of the Association for Behavior Analysis International, Chicago, IL.

## ABSTRACT

### USING EMPIRICALLY VALIDATED READING STRATEGIES TO IMPROVE MIDDLE SCHOOL STUDENTS' READING FLUENCY OF CLASSROOM TEXTBOOKS

by  
Amy C. Scarborough

According to the National Center for Education Statistics (2007), 27% of the nation's 8th grade population scored below the basic reading level in 2006-2007. Reading fluency strategies are a viable practice for improving reading achievement yet seldom are they incorporated into the 8th grade curriculum. To be effective, passages used in reading fluency strategies should be at the students' instructional reading level (Daly, Persampieri, et al., 2005; Welsch, 2007). However, if increased oral reading fluency gained at the instructional reading level fails to generalize to content-area text that a student is required to read, the gain is not clinically significant, as it does not allow the student access to required reading. Stahl and Heubach (2006) recommended providing instruction in more difficult material while providing a strong degree of support. In this study, four middle school students reading one to two years below grade level received strong support for increasing reading fluency while using their social studies textbook. The intervention package consisted of listening passage preview, repeated reading, phrase-drill error correction, and performance feedback with student charting. Two research questions guided this study: (a) What are the effects of a comprehensive treatment package consisting of commonly utilized strategies for improving oral reading fluency on middle school students' oral reading fluency using their required grade-level social studies textbooks? and (b) to what extent does performance generalize to required literature textbook passages and passages from CRCT Coach in Science (2002) and

CRCT Coach in Social Studies (2002)? A multiple probe across participants design was used to answer these questions. Visual analysis of graphically displayed single-case data revealed that the multicomponent reading intervention positively affected student performance on intervention and generalization passages. The results of this study are promising, and given that reading content-area text is the core of education in middle school, further research is necessary.



USING EMPIRICALLY VALIDATED READING STRATEGIES TO IMPROVE  
MIDDLE SCHOOL STUDENTS' READING FLUENCY OF  
CLASSROOM TEXTBOOKS

by  
Amy C. Scarborough

A Dissertation

Presented in Partial Fulfillment of Requirements for the  
Degree of  
Doctor of Philosophy  
in  
Educational Psychology  
in  
the Department of Educational Psychology and Special Education  
in  
the College of Education  
Georgia State University

Atlanta, GA  
2011

Copyright by  
Amy C. Scarborough  
2011

## ACKNOWLEDGMENTS

Without the guidance, support, and patience of many, I would not have finished such an accomplishment. To Dr. Laura Fredrick, thank you for your support through this long journey. You placed faith in my ability to begin this journey and never gave up on me. I have been blessed to have you guide me professionally and personally. To my dissertation committee, Drs. Daphne Greenberg, Paul Alberto, and Robin Morris, thank you for your support and patience. Additionally, thank you for the opportunities to work with all of you on your grants. To my parents, brothers, and my sister, thank you for standing by my side, helping with our children, and encouraging me to the end. I owe thanks to Rena Whitehouse for helping me think about the “bigger picture” in my writing. I thank John, my husband, for his patience, understanding, and commitment. Ten of the eleven years of our marriage have endured this strenuous journey. Here is to a new journey! To my beautiful children, John Laurence and Josie, I love you both very much. John Laurence was 11 months old when I started this journey and he turned 11 years old two weeks ago. Josie was born the week before I started my residency research and she turned 7 years old in February. I am excited that I can devote more of my attention to the two of you.

## TABLE OF CONTENTS

	Page
List of Figure.....	iv
List of Tables.....	v
Abbreviations .....	vi
Chapter	
1 IMPROVING ORAL READING FLUENCY: A REVIEW OF THE LITERATURE.....	1
Introduction.....	1
Inclusion Criteria .....	4
Summary of Research.....	7
References.....	31
2 USING EMPIRICAL VALIDATED READING STRATEGIES TO IMPROVE MIDDLE SCHOOL STUDENTS' READING FLUENCY OF CLASSROOM TEXTBOOKS.....	45
Introduction.....	45
Methodology.....	51
Results.....	57
Discussion.....	59
References.....	67
Appendix.....	74

## FIGURES

Figure	Page
1 Words Correct Per Minute: .....	60

## LIST OF TABLES

Table	Page
1 Participant Characteristics.....	52
2 Reading Grade Level of Passages.....	54

## ABBREVIATIONS

CRCT	Criterion-Referenced Competency Test
IOA	Interobserver Agreement
LPP	Listening Passage Preview
NASBE	National Association of the State Boards of Education
NCES	National Center for Education
NICHHD	National Institute of Child Health and Human Development
PD	Phrase-drill Error Correction
PF	Performance Feedback
RR	Repeated Reading
WCPM	Words Correct Per Minute

CHAPTER 1  
IMPROVING ORAL READING FLUENCY:  
A REVIEW OF THE LITERATURE

In 2007, the National Endowment for the Arts published a report, “To Read or Not to Read: A Question of National Consequence,” that summarizes the overall status of our nation’s readers through early adulthood. The main finding suggested that after elementary school, students in middle school, high school, and college are reading less often and scoring lower on general reading ability assessments. The concern is that if this decline in the amount of reading and in the scores of reading ability continues, the overall status of the United States will weaken economically, socially, and civically.

One reading skill often neglected after elementary school is oral reading fluency, which is one avenue for addressing concerns of the overall reading achievement of the nation’s readers. It is important that primary, elementary, middle, and high school educators assess and monitor students’ oral reading fluency and provide responsive instruction. Reading fluency is important because it facilitates comprehension by providing a bridge between word recognition and comprehension. Fluent reading is the ability to read text smoothly and at a rate similar to speech. Based on LaBerge and Samuels’s (1974) theory of automaticity, fluent reading occurs when the reader has a repertoire of recognizable words and decoding skills that are automatic allowing the reader to focus on meaning. Fluently reading a text does not equate to understanding the text, but it does free up cognitive resources allowing the reader to allocate attention to the purpose of reading, that is, comprehension, instead of decoding. Moreover, fluent reading strongly predicts reading achievement and comprehension (Berninger, Abbott,



Vermeulen, & Fulton, 2006; National Institute of Child Health and Human Development [NICHD], 2000).

Being able to recognize words and their semantic representations requires development of orthographic, phonological, semantic, morphologic, pragmatic, and syntactic skills (Adams, 1990). In addition, these skills must integrate or synchronize for successful reading to occur (Breznitz, 2006). Therefore, the amount of time it takes to access and process these skills plays a significant role in the development of reading fluency. Wolf and Katzir-Cohen's (2001) "working definition" of reading fluency provides a comprehensive view of the development of reading fluency:

In its beginning, reading fluency is the product of the initial development of accuracy and the subsequent development of automaticity in underlying sublexical processes, lexical processes, and their integration in single-word reading and connected text. These include perceptual, phonological, orthographic, and morphological processes at the letter, letter-pattern, and word levels, as well as semantic and syntactic processes at the word level and connected-text level. After it is fully developed, reading fluency refers to a level of accuracy and rate where decoding is relatively effortless; where oral reading is smooth and accurate with correct prosody; and where attention can be allocated to comprehension. (p. 219)

Fluency development is an area of reading recognized as fundamental for reading achievement during elementary school (NICHD, 2000). The National Center for Education Statistics (NCES, 2007) reported that a large percentage of middle and high school students are not performing well despite the substantial knowledge base of reading

development and instruction in the primary and elementary grades. In response, researchers are beginning to broaden the focus of reading fluency interventions to middle and high school age students. Reading fluency is now recognized as a reading skill that is fundamental for students in middle school and high school to continue to practice (Boardman et al., 2008). Fortunately, many evidence-based strategies for improving oral reading fluency are available to educators serving first through twelfth grade.

Determining an efficient and effective intervention that meets the needs of an individual is vital for growth of any skill. Researchers using single-case methodologies have used one of two heuristic models as a framework for efficiently choosing the most effective intervention for improving oral reading fluency (Daly, Persampieri, McCurdy, Gortmaker, 2005). One model is the instructional hierarchy (Daly, Martens, Dool, & Hintze, 1998; Daly, Martens, Hamler, Dool, & Eckert, 1999). In this approach, instructional interventions are adapted for the student depending on whether the student needs instructional strategies that target the acquisition stage (e.g., modeling and error correction strategies), the fluency stage (e.g., practice and incentives for reading fluently), or the generalization stage (e.g., instruction in various contexts). Typically, researchers added strategies one at a time until an effective intervention was identified (Daly et al., 1999). However, in recent studies, researchers have dismantled strategies from multicomponent interventions until an effective intervention was identified (Daly, Persampieri, et al., 2005).

The second heuristic model examines skill deficits compared to performance deficits (Eckert, Ardoin, Daisey, & Scarola, 2000; Eckert, Ardoin, Daly, & Martens, 2002; Jones & Wickstrom, 2002; Jones et al., 2009; Noel et al., 1998). In this model,

researchers compare the effectiveness of skill-based strategies and performance-based strategies to determine whether the student demonstrates one or both deficits. For example, Jones and Wickstrom compared the effectiveness of two skill-based strategies and one performance-based strategy on oral reading fluency. All five participants demonstrated skill deficits during a brief experimental analysis. The skill-based strategy identified as the most effective for each individual student was further evaluated during an extended analysis confirming the results of the brief analysis for all of the students.

The purpose of this review is to summarize single-case methodological studies that examined the effectiveness of various strategies for improving oral reading fluency. Single-case methodologies allow the practitioner to determine quickly whether a given intervention is effective for an individual. In contrast, group studies focus on average scores of a group of students. Although this summary focuses on single-case methodologies, it is not limited to a specific strategy or student population. The purpose of this review is to determine which individual strategies and combinations of strategies have been found to be effective for improving oral reading fluency.

### **Inclusion Criteria**

Studies on oral reading fluency in peer-reviewed journals between 1980 and 2009 were located in the following databases: the Educational Resources Information Center (ERIC), Psychological Information (PsycINFO), Psychological Articles (PsycARTICLES), Psychological Extra (PsycEXTRA), Psychology and Behavioral Sciences Collection, Professional Development Collection, and Academic Search Complete databases on EBSCO host: Basic Search. From these databases, 31 studies met the following inclusion criteria.

- Described independent variable
- Reported correctly read words per minute as the dependent variable
- Controlled internal validity adequately
- Implemented a simple intervention
- Provided graphic displays of student data
- Followed guidelines, given a single participant
- Reported acceptable interobserver agreement

Each study examined the effectiveness of an operationally described independent variable on the dependent variable, words read correctly per minute, using a single-case design. Additionally, the independent, dependent, and extraneous variables were controlled adequately for maintaining internal validity (Richards, Taylor, Ramasamy, & Richards, 1999). Two studies had threats to internal validity and were not included in this review (Begeny & Martens, 2006; Martens et al., 2007). Studies were included only if the intervention strategies were simple for paraprofessionals, adult volunteers, or classroom teachers to implement. Six studies did not fit this criterion and were not included in this review (Hitchcock, Prater, & Dowrick, 2004; Lingo, Slaton, & Jolivette, 2006; Lionetti & Cole, 2004; Scott & Shearer-Lingo, 2002; Strong, Wehby, Falk, & Lane, 2004; Sutherland & Synder, 2007) For example, in the Lionetti and Cole study, student readings were recorded and then technically manipulated to achieve a faster rate. The purpose was to compare the relative effects of listening passage preview, via tape, either at the student's normal rate or at the faster rate. In the Hitchcock et al. study, the examiner videotaped the student reading and then spliced it together so the student could hear him or herself fluently read. In four studies, an entire curriculum was implemented as an

intervention (Lingo et al., 2006; Scott & Shearer-Lingo, 2002; Strong et al., 2004; Sutherland & Snyder, 2007).

Studies were included only if data were displayed graphically. Visual inspection allows for a quick assessment of the effectiveness of an intervention by overtly demonstrating the level, trend, and magnitude of performance across phases. Four studies did not provide a graphic display of students' correctly read words per minute (Kamps, Barbetta, Leonard, & Delquadri, 1994; Martens et al., 2007; Smith, 1979; VanWagenen, Williams, & McLaughlin, 1994). In one additional study, researchers did not display student performance graphically for two of the four participants (Daly & Martens, 1994). The performances of the two participants with graphic displays are included in this review.

Studies with a single participant, not including multiple baseline designs, needed to follow two guidelines to qualify for this review. First, studies were included if three demonstrations of the effect occurred at three time points given a single participant. All of the studies with a single participant qualified given this guideline. Second, Horner et al. (2005) suggested that studies with a single participant should provide a thorough operational description of the participant and the setting to increase the degree of external validity. Two studies did not qualify for this review because the operational description of the participant and the setting were insufficient (Bonfiglio, Daly, Martens, Lin, & Corsaut, 2004; Wilber & Cushman, 2006).

Studies were included only if authors reported acceptable interobserver agreement (IOA). In reading fluency research, two observers record correct and incorrect responses on a word-by-word basis. To calculate IOA, one divides the total number of agreements

by agreements plus disagreements and multiplies by 100. According to Poling, Methot, and LeSage (1995), interobserver agreement should be calculated during at least 25% of the sessions in each phase. Kennedy (2004) suggests that calculating IOA during 20% of the sessions is acceptable, but that 33% is preferable. For this review, studies that collected and reported IOA during 20% or more of the sessions were included. Ten studies did not meet this criterion. Five did not report IOA (Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; McCurdy, Daly, Gortmaker, Bonfiglio, & Persampieri, 2007; Smith, 1979; Tingstrom, Edwards, & Olmi, 1995; Turpie & Paratore 1995). Five studies included second observer observations for fewer than 20% of the sessions (Cates, Thomason, Havey, & McCormick, 2006; Gilbert, Williams, & McLaughlin, 1996; Musti-Rao, Hawkins, & Barkley, 2009; Nelson, Alber, & Gordy, 2004; VanAuken, Chafouleas, Bradley, & Martens, 2002).

### **Summary of Research**

For this review, 31 of the identified 51 studies met the inclusion criteria. A summary of the subject characteristics includes the number of students based on educational placement and school level. Intervention characteristics are summarized by single component and multicomponent interventions. Additionally, the summary is based on increases in oral reading fluency.

### **Subject Characteristics**

In the 31 studies, 144 students participated. Of the 144 participants, 46 were diagnosed with learning disabilities; 7 were diagnosed with emotional behavioral disabilities; 2 were diagnosed with mild intellectual disabilities; 10 were English language learners; 3 had a diagnosis of attention-deficit hyperactivity disorder; 1 had

speech and language impairments; 5 had repeated a grade; 6 had more than one disability; 64 were experiencing reading difficulties and did not receive any educational services. Additionally, 131 students attended primary through elementary school; 9 attended middle school; 4 attended high school.

### **Single Component Intervention Characteristics**

When a student does not perform a skill accurately, there are three possible reasons that can explain his or her performance. One is that the skill is new to the student or the student does not have a strong enough grasp on the skill. In this scenario, the student exhibits a skill deficit, which requires a skill-based strategy. Skill-based strategies, designed to address skill deficits, introduce and/or improve a skill by providing instruction in that skill or arranging antecedents to decrease deficits (Duhon et al., 2004). Repeated reading and listening passage preview are skill-based strategies designed to strengthen word identification and improve reading fluency. Three additional skill-based strategies designed to improve accuracy include systematic error correction, phrase-drill error correction, and syllable segmentation.

Some students have the necessary skills, but performing the skill is not reinforcing enough to continue practicing the skill until mastery. In this scenario, the student exhibits a performance deficit, which requires a performance-based strategy. Performance-based strategies, designed to address performance deficits, provide support for an acquired behavior by providing reinforcing consequences (Duhon et al., 2004). Student self-graphing and contingent reinforcement are performance-based strategies designed to promote fluency of accurate oral responding.

**Repeated reading.** Repeated reading is a well-known strategy for improving reading fluency through reading and rereading a passage that is on the learner's reading level. Repeated reading is effective for improving oral reading fluency with elementary students (Sindelar, Monda, & O'Shea, 1990; Stoddard, Valcante, Sindelar, O'Shea, & Algozzine, 1993), adolescent struggling readers (Roundy & Roundy, 2009), and students with learning disabilities (Mercer, Campbell, Miller, Mercer, & Lane; 2000; Sindelar et al., 1990; Rashotte & Torgesen, 1985). Furthermore, meta-analyses have validated its effectiveness with elementary students (Therrien, 2004), struggling adolescent readers (Scammacca et al., 2007; Wexler, Vaughn, Edmonds, & Reutebuch, 2008), adolescents with severe reading delays (Therrien, 2004) and students with learning disabilities (Chard, Ketterlin-Geller, Baker, Doabler, & Apichatabutra, 2009; Chard, Vaughn, & Tyler, 2002; Therrien & Hughes, 2008).

Through repeated reading, students increase their exposure to words, which can decrease the latency of recognizing the practiced words. LaBerge and Samuels (1974) regarded this type of practice as essential for establishing automaticity of the words read, thus building one's sight-word vocabulary. Automaticity in lower-level skills frees up cognitive resources for use on higher-level skills. Samuels and Flor (1997) suggested that automaticity in behavior allows "multi-tasking" to occur. In the case of reading, automaticity in decoding words and fluent reading allows a student to use his or her cognitive resources for more demanding cognitive tasks such as comprehension and metacognition.

Repeated reading is practice that requires the learner to read "a short, meaningful passage several times until a satisfactory level of fluency is reached. Then the procedure



is repeated with a new passage” (Samuels, 1988, p. 404). Recent literature suggests that reading a passage three times is optimal (NICHD, 2000; Therrien, 2004). During interventions with repeated reading, the examiner instructs the student to read and reread a passage quickly and accurately for one minute at which time the researcher tells the reader to stop reading. The researcher documents any errors the student makes during the reading. This procedure occurs two to three more times. Another common procedure is to instruct the student to read a short passage in its entirety first and then reread for one minute (Daly, Martens, Kilmer, & Massie, 1996; Daly et al., 1998; Daly et al., 1999; Daly, Murdoch, Lillenstein, Webber, & Lentz, 2002; Eckert, Dunn, & Ardoin, 2006).

For this review, the operational definition for the repeated-reading procedure is reading the same passage two or more times. Repeated reading without additional components occurred in four single-case studies (Begeny, Daly, & Valleley, 2006; Jones & Wickstrom, 2002; Jones et al., 2009; Valleley & Shriver, 2003). Repeated reading was effective for 13 of the 15 participants. Ten of the participants were in elementary school, 6 were struggling readers (Jones & Wickstrom, 2002; Jones et al., 2009), three received special education services in a regular education classroom (Jones et al., 2009), and one student had a learning disability and speech/language impairments (Begeny et al., 2006). Additionally, three high school students with learning disabilities who lived in a residential treatment facility increased oral reading fluency during the repeated reading condition (Valleley & Shriver, 2003).

Repeated reading may or may not include the addition of performance feedback. Repeatedly reading a passage aloud to an adult and not receiving any feedback does not provide the student with any information regarding performance, which may be essential

for improving performance. Feedback includes telling the student the number of words read correctly and/or incorrectly. Another form of feedback is telling the student how long it took to read the passage (Daly et al., 2002; Eckert et al., 2000). Repeated reading with performance feedback occurred in three single-case studies (Daly et al., 1999; Eckert et al., 2006; Welsch, 2007) and was effective for 10 out of 14 elementary students. The four struggling readers in the Daly et al. study, the four elementary students with learning disabilities in the Welsch study, and two of the six struggling elementary readers in the Eckert et al. study demonstrated gains in oral reading fluency following repeated reading with feedback based on words read correctly per minute.

Preliminary results suggest that repeated reading without feedback is effective for elementary students and for high school students with learning disabilities living in a residential treatment facility. Repeated reading with feedback is effective for elementary students with and without learning disabilities. More research is required to attain a more definitive answer about the effectiveness of repeated reading in its pure form with or without performance feedback.

**Listening-passage preview.** Listening passage preview (LPP) is a skill-based strategy that improves oral reading fluency by providing a model of fluent reading (Meyer & Felton, 1999). Listening passage preview, or modeling, is effective for improving comprehension (Cates et al., 2006; Hale et al., 2005; Kuhn & Stahl, 2003) and word recognition accuracy (Kuhn & Stahl, 2003; Rasinski, 2001). Burns and Wagner (2008) suggested that for students with low accuracy, listening and following along with a proficient reader is necessary for the student to perform well. Additionally, LPP may facilitate oral reading fluency for middle and high school struggling readers (Wexler,

Vaughn, Edmonds, & Reutebuch, 2008), primary through elementary students with disabilities (Chard et al., 2002), and primary through high school students without disabilities (Therrien, 2004).

Many students, especially students with low socioeconomic status, enter school with limited exposure to listening to stories by a fluent, proficient reader (Neuman & Roskos, 1993). This limited exposure leaves students with little knowledge of how to read narrative passages or expository text with appropriate intonation and expression. That is, they have a limited understanding of the rhythm of the language. In addition, the students' limited exposure to the printed word and its meaning impedes growth in receptive vocabulary. These students enter school behind their same-age peers in reading-related skills, and according to the "Mathew Effect," catching up with their peers is difficult (Stanovich, 1986). LPP provides a demonstration of the rhythm of the language and an opportunity to hear the correct pronunciation of the words in the passage. If the student also reads silently along with the reader, then the bond between the written word (orthography) and the oral word (phonology) may strengthen.

During LPP, before the student reads the passage, the examiner reads it aloud while the student follows along on another copy of the passage. This strategy has been implemented by adults (Rose 1984; Rose & Beattie, 1986; Rose & Sherry, 1984), peers (Yurick, Robinson, Cartledge, Lo, & Evans, 2006), and through tape recordings of adults (Daly & Martens, 1994; Rose & Beattie, 1986). Adult implementation of listening passage preview is more effective than peer implementation for improving fluency (Therrien, 2004). One variation involves listening to smaller chunks of text before reading. McComas et al. (2009) examined the effectiveness of three modeling

interventions: listening passage preview, listening sentence preview (LSP), and listening word preview (LWP) with three elementary school students. All three students improved oral reading fluency with listening passage preview and listening sentence preview, but not with listening word preview.

Listening passage preview occurred in two studies and was effective for seven out of eight elementary students with learning disabilities (Rose & Beattie, 1986; Welsch, 2007). Few single case studies have examined the effectiveness of listening passage preview on oral reading fluency because most of the studies add repeated reading to LPP requiring students to read the passage two or more times after listening (Burns & Wagner, 2008). More research is required to attain a more definitive answer to the effectiveness of listening passage preview as an intervention for improving oral reading fluency.

**Corrective feedback.** The purpose of corrective feedback is to improve accuracy and word recognition. Systematic error correction, phrase-drill error correction, and syllable segmentation with blending are three corrective feedback strategies of varying intensity, from least intrusive to most intrusive, respectfully. The systematic error correction strategy occurs immediately after the student reads a passage aloud. The examiner points to and correctly reads the first word that the student read incorrectly and then asks the student “what word?” The student then reads the word correctly. Systematic error correction or variations of it occur in conjunction with repeated reading.

Several variations of systematic error correction exist. For example, Rose, McEntire, and Dowdy (1982) examined the effectiveness of word supply and sounding out. When a student made an error during an oral reading of a passage, the examiner

either supplied the correct word and instructed the student to repeat the word (word supply) or the examiner asked the student to sound out each phoneme and then read the word (sounding out). Word supply was more effective than sounding out and baseline performance. Another variation involves the examiner correcting an error as soon as the error occurs rather than at the end of the passage (Malloy, Gilbertson, & Maxfield, 2007).

Systematic error correction or variations of it occurred in three studies and it was effective (Alber-Morgan, Ramp, Anderson, & Martin, 2007; Malloy et al., 2007; Rose et al., 1982). Systematic error correction was effective for four out of five elementary school students who were English language learners (Malloy et al., 2007), all five elementary students with learning disabilities (Rose et al., 1982) and three of the four middle school students with behavioral problems (Alber-Morgan et al., 2007).

Phrase-drill error correction, the second type of corrective feedback, provides more intense corrective feedback compared to systematic error correction. The phrase-drill error correction strategy occurs immediately after the student reads a passage aloud. The examiner points to and correctly reads the first word that the student read incorrectly and then asks the student “what word?” The student then reads the word correctly. Then the examiner instructs the student to read the phrase containing the error word three times. By reading the phrase three times, the student has the opportunity to practice reading a less familiar word in context. This practice can strengthen the student’s connection between the orthographical, phonological, and lexical representations of that word, increasing the student’s sight word vocabulary (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Reading a phrase three times may develop greater knowledge of how to read syntactical segments of text, which may facilitate prosodic

reading or reading with expression and appropriate intonation (Kuhn & Stahl, 2004; Mokhtari & Thompson, 2006; Schwanenflugel, Hamilton, Kuhn, & Stahl, 2004). Phrase-drill error correction alone occurred in two studies (Daly et al., 2002; Jones et al., 2009) and was effective for eight out of eleven students. All of the students were in elementary school, five students identified as struggling readers (Daly et al., 2002; Jones et al., 2009) and three students identified as having learning disabilities (Jones et al., 2009).

Syllable segmentation with blending provides the most intense form of corrective feedback. This strategy has been implemented when a student has read the same word incorrectly during multiple readings of the same passage (Ardoin, McCall, & Klubnik, 2007; Ardoin, Williams, Klubnik, & McCall, 2009; Daly, Bonfiglio, Mattson, Persampieri, & Foreman-Yates, 2005; Daly Persampieri, et al., 2005). The ability to analyze a polysyllabic word by its syllables supports decoding abilities and increases sight word vocabulary (Bhattacharya, 2006; Bhattacharya & Ehri, 2004). Syllable segmentation with blending occurs after the second and subsequent readings. Using an index card, the examiner covers the word except for the first syllable, reads the syllable, and prompts the student to read the syllable. This procedure of modeling and prompting continues until the examiner exposes all of the syllables in the word. After all errors have been corrected with the syllable segmentation and blending strategy, the examiner instructs the student to review each word by reading each syllable, blending the syllables, and then reading the word. Four studies implemented syllable segmentation and blending (Ardoin et al., 2007; Ardoin et al., 2009; Daly, Bonfiglio, et al., 2005; Daly, Persampieri, et al., 2005) but this strategy was one of several strategies in a treatment package. Therefore, the effectiveness of syllable segmentation and blending alone is undetermined.

**Self-graphing.** Self-graphing performance provides a visual, concrete representation of one's performance and frequent opportunities to monitor progress (Fuchs & Fuchs, 1986), improves academic performance (Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999) and influences motivation (Morgan & Sideridis, 2006). Research suggests that self-graphing improves nonacademic behaviors such as disruptive behavior (Shapiro, & Cole, 1999), preparedness (Creel, Fore, Boon, & Bender, 2006), and on-task behaviors (Harris, Friedlander, Saddler, Frizzle, & Graham, 2005). Research also suggests that self-graphing improves academic performance of written expression, (Shimabukuro et al., 1999; Stotz, Itoi, Konrad, & Alber-Morgan, 2008) reading comprehension, (Shimabukuro et al., 1999) mathematics (Dunlap & Dunlap, 1989; Shimabukuro et al., 1999) and spelling (Harris et al., 2005). Furthermore, research suggests that self-graphing improves oral reading fluency (Eckert et al., 2000; Eckert et al., 2002; Gunter, Miller, & Venn, 2003).

After the student reads a passage, the instructor provides feedback regarding the number of words read correctly in one minute. The student graphs that number. Student graphing occurred in three studies (Eckert et al., 2000; Eckert et al., 2002; Gunter et al., 2003) and was effective for all 11 students. In two studies, self-graphing was implemented alone and was effective for the four elementary students at-risk for reading failure (Eckert et al., 2000) and for the one 3<sup>rd</sup> grade female with severe emotional and behavioral disabilities (Gunter et al., 2003). In the third study, Eckert and her colleagues (2002) examined the effectiveness of a multicomponent skill-based intervention with and without student graphing and contingent reinforcement. The addition of student graphing was more effective than baseline performance for the six struggling elementary readers.

For two of these students, the addition of self-graphing was a more effective intervention than the skill-based intervention alone. Two other studies, not reported here, used student graphing as a component of an intervention package and therefore the effectiveness of self-graphing alone cannot be determined (Tam, Heward, & Heng, 2006; Yurick et al., 2006). Student graphing as a solo strategy has not been examined enough to draw any substantial conclusions, but preliminary findings are promising.

**Contingent reinforcement.** Contingent reinforcement, based on behavioral principles, involves delivering or removing a stimulus contingent upon a response, and that response increasing or maintaining in the future. When used in reading, contingent reinforcement is typically positive reinforcement in which a stimulus is contingent upon meeting a fluency goal. Fluency goals have varied across studies that have used contingent reinforcement. One fluency goal commonly utilized is reading a set number of words correctly (Daly et al., 1998, 1999). For example, the researchers provided positive reinforcement contingent upon the student reading 100 words per minute correctly on 5<sup>th</sup> grade passages and 60 or 70 words per minute correctly on 1<sup>st</sup> and 2<sup>nd</sup> grade passages (Daly et al., 1998, 1999). Another fluency goal commonly utilized is reading 30% more words correctly per minute over baseline performance (Jones & Wickstrom, 2002; Jones et al., 2009) or 30% more words correctly per minute over the student's best performance (Daly, Persampieri, et al., 2005; McCurdy et al., 2007). Some fluency goals were less stringent such as requiring performance to increase by 5% over initial passage reading (Eckert et al., 2002), by 10% over the median of previous performances (Noel et al., 2001), or by 10% over the average of the previous four performances (Welsch, 2007). The least stringent goals were those requiring a student to read at least one additional



word correctly per minute over his or her previous fluency performance (Begeny et al., 2006; Daly, Bonfiglio, et al., 2005; Malloy et al., 2007; Noel et al., 1998).

The types of stimuli available as reinforcers play a large role in the effectiveness of reinforcement as a strategy to increase reading fluency. Alberto and Troutman (2008) recommend conducting a preference assessment or survey to determine a stimulus that motivates a student to perform at his or her best. Only three studies included an item preference assessment or interview (Begeny et al., 2006; Daly et al., 1999, 1998). Contingent reinforcement was effective for the one elementary school student with learning disabilities who attended an alternative school for individuals with behavioral impairments. The findings of the Daly et al. (1999) study suggested that contingent reinforcement was effective for one middle school student and two elementary students who struggled with reading. The findings of the Daly et al. (1998) study suggested that contingent reinforcement was effective for two struggling readers, a middle school student and an elementary student. Northup, George, Jones, Broussard, and Vollmer (1996) suggested that contingent reinforcement is more effective when a student gets to choose from among several types of stimuli instead of choosing an item from a bag or rating items. In lieu of a preference assessment, Jones et al. (2002, 2009) presented three colored coupons to represent the three types of available stimuli--prizes, edibles, or awards. Contingent reinforcement was effective for increasing the number of words read correctly for four out of the five struggling elementary readers in the Jones et al. (2002) study. Similarly, two of the three struggling elementary readers and the three elementary students who received special education services in a general education classroom increased oral reading fluency with the addition of contingent reinforcement. Although

the students in the Jones and colleagues (2002, 2009) studies increased their oral reading fluency, they did not meet the fluency goal, which required the students to increase performance by 30% over baseline performance. Students did meet this goal when the intervention included contingent reinforcement and additional strategies.

In seven additional studies, the researchers did not conduct a preference assessment. In Eckert et al. (2000, 2002), contingent on meeting the fluency goal, students could choose educationally-relevant items such as pencils, erasers, and pens. In the remaining studies, students had a variety of items to choose from such as stamp markers, baseball cards, and pocket games (Daly et al., 2002, Daly, Persampieri, et al., 2005; Malloy et al., 2007; Noel et al., 2001; Welsch, 2007).

Contingent reinforcement occurred in 13 studies and was effective for increasing correctly read words per minute over baseline data for 37 out of 50 students. Approximately 30% of the 37 students received educational services for disabilities including attention deficit disorder, learning disabilities, and intellectual deficits. Additionally, 12% of the 37 students who increased oral reading fluency with contingent reinforcement were English language learners. With the exception of two sixth-grade students, all of the students attended elementary schools.

### **Multicomponent Intervention Characteristics**

Students who exhibit skill deficits may require multiple skill-based strategies instead of just one skill-based strategy to improve oral reading fluency. Students who exhibit performance deficits may require multiple performance-based strategies instead of just one performance-based strategy to improve oral reading fluency. Additionally,

students who exhibit skill and performance deficits may require a combination of skill-based and performance-based strategies to improve oral reading fluency. In the studies reviewed, students who required multiple performance-based strategies also required one or more skilled-based strategies. Therefore, this section provides a summary of those students who required multiple skill-based strategies and those who required combinations of skill- and performance-based strategies.

**Skilled-based strategies.** In 13 studies, researchers implemented two skill-based strategies (RR with LPP, LPP with phrase-drill error correction, and RR with systematic error correction) to improve oral reading fluency. In seven studies, researchers examined the combination of repeated reading and listening passage preview (Daly et al., 1999, 2002; Eckert et al., 2000, 2002; Rose, 1984; Rose & Sherry, 1984; Weinstein & Cooke, 1992). In both of Daly's studies (Daly et al., 1999; Daly et al., 2002), researchers compared the relative effects of repeated reading alone and with listening passage preview. Participants in both studies were struggling readers in elementary school. Six out of the nine participants made larger gains in oral reading fluency with the combination of RR and LPP. Eckert and colleagues (2000, 2002) found similar results for all 10 struggling readers in elementary school. In both of Rose's studies (Rose, 1984; Rose & Sherry, 1984), researchers compared the effectiveness of repeated reading with listening passage preview and repeated reading with silent passage preview. Rates of oral reading fluency increased during the condition consisting of repeated reading and listening passage preview for the six elementary school students with learning disabilities (Rose, 1984) and for four of the five high school students with learning disabilities (Rose & Sherry, 1984). Weinstein and Cooke (1992) compared a fixed-rate criterion with a

criterion based on a set number of improvements. Both interventions included repeated reading and listening passage preview. All four elementary school students with learning disabilities made large gains in oral reading fluency during both conditions. In summary, the combination of repeated reading and listening passage preview was effective for 27 of the 34 participants including 13 struggling readers in elementary school, 10 elementary school students with learning disabilities, and 4 high school students with learning disabilities.

In three studies, researchers examined the effectiveness of listening passage preview and phrase-drill error correction with students in elementary school (Daly et al., 1998; Jones & Wickstrom, 2002; Jones et al., 2009). In these studies, researchers examined the effects of contingent reinforcement, repeated reading, phrase-drill error correction that included listening passage preview, and combinations of these strategies. Phrase-drill error correction that included listening passage preview was effective for two of the three struggling readers in the Daly et al. study, for four of the five struggling readers in the Jones and Wickstrom study, and for the three struggling readers and the three students with learning disabilities in the Jones et al. study. In summary, rates of oral reading fluency increased over baseline performance for 12 of the 14 elementary school students during the intervention that included phrase-drill error correction and listening passage preview. Of the 12 elementary school students, three had learning disabilities and nine were struggling readers.

In three studies, researchers combined repeated reading and systematic error correction (Alber-Morgan et al., 2007; Malloy et al., 2007; Rose et al., 1982). Alber-Morgan et al. conducted their study with four middle school students who exhibited

emotional and behavioral problems. Repeated reading and systematic error correction produced higher rates of oral reading fluency compared to rates during baseline for three of the four students, two of whom had learning disabilities. Malloy et al. examined the relative effects of repeated reading with systematic error correction and four other reading strategies. Repeated reading with systematic error correction was effective for improving oral reading fluency for four out of the five Latino students in elementary school. Rose et al. compared the relative effectiveness of repeated reading with one of two corrective feedback procedures, systematic error correction, and sounding out. Four of the five elementary school students with learning disabilities produced higher rates of oral reading fluency during the systematic error correction condition. In summary, repeated reading and systematic error correction was effective for 11 out of 14 students, including four elementary school students with learning disabilities, four Latino elementary school students who previously received services as English language learners, and three middle school students with emotional behavioral disabilities and learning disabilities.

**Combinations of skill- and performance-based strategies.** Multicomponent interventions that included three skill-based strategies and one performance-based strategy occurred in six studies (Bonfiglio, Daly, Persampieri, & Andersen, 2006; Daly et al., 2002; McComas et al., 2009; Noel et al., 2001, 1998; Tam et al., 2006). Bonfiglio et al. examined the effectiveness of a treatment package consisting of three skill-based strategies and one performance-based strategy. Researchers then dismantled the treatment package until the most efficient intervention was identified. All four struggling readers in elementary school produced large gains in oral reading rate during the condition with

three skill-based strategies, taped preview, choral reading, and repeated reading, and one performance-based strategy, contingent reinforcement. Daly et al. systematically added strategies until an intervention package was identified for each student. The intervention package that consisted of listening passage preview, repeated reading, phrase-drill error correction, and contingent reinforcement was the most effective condition for two of the five struggling readers in elementary school. McComas et al. conducted a brief experimental analysis and found that listening passage preview, repeated reading, systematic error correction, and contingent reinforcement were effective for improving oral reading fluency for all three struggling readers in elementary school. This same combination of strategies (McComas et al., 2009) was effective for 11 elementary school students, two with attention deficit hyperactivity disorder (Noel et al., 1998), four without disabilities (Noel et al., 2001), and five English language learners (Tam et al., 2006). In summary, the combination of listening passage preview, repeated reading, corrective feedback, and contingent reinforcement was an effective intervention for 20 out of 24 elementary school students that included struggling readers, students with ADHD, and English language learners.

In one study, researchers examined the effectiveness of an intervention that combined three skill-based strategies and two performance-based strategies (Yurick, Robinson, Cartledge, Lo, & Evans, 2006). The intervention consisted of peer-mediated repeated reading, phrase-drill error correction, listening passage preview, contingent reinforcement, and self-graphing. This combination of strategies produced significantly higher rates of oral reading compared to sustained-silent reading for all 22 elementary

school students. Of these students, three were classified as having learning disabilities, four had repeated a grade, and one of those four had speech impairments.

Five studies were conducted that examined the effectiveness of four skill-based strategies and one performance-based strategy (Ardoin et al., 2007, 2009; Bonfiglio et al., 2006; Daly, Bonfiglio, et al., 2005; Daly, Persampieri, et al., 2005). Ardoin et al. (2007, 2009) and Daly, Persampieri, et al. implemented the same skill- and performance-based strategies: listening passage preview, repeated reading, phrase-drill error correction, syllable segmentation with blending, and contingent reinforcement. Ardoin et al. (2009) compared the effectiveness of two multicomponent interventions on oral reading fluency with three elementary school age students who attended a residential treatment facility. The two interventions differed with respect to the number of times the passage was read, three verses six times. Ardoin et al. (2007) compared the effectiveness of two multicomponent interventions on oral reading fluency with six struggling readers in elementary school. The difference between the two interventions was whether the students read one passage four times or two similar passages two times each. Daly, Bonfiglio, et al. compared the effectiveness of two multicomponent interventions on oral reading fluency with four struggling elementary school readers. The difference between the two interventions was whether the students read an easy text, text written on the student's instructional reading level, or a hard text, text written at least two years above the student's instructional reading level. The multicomponent intervention remained the same and was effective in all three studies. All 13 elementary students produced higher rates of oral reading fluency during conditions that included the four skill-based strategies and contingent reinforcement.

Two studies shared a common purpose, to identify an effective and efficient intervention package for each individual (Daly, Persampieri, et al., 2005) or for a small group of four students (Bonfiglio et al., 2006). Daly, Persampieri, et al. and Bonfiglio et al. implemented a multicomponent treatment package first and then dismantled the components. In Daly's study, both elementary school students improved their oral reading fluency during the comprehensive treatment package with the same four skill-based strategies mentioned above. For one student the multicomponent intervention was the most effective intervention. An extended analysis verified the effectiveness of the intervention. In the Bonfiglio et al. study, the treatment package consisted of listening passage preview, choral reading (i.e., student and teacher read the passage aloud at the same time), repeated reading, word-drill error correction (i.e., student read an error word three times instead of reading the phrase containing the error word), and contingent reinforcement. Substantial increases in performance occurred with all four elementary school students. In summary, all 18 students, improved oral reading fluency during conditions that consisted of four skill-based strategies and one performance-based strategy. Of these 18 students, three were classified as learning disabled (Daly, Bonfiglio et al., 2005), three attended a residential facility for individuals with behavioral problems, one of whom had a learning disability, (Ardoin, et al., 2009), and 12 were struggling readers in elementary school (Ardoin et al., 2007; Bonfiglio et al., 2006; Daly, Persampieri, et al., 2005).

### **Conclusion**

Ultimately, the goal of reading is to comprehend text. Despite the wealth of research and knowledge about the reading skills that need to be developed and how best



to develop these skill, 34% of the nation's fourth-graders on average scored below the basic level in reading in 2009 (NCES, 2009). This percentage rises to 46% for fourth-graders living in large urban cities (NCES, 2009). For the nation's eighth-graders, 26% scored below the basic level in reading in 2009 and this percentage rises to 38% for eighth-graders living in large urban cities (NCES, 2009). Because of the strong relation between reading fluency and reading comprehension, improving reading fluency is one avenue for reducing the overall percentage of students scoring below the basic level.

A successful life depends on reading. Students who find reading arduous and demanding rarely persevere, which often leads to further reading deficits. By providing students with instruction in reading fluency and by monitoring students' reading fluency, practitioners can help prevent further reading deficits. Reading fluency is the ability to read words accurately and at a rate consistent with speech. Fluent reading is important because it facilitates the connection between word recognition and comprehension (National Institute for Literacy, 2001). The result of this connection alleviates the bottleneck effect of laboriously decoding words, freeing cognitive resources for use on comprehension. The purpose of this review was to determine which individual strategies and combinations of strategies are effective for improving oral reading fluency with primary through high school students with and without disabilities.

Skill-based strategies and performance-based strategies implemented alone are associated with improvements in the number of words read correctly per minute. While the results are noteworthy, one must take into consideration the number of studies that were conducted and the number of students who participated for each study. The percentage of students who demonstrated gains for each individual skill-based strategy

ranged from 72% to 88%. For repeated reading, seven studies were conducted and 29 students participated. For systematic-error correction, three studies were conducted and 14 students participated. For listening passage preview and phrase-drill error correction, two studies were conducted for each with 8 and 11 students, respectively. Studies that examined contingent reinforcement and self-graphing individually provided encouraging evidence with 74% and 100% of the students demonstrating gains in oral reading fluency, respectively. For contingent reinforcement, 14 studies were conducted and 58 students participated. For self-graphing, three studies were conducted and 11 students participated.

Additionally, the results of this review suggest that interventions consisting of two skill-based strategies are associated with improving oral reading fluency. Seven studies that examined the effectiveness of listening passage preview and repeated reading were conducted with 34 students, and 79% of those students demonstrated higher rates of oral reading fluency over baseline performance. Three studies conducted with 14 students examined the effectiveness of listening passage preview and phrase-drill error correction, and 86% of those students demonstrated gains in oral reading fluency. Additionally, three studies conducted with 11 students examined the effectiveness of repeated reading and systematic-error correction, and 100% of those students demonstrated gains.

Furthermore, the results of single-case studies that examined the effectiveness of three and four skill-based strategies combined with performance-based strategies on oral reading fluency provide strong evidence that such multicomponent interventions are associated with effective outcomes. Six studies conducted with 24 students examined the effectiveness of three skill-based strategies combined with performance-based strategies, and 83% of those students demonstrated gains in oral reading fluency. One study was

conducted with 22 students examining three skilled-based and two performance-based strategies, and 100% of those students demonstrated gains in oral reading fluency. In an additional five studies conducted with 19 students to examine the effectiveness of contingent reinforcement and four skill-based strategies, 100% of the students increased their oral reading fluency.

### **Implications**

Overall, the individual strategies and combinations of strategies to improve oral reading fluency are associated with increases in oral reading fluency. This is true for primary through high school students with and without disabilities. Additionally, the use of single-case methodologies provides an efficient way to monitor each student's progress in oral reading fluency and to monitor the effectiveness of the strategies. This review provides practitioners with several intervention options including individual and combinations of skill- and performance-based strategies that are easy to implement and effective for improving oral reading fluency for students with and without disabilities in elementary school through high school.

The findings from this review support the current literature that suggests repeated reading with and without a model is effective for struggling elementary students (Kuhn & Stahl, 2003), struggling adolescent readers (Scammacca et al., 2007; Wexler et al., 2008), and students with and without disabilities (Chard et al., 2009; Chard et al., 2002; Morgan & Sideridis, 2006 ). Repeated reading with assistance not only improves word recognition, but it also improves oral reading fluency. According to Barth, Catts, and Anthony (2009), word recognition is a key component for explaining individual

differences in reading fluency. Therefore, the reader must practice accurately identifying words until the reader recognizes the words automatically.

Kuhn and Stahl (2003) suggested that fluency instruction produces stronger results when students are reading between the preprimer level and the late second grade level where the focus of instruction is learning-to-read. During the third grade, the focus of instruction changes to reading-to-learn. Text becomes more difficult as students advance through each grade. Students' reading fluency will fluctuate depending on passage difficulty and content familiarity (Scammacca et al., 2007). Although larger increases in reading fluency may occur during the primary years when students are learning to read, it is crucial that reading fluency instruction occurs or that reading fluency is monitored throughout students' formal education. This is true for proficient readers as well (NCES, 2007).

The National Association of the State Boards of Education (2006) urged policymakers to focus on ensuring individualized reading instruction for struggling adolescent readers. Although only four studies were conducted with middle school students and two with high school students, the students who participated in these studies demonstrated higher rates of oral reading fluency with individual strategies and combinations of skill- and performance-based strategies. Additionally, the vast amount of reading-fluency research and positive outcomes with elementary students provides practitioners with various intervention options for middle and high school students. Future research should focus on reading fluency interventions with middle and high school students.

An additional focus for future research includes examining the effectiveness of oral reading fluency interventions with English language learners. The number of students entering the education system who are English language learners is increasing rapidly. According to the National Clearinghouse for English Language Acquisition (2011), there were approximately 5,346,673 English language learners enrolled in public schools during the 2008-2009 school year. The extent to which reading fluency interventions are effective for students who are English language learners is obscured because only two single-case design studies focused on this population. Additional research is needed to determine which strategies are effective with students who are English language learners.

## References

- Adams, M. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Alber-Morgan, S. R., Ramp, E. M., Anderson, L. L., & Martin, C. M. (2007). Effects of repeated readings, error correction, and performance feedback on the fluency and comprehension of middle school students with behavior problems. *The Journal of Special Education, 41*, 17–30.
- Alberto, P. A., & Troutman, A. C. (2008). *Applied behavior analysis for teachers* (7<sup>th</sup> ed.). Upper Saddle River, NJ: Pearson.
- Ardoin, S. P., McCall, M., & Klubnik, C. (2007). Promoting generalization of oral reading fluency: Providing drill versus practice opportunities. *Journal of Behavioral Education, 16*, 55-70.
- Ardoin, S. P., Williams, J. C., Klubnik, C., & McCall, M. (2009). Three versus six rereading of practice passages. *Journal of Applied Behavior Analysis, 42*, 375-380.
- Barth, A., Catts, H. W., & Anthony, J. (2009). The component skills underlying reading fluency in adolescent readers: A latent variable analysis. *Reading and Writing: An Interdisciplinary Journal, 22*, 567-590.
- Begeny, J. C., Daly, E. J., III & Valleley R. J. (2006). Improving oral reading fluency through response opportunities: A comparison of phrase drill error correction with repeated reading. *Journal of Behavioral Education, 18*, 56-70.
- Begeny, J. C., & Martens, B. K. (2006). Assisting low-performing readers with a group-based reading fluency intervention. *School Psychology Review, 35*, 91-107.

- Berninger, V. W., Abbott, R., Vermeulen, K., Fulton, C. M. (2006). Paths to reading comprehension in at-risk second-grade readers. *Journal of Learning Disabilities, 39*, 334–351.
- Bhattacharya, A. (2006). Syllable-based reading strategy for mastery of scientific information. *Remedial and Special Education, 27*, 116-123.
- Bhattacharya, A. and Ehri, L. (2004). Graphosyllabic analysis helps adolescent struggling readers read and spell words. *Journal of Learning Disabilities, 37*, 331-348.
- Boardman, A. G., Roberts, G., Vaughn, S., Wexler, J., Murray, C. S., & Kosanovich, M. (2008). *Effective instruction for adolescent struggling readers: A practice brief*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Bonfiglio, C. M., Daly, E. J. III, Martens, B. K., Lin, L. R., & Corsaut, S. (2004). An experimental analysis of reading interventions: Generalization across instructional strategies, time, and passages. *Journal of Applied Behavior Analysis, 37*, 111-114.
- Bonfiglio, C. M., Daly, E. J., III, Persampieri, M., & Andersen, M. (2006). An experimental analysis of the effects of reading interventions in a small group reading instruction context. *Journal of Behavioral Education, 15*, 93-109.
- Breznitz, Z. (2006). *Fluency in reading: Synchronization of processes*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Burns, M. K. & Wagner, D. (2008). Determining an effective intervention within a brief experimental analysis for reading: A meta-analytic review. *School Psychology Review, 37*, 126-136.
- Cates G. L., Thomason K., Harvey, M., McCormick, C. (2006). A preliminary investigation of the effects of reading fluency interventions on

- comprehension: Using brief experimental analysis to select reading interventions. *Journal of Applied School Psychology*, 23, 133–154.
- Chard, Ketterlin-Geller, Baker, Doabler, & Apichatabutra (2009). Repeated reading interventions for students with learning disabilities: Status of the evidence. *Exceptional Children*, 75, 263-281.
- Chard, D., Vaughn, S., & Tyler, B. J. (2002). A synthesis of research on effective interventions for building reading fluency with elementary students with learning disabilities. *Journal of Learning Disabilities*, 36, 386-406.
- Chafouleas, S. M., Martens, B. K., Dobson, R. L., Weinstein, K. S., & Gardner, K. B. (2004). Fluent reading as the improvement of stimulus control: Additive effects of performance-based interventions to repeated reading on students' reading and error rates. *Journal of Behavioral Education*, 13, 67-81.
- Creel, C., Fore III, C., Boon, R., & Bender, W. (2006). Effects of self-monitoring on classroom preparedness skills of middle school students with Attention Deficit Hyperactivity Disorder. *Learning Disabilities: A multidisciplinary Journal*, 14, 105-114.
- Daly, E. J., III, Bonfiglio, C. M., Mattson, T., Persampieri, M., & Foreman-Yates, K. (2005). Refining the experimental analysis of academic skills deficits: Part I. An investigation of variables that affect generalized oral reading performance. *Journal of Applied Behavior Analysis*, 38, 485–497.
- Daly, E. J., III, & Martens, B. K. (1994). A comparison of three interventions for increasing oral reading performance: Application of the instructional hierarchy. *Journal of Applied Behavior Analysis*, 27, 459–469.



- Daly, E. J., III, Martens, B. K., Dool, E. J., & Hintze, J. M. (1998). Using brief functional analysis to select interventions for oral reading. *Journal of Behavioral Education*, 8, 203-218.
- Daly, E. J., III, Martens, B. K., Hamler, Dool, E. J., & Eckert, T. L. (1999). A brief experimental analysis for identifying instructional components needed to improve oral reading fluency. *Journal of Applied Behavior Analysis*, 32, 83-94.
- Daly, E. J., III, Martens, B. K., Kilmer, A., & Massie, D. R. (1996). The effects of instructional match and content overlap on generalized reading performance. *Journal of Applied Behavior Analysis*, 29, 507-518.
- Daly, E. J., III, Murdoch, A., Lillenstein, L., Webber, L., & Lentz, F. E. (2002). An examination of methods for testing treatments: Conducting brief experimental analyses of the effects of instructional components on oral reading fluency. *Education & Treatment of Children*, 25, 288-316.
- Daly, E. J., III, Persampieri, M., McCurdy, M., & Gortmaker, V. (2005). Generating reading interventions through analysis of academic skills: Demonstrated and empirical evaluation. *School Psychology Review*, 34, 395-414.
- Dunlap L. K., & Dunlap, G. (1989). A self-monitoring package for teaching subtraction with regrouping to students with learning disabilities. *Journal of Applied Behavior Analysis*, 22, 309-314.
- Duhon, G. J., Noel, G. H., Witt, J. C., Freeland, J. T., Dufrene, B. A., & Gilbertson, D. (2004). Identifying academic skill and performance deficits: The experimental analysis of brief assessments of academic skills. *School Psychology Review*, 34, 74-86.

- Eckert, T. L., Ardoin, S. P., Daisey, D. M., & Scarola, M. D. (2000). Empirically evaluating the effectiveness of reading interventions: The use of brief experimental analysis and single case designs. *Psychology in the Schools, 37*, 465-473.
- Eckert, T. L., Ardoin, S. P., Daly, E. J., & Martens, B. K. (2002). Improving oral reading fluency: A brief experimental analysis of combining an antecedent intervention with consequences. *Journal of Applied Behavior Analysis, 35*, 271–281.
- Eckert, T. L., Dunn, E. K., & Ardoin, S. P. (2006). The effects of alternate forms of performance feedback on elementary-aged students' oral reading fluency. *Journal of Behavioral Educational, 15*, 149-162.
- Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta-analysis. *Exceptional Children, 53*, 199–208.
- Gilbert, L., Williams, R. L., & McLaughlin, T. F. (1996). Using Assisted Reading to improve reading fluency of learning disabled students. *Journal of Applied Behavior Analysis, 29*, 255-257.
- Gunter, P. L., Miller, K. A., & Venn, M. L. (2003). A case study of the effects of self-graphing reading performance data for a girl identified with emotional/behavioral disorders. *Preventing School Failure, 48*, 28-31.
- Hale, A. D., Skinner, C. H., Winn, B. D., Oliver, R., Allin, J. D. & Molloy, C. C. (2005). An investigation of listening and listening-while-reading accommodations on reading comprehension levels and rates in students with emotional disorders. *Psychology in the Schools, 42*, 39–51.

- Harris, K. R., Friedlander, B. D., Saddler, B., Frizzelle, R., & Graham, S. (2005). Self-Monitoring of attention versus self-monitoring of academic performance: Effects among students with ADHD in the general education classroom. *Journal of Special Education, 39*, 145-157.
- Hitchcock, C., Prater M., & Dowrick, P. (2004). Reading comprehension and fluency: Examining the effects of tutoring and video self-modeling on first grade students with learning difficulties. *Learning Disability Quarterly, 27*, 89–103.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-case research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.
- Jones, K. M., & Wickstrom, K. F. (2002). Done in sixty seconds: Further analysis of the brief assessment model for academic problems. *School Psychology Review, 31*, 554-568.
- Jones, K. M., Wickstrom, K. F., Noltemeyer, A. L., Brown, S. M., Schuka, J. R., & Therrien, W. J. (2009). An experimental analysis of reading fluency. *Journal of Behavioral Education, 18*, 35-55.
- Kamps, D., Barbetta, P., Leonard, B., & Delquadri, J. (1994). Classwide peer tutoring: An integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers. *Journal of Applied Behavior Analysis, 27*, 49-61.
- Kennedy, C. H. (2004 ). Recent innovations in single-case designs. *Journal of Behavioral Education, 13*, 209-211.
- Kuhn, M. R., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial

- practices. *Journal of Educational Psychology*, 95, 3–21.
- LaBerge, D., & Samuels, S. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293-146.
- Lingo, A. S., Slaton, D. B., & Jolivet, K. (2006). Effects of Corrective Reading on the reading abilities and classroom behaviors of middle school students with reading deficits and challenging behaviors. *Behavioral Disorders*, 31, 265-283.
- Lionetti, T. M., & Cole, C. L. (2004). A comparison of the effects of two rates of listening while reading on oral reading fluency and reading comprehension. *Education and Treatment of Children*, 27, 114-129.
- Malloy, K. J., Gilbertson, D., & Maxfield, J. (2007). Use of brief experimental analysis for selecting reading interventions for English language learners. *School Psychology Review*, 36, 291-310.
- Martens, B. K., Eckert, T. L., Begeny, J. C., Lewandowski, L. J., DeGennaro, F. D., Montarello, S. A., ... Fiese, B. H. (2007). Effect of a fluency-based program on the reading performance on low-achieving second and third grade students. *Journal of Behavioral Education*, 16, 39-54.
- McComas, J. J., Wagner, D., Chaffin, M., Holton, E., McDonnell, M., & Monn, E. (2009). Prescriptive analysis: Further individualization of hypothesis testing in brief experimental analysis of reading fluency. *Journal of Behavioral Education*, 18, 56-70.
- McCurdy, M., Daly, E., Gortmaker, V., Bonfiglio, C., & Persampieri, M. (2007). Use of Brief Instructional Trials to Identify Small Group Reading Strategies: A Two Experiment Study. *Journal of Behavioral Education*, 16, 7-26.

- Mercer, C. D., Campbell, K. U., Miller, M. D., Mercer, K. D., & Lane, H. B. (2000). Effects of a reading fluency intervention for middle schoolers with specific learning disabilities. *Learning Disabilities Research & Practice, 15*, 179–189.
- Meyer, M. S., & Felton, R. H. (1999). Repeated reading to enhance fluency: Old approaches and new directions. *Annals of Dyslexia, 49*, 283–306.
- Mokhtari, K., & Thompson, B. (2006). How problems of reading fluency and comprehension are related to difficulties in syntactic awareness skills among fifth graders. *Reading Research & Instruction, 46*, 73-96.
- Morgan, P. L., & Sideridis, G. D. (2006). Contrasting the effectiveness of fluency interventions for students with or at risk for learning disabilities: A multilevel random coefficient modeling meta-analysis. *Learning Disabilities Research & Practice, 21*, 191–210.
- Musti-Rao, S., Hawkins, R. O., & Barkley, E. A. (2009). Effects of repeated readings on the oral reading fluency of urban fourth-grade students: Implications for practice. *Preventing School Failure, 54*, 12-23.
- National Association of the State Boards of Education (2006). *Reading at Risk: The State Response to the Crisis in Adolescent Literacy: Report of the NASBE Study Group on Middle and High School Literacy outlining a framework based on key state actions needed to take to leverage systemic improvements in classroom instruction and school quality*. Alexandria, VA: Author.
- National Center for Education Statistics ([NCES] 2009). *The nation's report card: Reading 2009 state snapshot report*. Retrieved from [http://nationsreportcard.gov/reading\\_2009](http://nationsreportcard.gov/reading_2009)

- National Center for Education Statistics ([NCES] 2007). *The nation's report card: Reading 2007 state snapshot report*. Retrieved from <http://nces.ed.gov/nationsreportcard/pdf/stt2007/2007497GA8.pdf>
- National Clearinghouse for English Language Acquisition (2011). *The growing numbers of English learner students*. Retrieved from [http://www.ncela.gwu.edu/files/uploads/9/growingLEP\\_0809.pdf](http://www.ncela.gwu.edu/files/uploads/9/growingLEP_0809.pdf).
- National Endowment for the Arts (2007). Research Report #47. *To read or not to read: A national consequence*. Washington, DC: U.S.
- National Institute for Literacy. (2001). *Put reading first: The research building blocks for teaching children to read*. Washington, DC: Author.
- National Institute of Child Health and Human Development [NICHD] (2000). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-47690). Washington, DC: U.S. Government Printing Office.
- Nelson, J. S., Alber, S. R., & Gordy, A. (2004). Effects of systematic error correction and repeated readings on the reading accuracy and proficiency of second graders with disabilities. *Education and Treatment of Children*, 27, 186-198.
- Neuman, S. B., & Roskos, K. (1993). Access to print for children of poverty: Differential effects of adult mediation and literacy-enriched play settings on environmental and functional print tasks. *American Educational Research Journal*, 30, 95-122.

- Noel, G. H., Freeland, J. T., Witt, J. C., & Gansle, K. A. (2001). Using brief assessments to identify effective interventions for individual students. *Journal of School Psychology, 39*, 335–355.
- Noel G. H., Gansle K. A., Witt J. D., Whitmarsh E. L., Freeland J. T., LaFleur L. H., ... Northup, J. (1998). Effects of contingent reward and instruction on oral reading performance at differing levels of passage difficulty. *Journal of Applied Behavior Analysis, 31*, 659–664.
- Northup, J., George, T., Jones, K., Broussard, C., & Vollmer, T. R. (1996). A comparison of reinforcer assessment methods: The utility of verbal and pictorial choice procedures. *Journal of Applied Behavior Analysis, 29*, 201–212.
- Poling, A., Methot, L., & LeSage, M. (1995). *Fundamentals of behavior analytic research*. New York: Plenum Press.
- Rashotte, C. A., & Torgesen, J. K. (1985). Repeated reading and reading fluency in learning disabled children. *Reading Research Quarterly, 20*, 180–188.
- Rasinski, T. V. (1990). Effects of repeated reading and listening-while-reading on reading fluency. *Journal of Educational Research, 83*, 147–150.
- Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest, 2*, 31-74.
- Richards, S. B., Taylor, R. L., Ramasamy, R., & Richards, R. Y. (1999). *Single subject research: Applications in the educational and clinical settings*. Belmont, CA: Wadsworth Group.
- Rose, T. L. (1984). The effects of two prepractice procedures on oral reading. *Journal of*

- Learning Disabilities, 17, 544-548.*
- Rose, T. L., & Beattie, J. R. (1986). Relative effects of teacher-directed and taped previewing on oral reading. *Learning Disability Quarterly, 9, 193-199.*
- Rose, T. L., McEntire, E., & Dowdy, C. (1982). Effects of two error-correction procedures on oral reading. *Learning Disability Quarterly, 5, 100-105.*
- Rose, T. L., & Sherry, L. (1984). Relative effects of two previewing procedures on LD adolescents' oral reading performance. *Learning Disabilities Quarterly, 7, 39-44.*
- Roundy, A. R., & Roundy, P. T. (2009). The effect of repeated reading on student fluency: Does practice always make perfect? *International Journal of Social Sciences, 4, 54-59.*
- Samuels, S. J. (1988). Information processing abilities and reading. *Journal of Learning Disabilities, 20, 18-22.*
- Samuels, S. J., & Flor, R. F. (1997). The importance of automaticity for developing expertise in reading. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 13, 107-121.*
- Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. (2007). *Reading interventions for adolescent struggling readers: A meta-analysis with implications for practice.* Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Schwanenflugel, P., Hamilton, A. M., Kuhn, M., & Stahl, S. (2004). Becoming a fluent reader: Reading skill and prosodic features in the oral reading of young readers. *Journal of Educational Psychology, 96, 119-129.*
- Scott, T. M., & Shearer-Lingo, A. (2002). The effects of reading fluency instruction on



the academic and behavioral success of middle school students in a self-contained EBD classroom. *Preventing School Failure*, 46, 167-174

Shapiro, E.S., & Cole, C.L. (1999). Self-monitoring in assessing children's problems.

*Psychological Assessment*, 11, 448-557.

Shimabukuro, S. M., Prater, M. A., Jenkins, A., & Edelen-Smith, P. (1999). The effects of self-monitoring of academic performance on students with learning disabilities

and ADD/ADHD. *Education and Treatment of Children*, 22, 397-414.

Sindelar, P. T., Monda, L. E., & O'Shea, L. J. (1990). Effects of repeated readings on

instructional-and master-level readers. *Journal of Educational Research*, 83, 220-226.

Smith, D. D. (1979). The improvement of children's oral reading through the use of

teacher modeling. *Journal of Learning Disabilities*, 12, 172-175.

Stanovich, K. E. (1986). Matthew effect in reading: Some consequences of individual

differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360-406.

Stoddard, K., Valcante, G., Sindelar, P., O'Shea, L., & Algozzine, B. (1993). Increasing

reading rate and comprehension: The effects of repeated reading, sentence segmentation, and intonation training. *Reading Research and Instruction*, 32, 53-65

Stotz, K., Itoi, M., Konrad, M., & Alber-Morgan, S. R. (2008). Effects of self-graphing

on written expression of fourth grade students with high-incidence disabilities.

*Journal of Behavioral Education*, 17, 172-186.

Strong, A. C., Wehby, J. H., Falk, K. B., & Lane, K. L. (2004). The impact of a structured

- reading curriculum and repeated reading on the performance of junior high students with emotional and behavioral disorders. *School Psychology Review*, 33, 561-581.
- Sutherland, K., & Snyder, A. (2007). Effects of reciprocal peer tutoring and self-graphing on reading fluency and classroom behavior of middle school students with emotional or behavioral disorders. *Journal of Emotional and Behavioral Disorders*, 15, 103–118.
- Tam, K. Y., Heward, W. L., & Heng, M. A. (2006). A reading instruction intervention program for English-Language Learners who are struggling readers. *The Journal of Special Education*, 40, 79-93.
- Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial and Special Education*, 25, 252-261.
- Therrien, W. J., & Hughes, C. A. (2008). Comparison of repeated reading and question generation on students' reading fluency and comprehension. *Learning Disabilities: A Contemporary Journal*, 6, 1-17.
- Tingstrom, D. H., Edwards, R. P., & Olmi, D. J. (1995). Listening previewing in reading to read: Relative effects on oral reading fluency. *Psychology in the Schools*, 32, 318–327.
- Turpie, J. J., & Paratore, J. R. (1995). "Using repeated reading to promote reading success in a heterogeneously grouped first grade." *In Perspectives on Literary Research and Practice: 44th Yearbook of the National Reading Conference*, edited by K. A. Hinchman, D. J. Leu, and C. K. Kinzer, 255–264. Chicago, IL: National Reading Conference, Inc.

- Valleley, R. J., & Shriver, M. D. (2003). An examination of the effects of repeated readings with secondary students. *Journal of Behavioral Education, 12*, 55–76.
- Vanwagenen, M., Williams, R., & McLaughlin, T. (1994). Use of assisted reading to improve reading rate, word accuracy and comprehension with ESL Spanish speaking students. *Perceptual and Motor Skills, 79*, 227-230.
- Weinstein, G., & Cooke, N. L. (1992). The effects of two repeated reading interventions on generalization of fluency. *Learning Disabilities Quarterly, 15*, 21-28.
- Welsch, R. G. (2007). Using experimental analysis to determine interventions for reading fluency and recalls of students with learning disabilities. *Learning Disability Quarterly, 30*, 115–129.
- Wexler, J., Vaughn, S., Edmonds, M., & Reutebuch, C. K. (2008). A synthesis of fluency interventions for secondary struggling readers. *Reading and Writing: An Interdisciplinary Journal, 21*, 317-347.
- Wilbur, A., & Cushman, T. P. (2006). Selecting effective academic interventions: An example of using brief experimental analysis for oral reading. *Psychology in the Schools, 43*, 79–84.
- Wolf, M., & Katzir-Cohen, T. (2001). Reading fluency and its intervention. *Scientific Studies of Reading, 5*, 211-239.
- Yurick, A. L., Robinson, P. D., Cartledge, G., Lo, Y., & Evans, T. L. (2006). Using peer-mediated repeated readings as a fluency-building activity for urban learners. *Education and Treatment of Children, 29*, 469-506.

CHAPTER 2  
USING EMPIRICALLY VALIDATED READING STRATEGIES TO IMPROVE  
MIDDLE SCHOOL STUDENTS' READING FLUENCY  
OF CLASSROOM TEXTBOOKS

Of the nation's middle school students, 70% read below a proficient reading level and struggle to read the more challenging material they encounter (Rasinski & Padak, 2005). According to the National Center for Education Statistics (NCES, 2007), 27% of the nation's eighth-grade population scored below the basic reading level in 2006-2007. For Georgia's eighth-grade population, 30% scored below the basic reading level, which increases to 44% and 43%, for black students and students eligible for the National School Lunch Program, respectively. These statistics are daunting because adolescents who have reading difficulties are more likely to quit school before receiving a diploma (Daniel et al., 2006; Hock et al., 2008), to struggle finding employment, and to spend time in the juvenile justice system (National Association of the State Boards of Education [NASBE], 2006). For these reasons, it is important to know what reading skills struggling adolescent readers lack and what kind of instruction will effectively improve these deficits.

Word recognition, fluency, vocabulary, comprehension, and motivation are the five areas of focus for middle school reading instruction (Boardman et al., 2008). In a recent descriptive study, Hock et al. (2008) found that compared to average and proficient readers, struggling readers scored significantly lower on all four of the reading-based measures, word recognition, fluency, vocabulary, and comprehension. The lowest scores were in comprehension and fluency. Even proficient readers only scored in the average

range on fluency measures. Reading fluency is the ability to read text accurately at a rate similar to speech and is essential for comprehension (National Institute of Child Health and Human Development [NICHD], 2000).

The fluent reader does not allocate much attention to decoding words. Instead, the fluent reader allocates attention to comprehending text and monitoring comprehension. The dysfluent reader often allocates too much attention to decoding words or verifying accuracy before reading a word aloud. This laborious approach leads to slow, choppy reading that interferes with the attention readers need to allocate to the meaning of text. Not being able to read text fluently is one reason students might struggle to comprehend text (Biancarosa & Snow, 2004) and over time, this leads to greater reading difficulties, causing struggling readers to fall further behind their peers. The NICHD (2000) reported that instruction in reading fluency is a viable practice for improving reading fluency and comprehension.

### **Strategies for Increasing Reading Fluency**

Strategies commonly used to increase fluency include repeated reading, listening passage preview, error correction, and goal setting with performance feedback. The most common of these strategies is the repeated reading technique. There is a substantial empirical database on the efficacy of repeated reading, albeit mostly with elementary students (NICHD, 2000). Repeated reading improves word recognition (Fuchs, Fuchs, Hosp, & Jenkins, 2001; Kuhn & Stahl, 2003), reading rate (Fuchs et al., 2001; Mercer, Campbell, Miller, Mercer, & Lane, 2000; Meyer, 2002; Rasinski, 1990), and reading comprehension (O'Shea, Sindelar, & O'Shea, 1985; Rashotte & Torgesen, 1985). Furthermore, repeated reading is effective for all levels of readers, (O'Connor, White, &

Swanson, 2007; O'Shea et al., 1985; Rashotte & Torgesen, 1985; Rasinski, 1990; Rasinski & Padak, 1994; Valleley & Shriver, 2003) and for students with learning disabilities (Daly & Martens, 1994; Mathes & Fuchs, 1993; O'Conner et al., 2007). During repeated reading, the student reads the same passage aloud multiple times, usually three or to a predetermined fluency criterion. Repeated reading usually involves a combination of fluency strategies, such as repeated reading and systematic-error correction that hone in on other factors that contribute to reading fluency such as familiarity with sentence or text structure, word accuracy, and motivation.

Listening passage preview, another commonly used strategy for improving oral reading fluency, allows the reader to hear how the text should sound when read fluently and results in increased reading fluency (Rose, 1984; Rose & Beattie, 1986; Rose & Sherry, 1984; Welsch, 2007; Tingstrom, Edwards, & Olmi, 1995). During listening passage preview, the student follows along while an adult reads the passage aloud modeling fluent, proficient reading. Familiarity with text structure results from exposure to hearing fluent renditions of different text types. Therefore, hearing the passage before reading it can help the reader become more familiar with how to read different text structures or genres.

An additional commonly utilized strategy is error correction, which provides corrective feedback and the opportunity to read the error word correctly. When a student makes an error, the instructor pronounces the error word correctly and instructs the student to read the word correctly. This procedure helps decrease errors, increase correct words per minute, and improve word recognition. Phrase-drill error correction (PD) provides further practice in accurate reading (Daly, Andersen, Gortmaker, & Turner,

2006). During PD, after the instructor pronounces the error word correctly and the student repeats the correct pronunciation the student reads the phrase or sentence containing the error word three times. This provides further practice correctly reading phrases and sentences.

Performance feedback is another commonly utilized strategy for improving oral reading fluency that influences motivation and results in increased fluency (Morgan & Sideridis, 2006). After reading the text, the instructor provides feedback regarding the performance and the reader then charts it. Performance feedback provides students with immediate information regarding their performance. Self-graphing performance provides a visual, concrete representation of one's performance, frequent opportunities to monitor progress (Fuchs & Fuchs, 1986), and improved academic performance (Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1990).

### **Reading Fluency in Middle School**

Currently there is little evidence that middle school instruction involves reading fluency as part of the curriculum (Boardman et al., 2008). Additionally, the corpus of studies conducted with middle school students on oral reading fluency is small, but the findings are similar to those conducted with elementary school students. In summarizing the research on the efficacy of fluency interventions with sixth- to twelfth-grade struggling readers, Wexler, Vaughn, Edmonds, and Reutebuch (2008) reported that repeated reading effectively improved reading fluency and comprehension.

Improvements were greater with the addition of listening passage preview. Morgan and Sideridis' (2006) meta-analysis supports these findings for students with learning disabilities in grades five through twelve.

The goal of reading fluency interventions is to improve students' overall reading skills to the extent that they are reading on grade level. However, the reading fluency achievement gap between struggling readers and average to proficient readers does not seem to decrease over time (Shaywitz et al., 2006) and does not indicate a decrease with remediation (Bryant et al., 2000). One factor that possibly contributes to the persistent reading achievement gap is the use of texts corresponding to the students' independent and instructional reading levels instead of texts corresponding to the students' grade level. Based on Stahl and Heubach's (2006) recommendation, increased instructional support provides access to texts that are more difficult. For students whose reading fluency is one to two grade levels below their current grade level, providing intense instructional support in students' required textbook may help narrow the reading achievement gap.

The significant use of narrative text for reading fluency instruction is another factor that might contribute to the persistent gap in reading achievement. Although the use of narrative passages is recommended and effective (Daly, Bonfiglio, Mattson, Persampieri, & Foreman-Yates, 2005; Daly, Martens, Kilmer, & Massie, 1996; O'Connor et al., 2002; Welsch, 2007), if increased oral reading fluency fails to generalize to students' content-area texts, the gain is not clinically significant, as it does not allow the student access to required text. Narrative passages contain single exposures to rare, polysyllabic words (Hiebert & Fisher, 2005). In contrast, although social studies and science textbooks also contain rare, polysyllabic words, the content overlap among passages, sections, and chapters is relatively high providing frequent exposure to new, unfamiliar words. Frequent exposure to new words increases word accuracy, strengthens recognition of word parts, and expands the reader's sight-word vocabulary, which all



contribute to increased reading fluency (Scammacca et al., 2007). Additionally, passages that share a high percentage of words lead to greater generalization with unpracticed passages (Daly, Persampieri, McCurdy, & Gortmaker, 2005; Faulkner & Levy, 1994).

### **Current Study**

The first goal of this study was to extend the reading fluency literature by conducting the study with middle school students. In this study, eighth-grade students scoring at or below the 25th percentile in fluency on Grade 8 passages qualified to participate. Intervention packages that included repeated reading plus additional strategies such as, listening passage preview, phrase-drill error correction, and performance feedback with student-charting, have been effective for increasing oral reading fluency (Alber-Morgan, Ramp, Andersen, & Martin, 2007; Boardman et al., 2008; Eckert, Ardoin, Daly, & Martens, 2002; Morgan & Sideridis, 2006; Sutherland & Snyder, 2007; Wilbur & Cushman, 2006). Therefore, the intervention package utilized with eighth-grade students in the current study consisted of listening passage preview, repeated reading, phrase-drill error correction, and performance feedback with student charting.

The second goal of this study was to extend the reading fluency literature by measuring the effectiveness of the intervention using expository passages from the students' required social studies text as opposed to using narrative passages on the students' instructional or independent reading levels. The majority of reading fluency studies have used narrative passages that corresponded to the students' instructional level. Although the use of such passages is recommended and effective (Daly, Bonfiglio, et al., 2005; Daly et al., 1996; O'Connor et al., 2002; Welsch, 2007), it is not likely that fluency

gains on such passages will generalize to students' content-area texts. Rasinski and Padak (2005) found that middle school students read expository text without much expression and seemingly slower than narrative text. A final goal of this study was to extend the reading fluency literature by measuring intervention effects on generalization passages chosen from the students' literature book and practice passages from the Georgia Criterion-Referenced Competency Tests (CRCT) Coach in Science (2002) and Social Studies (2002).

Two research questions guided this study: (a) What are the effects of a comprehensive treatment package consisting of commonly utilized strategies for improving oral reading fluency on middle school students' oral reading fluency using their required grade-level social studies textbooks? and (b) to what extent does performance generalize to required literature textbook passages and passages from CRCT Coach in Science (2002) and CRCT Coach in Social Studies (2002)?

## **Method**

### **Participants and Setting**

This study took place in a southeast urban Title I middle school where 91% of the student population received services from the National School Lunch Program and 98% of the student population was identified as black. The mobility rate was 44%. The eighth-grade reading and social studies teachers selected eighth-grade students to participate who did not pass the reading subtest of the Georgia CRCT. The researcher obtained parental permission and student assent prior to any testing or data collection. Five eighth-grade students returned signed parental permission forms and assented. The

researcher administered the AIMSWEB curriculum-based assessment (Edformation, 2009) to determine if the students qualified. Students qualified if their reading rates were at or below the 25th percentile on eighth-grade passages (Hasbrouck & Tindal, 2006) of the AIMSWEB assessment. After completing the AIMSWEB assessment, one male student withdrew. The four remaining students participated, one female and three males. Three of them received speech and language services (see Table 1). Sessions occurred at a small table in the media center of the students' school.

Table 1

*Participant Characteristics*

Student	Gender	Grade	S & L	Grade 8 AIMSWEB: WCPM (Errors)		
				Passage 1	Passage 2	Passage 3
Adam	Male	8 <sup>th</sup>	Yes	96 (5)	101 (4)	98 (7)
Beau	Male	8 <sup>th</sup>	Yes	99 (2)	91 (4)	87 (10)
Collier	Male	8 <sup>th</sup>	No	129 (5)	113 (10)	99 (11)
Doreen	Female	8 <sup>th</sup>	Yes	110 (5)	93 (7)	109 (6)

*Note.* S & L = speech and language services.

**Materials**

Edformation's Standard Reading Assessment Benchmark Passages (Edformation, 2009) provide a set of three standardized graded benchmark passages for grades 1-8. The examiner assessed the potential participants' accurate oral fluency rate on the three benchmark passages from grades 6, 7, and 8. The students each read nine passages. All baseline, intervention, and generalization passages were transferred from the original documents to a Microsoft Word document. Table 2 provides the reading grade-level average and range of passages students received during baseline, intervention, and generalization.

Instructional materials included passages from the students' required social studies textbook. Passage length ranged from 199 to 451 words. Intervention passages were selected from Chapters 10, 11, and 12 because the students had not begun working on these chapters. Starting with Chapter 10, passages were selected in order from the first section to the last section of Chapters 10 and 11. The two passages from Chapter 12 were from the first section. The introductory paragraph of each chapter was not used during the study. Beginning with the first section of Chapter 10, full paragraphs were transferred in order to form a passage. Each passage only included paragraphs from one section.

Generalization passages, transferred to Word documents, included passages from students' required literature textbooks, the Georgia CRCT Coach, Science Grade 8 (2002), and Social Studies Grade 8 (2002). The Georgia CRCT Coach series is a test preparation for the CRCT which aligns with the Georgia Performance Standards. The CRCT Coach series provides lessons with multiple-choice and open-ended questions and two full-length practice tests. Selected passages from the literature textbooks were from the last half of the textbook and were stories the students had not read yet. Each of the literature passages was the beginning of a narrative and the number of words transferred per passage ranged between 261-360 words. Selected passages from the CRCT Coach Grade 8 Science and Social Studies were materials that the students had not studied yet. Again, the introductory paragraph of a major topic was not included in the study and passages did not include paragraphs from more than one section.

Table 2

*Reading Grade Level of Passages*

	Average and range of reading grade level			
	Adam	Beau	Collier	Doreen
Baseline	10.95 (9.9-13.5)	10.94 (9.9-13.5)	10.94 (9.9-13.5)	10.86 (9.2-13.5)
Intervention	10.13 (6.7-14.2)	10.11 (6.7-14.2)	10.10 (6.7-12.9)	9.75 (6.7-11.8)
<b>Generalization probes</b>				
<b>Literature</b>				
Baseline	3.1	4.80 (3.1-6.4)	5.40 (3.1-6.6)	5.40 (3.1-6.6)
Intervention	5.70 (2.8-8.5)	6.10 (2.8-8.5)	5.93 (2.8-8.5)	5.93 (2.8-8.5)
<b>Science</b>				
Baseline	9.1	8.10 (7-9.1)	8.10 (7-9.1)	8.63 (7-9.8)
Intervention	7.33 (5.6-9.8)	7.85 (6.9-9.8)	7.20 (6.9-7.6)	7.20 (6.9-7.6)
<b>Social Studies</b>				
Baseline	10.1	9.55 (9-10.1)	9.55 (9-10.1)	9.57 (9-10.1)
Intervention	8.70 (7.4-9.6)	8.40 (7.4-9.6)	8.63 (7.4-9.6)	7.96 (7.4-8.9)

**Dependent Variable**

Words correct per minute (WCPM) served as the dependent variable. The graphic display of the students' performance reported WCPM of their first and third reading to determine if performance improved on a passage after three reads and if performance generalized to first reads following listening passage preview on subsequent passages. The researcher scored a word as correct if the student read the word correctly within three seconds or self-corrected a mispronounced word within three seconds. The researcher scored a word as an error each time the student mispronounced a word, substituted another word, omitted a word, or did not read or self-correct a word in three seconds.

## **Independent Variable**

The independent variable was a treatment package that included four components: listening passage preview (LPP), repeated reading (RR), phrase drill error correction (PD), and performance feedback with self-graphing (PF). All students received LPP, RR, and PF for the first reading of each passage and PD for all errors. Students received RR and PF for the second and third reads plus PD for all errors.

**Listening passage preview (LPP).** The researcher read the passage orally with prosody while the student followed along on a printed copy of the passage.

**Repeated reading (RR).** The student read the passage aloud three times. The researcher supplied any words the student did not read within 3 seconds.

**Phrase-drill error correction (PD).** After the first, second, and third reading, the researcher pointed to and read each word that the student read incorrectly. The student read the word and then depending on the length of the sentence read the sentence or phrase containing that word three times. If more than one error occurred in one sentence, all errors were corrected first and then the student read the sentence three times.

**Performance feedback with self-graphing (PF).** After phrase-drill error correction, the researcher told the student how many words he or she read correctly in 1 minute and the student graphed that number on a bar graph.

## **Experimental Design and Data Analysis**

A multiple-probe design across participants was used to examine the effects of the treatment package on reading fluency. The multiple-probe design is a variation of the multiple baseline design, which is advantageous for controlling intervention carry-over effects that occur for behaviors that once learned, will not reverse (Kazdin, 1982). The

design began with observations of baseline performance of words correct per minute for each student. After the behavior was stable, the intervention began with one student and the remaining 3 students continued in the baseline probe condition. In a multiple-probe design, it is not necessary to collect continuous baseline data for the second and subsequent students (Horner & Baer, 1978). Therefore, baseline data were collected daily with the first participant. For the next three participants, four baseline data points were collected at the onset of the study and then one more each for the next two participants. For the fourth participant, three baseline data points were collected immediately prior to treatment because 9 days had passed since the first participant entered treatment.

Generalization probes occurred across baseline and treatment. There were three sets of generalization probes: literature passages, CRCT Coach Grade 8 Science (2002), and CRCT Coach Grade 8 Social Studies (2002). Across three sessions, students received one generalization probe from each of the three sets of generalization probes. After three generalization probes and one to three session without generalization probes, a new series of three generalization probes occurred across three subsequent sessions.

### **Procedure**

For the first student, the baseline phase continued until all data points were within 50% of the mean (Alberto & Troutman, 2008). The second student entered the intervention phase after the first student read at least one WCPM above the baseline average on the third read for two consecutive sessions. Subsequent participants entered intervention following this same decision rule.

**Baseline procedures.** During baseline, the researcher read the following directions to the student, “Read this passage as quickly and accurately as you can.” The student read the passage one time for 1 minute. If the student did not read a word within 3 seconds, the researcher read the word; however, no other feedback occurred during baseline.

**Intervention procedures.** Each intervention session began with the researcher reading a new passage (LPP) one time, while the student followed along on a printed copy of the passage. After LPP, the student read the passage three times. Before each student reading, the researcher said, “Read this passage as quickly and accurately as you can.” During each reading, the researcher documented all errors on a printed copy of the passage and provided the word if the student did not read a word within 3 seconds. After each read, phrase-drill error correction (PD) procedures were implemented with all documented errors. Then the researcher told the student the number of words read correctly in one minute and helped the student graph that performance (PF).

**Generalization procedures.** During baseline, students read a literature generalization passage during one session. During the next session, the students read a science generalization passage. During the following session, the students read a social studies generalization passage. The student read the generalization passages once while the researcher documented all errors on a printed copy of the passage. If the student did not read the word within 3 seconds, the researcher provided the word; however, no other feedback occurred during baseline. The same procedures occurred during intervention sessions except the researcher told the student the number of words read correctly in 1 minute and then helped the student graph that performance.



### **Treatment Integrity**

An independent observer evaluated the implementation of the treatment package by completing a treatment integrity checklist (see Appendix A) for 20% of treatment sessions. The researcher calculated treatment integrity by dividing the total number of procedures completed correctly by the number of procedures on the treatment integrity form. Mean treatment integrity for Adam, Beau, Collier, and Doreen was 99.2%, 100%, 99.8%, and 100%, respectively.

### **Interobserver Agreement**

All sessions were audio recorded. From the recordings, a trained independent observer recorded students' responses for 20% of each student's sessions across both phases. Interobserver agreement (IOA) was conducted on a word-by-word basis. IOA was calculated by dividing the total number of agreements by agreements plus disagreements and multiplying by 100%. Mean agreement for Adam, Beau, Collier, and Doreen was 99.5%, 99%, 99%, and 98% respectively.

### **Social Validity**

Each participant completed an eight-item questionnaire with a four-point Likert-type scale (see Appendix B) for a total possible positive score of 32. Items included statements regarding the different treatment components and students' thoughts on the effectiveness of the intervention. Out of a possible 32, the average score was 23 with the range of 19 to 28. The four students agreed that they improved their performance on passages from their literature text, CRCT Science Coach, and CRCT Social Studies Coach. In addition, they agreed that listening to the intervention passages before they read them and graphing their performance after each reading were both positive experiences. Two students agreed

that reading a passage three times was a positive experience, and one student strongly agreed that reading a phrase containing an error word three times was a positive experience. Additionally, two students and one teacher expressed positive comments about the study. Two students asked the researcher if they could continue the sessions after the study was complete. One student's teacher stated that the student began to ask questions and volunteer to read aloud during class. Additionally, all of the students passed the Georgia Criterion-Referenced Competency Test (CRCT) in reading.

### **Results**

Individual performances of the four students on baseline, intervention, and generalization passages are displayed in Figure 1. The results are reported as average WCPM during each phase of the study. The amount of overlap between baseline and intervention data is reported as a percentage. For generalization probes, an average WCPM was calculated for each type of passage using the first two and last two of each type of passage. That is, the first two and the last two literature generalization passages, the first two and last two science generalization passages, and the first two and last two social studies generalization passages.

Adam read on average 87.5 WCPM in baseline. During intervention, he read on average 88.4 and 113.1 WCPM on first and third reads, respectively. There was 97% overlap between baseline and first-read data points and a 33% overlap between baseline and third-read data points. For literature passages, he read an average of 78 WCPM on the first two probes and 116 WCPM on the last two probes. For the Georgia CRCT Coach: Science Grade 8 passages, he read an average of 92 WCPM on the first two probes and 114.5 WCPM on the last two probes.

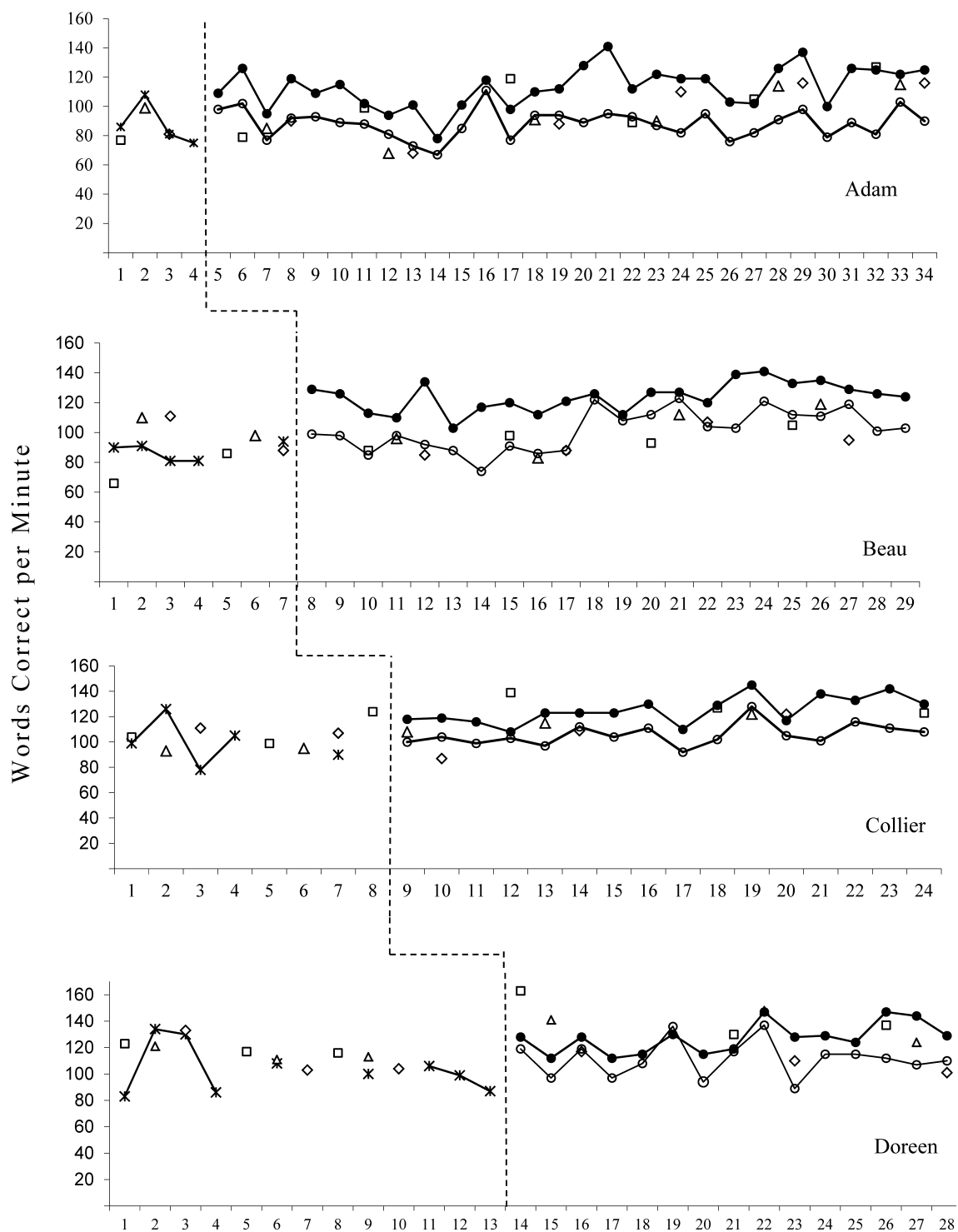


Figure 1. Number of WCPM for each participant. In the intervention phase, the open and closed circles denote 1<sup>st</sup> and 3<sup>rd</sup> reads, respectively. Generalization passages are open square = literature, open triangle = science, & open diamond = social studies.

For the Georgia CRCT Coach: Social Studies Grade 8 passages, he read an average of 85.5 WCPM on the first two probes and 116 WCPM on the last two probes.

Beau read on average 87.6 WCPM in baseline. During intervention, he read on average 101.7 and 123.8 WCPM on first and third reads, respectively. There was a 32% overlap between baseline and first-read data points and a 0% overlap between baseline and third-read data points. For literature passages, he read an average of 76 WCPM on the first two probes and 99 WCPM on the last two probes. For the Georgia CRCT Coach: Science Grade 8 passages, he read an average of 104 WCPM on the first two probes and 115.5 WCPM on the last two probes. For the Georgia CRCT Coach: Social Studies Grade 8 passages, he read an average of 99.5 WCPM on the first two probes and 101 WCPM on the last two probes.

Collier read on average 99.6 WCPM in baseline. During intervention, he read on average 105.8 and 125.3 WCPM on first and third reads, respectively. There was a 94% overlap between baseline and first-read data points and a 56% overlap between baseline and third-read data points. For literature passages, he read an average of 101.5 WCPM on the first two probes and 125 WCPM on the last two probes. For the Georgia CRCT Coach: Science Grade 8 passages, he read an average of 94 WCPM on the first two probes and 118.5 WCPM on the last two probes. For the Georgia CRCT Coach: Social Studies Grade 8 passages he read an average of 109 WCPM on the first two probes and 115.5 WCPM on the last two probes.

Doreen read on average 103.7 WCPM in baseline. During intervention, she read on average 111.5 and 127.1 WCPM on first and third reads, respectively. There was a 97% overlap between baseline and first-read data points and an 80% overlap between

baseline and third-read data points. For literature passages, she read an average of 120 WCPM on the first two probes and 133.5 WCPM on the last two probes. For the Georgia CRCT Coach: Science Grade 8 passages, she read an average of 116 WCPM on the first two probes and 136 WCPM on the last two probes. For the Georgia CRCT Coach: Social Studies Grade 8 passages, she read an average of 118 WCPM on the first two probes and 105.5 WCPM on the last two probes.

### **Discussion**

This study examined the effectiveness of a multicomponent reading intervention on oral reading fluency using the students' eighth-grade social studies textbook. The results suggest that the multicomponent reading intervention positively affected student performance on intervention and generalization passages.

Adam demonstrated a gain of .9 WCPM between his baseline average and his first-read average during intervention and a gain of 3.3 WCPM between his baseline average and the average of first-reads during the last four sessions. His average WCPM increased by 25.6 from baseline to third reads during intervention. On the third reads, he performed above his baseline average throughout the intervention with the exception of Session 14, when he performed 9.5 words below the baseline average. His average performance between the first two generalization probes and the last two generalization probes increased by 38.0 WCPM, 22.5 WCPM, and 30.5 WCPM on the literature passages, the Georgia CRCT Coach: Science Grade 8 passages, and the Georgia CRCT Coach: Social Studies Grade 8 passages, respectively.

Beau demonstrated gains of 14.1 WCPM between his baseline average and his first-read average during intervention and a gain of 20.9 WCPM between his baseline

average and the average of first-reads during the last four sessions. His average WCPM increased by 36.2 from baseline to third reads during intervention. His performance gains on generalization passages were modest with the greatest gains on literature probes. His average performance between the first two generalization probes and the last two generalization probes increased by 23 WCPM, 11.5 WCPM, and 1.5 WCPM on the literature passages, the Georgia CRCT Coach: Science Grade 8 passages, and the Georgia CRCT Coach: Social Studies Grade 8 passages, respectively.

Collier demonstrated gains of 6.2 WCPM between his baseline average and his first-read average during intervention and a gain of 9.4 WCPM between his baseline average and the average of first-reads during the last four sessions. His average WCPM increased by 25.7 from baseline to third-reads during intervention. After three intervention sessions, Collier's performance on generalization passages was consistently above his baseline average. His average performance between the first two probes and the last two probes increased by 23.5 WCPM, 24.5 WCPM, and 6.5 WCPM on the literature passages, the Georgia CRCT Coach: Science Grade 8 passages, and the Georgia CRCT Coach: Social Studies Grade 8 passages, respectively.

Doreen demonstrated a gain of 7.8 WCPM between her baseline average and her first-read average and a gain of 7.3 WCPM between her baseline average and the average of first-reads during the last four sessions. Her average WCPM increased by 23.4 from baseline to third reads during intervention. Her average performance between the first two probes and the last two probes increased by 13.5 WCPM and 20 WCPM on the literature passages and the Georgia CRCT Coach: Science Grade 8 passages, respectively.

Doreen's performance between the first two probes and the last two probes decreased by 12.5 WCPM on the Georgia CRCT Coach: Social Studies Grade 8 passages.

Together these results demonstrate that this multicomponent reading intervention improved oral reading fluency on passages from the students' social studies textbook and that improved oral reading fluency performance generalized to passages from the students' literature textbook, the Georgia CRCT Coach: Science Grade 8 passages and the Georgia CRCT Coach: Social Studies Grade 8 passages. These findings support Stahl and Heubach's (2006) recommendation that providing intensive reading support with difficult reading materials is a viable practice for improving reading skills. Moreover, this study adds to the dearth of studies that have examined the effectiveness of reading interventions on oral reading fluency with middle-school students.

Several variables such as intervention length, text features, and treatment options warrant further investigation. For example looking at the four final first-reads, improvements over baseline were greater with a greater number of sessions albeit only by 3.3 WCPM for Adam. In a recent single-subject meta-analysis, Morgan and Sideridis (2006) found that the addition of goal setting, performance feedback, and reinforcement further improved students' oral reading fluency. It is plausible that the students would have demonstrated higher performance levels if rewards were available contingent on achieving self-imposed practical goals for the second and third readings. Thus, future research should examine the effects of adding contingent reinforcement to the intervention package employed in this study.

It is plausible that text type also played a role in the results of this study. At least two aspects of the text utilized in this study warrant further investigation. First, the

researcher transferred the passages from the students' social studies textbook to a word document. In their exploratory analysis, Lagrou, Burns, Mizerek, and Mosack (2006) found that average readers read passages from the textbooks better than they read passages transferred to a word document. Second, research suggests that the rate of orally reading expository text is slower than the rate of reading narrative text (Petros, Bentz, Hammes, & Zehr, 1990). Compared to narrative passages, the social studies text utilized in this study contained a large number of multisyllabic words, names of historical people, and dates. Additionally, the intonation one uses when reading expository text compared to reading narrative text is different.

In addition to how text might have played a role in the results of this study, another limitation of this study is the utilization of one intervention package. Daly et al. (2006) suggested implementing a brief experimental analysis to determine whether the student displays deficits that are performance-based, skill-based, or both. Students who display performance-based deficits have acquired the skill but lack motivation to perform. Students who display skill-based deficits have not acquired the skill or have acquired the skill on a superficial level. Upon determining the type of deficit, the interventionist implements the most parsimonious strategy and adds additional strategies hierarchically until optimal performance occurs. For example, given Doreen's high fluency performance on many passages, it is plausible that had the researcher first implemented a brief experimental analysis the data might have indicated that Doreen needed performance-based strategies. Likewise, a brief experimental analysis might have indicated that Collier demonstrated performance deficits, albeit different from Doreen's deficits. Collier's performance during early intervention sessions included many



omissions and substitutions of definite and indefinite articles (the, a, an) and substitutions of words by adding or not pronouncing word endings. Offering a tangible item contingent on meeting goals based on reducing such errors might have been more effective for Collier. Alan's brief experimental analysis might have indicated that the optimal intervention package exclude listening passage preview because after the 23rd session, his oral reading rate was considerably higher and more stable on the CRCT Coach social studies generalization passages that did not include LPP, than on the first reads of the intervention passages.

This study extends the current literature in several ways. First, the intervention was conducted with middle school students adding to the small corpus of studies regarding intervention effects on oral reading fluency with middle school students. Second, the intervention was conducted using expository passages from the students' required social studies textbook during the intervention. Student performance increased on intervention and generalization passages, which suggests that reading fluency interventions are effective with content-area expository text. Thus, this study demonstrates that providing strong reading fluency support for middle school students using classroom texts is a viable strategy for improving reading fluency. The results of this study are promising, and given that reading content-area text is the core of education in middle school, further research is necessary.

## References

- Alber-Morgan, S. R., Ramp, E. M., Anderson, L. L., & Martin, C. M. (2007). Effects of repeated readings, error correction, and performance feedback on the fluency and comprehension of middle school students with behavior problems. *The Journal of Special Education, 41*, 17–30.
- Alberto, P. A., & Troutman, A. C. (2006). *Applied behavior analysis for teachers* (7<sup>th</sup> ed.). Upper Saddle River, NJ: Pearson.
- Biancarosa, G., & Snow, C. (2004). *Reading next: A vision for action and research in middle and high school literacy: A report to Carnegie Corporation of New York* (2<sup>nd</sup> ed.). Washington, DC: Alliance for Excellent Education.
- Boardman, A. G., Roberts, G., Vaughn, S., Wexler, J., Murray, C. S., & Kosanovich, M. (2008). *Effective instruction for adolescent struggling readers: A practice brief*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Bryant, D. P., Vaughn, S., Linan-Thompson, S., Ugel, N., Hamff, A., & Hougen, M. (2000). Reading outcomes for students with and without reading disabilities in general education middle-school content area classes. *Learning Disability Quarterly, 23*, 238-252.
- Daly, E. J., III, Andersen, M., Gortmaker, V., & Turner, A. (2006). Using experimental analysis to identify reading fluency: Connecting the dots. *The Behavior Analyst Today, 7*, 133–150.
- Daly, E. J., III, Bonfiglio, C. M., Mattson, T., Persampieri, M., & Foreman-Yates, K. (2005). Refining the experimental analysis of academic skills deficits: Part I. An investigation of variables that affect generalized oral reading performance.

*Journal of Applied Behavior Analysis*, 38, 485–497.

Daly, E. J., III, & Martens, B. K. (1994). A comparison of three interventions for increasing oral reading performance: Application of the instructional hierarchy.

*Journal of Applied Behavior Analysis*, 27, 459–469.

Daly, E. J., III, Martens, B. K., Kilmer, A., & Massie, D. R. (1996). The effects of instructional match and content overlap on generalized reading performance.

*Journal of Applied Behavior Analysis*, 29, 507–518.

Daly, E. J., III, Persampieri, M., McCurdy, M., & Gortmaker, V. (2005). Generating reading interventions through analysis of academic skills: Demonstrated and empirical evaluation. *School Psychology Review*, 34, 395–414.

Daniel, S. S., Walsh, A. K., Goldston, D. B., Arnold, E. M., Reboussin, B. A., & Wood, F. B. (2006). Suicidality, school dropout, and reading problems among adolescents.

*Journal of Learning Disabilities*, 39, 507-514.

Eckert, T. L., Ardoin, S. P., Daly, E. J., & Martens, B. K. (2002). Improving oral reading fluency: A brief experimental analysis of combining an antecedent intervention with consequences. *Journal of Applied Behavior Analysis*, 35, 271–281.

Edformation, Inc. (2009). Standard Reading Assessment Benchmark Passages Grade 6, 7, & 8. Retrieved August 8, 2009 from [www.edformation.com](http://www.edformation.com).

Faulkner, H. J., & Levy, B. A. (1994). Fluent and nonfluent forms of transfer in reading: Words and their message. *Psychonomic Bulletin and Review*, 6, 111-116.

Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta-analysis. *Exceptional Children*, 53, 199–208.

Fuchs, L. S., Fuchs, D., Hosp, M. K., & Jenkins, J. R. (2001). Oral reading fluency as an

indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5, 239–256.

Georgia CRCT Coach, Science Grade 8. (2002). New York, NY: Educational Design.

Georgia CRCT Coach, Social Studies Grade 8. (2002). New York, NY: Educational Design.

Hasbrouck, J., & Tindal, G. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher*, 59, 636–644.

Heibert, E. H., & Fisher, C. W. (2005). A review of the national reading panel's study on fluency: The role of text. *Elementary School Journal*, 106, 443–461.

Hock, M. F., Brasseur, I. F., Deshler, D. D., Catts, H. W., Marquis, J. G., Mark, C. A., & Stripling, J. W. (2008). What is the reading component skill profile of adolescent struggling readers in urban schools? *Learning Disability Quarterly*, 32, 21–38.

Horner, R. D., & Baer, D. M. (1978). Multiple-probe technique: A variation of the multiple baseline. *Journal of Applied Behavior Analysis*, 11, 189–196.

Kazdin, A. E. (1982). *Single case research design*. New York, NY: Oxford University Press.

Kuhn, M. R., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial practices. *Journal of Educational Psychology*, 95, 3–21.

Lagrou, R. J., Burns, M. K., Mizerek, E. A., & Mosack, J. (2006). Effect of text presentation on reading fluency and comprehension: An exploratory analysis. *Journal of Instructional Psychology*, 33, 100–109.

Mathes, P. G., & Fuchs, L. S. (1993). Peer-mediated reading instruction in special education resource rooms. *Learning Disabilities Research & Practice*, 8, 233–243.

- Mercer, C. D., Campbell, K. U., Miller, M. D., Mercer, K. D., & Lane, H. B. (2000). Effects of a reading fluency intervention for middle schoolers with specific learning disabilities. *Learning Disabilities Research & Practice, 15*, 179–189.
- Meyer, M. (2002). Repeated reading: An old standard is revisited and renovated. *Perspectives, 28*, 15-18.
- Morgan, P. L., & Sideridis, G. D. (2006). Contrasting the effectiveness of fluency interventions for students with or at risk for learning disabilities: A multilevel random coefficient modeling meta-analysis. *Learning Disabilities Research & Practice, 21*, 191–210.
- National Association of the State Boards of Education (2006). *Reading at Risk: The State Response to the Crisis in Adolescent Literacy: Report of the NASBE Study Group on Middle and High School Literacy outlining a framework based on key state actions needed to take to leverage systemic improvements in classroom instruction and school quality*. Alexandria, VA: Author.
- National Center for Education Statistics (2007). *The nation's report card: Reading 2007 state snapshot report*. Retrieved from <http://nces.ed.gov/nationsreportcard/pdf/stt2007/2007497GA8.pdf>
- National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-47690). Washington, DC: U.S. Government Printing Office.

- O'Connor, R. E., Bell, K. M., Harty, K. R., Larkin, L. K., Sackor, S. M., & Zigmond, N. (2002). Teaching reading to poor readers in the intermediate grades: A comparison of text difficulty. *Journal of Educational Psychology, 94*, 474–485.
- O'Connor, R. E., White, A., & Swanson, H. L. (2007). Repeated reading versus continuous reading: Influences on reading fluency and comprehension. *Exceptional Children, 74*, 31–46.
- O'Shea, L. J., Sindelar, P. T., & O'Shea, D. J. (1985). The effects of repeated readings and attentional cues on reading fluency and comprehension. *Journal of Reading Behavior, 17*, 129–142.
- Petros, T. V., Bentz, B., Hammes, K., & Zehr, D. H. (1990). The components of text that influence reading times and recall in skilled and less skilled college readers. *Discourse Processes, 13*, 387–400.
- Rashotte, C. A., & Torgesen, J. K. (1985). Repeated reading and reading fluency in learning disabled children. *Reading Research Quarterly, 20*, 180–188.
- Rasinski, T. V. (1990). Effects of repeated reading and listening-while-reading on reading fluency. *Journal of Educational Research, 83*, 147–150.
- Rasinski, T. V., & Padak, N. (1994). Effects of fluency development on urban second-grade readers. *Journal of Educational Research, 87*, 158–165.
- Rasinski, T. V., & Padak, N. (2005). Fluency beyond the primary grades: Helping adolescent struggling readers. *Voices from the Middle, 13*, 34-41.
- Rose, T. L. (1984). The effects of two prepractice procedures on oral reading. *Journal of Learning Disabilities, 17*, 544-548.
- Rose, T. L., & Beattie, J. R. (1986). Relative effects of teacher-directed and taped

- previewing on oral reading. *Learning Disability Quarterly*, 9, 193-199.
- Rose, T. L., & Sherry, L. (1984). Relative effects of two previewing procedures on LD adolescents' oral reading performance. *Learning Disabilities Quarterly*, 7, 39-44.
- Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. (2007). *Reading interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Shaywitz, S. E., Fletcher, J. M., Holahan, J. M., Shneider, A. E., Marchione, K. E., Stuebing, K. K., ... Shaywitz, B. A. (2006). Persistence of dyslexia: The Connecticut Longitudinal Study at adolescence. *Pediatrics*, 104, 1351-1359.
- Shimabukuro, S. M., Prater, M. A., Jenkins, A., & Edelen-Smith, P. (1999). The effects of self-monitoring of academic performance on students with learning disabilities and ADD/ADHD. *Education and Treatment of Children*, 22, 397-414.
- Stahl, S. A., & Heubach, K. A. D. (2006). Fluency-oriented reading instruction. In K. A. D. Stahl & M. C. McKenna (Eds.), *Reading research at work: Foundations of effective practice* (pp. 177-204). New York, NY: Guilford Press.
- Sutherland, K., & Snyder, A. (2007). Effects of reciprocal peer tutoring and self-graphing on reading fluency and classroom behavior of middle school students with emotional or behavioral disorders. *Journal of Emotional and Behavioral Disorders*, 15, 103-118.
- Tingstrom, D. H., Edwards, R. P., & Olmi, D. J. (1995). Listening previewing in learning to read: Relative effects on oral reading fluency. *Psychology in the Schools*, 32, 318-327.

- Valleley, R. J., & Shriver, M. D. (2003). An examination of the effects of repeated readings with secondary students. *Journal of Behavioral Education, 12*, 55–76.
- Welsch, R. G. (2007). Using experimental analysis to determine interventions for reading fluency and recalls of students with learning disabilities. *Learning Disability Quarterly, 30*, 115–129.
- Wexler, J., Vaughn, S., Edmond, M., & Reutebuch, C. K. (2008). A synthesis of fluency interventions for secondary struggling readers. *Reading and Writing: An Interdisciplinary Journal, 21*, 317-347.
- Wilbur, A., & Cushman, T. P. (2006). Selecting effective academic interventions: An example of using brief experimental analysis for oral reading. *Psychology in the Schools, 43*, 79–84.



## APPENDIXES

## APPENDIX A

## Treatment Integrity

Student's Name: \_\_\_\_\_ Passage Title: \_\_\_\_\_

Observer: \_\_\_\_\_ Date: \_\_\_\_\_

1. The experimenter orally reads the passage to the student, modeling fluent reading.	____ YES ____ NO
2. 1 <sup>st</sup> reading: The experimenter says, "Read this passage as quickly and accurately as you can."	____ YES ____ NO
3. The experimenter starts the timer as soon as the student reads the first word.	____ YES ____ NO
4. The experimenter provides the correct word during the reading if the student does not read a word within 3 seconds.	____ YES ____ NO
5. After first read, the experimenter points to the first error and says, "That word is _____, what word? Yes _____." Read this sentence three times.	____ YES ____ NO
6. The experimenter repeats the procedures in #5 with each error.	____ YES ____ NO
7. The experimenter tells him/her the number of words read correctly per minute and helps the student graph it.	____ YES ____ NO
8. 2 <sup>nd</sup> reading: The experimenter says, "Read this passage as quickly and accurately as you can."	____ YES ____ NO

9. The experimenter starts the timer as soon as the student reads the first word.	____ YES ____ NO
10. The experimenter provides the correct word during the reading if the student does not read a word within 3 seconds.	____ YES ____ NO
11. After second read, the experimenter points to the first error and says, "That word is _____, what word? Yes _____." Read this sentence three times.	____ YES ____ NO
12. The experimenter repeats the procedures in #11 with each error.	____ YES ____ NO
13. The experimenter tells him/her the number of words read correctly per minute and helps the student graph it.	____ YES ____ NO
14. 3 <sup>rd</sup> reading: The experimenter says, "Read this passage as quickly and accurately as you can."	____ YES ____ NO
15. The experimenter starts the timer as soon as the student reads the first word.	____ YES ____ NO
16. The experimenter provides the correct word during the reading if the student does not read a word within 3 seconds.	____ YES ____ NO
17. After third read, the experimenter points to the first error and says, "That word is _____, what word? Yes _____." Read this sentence three times.	____ YES ____ NO
18. The experimenter repeats the procedures in #17 with each error.	____ YES ____ NO

19. The experimenter tells him/her the number of words read correctly per minute and helps the student graph it.	<input type="checkbox"/> YES <input type="checkbox"/> NO
--	---

## APPENDIX B

## Social Validity – Student Questionnaire

ID#: \_\_\_\_\_

Date: \_\_\_\_\_

Read each item and circle the number that best describes how you feel.

1: strongly disagree 2: disagree 3: agree 4: strongly agree

1. For passages in my social studies textbook, I improved the number of words read correctly in one minute.	<b>1 2 3 4</b>
2. For passages in my literature textbook, I improved the number of words read correctly in one minute.	<b>1 2 3 4</b>
3. For passages from the CRCT Science Coach, I improved the number of words read correctly in one minute.	<b>1 2 3 4</b>
4. For passages from the CRCT Social Studies Coach, I improved the number of words read correctly in one minute.	<b>1 2 3 4</b>
5. My overall feeling about listening to the passage before reading it is positive:	<b>1 2 3 4</b>
6. My overall feeling about reading the passage three times is positive:	<b>1 2 3 4</b>
7. My overall feeling about practicing reading a word and reading the sentence containing the error three times is positive:	<b>1 2 3 4</b>
8. My overall feeling about graphing my performance after each reading is positive:	<b>1 2 3 4</b>