ABSTRACT

A BRIEF EXPERIMENTAL ANALYSIS OF READING COMPREHENSION

by Christie Lynn Nikanowicz

The purpose of this study was to design and test a brief experimental analysis for comprehension problems, derived from similar work in the area of reading fluency, with thirteen 3rd grade students identified as having reading skills far below grade-level expectations. Comprehension difficulties are hypothesized to be due to deficits in decoding fluency and/or inadequate text comprehension strategies. The brief experimental analysis involved rapidly exposing the children to several test conditions to explore the effects of these instructional variables on performance. Results analyzed using visual inspection produced four patterns of responding: (1) students for whom improvements in fluency resulted in improvements in comprehension, (2) students for whom both fluency and text comprehension strategies were needed to improve comprehension, (3) students whose brief experimental analysis lacked experimental control, and (4) students without comprehension problems.
A BRIEF EXPERIMENTAL ANALYSIS OF READING COMPREHENSION

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Introduction

The Importance of Comprehension

Comprehension, or understanding what is read, is the ultimate goal of reading (Cain & Oakhill, 2007a; Lyon, 1998). It is what matters most in reading instruction (Pressley, 2000) and is why reading is taught, for the purpose of allowing skilled readers to gain information, knowledge, and understanding (Cain & Oakhill, 2007a). Comprehension skills are essential to success not only during the school years, as they compose the foundation for subsequent learning in all academic subjects, but they are undeniably essential to success in life (National Reading Panel [NRP], 2000; Snow, Burns, & Griffin, 1998). A student who completes school as “an excellent reader – fluent and with a great vocabulary” (via his/her teacher), yet when asked, “What did the story mean?” cannot formulate an answer, is headed for trouble. This is a serious concern and one that has become all too common. In fact, reading was found to be the number one referral concern made to school psychologists, comprising approximately 57% of their total referrals (Bramlett, Murphy, Johnson, Wallingsford, & Hall, 2002).

The development of comprehension skills is a long-term process that begins in the earliest grades (Snow, Burns, & Griffin, 1998) with instruction focusing on several lower-order (i.e., word-level) skills (Pressley, 2000). These skills are those that are based upon word recognition and include the ability to decode, a sufficient vocabulary, and developing reading fluency. Skilled comprehenders gradually and efficiently proceed from these lower-order skills to the higher-order processes of reading (i.e., those beyond word-level that focus on the meaning of words), such as activating prior knowledge, formulating meaning across words, sentences, paragraphs, and entire passages, and using conscious, controlled text comprehension strategies such as summarizing and comprehension monitoring. To achieve comprehension, both lower-order skills (e.g., decoding and fluency) and higher-order processes (e.g., text comprehension strategies) must be present simultaneously, working together (Pressley, 2000).

Research indicates that comprehension failures are often associated with difficulties in the component skills of reading fluency and/or the use of text comprehension strategies (Cain & Oakhill, 2007a; Laing & Kamhi, 2002). In fact, oral reading fluency has even been shown to be a better predictor of comprehension than the direct comprehension measures of question answering, passage recall, and cloze (Fuchs, Fuchs, Hosp, & Jenkins, 2001). These findings support the notion that a simple measure of oral reading fluency can aid in detecting whether or
not a student is a competent, comprehending reader. However, other research suggests that poor readers’ performance is due primarily to a lack of knowledge and use of appropriate comprehension monitoring strategies while reading (Forrest-Pressley & Waller, 1984) as well as a lack of ability and/or tendency to efficiently use active, organized information-processing strategies (Torgesen, 1977).

In sum, the research is mixed regarding the cause of comprehension difficulties in children. Thus, this study sought to examine both hypothesized sources (oral reading fluency deficits and/or text comprehension strategy deficits) in children with comprehension difficulties using a brief assessment model in order to identify the underlying hypothesis for each individual student. To begin, the theory and research behind each hypothesized source will be reviewed.

Literature Review

**The Role of Decoding Fluency in Comprehension**

Comprehension is a complex task that depends upon the integration of several hierarchical skills and processes including, but not limited to, decoding (or blending the sounds of letters to form words) and fluency (decoding/reading with speed, yet accuracy) (Adams, 1990; NRP, 2000; Oakhill & Cain, 2007). Specifically, fluency has been described as “one of several critical factors necessary for reading comprehension” (NRP, p. 11).

To begin, successful comprehension requires that the reader can decode the words in the text being read (Adams, 1990). Second, the reader must be able to read with enough efficiency (e.g., speed and accuracy) to be able to remember what was read long enough to relate it to previous knowledge and form an understanding of the big picture (NRP, 2000). Placing even more emphasis on the importance of decoding skills, it is theorized that fluency problems are the result of poor decoding skills (LaBerge & Samuels, 1974). When decoding is slow, information that is read enters the memory at a slow rate and therefore cannot remain active in the short term memory long enough to form complete concepts (Adams). In other words, the more effort that is required to decode a word, the less effort that is available to understand it (LaBerge & Samuels). In instances where difficulties in such foundational skills exist, higher-order skills, including comprehension, inevitably suffer (Howell & Nolet, 2000; Shapiro, 2004).

Therefore, it is hypothesized that by improving a student’s reading fluency, they will be able to process and store more information and faster, thus allowing for greater comprehension.
of what is read. To date, attempts to increase students’ oral reading fluency, and thus comprehension, have included two methods: curriculum revision and repeated reading.

Curriculum revision (or matching) entails finding the reading level in which the student achieves adequate fluency (i.e., 70-100 correct words per minute [CWPM]; Fuchs & Deno, 1982; Gickling & Thompson, 1985). This often involves lowering the grade level readability of material for a struggling reader. For example, a 3rd grader who cannot obtain adequate fluency in 3rd grade material is, instead, instructed in 2nd grade materials. With this technique, it is assumed that the student will more easily comprehend material because their fluency has increased.

Treptow, Burns, and McComas (2007) examined the effects of matching reading materials to students’ skill levels using curriculum-based assessment for instructional design (CBA-ID; Gickling & Havertape, 1981) on measures of on-task behavior and reading comprehension. Briefly, CBA-ID entails assessment to determine which materials fall in the student’s independent level (greater than 97% known words), instructional level (93-97% known words), and frustration level (fewer than 93% known words) and targeting the instructional level during intervention for the greatest effects on achievement. Three third-grade students identified as having low levels of on-task behavior during reading and low oral reading fluency participated in this study which employed a single-subject multi-element design including the three conditions (difficulty levels) counterbalanced in order over nine sessions (i.e., each level was presented three times). Results suggested that students demonstrated improved time on-task during those sessions when they were provided with instructional materials and that comprehension scores were greatest during the instructional and independent levels, as opposed to the frustration level. In general, this study provided preliminary evidence for assessing and targeting students’ instructional level during reading activities.

Repeated reading also increases fluency, but without altering curriculum materials. Repeated reading involves having the student practice the reading material over several trials in an attempt to increase fluency (Samuels, 1979). The theoretical groundwork for this technique lies in the philosophy that as with any skill being acquired, whether it be riding a bike or learning to read, practice is the key (NRP, 2000). Specifically, repeated readings allows for practice in decoding by exposing the student to the same words multiple times with the objective of developing automaticity which will enhance fluency (LaBerge & Samuels, 1974). As the effort a reader puts into decoding and comprehension is described as a “trade-off” (Adams, 1990, p.
it is suggested that any intervention which improves decoding fluency (making it less effortful) will result in more effort available for greater comprehension.

A meta-analysis by Therrien (2004) which included 18 eligible repeated reading intervention studies conducted between its conception in 1977 and 2001 provided support for the intervention’s use. Findings revealed that repeated reading was effective at improving students’ reading fluency and comprehension.

*The Role of Text Comprehension Strategies in Comprehension*

Howell & Nolet (2000) explain that comprehension is based on more than just the establishment and use of skills in decoding and vocabulary, or what are referred to as enabling skills. Comprehension also requires the application of comprehension strategies and that it is the successful integration of these two (enabling skills and comprehension strategies) that makes for good comprehenders. Comprehension strategies can include comprehension monitoring, selective attention to the text, making adjustments for task difficulties, connecting the text to prior knowledge, and clarifying, all of which allow the student to be “active” in the reading and their pursuit of meaning (Howell & Nolet, p. 205).

This perspective of “active reading” (Howell & Nolet, 2000) views comprehension deficits as based in a metacognitive framework (Cain & Oakhill, 2007b; Forrest-Pressley & Waller, 1984). Forrest-Pressley and Waller explain metacognition as having two components. First, the student is aware of his or her cognitions, meaning that they can speak about the specific strategies they have, how they use them, when they use them, and why they are important. Second, they have the ability to control these metacognitions, meaning that they can plan, compare and select, monitor, and revise their strategies. Readers with metacognition also know about the goals and processes of reading and regularly apply this knowledge as they read (Cain & Oakhill, 2007b). For example, a good comprehender recognizes when they do not understand what they have read and make a conscious effort to return to the material and apply the necessary strategies to ensure that they have understanding before they move on (Cain & Oakhill, 2007b). This is the comprehension strategy known as comprehension monitoring (or monitoring for meaning) with self-correction and is used frequently by good comprehenders (Cain & Oakhill, 2007b; Howell & Nolet). Thus, a student with good comprehension is one who is aware of and can control their metacognitions to their advantage and it is those readers who demonstrate this
deliberate use of comprehension strategies that have the most improved reading (Cain & Oakhill, 2007b; Forrest-Pressley & Waller).

From the perspective that comprehension deficits are the result of inefficient or a lack of student involvement in the reading material and/or use of cognitive strategies (Rosenshine et al., 1996), metacognition training appears to be a key element of intervention (Forrest-Pressley & Waller, 1984). Two types of training include question generation and think-aloud procedures.

Question generation is a form of comprehension instruction in which readers ask themselves questions about the passage while reading (NRP, 2000). Included in the National Reading Panel’s list of comprehension instructional methods that have a “solid scientific basis” (p. 18) for improving comprehension in non-disabled learners, question generation is theorized to improve comprehension by focusing students’ attention on the content of the material being read (Rosenshine et al., 1996). It is a cognitive strategy in that it assists them in learning how to think and it is characterized as a heuristic (versus an algorithm) because rather than showing the exact steps to take (which is impossible as the task of comprehension varies across each unique reading material) it teaches them a broad skill, in this case, how to generate questions to test for understanding, which is expected to generalize to facilitate the comprehension of a wide-range (if not all) materials (Cain & Oakhill, 2007b; Rosenshine et al.).

To examine the effectiveness of question generation at increasing students’ comprehension, Davey and McBride (1986) compared the performance of 52 sixth graders on eight comprehension questions (literal and inferential) following participation in either a question generation intervention in which they were asked to generate two questions emphasizing the most important aspects of the story or a read-reread intervention in which they were instructed to read, re-read, and study the passage until the comprehension measure was given. While both groups were found to perform about equally on the literal (factual) questions, the question generation group outperformed the read-reread group on the inferential (higher-order thinking) questions, suggesting that they had developed greater comprehension and that the question generation technique is an effective technique for use with students.

Another metacognitive training technique, the think-aloud procedure (Ward & Traweek, 1993), requires the student to say all of the thoughts that come to their mind while completing a cloze passage. A cloze passage is one in which every seventh word is blank (first and last sentence remain intact) (Fuchs et al., 2001). By indicating their reasoning out loud during the
problem-solving process, the student’s metacognition is proposed to increase, thus increasing comprehension too (Ward & Traweek). These improvements in comprehension are suggested for multiple reasons, including that the cloze format specifically (and think-aloud technique, in general) better captures the student’s attention, forcing “active” interaction from the student, improving consciousness of what is being read along the way, heightening awareness of performance and the desire to do well as their work is being supervised by either a peer and/or adult, while also requiring the use of prior knowledge, looking ahead, and monitoring performance (Dewitz, Carr, & Patberg, 1987; Ward & Traweek). In addition, the greater attention and deeper processing experienced during think-aloud procedures may help create a stronger, more vivid memory of what is read, thus enhancing performance on subsequent comprehension measures as recall of strongly encoded memories is more efficient (Ward & Traweek).

Ward and Traweek (1993) found that fifth grade students who were randomly assigned to participate in think-aloud procedures while working a cloze task improved their reading comprehension (assessed via questioning) significantly more than those who completed the cloze without using the think-aloud procedures. The authors concluded that reading problems may be the result of more than just enabling skills, rather they may potentially be the result of deficits in the area of reading strategies and that trial use of interventions, including think-aloud procedures, can assist in providing recommendations.

Meta-Analysis of Reading Interventions

Thus far, four reading interventions aimed at improving students’ fluency and/or comprehension have been introduced: curriculum revision, repeated reading, question generation, and think-aloud. To date, curriculum revision and think-aloud techniques have not been included in meta-analyses; repeated reading and question generation have and will be discussed here.

The dramatic improvements in reading fluency as a result of repeated reading have not always translated into gains in the students’ comprehension. A recent meta-analysis by Therrien (2004) indicates that while the intervention is effective at increasing the oral reading fluency and comprehension of both nondisabled students and students with learning disabilities, it has, at best, produced only a moderate mean increase on students’ fluency and a somewhat smaller mean increase on comprehension.
Although collectively the results of question generation studies support its effectiveness at improving students’ comprehension, individually these studies present a wide array of findings. In a meta-analysis of question generation studies, Rosenshine and colleagues (1996) found that while overall the instructional strategy of having students generate questions as they read resulted in gains in comprehension, effect sizes ranged from small to large.

An examination of the aforementioned research indicates a possible reason for the lack of consistent improvement in student comprehension. Many studies did not take into account the possible interaction between a text’s level of difficulty and the students’ level of reading ability. This is unfortunate because text difficulty impacts how the material becomes fluent to the reader and is understood (Faulkner & Levy, 1994). Furthermore, a review of the literature indicates that repeated reading interventions have had a consistent positive effect when the student has identified difficulties in the area of fluency, and that question generation interventions have had a consistent positive effect when the student did not have identified difficulties in the area of fluency (i.e., fluency was ruled out).

Summary of Literature Review

Based on this review of the literature, it appears that most comprehension problems are due to poor fluency and/or inadequate text comprehension skills. The most common strategies for building fluency are decreasing the difficulty level (e.g., curriculum matching) or repeated readings, while text comprehension is typically improved by teaching metacognitive strategies such as prompts (e.g., question generation) or self-monitoring (e.g., think-aloud). Meta-analyses of comprehension interventions indicate that neither fluency-based nor strategy-based interventions are effective for most kids, and both are effective for some. Thus, an assessment technique is needed in the area of reading comprehension that can assist in providing recommendations as to which strategy is likely to be the most effective for each individual child. Without it, arbitrarily selecting one of these strategies for use during intervention will result in only a 50/50 chance of successfully matching the intervention to the students’ needs, and odds like this will inevitably leave many kids behind. Therefore, it seems apparent that a method for matching interventions to the source of comprehension problems is needed. Currently, however, there are no studies that have identified learner characteristics that predict student response to comprehension interventions. What is needed, then, is a brief experimental analysis of comprehension.
Brief Experimental Analysis

An important foundation of school psychology practice within a response to intervention (RTI) framework includes linking assessment to intervention. This means that the information gathered about the student during the assessment phase is used directly as the foundation for selecting an intervention. In other words, the aim is to pick an intervention that matches the child’s needs and then show that the selected intervention is having an impact on those needs. This approach not only produces more practical and beneficial outcomes for the student involved, but overall is critical to developing a school’s capacity to effectively handle reading problems, which may depend on this element (Jones et al., 2003).

To begin the process of matching an intervention to students’ needs, an assessment of the individual student’s skills must be conducted prior to intervention in order to later select and implement the intervention believed to hold the most potential for success. This approach is complicated however, given the controversial history of aptitude by treatment interaction (ATI) research in education. The aim of ATI, similar to intervention matching, includes matching learning style with instructional style in order to produce better student outcomes (Cronbach, 1957). The controversy is that ATI has been unsuccessful at proving that which its foundation rests upon, which is differential responding of children to treatments that focus on remediating processing deficits or capitalizing on processing strengths (Gresham & Witt, 1997).

Meanwhile, an alternative approach to linking assessment to intervention can be derived from the literature on functional behavioral analysis (FBA). While this technique of manipulating antecedent and/or consequent variables within highly controlled conditions to determine the functional relationship (i.e., change in one causes change in the other) has predominantly focused on matching reinforcement-based interventions to the function of clinical behavioral concerns such as self-injury, it has recently been extended for use as an assessment technique in identifying the cause of students’ academic problems (Daly, Witt, Martens, & Dool, 1997). Under highly controlled or analogue conditions, the presence or absence of environmental variables such as teacher attention or demands are manipulated while directly observing impact on student behavior. A great deal of literature has indicated that interventions matched to a functional analysis produce strong effects, even when conducted in a brief format.

A brief experimental analysis of academic problems involves rapidly exposing a child to several brief test conditions in a predetermined order from least to most intrusive in order to
explore the effects of motivational and instructional variables on a child’s performance (Daly et al., 1997). Each condition represents a different intervention with corresponding hypotheses about what causes underlie the problem (e.g., condition – incentives, cause – motivation) (Daly et al., 1997). The objective is to test multiple conditions in order to identify: (a) the source of the child’s difficulties, (b) the intervention that produces the greatest outcome for the purpose of recommending an intervention for future use, and/or (c) at least eliminating those that have little or no positive effect (Daly et al., 1997; Jones, Wickstrom, & Daly, 2008). When student performance during any of the conditions moves in the desired direction and/or meets an established criterion, the condition judged to be the most effective, yet least intrusive is then required to demonstrate its effect twice by means of a mini-reversal design that is conducted so as to establish greater confidence in the findings. Having successfully demonstrated its positive effect on two separate trials, the intervention is concluded to be the cause of the positive change and be the intervention that is most likely to continue to produce similar positive changes in student performance during intervention (Daly et al., 1997).

The most common approach to arranging the conditions in a functional behavior analysis is a multi-element design (Daly et al., 1997; Iwata et al. 1994). This design typically begins with a baseline phase to establish the student’s level of performance in the area of concern prior to intervention. Next, each condition (intervention) is tested at least once until sufficient data for each one exists. Since the extension of functional analysis procedures to academic areas of concern, a standard protocol of conditions to be tested within a brief multi-element design have been based upon Daly et al.’s proposed five common reasons why students fail. Four of these five reasons are the hypotheses typically tested within the experimental conditions. The first is that the student simply does not want to do the work. This is considered to be a problem in the area of motivation and is tested by providing the student incentives. The second is that the student has not spent enough time doing the task. In other words, they have had insufficient practice with the materials and thus practice forms the basis for the intervention tested within this condition. Third, the student has not had enough help to do it. Difficulties in this area can be displayed by insufficient accuracy, fluency, and/or generalization to other settings; however, the reason for such difficulties is often the same, which is that the student hasn’t experienced enough prompting and feedback as they practice the skill. Therefore, these instructional elements are the foundation for the intervention tested in this condition. Finally, the fourth reason why students
fail is that it is simply too hard. There may be a bad match between the student’s skill level and the difficulty level of the instructional materials that is better aligned during testing in this condition.

The brief experimental analysis has most recently been used to identify effective strategies for improving oral reading fluency (Daly, Martens, Dool, & Hintze, 1998; Daly, Martens, Hamler, Dool, & Eckert, 1999; Eckert, Ardoin, Daly, & Martens, 2002; Jones & Wickstrom, 2002; VanAuken, Chafouleas, Bradley, & Martens, 2002). Daly and colleagues (1998) conducted a brief assessment of oral reading fluency with three students, grades three through six, all referred for reading problems. In this study a series of interventions, each with its own unique hypothesis about the cause of the problem, was tested briefly to examine its effects. The most effective, yet least intrusive of the interventions was selected and replicated to confirm findings. Interventions tested within these studies were based upon variables that children with fluency deficits have been shown to respond differentially to, including incentives, repeated readings, phrase (word) drills, and curriculum modifications (i.e., easier material), as well as conditions composed of more than one intervention (e.g., listening passage preview plus repeated readings) in what is called a “treatment package” (Jones et al., 2003, p. 6) within an interaction approach. At least one condition was found to produce improvements in oral reading fluency on an instructional passage and a generalization passage for each student. Conditions that resulted in improvement varied among participants.

Closely resembling Daly et al. (1998), Daly et al. (1999) tested the brief assessment with four students ranging from first to sixth grade to assist in selecting an intervention to remediate difficulties in learning to read. Again, at least one condition was found to produce improvements in oral reading fluency for all students on both an instructional and high content overlap (generalization) passage. Students were found to respond differently to the conditions.

Eckert et al. (2002) also conducted a brief experimental analysis of oral reading fluency with six students ranging from first through fourth grade, all referred by their teachers as evidencing difficulties in reading. This study tested the effects of the combination of an antecedent intervention (e.g., listening passage preview and repeated reading) with either or both consequences (e.g., contingent rewards and/or performance feedback) and found that while all six students showed improvements in CWPM as a result of the antecedent condition alone, four students showed even greater improvements as a result of combining the antecedent intervention
with either of the consequences, whereas for two students the results of the combination were undifferentiated and it was yielded that the antecedent intervention alone was enough for improvement. Eckert and colleagues concluded that with such strong evidence of differential responding by the students to the interventions, an efficient, yet individualized approach to assessment is needed in order to select the intervention that will be the most effective for each individual child.

The important factor common to all of these studies is the evidence of differential responding among students to different interventions all aimed at improving oral reading fluency as this is the primary basis for conducting a functional analysis. It is also important to note research indicating that differential responding is reliable. Jones and Wickstrom (2002), for example, conducted an extended analysis consisting of an alternating treatment design between the (most effective) intervention selected via a brief experimental analysis and a baseline condition for five students. Results indicated that the overall mean was higher for the intervention that was selected (i.e., deemed most effective) in every comparison; for all five students across three dependent measures, thus supporting the stability of the results produced by a brief assessment. Furthermore, VanAuken et al. (2002) provided preliminary findings supporting the treatment utility of the brief assessment. In this study, the interventions for three students determined to be the most effective (i.e., produced the greatest gains) and the least effective (i.e., minimal or no gains) at improving oral reading fluency for each individual student as determined by a brief assessment were both implemented and data was collected over a minimum of 21 intervention days. Data revealed that the more effective intervention produced greater initial gains than the less effective intervention for two of the students and greater gains during an extended analysis for one student. The data suggested that the brief assessment was successful at discriminating among effective and ineffective interventions at least initially (VanAuken et al., 2002).

While the extension of functional behavior analysis procedures to academic concerns, in the form of a brief experimental analysis, is a great step forward in linking assessment to intervention within reading, two issues remain true: (1) although comprehension is continually acknowledged as the ultimate goal of reading (Lyon, 1998), comprehension problems in students persist (Cain & Oakhill, 2007b) and (2) while fluency problems have been shown to respond positively to all of the elements targeted in the protocol for a brief assessment for fluency (e.g.,
motivation, practice, modeling) (Daly, Lentz, & Boyer, 1996), selecting the best intervention aimed at improving a student’s comprehension is not so clear cut. An analysis of comprehension improvement in the available literature seems to indicate that fluency-based interventions are more effective for children with fluency deficits, while active text comprehension strategies are more effective for children who have adequate fluency (Therrien, 2004). Furthermore, unlike fluency, the elements of intervention have a differential (rather than additive) impact on comprehension, indicating that assessment of the child’s skills and/or needs prior to intervention seems critical, if not absolutely necessary.

In other words, common strategies such as incentives, repeated readings, or easier material are likely to impact, to some degree, rates of fluency for any child. The purpose of a brief experimental analysis for reading fluency has been to examine the relative effectiveness so as to maximize treatment gains. For comprehension problems, on the other hand, it is not likely that fluency-based strategies such as curriculum matching or repeated readings will assist a reader who has already achieved a sufficient fluency. Likewise, it is not likely that active text comprehension strategies will assist a reader who continues to struggle with fluency. Thus, it is within the area of reading comprehension that a brief experimental assessment may ultimately prove to be most valuable. The first step will require showing differential responding: that is, for children demonstrating the same comprehension levels, assessment must indicate that some children are responsive to fluency-based strategies while others are responsive to strategy training. Differential responding would thus “validate” the need for a brief experimental analysis (Daly et al., 1998; Daly et al., 1999).

**Purpose of this Study**

The purpose of this study was to design and test a brief experimental analysis for comprehension problems, derived from similar work in the area of reading fluency. The following research question was addressed: Do the sources of comprehension problems differ among children with low oral reading fluency? To address this question, a brief experimental analysis was conducted for 13 children with reading skills far below grade-level expectations. The independent and combined effects of fluency-based accommodations (i.e., easier material) versus strategy training (i.e., think-aloud procedures) were evaluated for each child. If the children responded differently, then it would be concluded that the source of comprehension problems vary among children with low reading fluency.
Method

Participants and Setting

Participants were thirteen 3rd grade students (eight male, five female) from two public elementary schools located in a rural area of southwestern Ohio. These students were all recommended by their teachers for participation in a one-on-one reading program with graduate students at a local university. The study took place over two days (per student) either in the students’ schools during the academic year (for six students) or within an academic summer program held at a public high school located in the same region (for seven students). Each student was worked with individually either in a quiet workspace outside of their classroom (during the academic year) or at their individual workstation during the summer program. During each meeting, the student participated in several reading-related activities. These meetings lasted approximately 30-60 minutes each. For those students who participated during the academic year, times were arranged with each child’s teacher so as to minimize them missing valuable instructional time during their participation in the study (e.g., pulled during independent reading/seat-work).

Measurement

Reading passages ranged from the students’ grade level (3rd grade) down to pre-1st grade reading level (e.g., 0.3-0.7 Flesch-Kincaid Readability; see Appendix A). A measure of oral reading fluency was obtained for all readings by calculating the number of correct words per minute (CWPM).

Immediately after reading each passage, comprehension accuracy was measured by asking the child 10 questions (4 literal, 3 intersentential, and 3 inferential; see Appendix B). Literal questions are those in which the answer can be found directly, word-for-word in the passage. Intersentential questions are those in which the answer can be found directly in the passage, across two or three sentences. Inferential questions are those in which the answer cannot be found directly in the passage, but must be inferred. The student’s comprehension score was calculated as the number of questions answered correctly out of 10.

Reliability

To estimate the accuracy of examiner scoring, all oral readings were audio taped. Comprehension questions were recorded (written) verbatim from the student’s response and were blinded in terms of how they were scored by the primary examiner (i.e., contained no
markings of correct or incorrect answers). A graduate student trained in the administration and scoring of oral reading fluency (CWPM) and comprehension questioning used the audiotapes to independently score 59% of the oral readings as well as 97% of the comprehension questions. Inter-observer agreement (IOA) was calculated by dividing the number of scoring agreements by the number of agreements plus disagreements, and multiplying by 100. The mean reliability of the oral readings was 96% (range, 88% to 100%) and the mean reliability of the comprehension questions was 94% (range, 70% to 100%). The high degree of reliability of both measures indicates that they were accurate and free from bias.

Experimental Conditions

A brief experimental analysis or brief assessment (Jones et al., 2008) was conducted during two sessions with each student. Students met individually with an examiner to conduct their brief assessment. The brief assessment entailed implementing a series of brief (5-10 minute), analogue instructional conditions, obtaining fluency and comprehension measures for each condition. Fluency, calculated as CWPM, was obtained for each condition. Comprehension, measured via questioning, was also obtained for each condition after the student read the entire passage. Baseline and two experimental conditions (fluency and fluency plus comprehension) were used to evaluate the differential impact of the instructional conditions on oral reading fluency and comprehension. A mini-reversal consisting of a reversal to baseline conditions and replication of the most effective yet least intrusive condition was also conducted.

Baseline. During baseline, students were given a 3rd grade level reading passage and the following instructions:

“(Point to the first word) When I say ‘start,’ begin reading aloud at the top of this page. Read across the page (demonstrating by pointing) until you have read the entire story. Try to read each word. If you come to a word you don’t know, just skip it and go on to the next one. Be sure to do your best reading. Ready? Go.”

As the student read aloud the examiner followed along on their own copy of the passage (see Appendix C), marking any errors (e.g., mispronunciations, omitted words). If the child hesitated on a word for more than 3-seconds, the examiner told the child to “go on” and the word was counted as an error. At one minute the examiner marked the last word read by the child, but allowed them to finish the passage.

Next, the child was given questions about the passage and the following instructions:
“Now I’m going to ask you some questions about the story you just read.” The questions were read to the student by the examiner. The story was available to the child to refer back to during questioning. The examiner recorded all of the child’s responses verbatim.

**Fluency.** The fluency condition consisted of instructional matching. Specifically, the examiner administered a mastery level passage to the child, and asked 10 questions for comprehension. A mastery level passage is one in which a third grade child reads at least 100 CWPM with six or fewer errors. Mastery levels for each child were determined by administering several different passages, beginning one grade lower (e.g., 2nd grade) and continuing to 1st or pre-1st grade readability, until the fluency criterion was met or until the lowest readability was reached. Comprehension questions were administered for the mastery level passage or, if mastery level was not reached, the passage in which the greatest fluency level was obtained (i.e., highest CWPM).

This condition was intended to assess the effects of fluency on comprehension, in the least intrusive manner. Although the literature review for this study detailed the available research and theory behind using an alternate fluency building strategy, repeated reading, this intervention was not included in the brief assessment due to the confounding variable of repetition. If repeatedly reading a passage led to increased comprehension, it would not be possible to attribute the increases to increased fluency alone because also embedded within the repeated reading strategy is repetition of content, as the passage is reread several times. By using curriculum revision rather than repeated reading, the impact of fluency alone was evaluated.

**Fluency plus Comprehension.** The comprehension condition consisted of the think-aloud procedure. Specifically, the examiner administered a new mastery level passage, and asked 10 questions for comprehension. Before administering the passage, however, the examiner administered a cloze version (see Appendix D), with the following instructions:

“This story has every seventh word missing. (Point to the first word) When I say ‘start,’ begin reading aloud at the top of this page. Read across the page (demonstrating by pointing) until you have read the entire story. Try to read each word. When you come to a blank, skip it. If you come to a word you don’t know, just skip it and go on to the next one. Be sure to do your best reading. Ready? Go.”
The examiner followed along on their own copy, marking the last word read by the child at one minute, but allowing them to finish the passage. The reading of the cloze version of the passage was used to determine the child’s fluency score for this condition.

Next, the student continued working with the same cloze passage used above to complete a think-aloud intervention. The student was given the following instructions:

“This story has every seventh word missing. (Point to first word) When I say ‘start,’ begin reading at the top of this page. Read across the page [demonstrating by pointing]. This time, when you get to a blank, tell me a word that can go into that blank that makes sense. If you don’t know a word to go in the blank, you can skip it and come back to it later. If you change your mind, it is okay to change your answer. Also, I want to hear why you picked that word or why you thought it made sense. So after you tell me a word, tell me why you picked it.”

“Let’s practice one. Read all the way to the first blank. (Pause.) Now tell me a word that makes sense. (Pause.) Why do you think that makes sense?”

If the child got the practice item correct, the examiner said: “Good, now you know how to do it.” If the child got the practice item incorrect, the error was noted and the child was asked to self-correct (i.e., with no help by the examiner). If the error was repeated, the examiner pointed to the critical information in the passage needed to complete the blank. If the error was repeated a third time, the examiner provided the student with the correct answer and instructed the child to point to the critical information in the passage needed to complete the blank. This procedure for correcting errors was used with all subsequent errors. After the practice item was complete, the examiner said: “Ready? Go.” The child continued until all blanks were completed.

The responses the child provided as to their reasoning for filling in the blanks didn’t matter so long as they demonstrated that they used some degree of logical reasoning in selecting their (correct) answer. Once the think-aloud was completed, 10 questions about the passage were asked.

The purpose of this condition was to assess the independent effects of teaching the child to identify and integrate critical information while reading text. The think-aloud procedure is intended to develop the child’s self-monitoring of text comprehension. Although the literature review for this study detailed the available research and theory behind using question generation, the think-aloud was employed in the brief assessment model due to two factors. First, the impact
of an antecedent-only strategy such as question generation is likely to be difficult to detect in a single session. Second, the question generation strategy involves asking and answering general questions, such as “Who are the main characters?” or “When did the story take place?” Therefore, it was likely that the question generation strategy would generate questions that might also be included in the comprehension assessment. Thus, the think-aloud was selected as the best representative of strategy training procedures, given short-term nature of the brief assessment.

*Mini-reversal.* The impact of the most effective strategy was replicated by conducting a reversal and replication. During the *reversal* condition, a new passage was administered using baseline procedures (and calculating CWPM and questioning).

During the *replication* condition, the experimental condition (either fluency or fluency plus comprehension) that resulted in the greatest increase in comprehension accuracy was implemented a second time, following the same procedures and instructions as were given during the first administration of the condition. If the fluency and comprehension conditions produced the same comprehension score, the least intrusive condition, fluency, was selected for replication.

*Treatment Integrity*

Treatment integrity checklists were completed by the examiner during implementation of the brief assessment to ensure the correct implementation of all conditions. See attached Appendix E for integrity checklists. Analysis of self-reported integrity checklists revealed an adherence to intervention steps 100% of the time.

*Design and Procedures*

The 13 children included in this study were participants in either a reading tutoring study conducted in the fall of 2007 (six students) or an academic summer program held in July 2008 (seven students). All teachers and parents/guardians of the students involved received a description of the objectives aligned with the study and provided written consent to participate (see Appendix F). Child assent was also obtained (see Appendix G).

A multi-element design was used to compare the relative effects of the brief assessment conditions (Iwata et al., 1994). A multi-element design involves implementing a series of conditions, one at a time, starting with a baseline phase to establish levels of the behavior prior to intervention, until all conditions are complete. This study included the following conditions: baseline, fluency, and fluency plus comprehension. Next, a mini-reversal was conducted. This
included identifying the condition that produced the greatest amount of improvement towards meeting a given criterion and repeating it (replication) following a return to baseline (reversal). By demonstrating improved performance as a result of the most effective condition on two occasions, it could be concluded with greater confidence that the instructional condition indeed caused the improvement and that when recommended/selected as an intervention for future use, that it will produce similar results. This study took place over five weeks during the fall of 2007 and one week during the summer of 2008 (two days per student), which included completion of the entire brief assessment, baseline through mini-reversal, for each participant.

A multi-element design was used in order to briefly test the effects of several instructional conditions, each with its own hypothesis about the underlying cause of the problem. This design allows for comparison of the relative effects across conditions as well as demonstration of the efficacy of one condition by replication through a mini-reversal procedure. Most importantly, the multi-element design reveals differential responding of participants to the different instructional conditions.

**Data Analysis**

In order to evaluate the effects of each condition during administration of the brief assessment, visual inspection was used. Visual inspection allowed for distinction among instructional conditions. The use of graphs for each student showed the results of the brief assessment, and the condition determined to be the most effective at producing improvements in comprehension. These graphs will also provide evidence of differential responding, if present.

Figure 1 displays four hypothetical patterns of responding that would indicate four distinct assessment decisions. Graphic data is presented for each individual student, indicating what was found in their brief experimental assessment of comprehension. The four potential patterns of scores are: (1) no solution needed (Figure 1, top left panel), (2) fluency solution only (Figure 1, top right panel), (3) comprehension solution only (Figure 1, bottom left panel), and (4) fluency and comprehension solution (Figure 1, bottom right panel).

Analysis consisted of visual inspection of changes by each student in response to baseline and the instructional conditions presented in the brief assessment on oral reading fluency and comprehension. The main objective of this study was to determine if students’ comprehension varies across instructional conditions, thus signaling different causes of comprehension deficits for different students (i.e., differential responding).
The primary research question in this study was “What are the sources of comprehension difficulties for children exhibiting low levels of reading fluency and low comprehension accuracy?” Four general patterns of responding were predicted to occur:

No Problem (top left panel): High levels of reading fluency and comprehension indicate that there is no comprehension problem.

Fluency Problem (top right panel): This pattern indicates a perfect correlation between increased fluency and comprehension. When fluency is increased, comprehension improves. As fluency decreases, comprehension decreases. Thus, this child’s comprehension problems are due solely to fluency deficits.

Comprehension Problem (bottom left panel): This pattern indicates no correlation between fluency and comprehension. At baseline, fluency levels are high, yet comprehension is low. The fluency condition, in this case, is a replication of baseline because baseline levels of fluency were adequate. Comprehension improves when text monitoring strategies are taught through the think-aloud procedure. Thus, this child’s comprehension problems are due solely to inadequate text comprehension strategies.

Fluency and Comprehension Problem (bottom right panel): This pattern indicates an imperfect correlation between fluency and comprehension. Following baseline, the fluency condition does not impact comprehension accuracy. Comprehension improves only when both fluency is increased and text monitoring strategies are taught through the think-aloud procedure. Thus, this child’s comprehension problems are due to both fluency deficits and inadequate text comprehension strategies.

Results

This study involved exposing 13 children to five experimental conditions that isolated the impact of baseline, fluency, and strategy training on comprehension. For four children (31%), no comprehension problems were identified during either baseline conditions. In other words, these children displayed a pattern aligned most closely with the top left panel in Figure 1.

For nine children, both fluency and comprehension were identified as problem areas, based on a fluency score below 110 CWPM for those students who participated in the fall and 90 CWPM for those who participated in the summer (Good, Gruba, & Kaminski, 2002) and a questioning score below 80% accuracy (Howell & Nolet, 2000). Among the children, three patterns of responding were observed.
No Experimental Control

For three children, no experimental control was achieved.

*Jenna.* Visual inspection did not result in a “clean” brief assessment as there was no form of reversal during baseline (see Figure 2). Rather, Jenna’s comprehension accuracy was at its greatest during the return to baseline, contrary to what was expected. Furthermore, Jenna’s comprehension skills appear to be independent of her fluency as the two are not neatly correlated.

*Adam.* Experimental control during the brief assessment with Adam was also not achieved (see Figure 3). There was no predictable pattern to any of his scores, fluency or comprehension.

*Nolan.* The baseline phase yielded one of his greatest comprehension scores (see Figure 4), thus making a reversal to baseline difficult. In general, no pattern within his data could be detected.

**Fluency Problem**

*Lee.* This was a very clear brief assessment in which comprehension accuracy was dramatically improved during the fluency condition (see Figure 5). Similar improvements in comprehension were also seen during the fluency/comprehension condition, however, fluency was selected as the primary source of Lee’s comprehension difficulties for two reasons. First, while the fluency/comprehension condition produced similar gains in comprehension, fluency saw a slight decrease during this phase. Second, given a situation in which both conditions produce similar improvements in comprehension accuracy, the least intrusive of the two is selected. In this case, the fluency condition was selected as the least intrusive, yet most effective for Lee.

*Sarah.* While Sarah displayed high fluency and comprehension levels during baseline (see Figure 6), her greatest comprehension score was achieved during the fluency condition (as well as her highest fluency score). The combination of these scores was unmatched during the fluency/comprehension condition as fluency declined significantly during this phase. A clear reversal to baseline allowed for a clear-cut replication of the fluency phase, again yielding her (second) highest comprehension and fluency scores.

These two participants exhibited patterns of responding most closely aligned with Figure 1, top right panel, with one exception: none of the children’s fluency rates fluctuated to the
degree depicted in the figure. Experimental control was achieved by the fluency condition, which involved exposure to an easier passage (i.e., curriculum revision). However, adequate levels of fluency (e.g., greater than 90 CWPM for summer participants or 110 CWPM for fall participants) were never achieved.

Fluency and Comprehension Problem

Jackie. While the fluency condition improved both Jackie’s fluency level and comprehension accuracy (see Figure 7), it was the fluency plus comprehension condition that yielded Jackie’s highest comprehension accuracy. Furthermore, a clear reversal to baseline allowed the effectiveness of the fluency plus comprehension condition to be demonstrated a second time, thus providing greater confidence in the conclusion that the fluency plus comprehension condition was responsible for producing the results at hand and was the most effective strategy for improving Jackie’s comprehension accuracy.

Justin. Following low baseline levels of fluency and comprehension (see Figure 8), the fluency condition improved both areas for Justin, including bringing comprehension accuracy to criterion levels (80%). However, it was the combined fluency and comprehension condition that was the most effective, bringing comprehension accuracy levels above criterion levels. Furthermore, following a clean reversal to baseline, replication of the fluency/comprehension condition resulted in his greatest comprehension accuracy.

Austin. This was a very clean brief assessment in which low levels of fluency and comprehension were present during all conditions except for the most effective strategy, fluency/comprehension, and its replication phase (see Figure 9).

Ben. Ben’s fluency was fairly consistent across all phases of the brief assessment (see Figure 10). The fluency condition not only failed to improve fluency levels, but also resulted in a drop in comprehension accuracy from baseline. Not until the fluency/comprehension condition did comprehension accuracy reach criterion levels, as was also found during replication of this most effective strategy.

These four participants exhibited patterns of responding most closely aligned with Figure 1, bottom right panel, with one exception: none of the children’s fluency rates fluctuated to the degree depicted in the figure. Experimental control was achieved only by combining the fluency and comprehension (i.e., think-aloud) interventions. However, adequate levels of fluency (e.g., greater than 90 or 110 CWPM) were never achieved.
Summary of Results

The results, specifically the most effective strategy, for those nine participants described above can be seen summarized in Table 1. As previously mentioned, none of the children who participated in this study exhibited any of the three patterns displayed in Figure 1 due to the inability to directly increase fluency. Fluency levels fluctuated across conditions, but did not, at any point, increase to criterion levels.

Discussion

The purpose of this study was to explore the use of the brief experimental analysis in the area of reading comprehension. As it has been successfully employed in the similar field of reading fluency and as there is a critical need for a tool that can link assessment to intervention in the area of reading comprehension, this study proposed the use of the brief experimental analysis with students with comprehension problems. The first step in this investigation, however, was to first determine if students with comprehension problems differ in regards to the source of the problem, thus signaling the need for such an assessment. Therefore, this study posed the following research question: Do the sources of comprehension problems differ among children with low oral reading fluency? The results suggest that yes, they do.

Thirteen 3rd grade students identified as performing below grade level expectations in the area of reading participated in this study, which entailed each student completing a brief experimental analysis of reading comprehension. Over two days (per child), two hypotheses about the potential cause of comprehension difficulties was examined within a brief experimental analysis: low oral reading fluency resulting in low comprehension or inadequate active text comprehension strategies resulting in low comprehension. The brief experimental analysis involved exposing the children to several, brief conditions that included baseline, fluency, fluency plus comprehension, reversal to baseline, and replication of the most effective condition (fluency or fluency plus comprehension) in order to determine the strategy likely to be the most effective at remediating the comprehension deficit.

Results revealed that the students included in this study displayed two patterns of responding. First, two students exhibited a fluency problem in which low reading fluency was the best predictor of comprehension. When fluency increased, so did comprehension. Second, four students exhibited a fluency plus comprehension strategy problem in which both fluency and strategy training were needed to improve comprehension levels. In addition, three children’s
brief assessments did not yield experimental control and patterns of responding could not be
detected while four children were found to not have difficulties in the area of comprehension.
These results provide support for the hypothesis which stated that children respond differentially
to experimental analysis, thus also providing support for the use of the brief experimental
analysis in the area of reading comprehension in order to determine the underlying cause of a
student’s comprehension problem (i.e., fluency, comprehension strategy).

There were however, several limitations to this study. First, questioning was used to
assess the students’ comprehension of reading materials within this study despite the fact that it
is often regarded as a questionable measure of comprehension. Second, the reliability of
questioning is also questionable. Within the group of 13 children, the average difference between
like (repeated) conditions and unlike (non-repeated) conditions was calculated. Like conditions
included baseline, which was administered twice to all children, and the replicated condition
(fluency or fluency plus comprehension), which varied among the participants but one of which
was administered twice to all children. Unlike conditions included baseline and the strategy
conditions (fluency and fluency plus comprehension). The average difference for like (repeated)
conditions was 1.5 for baseline-baseline and 1.2 for replicated conditions (either fluency-fluency
or fluency plus comprehension-fluency plus comprehension), while the average difference for
unlike (non-repeated) conditions was 1.4 for baseline-fluency and 1.8 for baseline-fluency plus
comprehension. Overall, the variance of the average differences between like conditions ($M = 1.35$) and unlike conditions ($M = 1.6$) was minimal (.25), which is contrary to what would be
expected; If questioning was a reliable measure, average differences between like conditions
should be small, average differences between unlike conditions should be large, and a
comparison of the two (like and unlike conditions) should yield a clear contrast. The implication
is that a screening for comprehension problems based solely on one administration is risky.

The third and most serious limitation is that the relationship between fluency and
comprehension was difficult to discern due to difficulties manipulating fluency levels within the
experimental analysis. To increase fluency, this study manipulated readability level. Overall,
performance in third grade passages ($M = 46$ CWPM) was lower than easier passages ($M = 52$
CWPM), but adequate fluency above 90 CWPM for summer participants or 110 CWPM for fall
participants was obtained in zero cases. Thus, it is difficult to attribute comprehension gains to
fluency gains. Perhaps it is some other element of grade-level readability that produces

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comprehension gains; for example, the structure of easier passages or differences in comprehension questions at easier levels.

Additional research should be conducted to support the conclusions drawn by this study, specifically examining the utility and effectiveness of the brief experimental analysis for reading comprehension. Future research in this area may opt to use repeated reading (Samuels, 1979) to achieve the criterion level of fluency. However, as was the reason against its inclusion in this study, teasing out whether the effects on comprehension were due to increased fluency or repetition of content with repeated reading would remain difficult. On the other hand, to avoid the concern with using repeated reading as the fluency intervention, future research could use an original passage during instruction and a generalization passage for measurement. This might prolong the assessment, however, and still may not increase fluency. Thus, the challenge for “ruling out” fluency is that the speed and accuracy of reading a particular passage cannot be directly increased or decreased.

Regarding the implications for practice, it is presumed that fluency and comprehension are highly correlated. And this is probably true, in general. But among the sample of at-risk readers such as those used in this study, it is the relationship that is critical. If a child’s fluency is directly related to their comprehension difficulties then they would most likely benefit from techniques to increase their oral reading fluency such as repeated reading to in turn improve their comprehension. But if there is no relationship between fluency and comprehension then the child is most likely to benefit from the teaching of active text comprehension strategies such as question generation or think-aloud procedures. This study provided only one means for assessing this relationship; there is possibly a better or more effective way still out there waiting to be discovered. As an initial investigation in this area, however, this study produced several interesting findings. With additional research support, the brief experimental analysis could someday prove to be a useful tool in the treatment planning for students with comprehension difficulties.
References


Table 1

Summary of Results

<table>
<thead>
<tr>
<th>Figure Number</th>
<th>Participant</th>
<th>Most Effective Strategy</th>
</tr>
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<tbody>
<tr>
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<tr>
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<td>Adam</td>
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</tr>
<tr>
<td>4</td>
<td>Nolan</td>
<td>No control</td>
</tr>
<tr>
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<td>FL</td>
</tr>
<tr>
<td>6</td>
<td>Sarah</td>
<td>FL</td>
</tr>
<tr>
<td>7</td>
<td>Jackie</td>
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</tr>
<tr>
<td>8</td>
<td>Justin</td>
<td>FL/CO</td>
</tr>
<tr>
<td>9</td>
<td>Austin</td>
<td>FL/CO</td>
</tr>
<tr>
<td>10</td>
<td>Ben</td>
<td>FL/CO</td>
</tr>
</tbody>
</table>
Figure 1. Brief experimental analysis of comprehension: Hypothetical patterns of responding.
Figures 2 - 10. Individual results of a brief experimental analysis of comprehension of nine participants.
Figure 7. Jackie

Figure 8. Justin
Bill woke up and the sun was shining. Bill was excited because it was his turn for show and tell.

“Today is going to be a good day,” he said, “I can not forget to bring my pet mouse.”

Bill went down the stairs into the kitchen. He sat down and ate two eggs and three pancakes. The school bus arrived early and Bill hurried to get on. Bill got to school and went in the classroom. The teacher told Bill to get out his show and tell. Bill searched in his bag. His pet mouse was not there!

“Oh no, I forgot my pet mouse” cried Bill.

Just then, Bill’s father showed up at the classroom with the pet mouse.

“You left your mouse at home,” said father to Bill.

“Thank goodness, I can now show the class my pet mouse,” said Bill.
Show and Tell (Questions)

1. Why was Bill excited?
2. What can Bill not forget?
3. How many eggs did Bill eat?
4. How many pancakes did Bill eat?
5. Where did Bill leave the pet mouse?
6. Which two places does this story take place?
7. Where should Bill have put his pet mouse?
8. What did Bill do after his teacher told him to get him out his show and tell?
9. How was Bill feeling when his father showed up at school?
10. What is another title for this story?
Bill woke up and the sun was shining. Bill was excited because it was his turn for show and tell.

“Today is going to be a good day,” he said, “I can not forget to bring my pet mouse.”

Bill went down the stairs into the kitchen. He sat down and ate two eggs and three pancakes. The school bus arrived early and Bill hurried to get on. Bill got to school and went in the classroom. The teacher told Bill to get out his show and tell. Bill searched in his bag. His pet mouse was not there!

“Oh no, I forgot my pet mouse” cried Bill.

Just then, Bill’s father showed up at the classroom with the pet mouse.

“You left your mouse at home,” said father to Bill.

“Thank goodness, I can now show the class my pet mouse,” said Bill.
Bill woke up and the sun was shining. Bill was excited because it was ___________ turn for show and tell.

“Today ___________ going to be a good day,” ___________ said, “I can not forget to ___________ my pet mouse.”

Bill went down ___________ stairs into the kitchen. He sat ___________ and ate two eggs and three ___________. The school bus arrived early and ___________ hurried to get on. Bill got ___________ school and went in the classroom. ___________ teacher told Bill to get out ___________ show and tell. Bill searched in ___________ bag. His pet mouse was not ___________!

“Oh no, I forgot my pet ___________” cried Bill.

Just then, Bill’s father ___________ up at the classroom with the ___________ mouse.

“You left your mouse at ___________,” said father to Bill.

“Thank goodness, I can now show the class my pet mouse,” said Bill.
APPENDIX E

Brief Assessment of Reading Comprehension
Treatment Integrity Checklist

Child: __________________________  Examiner: _______________________

Baseline
Passage (3rd): _______________  Date: ______________
Assessed fluency: CWPM _____  Errors _____  IOA _____
_____ Allowed to finish reading entire passage
Assessed comprehension: Overall percentage correct _____  IOA _____
_____ Student allowed to refer back during questioning

Fluency (FL)
BL ≥ 70-100 CWPM? Y / N
Yes - Administer a new 3rd grade passage, then proceed to Comprehension (CO)
Passage (3rd): _______________  Date: ______________
Assessed fluency: CWPM _____  Errors _____  IOA _____
_____ Allowed to finish reading entire passage
Assessed comprehension: Overall percentage correct _____  IOA _____
_____ Student allowed to refer back during questioning

No - Continue Fluency with the next (lower) passage (2nd)

Passage (2nd): _______________  Date: ______________
Assessed fluency: CWPM _____  Errors _____  IOA _____
_____ Allowed to finish reading entire passage
≥ 100 CWPM? Y / N
Yes - Proceed to Questioning
Assessed comprehension: Overall percentage correct _____  IOA _____
_____ Student allowed to refer back during questioning

No - Continue Fluency with the next (lower) passage (1st)
Comprehension (CO)

Grade Level (GL) of passage is that determined in FL (and continue to use throughout)

Cloze Passage (GL ___): ________________ Date: ____________
Assessed fluency: CWPM _____ Errors _____ IOA _____
_____ Skip blanks
_____ Allowed to finish reading entire passage
_____ Re-read same cloze passage: _____ fill in blanks aloud _____ provide brief reasoning
_____ Followed error procedure:
   1st time = noted and child is asked to self-correct (no help)
   2nd time = point to critical information in passage needed to answer
Reversal (to BL)
Passage (3rd): _______________ Date: _______________
Assessed fluency: CWPM _____ Errors _____ IOA _____
_____ Allowed to finish reading entire passage
Assessed comprehension: Overall percentage correct _____ IOA _____
_____ Student allowed to refer back during questioning

Replication
Repeat condition (FL or CO) that produced the greatest comprehension score (if equal, repeat FL)

Fluency (FL):
Passage (GL ___): _______________ Date: _______________
Assessed fluency: CWPM _____ Errors _____ IOA _____
_____ Allowed to finish reading entire passage
Assessed comprehension: Overall percentage correct _____ IOA _____
_____ Student allowed to refer back during questioning

Comprehension (CO):
Cloze Passage (GL ___): _______________ Date: _______________
Assessed fluency: CWPM _____ Errors _____ IOA _____
_____ Skip blanks
_____ Allowed to finish reading entire passage
_____ Re-read same cloze passage: _____ fill in blanks aloud _____ provide brief reasoning
_____ Followed error procedure:
  1st time = noted and child is asked to self-correct (no help)
  2nd time = point to critical information in passage needed to answer
  3rd time = provide answer and instruct child to point to critical information
Assessed comprehension: Overall percentage correct _____ IOA _____
_____ Student allowed to refer back during questioning

3rd time = provide answer and instruct child to point to critical information
Assessed comprehension: Overall percentage correct _____ IOA _____
_____ Student allowed to refer back during questioning
APPENDIX F
Parent Consent for Research Participation

**Purpose:** Your child is invited to participate in a school service to improve his or her school success. A graduate student in school psychology at Miami University will work closely with your child and teacher. The goal will be to find helpful ways to increase your child’s classroom skills. The graduate student will be supervised by the school psychologist at the school. You will be able to see any information about your child at any time. You will be given a report on your child’s progress at the end of the program.

**Procedure:** Your child will be asked to read brief passages and write responses to questions on those passages. We may ask your child and his or her teacher questions about the best way to teach. We may ask them to explain what has been tried in the past. Finally, your child will learn and practice new classroom skills during two 30-minute sessions. Sometimes this will be done outside of the classroom, at a time when your child will not miss any important teaching. No tests will be given and your child will not be asked for personal information.

There are no risks to this program. Most children enjoy working closely with graduate students. The program includes practice and other techniques used to help children learn and do better in school. There is a chance that your child will not improve, however, and that he or she may not like the extra work. If your child is not happy with the program, we will meet with you and your child to discuss how the program should be changed. If you decide it is best to stop the program, we will do so immediately.

All materials and records we use will be kept at the school, in a locked file that you can review at any time. Information about your child’s progress, however, may be shared during university supervision, written as research report, or presented at professional conferences. If information regarding this program is shared with anyone except you and your child’s teacher, your child’s name will not be used. Your child’s name will not be placed on any material or records that leave the school property. No one, except you and your child’s teacher, will know that your child participated in this program.

**Parent’s Rights:** Your child’s participation in this program is voluntary. You may refuse to participate, or withdraw your child at any time. To get information about how the program is going, or to withdraw your child, simply contact his or her teacher or the person listed below. This person is also available to answer any questions and to make certain that you understand the program. You may also contact the Office for the Advancement of Research and Scholarship via phone (513-529-3734) or email (humansubjects@muohio.edu) for questions about your rights as a research participant.

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I HAVE READ AND UNDERSTAND THE PURPOSE OF THIS PROJECT, THE PROCEDURES INVOLVED, AND MY RIGHTS. I AGREE TO ALLOW MY CHILD TO PARTICIPATE IN THIS PROGRAM.
PRINT CHILD’S NAME

______________________________

Parent’s Signature                      Date
APPENDIX G
Child Assent Script

Examiner: ________________________________    Date: __________________

Student: ________________________________

My name is _________________ and I would like you to meet with you and help you with school. I am going to tell you ways that I have helped other children, and after that, you can tell me if you want to be part of it or not.

If you decide to work with me, you will be reading some stories and I will ask you some questions about the stories you've read. We will meet together once or twice during school (or School of ROCK), and I will help you with reading.

Do you understand what this program is like?
Do you have any questions?

It is okay if you decide not to be part of this program. If you say no, your teacher and/or parents will find other ways to help you be successful. You can simply tell me yes or no.

____________________________________________________________________

Print Your Name ________________________________________________

☐ YES    If you want to participate in this program, check here (point to the box).

☐ NO     If you do not want to participate in this program, check here (point to the box).

Thank you for letting me talk with you today!