RESPONSE TO INTERVENTION: INCORPORATING PROBLEM VALIDATION AND INCREASING INTENSITY DESIGNS INTO INTERVENTIONS FOR ORAL READING FLUENCY

by Meghan L. Geer

Identifying interventions for improving reading achievement is critical as the Response to Intervention (RTI) model poses a new means of delivering services by identifying at-risk students, delivering interventions, and evaluating the effectiveness of the interventions. The current study focused on the use of a problem validation model for identifying an academic problem and using single-case, increasing intensity designs to create an RTI model for evaluating oral reading fluency difficulties. Four elementary school students were identified with oral reading fluency deficits through problem validation screening. The effects of different treatment conditions were examined using brief experimental analysis, and intervention packages were created for each student. Treatment progress was monitored weekly using oral reading fluency curriculum-based measurements as well as school-wide CBM benchmarking. Summary statistics and growth rates were utilized to analyze intervention effectiveness. Results indicated that two of the four students’ growth rates exceeded that of classroom peers. Strengths and limitations of the interventions as well as future research is discussed.
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A Thesis

Submitted to the
Faculty of Miami University
in partial fulfillment of
The requirements for the degree of
Specialist of Education
Department of Educational Psychology
by
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2008

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Introduction

Students identified as learning disabled (LD) make up five percent of the school population. From the years 1979-1980 to 1998-1999, the population of students identified as learning disabled increased from 1.2 million to 2.8 million, making LD the largest category in special education (Kavale, 2001; Vaughn & Fuchs, 2003). The present increase of students labeled as learning disabled occurred for three main reasons according to Vaughn and Fuchs (2003): greater acceptance of the LD diagnosis socially compared to other special education categories; the heightened need for literacy skills at home and in employment; and the recognition of the serious academic and social problems experienced by students with learning disabilities. Historically, LD has been associated with an unexpected failure to learn, and past definitions of LD revolved around the concept of a discrepancy between intelligence and academic achievement.

The most common referral for LD results from a student having significant difficulties in the area of reading. In his report to Congress, Lyon (1998) reported that for 20% to 30% of students, reading is the most difficult task they will encounter throughout their time in school. When faced with students who had such difficulties with reading, the response of educators was to refer the child for special education services. Students whose achievement was discrepant from their intelligence scores were classified as LD and entitled to special education services or placements. What then occurred was a pattern of “refer-test-place” in which students were subjected to standardized testing to be labeled as LD.

However, as educational practices advanced, practitioners such as school psychologists were compelled to create alternatives to the standard practice of refer-test-place (Reschly & Ysseldyke, 2002). A focus on problem solving and interventions tries to eliminate the overrepresentation of students in special education by reserving special education placements until education in the regular education classroom has been maximized. New regulations require that before a referral for special education can be completed, there must be documentation that intervention and adaptations were used in the regular education classroom (Fuchs, Fuchs, & Speece, 2002). The move from traditional testing to a problem solving approach has set the change for federal regulations as well. Currently IDEA 2004, which was signed into law on December 3, 2004, contains provisions that have the potential to change the way in which students are identified as having a Specific Learning Disability. The U.S. Department of Education published the first IDEA regulations (part B) on August 14, 2006. The law states
When determining whether a child has a specific learning disability as defined in section 602, a local education agency shall not be required to take into consideration whether the child has a severe discrepancy between achievement and intellectual ability in oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning. 20 U.S.C § 14 (b) (6) (A)). In determining whether a child has a specific learning disability, a local education agency may use a process that determines if the child responds to scientific research-based interventions as part of the evaluation procedures described in paragraphs (2) and (3). (20 U.S.C § 14 (b) (6) (B)).

The changes that the definition discusses are the move from the discrepancy model to a response-to-intervention model (RTI). While the law does not mandate the use of RTI, it does authorize LEAs to determine more effective means of identifying SLD. This “paradigm shift” focuses on early intervention, matching instruction to a student’s individual needs, and progress monitoring of interventions (Reschly & Ysseldyke, 2002; Vaughn, Linan-Thompson, & Hickman, 2003). Before the law was passed, Fuchs, Mock, Morgan, and Young (2003) warned, “with IDEA reauthorization looming, and support weakening for IQ-achievement discrepancy, we urge stakeholders to think about RTI” (p. 169). Using a problem solving approach and team-based decisions, RTI involves identifying at-risk students, delivering interventions, and evaluating the effectiveness of the interventions. Students who do not respond to effective interventions will be deemed unresponsive.

The remainder of this review of the literature will focus on assessment of early literacy skills, the current problems with the discrepancy model, discuss the benefits of the RTI model, describe three approaches to RTI, and describe how RTI can be used in conjunction with brief assessments and curriculum-based measurements as a probable model to identify students with disabilities.

Early Literacy

Assessment of early literacy skills can help aide school professionals promote beginning reading success for all students by improving instruction and intervention through early identification. Current research in the area of reading is guided by the findings of the National Reading Panel, which was created by Congress and the Director of the National Institute of Child Health and Human Development (NICHD). The purpose of the panel was to assess the current state of research-based knowledge, including the effectiveness of differing approaches of teaching children to read. The Report of the National Panel outlined the five “big ideas” for
reading instruction: alphabetic principal, phonemic awareness, accuracy and fluency, vocabulary, and comprehension (Report of the National Reading Panel, 2000). Phonemic awareness and alphabetic understanding play a crucial role in the development of emerging reading skills in Kindergarten and first grade (Coyne & Harn, 2006). Phonics instruction teaches the acquisition of letter-sound correspondence. The meta-analysis conducted by the National Reading Panel (2000) found that systematic phonics instruction results in benefits for all children, grades Kindergarten through sixth, as well as for all children having difficulty learning to read. As students become competent with phonics skills, the area of accuracy and fluency within connected text becomes critical, as it highly correlates with reading comprehension skills. Oral reading procedures have a “significant and positive impact on word recognition, fluency, and comprehension across a range of grade levels” (National Reading Panel, 2000, p. 12).

Discrepancy Model

The discrepancy model has been used to classify students as learning disabled for over 25 years (Gresham et al., 2004). Reschly and Ysseldyke (2002) assert that “diagnosis of LD through determination of the size of the ability-achievement discrepancy, involving administration of one or more IQ tests, is the single most frequent activity of school psychologists” (p. 8). According to Gresham (2001), the four major methods of evaluating learning disabilities using the discrepancy model include deviation from grade level, expectancy levels, standard score differences, and regression analysis. When students were found to be discrepant based on these criteria, they were often qualified for special education services (Gresham, 2002). However, despite the widespread use of the discrepancy model, there is no federal mandate to base LD classification on specific test scores, as well as no clear definition of the terms “intelligence,” “achievement,” or “discrepancy” (Dumont, Willis, & McBride, 2001).

The discrepancy model has been under scrutiny as professionals have tried to move the field of learning disabilities out of a deficit model into a problem-solving model. The rising numbers of students being served under the classification of learning disabilities has many politicians and policy makers questioning the use of the discrepancy model. The rising costs of special education have become a political battle, causing many policy and educational advisors to advocate for the end of the discrepancy model (Fuchs et al., 2003).

Many educators agree that the use of intelligence scores in the discrepancy model does not inform teachers and parents of a student’s potential (Vaughn et al., 2003). Norm referenced assessments, which include both intelligence tests and achievement tests, are also not linked directly to interventions and contribute little to educational program planning (Gresham, 2001;
Kovaleski, 2004; Shapiro, 2004). The discrepancy model does not take into account certain environmental factors, such as a poor instructional environment (Gresham et al., 2004). Gresham (2001) states that the critical problem with the process of LD identification is the missing link between the assessment procedures and the interventions that result from those procedures. Vellutino et al., (1996) questioned the widespread use of the IQ-achievement discrepancy model. Their research on intensive reading tutoring to remediate poor readers found there was a weak link between intelligence scores and reading ability, meaning that having a high IQ does not always correlate with having high reading ability. The skills assessed in intelligence tests may not be as critical for success in reading as are skills such as phonetic decoding and segmentation (Vellutino et al., 1996).

Another critical problem with the discrepancy model is the assumption that the child must fail before receiving services. Students are initially referred to school psychologists in the early grades due to problems and poor performance in reading. However, at this young age, despite the presence of poor performance, the discrepancy between intelligence and achievement is not significant enough to warrant a diagnosis. Students are then evaluated every year after for the poor performance in reading. This wait-to-fail model does not allow for identification of students as LD until they are in the third grade when achievement scores are finally significantly below their intelligence scores. This approach assumes that a child must be discrepant to receive services and must perform poorly for many years in school before his or her score is low enough to qualify (Reschly & Ysseldyke, 2002; Vaughn et al., 2003; Fuchs et al., 2003; Kovaleski, 2004). However, even when a student is referred and evaluated for special education services, the process has a specific timeline, which can take months. A struggling student is then waiting months for the “refer-test-place” model to be completed before he or she receives support or special services (Reschly & Ysseldyke, 2002; Gresham, 2004).

Use of the discrepancy criterion also does not reliably distinguish between students with learning disabilities and students who are low achievers (LA). According to Shinn, Good, and Parker (1999), students with disabilities may represent the lower end of the continuum of abilities. When students are identified using the traditional discrepancy model, what educators are doing is merely identifying students who may be underachievers, not students with a true learning disability (Kavale, 2001). The use of achievement tests makes it difficult to distinguish among students with mild mental retardation, learning disabilities, and low achievers (Gresham, 2001). Research conducted in the Minnesota studies support the notion that the use of a discrepancy model fails to distinguish among similar populations of students (as cited in Kavale,
Because of the inability to properly distinguish students, the use of the discrepancy model often underidentifies, overidentifies, and misidentifies students (Gresham 2001; Vaughn et al., 2003; Kovaleski, 2004). False positives may occur when students have high intelligence scores yet have average achievement scores. False negatives occur when students have a learning disability, but are not identified through the use of assessments (Kovaleski, 2004).

In this traditional approach to identifying students using the discrepancy model, academic needs is not a priority. The deficit approach of waiting for children to fail to classify them for special education services has led to 70% of educators stating the IQ-achievement discrepancy should play no role in the identification process (Speece & Shekita, 2002 as cited in Fuchs et al., 2003). Education has become obsessed with the focus on deficits, which leaves little time and effort devoted to effective interventions and treatments (Reschly & Ysseldyke, 2002). As problems with the discrepancy model are further scrutinized, the literature provides support that an alternative to conventional learning disability evaluation must take the place of such a problematic approach. The new legislation allows for the use of the RTI model. The shift from deficits to a focus on outcomes is made possible through a problem solving and RTI approach.

**Response-to-Intervention**

Response to Intervention is a model of problem solving, which through the use of a tiered delivery system provides a means for school systems to assist student achievement prior to completing a referral for special education. According to Gresham (2001), the purpose of the RTI method is to identify students who are not responding to a validated intervention. The student’s lack of responding to an effective and validated intervention is measured (Gresham, 2004). Instead of utilizing the discrepancy model, “those who are identified as LD would be essentially those who do not respond to treatment and display low achievement” (Vaughn et al., 2003, p. 392). The basic and broad tenants of the RTI model were described by Fuchs et al. (2003). Initially, students are provided with “generally effective” instruction from the classroom teacher. The teacher monitors the progress of all students. Students who do not respond to the classroom instruction are given something more or something else, such as tutoring, interventions, accommodations, etc. Again, students’ progress is monitored. Those who still do not respond are either further evaluated for special education or determined as qualifying for special education services.

When students are identified using this problem-solving framework, a positive alternative to the discrepancy model is created. Unlike using norm-referenced intelligence and achievement tests, the RTI model effectively links the identification process and intervention.
The focus remains on instructional and learning goals being met, with the majority of the focus on outcomes (Kovaleski, 2004; Vaughn & Fuchs, 2003; Fuchs, et al., 2003; Gresham, 2004). The RTI model does not focus on deficits, but uses risk to assess students. Students are identified earlier through screening in primary grades. Those students are provided with effective instruction to move them out of risk. Students are also continuously assessed for risk through ongoing identification procedures (Vaughn & Fuchs, 2003). The RTI model requires on-going monitoring of student progress and intervention fidelity (Vaughn et al., 2003; Vaughn & Fuchs, 2003). Research has shown that through RTI an increased number of at-risk or struggling students are provided with supplemental instruction and in a quicker manner (Fuchs et al., 2003; Vaughn et al., 2003). Unlike the lengthy timeline that is often used in traditional refer-test-place models, the RTI approach provides the help quickly to the student. There is no need to wait for a special education placement, but a struggling student receives effective interventions immediately (Gresham, 2004). Not only are struggling students helped, but also when interventions are implemented at the universal (classroom or school-wide level), a large majority of students benefit from the intervention (Fuchs & Fuchs, 1998; Gresham, 2004).

Proponents of the RTI model assert that this problem-solving model reduces the bias in assessment. Since teacher referral for special education is often hit-or-miss, bias is reduced in the referral process. Bias concerning underidentification of girls and overidentification of minority students will be decreased compared to traditional approaches (Vaughn & Fuchs, 2003). This is due to the increased accuracy of the RTI model. No longer needing to rely strictly on teacher referral, students who are at-risk or struggling are identified through problem-solving screening procedures (Gresham, 2004). According to the National Research Council (2002), “Response to Intervention model holds promise for assuring that students who are most at need and most likely to benefit from special education would be selected and provided special education services” (as cited in Vaughn & Fuchs, 2003, p 141). Because of intensive and individualized interventions, RTI helps distinguish students with LD from students who perform poorly due to lack of adequate and effective instruction (Fuchs et al., 2003). The accuracy of the RTI identification decreases the overidentification of students (i.e., referred to as false positives; Gresham, 2004). This leads to less students being identified as needing special education, which saves school districts money (Fuchs et al., 2003). School districts also save money by utilizing the preventative focus of RTI. The use of early screening procedures identify at-risk students, which reduces the need (and cost) of more intense and lengthy academic and behavioral interventions in the future (Gresham, 2004).
Gresham (2001) examined three major models or approaches to response-to-intervention when defining learning disabilities: predictor criterion, dual-discrepancy, and behavior analysis.

**Predictor criterion.** The first approach is referred to as predictor-criterion, which utilizes skills that predict competency in reading and then uses those skills to teach students. Interventions in this approach focus on a combination of direct instruction and teaching students specific strategies. Vellutino et al. (1996) used strategy training in reading tutoring of kindergarten and first grade children identified through a screening process as having poor reading ability. One hundred eighteen students were divided into two separate groups: tutoring and normal classroom instruction. The content of the tutoring sessions was child specific, utilizing connected text, strategies for word identification (sentence contexts for predicting, external aids, phonetic coding) and strategies for sight vocabulary (phoneme awareness, phonetic decoding, writing skills). Tutoring sessions were daily thirty-minute sessions lasting approximately fifteen weeks. The response to the tutoring, or response to remediation, was measured by the reading growth rate from the start of kindergarten to the start of second grade. The slopes of the growth rates were divided into four categories: very limited growth (VLG), limited growth (LG), good growth (GG), and very good growth (VGG). Most of the poor readers in the tutoring program (67.1 percent) scored within average or above average on reading achievement measures just after one semester of reading. Growth in response measurement was used to identify students whose learning growth slope fell in the bottom half of students as difficult to remediate (Vellutino et al., 1996).

**Dual-discrepancy.** The second approach or model described by Gresham (2001) is the dual-discrepancy model that focuses on a student’s failure to respond to effective regular education instruction. Special education is considered in this approach when a student’s performance level and growth level are significantly below that of his or her peers. In this method, the primary purpose is to identify students as LD or to remediate other academic difficulties. A student would receive LD services if he or she were discrepant from his or her peers in both learning growth rate and level of performance (Fuchs & Fuchs, 1998; Fuchs, 2003; Fuchs et al., 2002). When measurement is complete, the decision for special education determination must verify the following four characteristics according to Fuchs and Fuchs (1998):

(a) the regular classroom is providing acceptable growth for many students and thus is a generally nurturing environment, (b) important dual discrepancies on performance level
and growth rate exist between a target child and classroom peers, (c) inadequate individual learning occurs even with general education adaptations, and (d) improved growth can be derived with the provision of special education (p. 207).

Response-to-intervention in the dual discrepancy approach is typically organized and implemented through a set of three tiers or phases. The three tiers utilize the problem solving process and guide the assessment procedure using a RTI approach.

During the first tier, all students are screened to identify high-risk students (Kovaleski, 2004). This phase includes classroom assessment of students to determine the overall rate of responsiveness. This assessment helps determine if adequate learning can be expected in the classroom environment (Vaughn & Fuchs, 2003) and to determine if the growth rate in the classroom is sufficient enough to generate growth. Students are identified whose level of performance is below that of classroom peers, thus high-risk students are identified (Fuchs et al., 2002). According to Kovaleski (2004), schools must identify three types of students: students that have attained skills, students who are developing the skills, and students who are deficient. Teams of professionals work together to analyze the assessment data and to design and implement instructional strategies aimed at high-risk students.

The second tier involves delivering scientifically-based interventions structured to create an “instructional match” (Kovaleski, 2004). Tier Two begins as soon as possible after a student is identified as being at risk (Vaughn, 2003). The teacher and consultant systematically test classroom adaptations to improve academic responsiveness in the regular education classroom. It must be determined whether or not the classroom environment is the most suitable learning setting (Fuchs et al., 2002; Vaughn & Fuchs, 2003). The team of professionals continues to assess responsiveness to interventions. While no concise research outlines the time line, in general research supports 8 to 12 weeks of intervention (Vaughn, 2003).

Last, during the third tier, the extent of academic deficiency is evaluated and the need for special education is reviewed (Kovaleski, 2004). Only when students fail to improve in growth to the corrective action are special education services to supplement general education instruction considered (Vaughn & Fuchs, 2003). If there is no evidence to support growth and responsiveness in removing a student from the regular education classroom, then a special education placement is not warranted (Fuchs & Fuchs, 1998; Vaughn & Fuchs, 2003). A consistent research consensus has not been reached as to what exactly the third tier of intervention should look like for struggling students. Tier Three differs from Tier Two, in that it is more intensive, tailored to the individual child, and may continue longer. In a review of three
RTI model studies, Marston (2005), stated that Tier Three may be a mix of both general and special education services, although the services and interventions at this level are intense in nature, regardless of whether or not the third tier is only reserved for special education evaluation and placement. James Hale (2006) proposes that at the third tier, a comprehensive cognitive hypothesis-testing evaluation be completed, as research in cognitive and neuropsychology should not be ignored by practitioners. While there is no consensus regarding the use of intelligence assessments among researchers and there is a lack of evidence supporting the use of intelligence assessments (Fuchs & Fuchs, 2006), it is the decision-making group at the school level that determines the exact nature of what Tier Three may look like for individual students (Lichtenstein & Klotz, 2007).

Behavioral analysis. The final response-to-intervention approach, the behavioral analysis method, uses the manipulation of antecedents and consequences to improve reading. This approach functionally describes a student’s difficulties with reading. Using mainly single-case experimental designs, this approach focuses on assessment and intervention and special education decision making based on applied behavioral analysis technology (Gresham, 2001). Daly, Witt, Martens, and Dool (1997) proposed five functional explanations of poor student performance, applying the use of functional analysis to academic skills. The five hypotheses are: 1) students do not want to do it, 2) students have not had enough time to do it, 3) students may not have had enough help to do the academic task, 4) students may not have had to do it that way before, and 5) academic materials may be too difficult for students. Using this perspective, the job of the school team is to analyze the factors that may explain poor academic performance and then design and implement an intervention to improve academic responding (Gresham, 2001).

Research

Very few empirical research studies focused on the evaluation component of the RTI model have been completed to date. Using the RTI model as a foundation, Vaughn et al. (2003) studied the effect of a 30-week reading intervention on 45 second grade students. Thirty-five minutes of daily intervention focused on fluency, phonemic awareness, instructional level reading, word analysis, and writing. Students who exited the program after 30 weeks and those who never exited the program were considered resistant to intervention. These 21 students were described as requiring special education services, demonstrating over the thirty weeks that extensive supplemental reading instruction was essential.

One study by Marolt and Telzrow (2007) used a standard protocol approach to implementing response to intervention at a district wide level. The research findings highlighted
the progress made by preventing reading failure in grades K-4 across four elementary schools. Students were screened using curriculum-based measurements three times per year in the areas of early literacy, oral reading fluency, and reading comprehension. Tier 1 services were provided through a core scientifically-based reading curriculum with an additional phonics intervention. Students who fell below the 24th percentile on CBM were identified to receive Tier 2 interventions, consisting of daily 20 to 30 minutes of additional literacy instruction for 8 to 12 weeks. Tier 3 interventions were delivered in individual or small groups 45-60 minutes daily, and were reserved for students who failed to make progress in several Tier 2 interventions. Progress was monitored for all students receiving Tier 2 and Tier 3 interventions on a biweekly basis. Data collected at the end of the second year of the RTI implementation revealed that the number of intervention referrals dropped from 86 to 19 over the two-year time period. Reading achievement increased, as the percentage of students in grades 2-4 performing at benchmark rose from 50 percent in the fall to 62 percent in the spring. Referrals for specific learning disabilities also decreased, from 47 to 17 over the course of one year.

While limited, research on RTI has expanded to include findings on diverse students and English language learners. Linan-Thompson, Vaughn, Prater, and Cirino (2006) identified first grade English language learners who were at-risk for reading difficulties. At-risk students were randomly assigned to intervention and control groups. Intervention consisted of small-group supplemental reading instruction for 50 minutes daily for a period of 7 months. Students in the control group received the school’s existing instructional program. Results after two years of data collection found that students assigned to the first grade intervention met the established criteria compared to students who did not receive the intervention treatment.

**Components of RTI Models**

Though differing approaches to the RTI model exist, several components are present in the literature. The following are recommended variables found in the literature involving RTI and reading: identification/screening, formative progress monitoring, brief experimental analysis, and increasing intensity (Barnett, Daly, Jones, & Lentz, 2004).

*Identification/Screening.* The Dynamic Indicators of Basic Early Literacy Skills are an assessment procedure comprised of individualized standardized measures. Each short one-minute assessment is designed to measure pre-reading and early literacy skills. According to Good and Kaminski (2001), DIBELS are valid and reliable measures of three “big ideas” of literacy skills: phonological awareness, alphabetic principle, and fluency with connected text. Information gathered from DIBELS can be used to evaluate individual student reading progress, as well as
data on entire classrooms, schools, or school districts. When used in conjunction with a response-to-intervention approach to reading difficulties, DIBELS can be used to screen for students in primary grades who are struggling. DIBELS data can also show how a student’s literacy skills are functioning in comparison with classroom peers.

In order to assess if students fall below their classroom peers in performance and learning growth, a systematic screener or identification process must be used. Problem validation is a process that guides assessment and decision making using data from both classroom norms and national norms based on literature-based criteria. This process contains three major steps: assessment, interpretation, and intervention. During the assessment phase, the teacher is interviewed to obtain an objective description of the referral problem. The entire classroom is then assessed with brief probes using grade level academic materials. Oral reading fluency, written expression, and math are all assessed. A behavioral observation is also conducted. The student who is experiencing the referral problem is then given a can’t do/won’t do assessment using the same materials used during the classwide assessment. This will help determine if the student can perform better than he or she did in the classwide assessment as well as determine if the child has a performance or a skill deficit (VanDerHeyden, Witt, & Naquin, 2002).

After the assessment step is complete, the academic and behavioral data collected are then evaluated and linked to an intervention. The student who was referred is then compared to both literature and local norms (other students in the classroom). The data will reveal if the student is discrepant from classroom peers (individual student concern), student is performing similar to classroom peers at benchmark (no problem), or the entire classroom is performing below benchmark standards (class wide problem). Once the data have been interpreted, a functionally related intervention is developed (VanDerHeyden, Witt, & Naquin, 2002).

The last phase in the problem validation process is termed intervene. The goal of this phase is to assess whether the intervention and assessments conducted are on track. There are four outcomes during the intervention phase: the treatment was not effective because the intervention was not implemented properly, the treatment was not effective because the initial assessment was incorrect or incomplete, the intervention was effective but it needs to be simplified, or the intervention was effective and will be continued (VanDerHeyden, Witt, & Naquin, 2002).

**Formative progress monitoring.** The most effective means to monitor student outcomes is to monitor progress throughout the duration of the intervention (Vaughn & Fuchs, 2003). Outcome measures must be child focused. A direct assessment method, such as curriculum based
measurement (CBM), may be used, as well as indirect methods such as child and behavioral rating scales. Measures may focus on outcomes such as academic engaged time, rate of skill growth, and behavioral or academic fluency (Barnett et al., 2004). The most widely used formative progress monitoring tool cited in the literature is CBM (Fuchs & Fuchs, 1997; Fuchs et al., 2002; Fuchs, 2003; Vaughn, & Fuchs, 2003).

CBM is a set of standardized procedures that assess student’s academic skills in the major curricular areas of reading, math, spelling, and written expression. According to Deno (1985), who established this measurement system, CBM was designed to objectively measure student outcomes and to help educators plan effective instruction. Thus, CBM serves two main purposes: to monitor academic progress and to link instruction with assessment (Fuchs & Fuchs, 1997). Curriculum-based measurements have historically been shown in research to effectively guide low-stakes classroom and screening-based decisions (Christ, Davie, & Berman, 2006). According to Daly, Martens, Dool, & Hintze (1998), CBM has the advantage over other reading proficiency measures of being “sensitive to short-term instructional growth” (p. 203). Shinn and Bamonto (1998) compare CBM to a thermometer that gauges the effectiveness of an academic intervention. Research has shown that the growth slope of CBM can be used to measure a student’s responsiveness to an intervention (Daly et al., 1998; Jones & Wickstrom, 2002; Fuchs, 2003) as well as to inform educators when an intervention needs revision due to a lack of responsiveness. Research has also been collected that suggests a single administration of a CBM probe may be a better predictor of academic achievement than some norm-referenced/group administered achievement tests (Ardoin et al., 2005).

CBM samples an extensive range of academic skills with each repeated measurement examining the same constructs. When assessing oral reading fluency rates using CBM, students read aloud from a selected passage for one minute. The metric recorded by practitioners is correct words per minute on three separate reading passages. The number of words read correctly is an accurate representation of reading fluency. Increases in oral reading fluency have been shown to correspond with increases in reading comprehension (Lyon, 1998; National Reading Panel, 2000).

CBM scores are “performance indicators” according to Fuchs et al. (2002) who recommend that CBM be a part of the response-to-intervention model. These performance indicators can be used by practitioners to identify discrepancies in performance between individual students and classroom peers, which can help make decisions about the need for special education services. Response-to-intervention, when combined with CBM, can be
determined in a considerable shorter amount of time than traditional approaches. When progress
monitoring with CBM is utilized, responsiveness to an intervention can be determined in as short
of time as two months (Fuchs, 2003; Fuchs & Fuchs, 1998).

Brief experimental analysis. When designing individualized interventions in a response-
to-intervention approach with reading difficulties, an essential component is a brief experimental
analysis of a student’s oral reading fluency. In a brief experimental analysis, students are
exposed briefly to differing experimental conditions to determine which strategy or treatment is
the most effective (Barnett et al., 2004). The use of the testing hypotheses is a validated approach
to determining the factors that shape academic performance and can help educators determine
which level of intervention is necessary when designing treatments.

In their 1997 article, Daly et al. examined five functional explanations of poor
performance of 4 elementary students, applying the use of functional analysis to academic skills
and the instructional hierarchy. The hypotheses were: the student does not want to do it, the
students has not practiced the skill enough, the student has not had enough help to do the
academic task, the student has never had to complete the work in that way before, and the
academic material may be too hard for the student. Using the brief experimental analysis,
intervention treatments were combined until oral reading fluency rates increased. Results
suggested that a brief experimental analysis could be used to design and implement intervention
treatments and could also be utilized to rule out ineffective treatments (Daly et al., 1997).

Daly at al. (1998) used the five hypotheses to design a procedure that lead to reliable
intervention design while minimizing the time for collecting data. Three students, from grades 3,
5, and 6, were part of reading tutor intervention programs, in which treatments were ordered
hierarchically from least intrusive to most intrusive. CBM passages were used to measure correct
words read per minute. The results of the interventions varied for each student, and each student
was delivered a different treatment package. Daly et al. (1998) concluded that this brief
assessment model was successful with academic behaviors and found that each student
responded uniquely to the treatments.

Jones and Wickstrom (2002) reached similar conclusions using the brief assessment
model to examine treatment variables for academic problems. Five elementary students were
given treatment packages using four experimental conditions based on a hierarchy of resources
and time: incentive, repeated readings, phrase drill, and easier material. After one testing of each
combination of interventions, the most effective strategy was implemented. Last, a mini-reversal
was completed to ensure that the chosen intervention was effective in increasing oral fluency
rates. This combination of curriculum based measurements and functional analysis is thus helpful when identifying strategies for students with reading difficulties and should be used when word recognition and oral reading fluency is the main focus of concern (Jones & Wickstrom, 2002).

A recent study conducted by Mallow, Gilberston, and Maxfield (2007) revealed that the use of the brief experimental analysis may be effective for identifying and implementing effective reading interventions to improve the oral reading fluency of English Language Learners. The study was completed using five elementary students who were identified English Language Learners. The authors utilized five experimental conditions as part of the brief analysis, each condition relying on increasing language support: contingent reward, listening passage preview, repeated reading, key word, and incremental rehearsal. The last two conditions demonstrate the importance of vocabulary building in the development of the English Language and reading achievement. After the testing of each condition, an extended analysis was conducted using alternating baselines to identify the least intrusive, most effective reading intervention. Oral reading fluency progress monitoring data found individual differences and variability among response to conditions for each participant, but each student did respond to at least one experimental condition. Thus, this study lends support that use of the brief experimental analysis is a time efficient and effective means for selecting interventions for English Language Learners (Mallow, Gilbertson, & Maxfield, 2007).

**Increasing-intensity.** Response-to-Intervention designs must incorporate a decision making process that increases or decreases the intensity of interventions in graduated amounts. According to Barnett at al. (2004), intensity of intervention refers to the time, effort, or resources that are involved in academic and behavioral interventions. Intensity of an intervention can be measured by recording the intervention schedule by day and length (times per day and duration in minutes) or as a percentage of occasions that the intervention was in place (Barnett et al., 2004). The reasoning behind the increasing/decreasing intensity design is to find the least intrusive intervention that meets a student’s needs. According to Gresham (2004), matching the intensity of the intervention to the intensity or the severity of the problem is the most important consideration when developing school-based interventions.

Increasing/decreasing intensity involves “step-by-step decisions” as interventions are implemented to determine the least amount of intervention needed to meet a student’s goals or objectives. By extending, adding, subtracting, or altering intervention components, the level and intensity needed for student success can be determined (Barnett et al., 2004).
When examining the intensity of interventions, it is important to consider the hierarchy of intensity, which is the sequence of interventions based on the intensity of instruction (Barnett et al., 2004). Specifically, the instructional hierarchy of oral reading fluency assesses reading in a learning sequence, with specific interventions tied to the stages in the hierarchy (Daly, Lentz, & Boyer, 1996). The first stage in the sequence is acquisition of the reading skills. Strategies addressing acquisition involve modeling, demonstration, prompting and cueing. The second stage, fluency, involves a student using the reading skills rapidly. Interventions focusing on fluency should include repetition, reinforcement, and drill. The third stage in the instructional hierarchy is generalization, which is the application of the newly acquired skills into multiple environments. Students in this stage of development need access to new events and may require a shaping process with incentives and prompts. The final stage in the sequence is adaptation in which students must learn to use their new skills in novel settings and demands. Teaching and interventions must focus on letting students experience their skills in as many novel settings and situations as possible (Daly at al., 1996).

Along with the other components necessary for the RTI process, the use of an increasing intensity designs in the problem solving process could help analyze interventions and assist a school intervention team in making data-based decisions about intervention effectiveness (Barnett et al., 2004).

Purpose of Study

To date, there have not been any empirical studies documenting the effects of a response-to-intervention model in the determination of special education eligibility for learning disabilities. The current study focused on the use of a problem validation model for identifying an academic problem and using single-case designs to create a response-to-intervention model for evaluating reading difficulties. Using the functional hypotheses for academic difficulties (Daly et al., 1997) and the brief experimental designs for reading (Daly et al., 1998; Jones & Wickstrom, 2002), this exploratory study adds to the existing knowledge of response-to-intervention related to oral reading fluency. Specific research questions included:

1. Did the use of a problem validation phase involving the comparison of students to classroom peers provide an accurate means to identify students with oral reading fluency problems?
2. Did findings in these case studies validate previous brief assessment research findings for identifying and implementing interventions for oral reading fluency?
3. Would linking the problem validation phase with the RTI process assist in the process of SLD eligibility determination?

4. Would the use of single-case and increasing intensity designs add to the strength of intervention design and the SLD eligibility decision?

These research questions were examined through a reading intervention/tutoring program with four elementary students. In each intervention case, the students were compared to their classroom peers in a problem validation screening, a brief experimental analysis was conducted, and interventions were designed and implemented based on specific student need.
Method

Participants and Setting

Three third grade students (Craig, Hope, and Kip) and one 4th grade student (Jenna) from a suburban elementary school in Southwest Ohio participated in a reading tutoring program. Two students were male and two were female. All four students were Caucasian and were age-appropriate for their grade (no retentions). All students were receiving instruction in the general education curriculum while two students (Hope and Chris) were receiving additional reading instruction through the school’s Title 1 reading program during the course of the research project. Students were identified to be a part of the program through a class-wide screening of oral reading fluency performance as well as by teacher referral. Prior to beginning the study, written consent was obtained from each student’s guardians (Appendix A) as well as verbal assent was obtained from each child and teacher. Tutoring sessions took place in an empty classroom located nearby the student’s classroom.

Tutors/Examiners

Two second-year students in the school psychology program at Miami University were trained in the tutoring procedures and conducted the assessment and tutoring sessions with the selected elementary students. Both students had received their master’s degree in school psychology. Training included in-class training during EDP 612 course (Psychoeducational Assessment and Intervention-II) and separate research training sessions, which included readings, discussion and didactic role practice.

Materials

Reading passages. Curriculum-based measurement (CBM) reading passages used in the study were re-typed from a variety of reading series. Readability of all the reading passages was determined using Fry Readability Index (Fry, 1977) which provides a general grade level or reading based on the number of sentences and the number of syllables per 100 words. The Fry method is based on the premise that decreasing the number of syllables and words per sentence also decreases the readability of a passage (Fry, 1997). If a reading passage did not meet the readability for a specific grade, the words in the passage were adjusted to have more or less syllables. Sentences also were adjusted to make the passage contain more or less words. Any changes in the reading passages were made so that the original meaning of the passages were maintained (Fry, 1977). Refer to Appendix B for graphic display of Fry Method.
Dependent Variables

Three dependent measures on oral reading fluency were used. Correct words per minute (CWPM) served as the general metric during assessment and intervention phases. As described in the next sections, students were required to read the same passage during some assessment conditions in order to measure the immediate and generalized effects of a particular reading strategy.

General CBM reading measure. The correct words per minute on the first reading of a CBM probe served as the general reading measure. A general score represented a student’s reading performance prior to any intervention or practice with the reading passage, which is more representative of student growth over time. A word was considered read correctly if it was pronounced correctly in 3 seconds. While the student read the passage, the examiner marked the student’s errors on a separate probe. If a student paused or hesitated for more than 3 seconds, the examiner told the student to “continue reading” and the word was marked as an error. Errors also included mispronunciations, substitutions, and omissions. Self-corrections, inserted words, dialect, and repetition were not counted as errors. The examiners did not provide the students with a correct word if he or she hesitated, as this would alter the experimental conditions (i.e., could be viewed as an intervention in itself). The general score was recorded after the first reading of a passage.

Immediate CBM reading measure. The number or correct words per minute on the final reading of a CBM probe represented the immediate reading measure. Immediate reading measures demonstrated the instant effects of the intervention on the passage and were recorded after implementation of the intervention.

Oral reading fluency growth rate. Growth in oral reading fluency was measured using weekly growth rates. Growth rate was defined as the average number of CWPM per week a student increased between two assessment administrations. These data were collected as part of school-wide oral reading fluency assessments in the fall, winter, and spring of the school year. Growth rates were calculated by subtracting the first assessment score from the second assessment score and then dividing by the number of weeks between the assessments. Expected growth rates during each week of intervention were: Grade 1: +2 CWPM/week, Grade 2: +1.5 CWPM/week, Grade 3-4: +1 CWPM/week (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993).

Independent Variables

The independent variable used in this study was the treatment condition provided to each student based on functional hypotheses of academic problems and the brief assessment model
The independent variable for each student varied in both type and intensity, and included one or more of the following conditions: incentive, repeated reading, listening passage preview/phrase drill, and easier material.

*Incentive.* The purpose of the incentive condition was to assess if a student would improve his or her reading performance due to an incentive. This condition helped determine if student difficulty with reading was due to a lack of motivation (performance deficit) or a lack of necessary reading skills (skills deficit) (Daly et al., 1997; 1998; Jones & Wickstrom, 2002). After the student read the passages, he or she chose a reward (e.g., a reward coupon, a prize coupon, or a phone coupon) if he or she reached the set goal. The student then read the passage for 60 seconds while the examiner monitored CWPM and errors. A consolation prize was given to each student regardless of goal attainment.

*Repeated reading.* The purpose of the repeated reading treatment condition was to assess whether increased opportunities to respond to reading material would increase reading performance. Research has shown that repeated readings can increase fluency and comprehension, as well as assist in the building of basic academic skills (Daly et al., 1997; Doughty, Chase, & O’Sheilds, 2004). In this condition, the student re-read the CBM passage four times (Daly et al. 1998).

*Listening passage preview/phrase drill.* The purpose of this treatment condition was to assess if learning trials, which included modeling, correction, and rehearsal, would increase reading fluency performance. These strategies have all been shown to enhance reading performance (Daly et al., 1997; Daly et al. 1998). The examiner first read the passage aloud. Next, the student read the passage aloud while the examiner highlighted errors. The examiner then read the error words aloud to the student. Finally, the student read the phrases containing the errors three times (Daly et al., 1998). Immediate correction was provided for any errors.

*Easier material.* The purpose of the easier material treatment condition was to determine whether lowering the difficulty of curriculum reading materials would increase reading performance (Jones & Wickstrom, 2002). The student read a CBM passage one grade-level below his or her instructional level.

**Procedures**

The procedures in this study consisted of five phases: problem validation, problem analysis, treatment strength, problem evaluation, and follow-up.

**Phase I: Problem validation.** The problem validation phase served the purpose of gathering background information about each student, identifying the specific student needs, and
verifying that a problem existed. First, teachers were asked to complete the Teacher Interview Form (Appendix C). A follow up interview was then conducted to clarify goals and procedures and determine a schedule for observation, teacher updates, and tutoring.

A problem validation screening was then conducted to compare student performance to peers and literature-based criteria based on CBM measures in reading, math, and written expression. These data were collected by the school as part of its school-wide assessment benchmarks. In order to assess student task engagement, the examiners conducted behavioral observations using a systematic observation measure using an interval recording system. The observers measured the percentage of task and instructional engagement of the targeted students and peers using 10-second intervals. In addition to on-task behaviors, motor and verbal behaviors were also recorded. The purpose of the problem validation phase was to identify and isolate the specific problem. By comparing students to classroom and literature benchmarks and conducting a classroom observation, the examiners were able to rule out classroom behavior or difficulties in another academic subject.

Finally, one-on-one assessment was conducted in order to establish a stable and non-escalating baseline. During each session, the examiner administered 6 CBM passages with appropriate breaks between administrations. Sessions were conducted two times per week for 30 minutes each. Weekly means of the medians were graphed for baseline. This continued until a “stable” baseline was established and confirmed with the university supervisor. A baseline was considered stable if no data points of the baseline varied more than 20% from the mean of the baseline (Alberto & Troutman, 2003). At least three data points were needed to determine stability. Fidelity checklists were completed for each baseline session (Appendix D). Agreement sampling was conducted, with approximately every third baseline session assessed for interobserver reliability. For the four students, the average length of this phase was 2 weeks (range 1 to 3 weeks).

Phase II: Problem analysis. The brief assessment took place during the problem analysis phase. To begin the brief assessment, the examiner determined the student’s goal using the baseline data of CWPM. The goal was set by multiplying the median of the last three baseline data points by 1.3, which corresponds to a 30 percent increase (Jones & Wickstrom, 2002). An effective treatment had been established as one that increases student performance by 30 percent and produces less than 6 errors in third grade and above (Fuchs & Deno, 1982).

Once a goal was identified, assessment of a series of brief intervention trials occurred, which included implementing the least intrusive intervention first and moving to more intrusive
interventions in the following order: incentive (IN), repeated reading (RR), listening passage preview/phrase drill (LPP/PD), and easier material (EM). Incentive reading and repeated reading were conducted in one day, and listening passage preview/phrase drill and easier material in another (see Appendix E for scripted instructions for each experimental condition). Fidelity checklists were completed after each administration. The least intensive, most effective intervention was identified, considering the student’s errors. A replication phase was then done to produce a reproduction of the effects of the most effective condition. A mini-reversal was used if needed to replicate the effects of the intervention and to rule out practice effects (Jones & Wickstrom, 2002). A mini-reversal included two components. First, a return to baseline conditions (30 percent decrease from the highest data during the intervention trials) and second, a replication when the selected intervention was implemented again (30 percent increase over the reversal condition score). Problem analysis lasted an average of 2 weeks across all four participants (range 1 to 3 weeks).

**Phase III: Treatment strength.** Tutoring visits continued twice per week with the single most effective strategy identified during the problem analysis phase. The goal of this phase was for the student to reach stable performance on the immediate effects. As many least intrusive and most effective Brief Assessment condition scripts (Appendix D) as possible were administered during each 30-minute tutoring visit. For every condition that included either repeated reading or phrase drill, each general CBM score (first reading) and each immediate CBM score (final reading) was recorded. Only immediate scores were graphed at this time. Once the effects of the initial conditions were stabilized, it was determined whether the median of the last three immediate CWPM was above the literature-based standard of 100 CWPM for 3rd and 4th graders (Good & Kaminski, 2001). If so, then Phase IV was implemented. If not, then the next least intrusive additional treatment was added to the tutoring package. Evaluation continued until the examiner identified the least amount of treatment necessary to increase immediate performance levels to literature-based standards. Fidelity checklists were continued and inter-observer agreement was also recorded. The treatment strength phase took approximately 2.5 thirty-minute sessions per student (range from 1 to 4 sessions per student).

**Phase IV: Treatment evaluation.** Aimlines, which graph the trajectory towards the fluency goal, were created from the median baseline point to goal based on expected growth rate. The goal was set for 16 weeks from the initial treatment evaluation session, and was calculated by adding Fuchs et al. (1993) expected growth rate to each week of intervention that is +1 CWPM/week for grades 3-4.
Tutoring visits twice per week continued and as many ideal treatment strength scripts were administered as possible. Fidelity checklists also were continued. General CBM scores and immediate CBM scores were monitored, with only general scores graphed. Necessary treatment duration was evaluated by using the general CBM score to evaluate progress. A three-point decision rule was used to evaluate progress against the aimline. If three consecutive data points fell below the aimline, a change in interventions was considered. A change in intensity occurred, either by adding the next least intrusive intervention to the treatment package or increasing the frequency of tutoring sessions per week. This phase took an average of approximately 18 weeks per student (range 9 weeks to 26 weeks).

Phase V: Follow up. During the final phase, dates and scores were recorded for any school-wide benchmarking. A follow-up/problem evaluation interview was conducted with the teacher. A comprehensive report was mailed to the parents and schools after all tutoring sessions were completed (see Appendix F for a sample report for one participant).

Design
This study included a brief assessment that was conducted using a multi-element design in order to determine the effects of differing oral reading fluency treatments (Alberto & Troutman, 2003). Following baseline, a multi-element, increasing intensity design was used to examine intervention effects on oral reading fluency rates (Jones & Wickstrom, 2002).

Interrater Agreement
All sessions were audiotaped and 35 percent of taped sessions were listened to by a secondary observer/coder to score agreement on CWPM. Mean inter-rater agreement for CWPM was 99.3 percent (range 95 to 100 percent).

Treatment Fidelity
Fidelity checklists were completed by each examiner to ensure proper implementation of conditions and procedures during each treatment session (Appendix D). Each session was audiotaped and 35 percent of tapes were listened to by a secondary observer/coder to code the steps, checking for accuracy of procedures. Fidelity checklist inter-agreement averaged 100 percent.

Results
Problem Validation
Data from the Problem Validation phase are displayed in Figure 1. The graphs display the results from the Problem validation screening and data from the school-wide benchmark assessments. The data indicate that three of the four participants were discrepant from their
classroom peers in oral reading fluency. Literature benchmarks as well as the school benchmark indicate that third grade students should be reading 100 CWPM. The three students who varied in their oral reading fluency had a mean of 61 CWPM.

Oral reading fluency appeared to be the biggest area of concern for these selected participants. While the problem validation screening indicated that several of the students were also discrepant from their classroom peers in written expression and mixed math, these areas were not addressed in this study. For three of the four students, classroom behavior, as measured by time-on task, did not appear to differ significantly from classroom peers. The largest discrepancy for time on-task was for Hope, who was on-task 65 percent of the time while classroom peers remained on-task for 89 percent of the time. The participant who was not discrepant from classroom peers in the area of oral reading fluency was Kip. Although he read 95 CWPM, Kip was referred for intervention due to documented history of reading difficulties in previous years. His classroom teacher and the administration felt it beneficial for him to continue to receive oral reading fluency intervention.

**Baseline**

Phase 1 included gathering of baseline data. The median baseline score (CWPM) for the four participants were Craig: 62; Hope: 77; Jenna: 66; and Kip: 96.

**Problem Analysis**

Following the baseline condition, the problem analysis phase utilized a brief experimental analysis to determine the most effective, least intrusive intervention for each participant. Individual results are as follows and are shown in Figures 2 through 5.

Craig’s median oral reading fluency rate was 62 CWPM during the baseline condition. During the brief experimental analysis process, three intervention conditions (repeated readings, listening passage preview/phrase drill, and easier material) resulted in an increase of 30 percent or higher over his median baseline score. During the repeated reading (RR) condition, Craig’s performance increased to 93 CWPM. RR was selected as the intervention to replicate, for it was the most effective, least intrusive intervention that increased his performance. A reversal condition (mini-withdrawal) was necessary, and a baseline score of 38 was obtained. A replication phase was conducted with the RR condition, which resulted in an increased performance of 115 CWPM. Repeated reading was the intervention selected for evaluation in Phase III, treatment strength. See Figure 2.1.

Hope’s median oral reading fluency rate during the baseline condition was 77 CWPM. During the brief experimental analysis process, repeated reading (RR) was the sole condition that
resulted in an increase of 30 percent over her baseline median of 77 CWPM. During the RR condition, Hope’s oral reading performance increased to 113 CWPM. Repeated reading was selected as the intervention to replicate because it was the most effective, least intrusive condition that resulted in performance over the goal. A reversal condition was not needed, as a result of the easier material condition bringing Hope’s performance back to baseline level. A replication phase was conducted with the RR condition, which resulted in an increased performance of 94 CWPM. Repeated reading was the intervention selected for evaluation in Phase III, treatment strength. See Figure 3.1.

Jenna’s median oral reading fluency rate during the baseline phase was 66 CWPM. During the brief experimental analysis process, both repeated readings (RR) and listening passage preview/phrase drill (LLP/PD) resulted in an increase of 30 percent or higher over her median baseline score. Because it was the most effective, least intrusive of the two conditions, RR was selected as the intervention to replicate. A reversal condition (mini-withdrawal) was necessary, and a baseline score of 51 CWPM was obtained. A replication phase was conducted with the RR condition, which resulted in an increased performance of 126 CWPM. Repeated readings was the intervention selected for Jenna for treatment strength in Phase III. See Figure 4.1.

Kip’s median oral reading fluency during the baseline condition was 96 CWPM. During the brief experimental analysis process, only the easier material condition resulted in an increase of 30 percent or higher above his baseline score. However, because repeated readings (RR) also resulted in an increase above the literature-based goal of 100 CWPM, and it was the least intrusive intervention, it was selected as the intervention to replicate. His score during RR increased to 112 CWPM. A reversal condition (mini-withdrawal) was necessary, and a baseline score of 110 was obtained. A replication phase was conducted with the RR condition, which resulted in an increased performance of 141 CWPM. RR was the intervention selected for evaluation in Phase III, treatment strength. See Figure 5.1.

Treatment Strength

During the treatment strength phase for Craig, the condition of RR failed to keep the median of the oral reading fluency scores above the literature-based criteria goal of 100 CWPM. This indicated that RR alone would not help increase Craig’s oral reading fluency scores. The next effective, least intrusive condition was added to the RR condition, which was incentive (IN). When this intervention package was administered in the treatment strength phase, Craig’s oral reading fluency scores increased above the goal line of 100 CWPM. Thus, the intervention
of RR + IN was chosen as the intervention to best increase Craig’s oral reading fluency. See Figure 2.1.

During the treatment strength phase for Hope, the condition of RR failed to keep her performance above the literature-based criteria of 100 CWPM. The median of the three data points fell below the goal of 100 CWPM. This indicated that RR alone would not increase Hope’s oral reading fluency. The next effective, least intrusive condition, incentive, was added to RR. When the RR+ IN condition was administered, the median of the three data points fell below the goal line. In order to help her exceed the goal of 100 CWPM, the strategy of listening passage preview/phrase drill was added. However, this package, RR + IN + LPP/PD was also not effective in helping raise Hope’s performance above the goal of 100 CWPM. However, it was decided after discussion with the classroom teacher, principal, and university supervisors that the intervention package of RR+IN+LPP/PD be continued in the treatment evaluation phase. See Figure 3.1.

During the treatment strength phase for Jenna, only RR was necessary to assess. The median of her oral reading fluency scores (118 CWPM) fell above the literature-based goal of 100 CWPM. Thus, RR was the intervention chosen to best increase Jenna’s oral reading fluency performance. See Figure 4.1.

During the treatment strength phase for Kip, the intervention of RR was successful at getting all three data points above the literature-based goal of 100 CWPM. The median of his scored was 140 CWPM. Thus, RR was the intervention selected to best help increase Kip’s oral reading fluency performance. See Figure 5.1.

*Treatment Evaluation*

Results from the treatment evaluation phase revealed that the oral reading fluency of three out of the four participants improved over the course of the intervention period. Each student received an individualized treatment package based on the above results. During this phase, the students were made aware of their progress by the graphs of their weekly oral reading fluency scores. Individual results are discussed below:

Craig’s median baseline score was 62 (CWPM) during the problem analysis phase. Based on the expected growth rate of +1 word per week, Craig’s initial goal was set for 78 CWPM. However, Craig did not participate in the entire 16-week intervention due to the end of the school year, and after 11 weeks, his aimline was adjusted to 72 CWPM. Craig received intervention only once per week during the first two weeks of the treatment evaluation phase due to scheduling conflicts in his classroom. His corresponding data points fell below the aimline (59
and 61). However, as shown in Figure 2.2, when the intervention of RR+IN was implemented twice weekly, his weekly medians were all above the aimline. Overall, 82 percent of weekly data points fell at or above the aimline. No three consecutive data points fell below the aimline during the 11-week intervention period, and thus it was not necessary to adjust the intensity of the RR+IN treatment package. Craig’s highest weekly median of 86 CWPM occurred during the 8th week of intervention. Craig’s percentage of non-overlapping data for the intervention was 64 percent. Based on the criteria for PND outlined by Scruggs and Mastropieri (1998), the rating of the intervention was “questionable.” Thus, this particular summary statistic suggests that this intervention may have been only somewhat successful for Craig.

Hope’s median baseline score was 77 (CWPM). Hope’s goal for the 16-week intervention was set for 96 CWPM. Due to it being the end of the school year, Hope did not participate in the entire 16-week intervention, and after 11 weeks, her aimline was adjusted to 88 CWPM. Tutoring sessions using the RR+IN+LPP/PD were conducted two times per week until three consecutive data points fell below the aimline. At this time, it was decided that since the intervention package itself was intense with a combination of three interventions, the intervention would not change, but the frequency of the intervention would be increased. Tutoring sessions were then conducted for three times per week for the next two weeks. Hope’s highest score of 84 CWPM occurred during the 6th week of intervention, and her lowest score of 66 CWPM occurred during the 8th week of intervention. After the intervention was increased to three times per week, her median weekly scores were 69 CWPM and 75 CWPM. While Hope’s scores were consistently below the aimline, a visual analysis demonstrates that Hope’s performance was moving upward. It is important to note that Hope’s incentive was altered midway through the treatment evaluation phase. She began receiving points she could turn in towards a gift-certificate to her favorite store, an incentive Hope indicated would be more motivating. Also of importance is that Hope is the only participant for whom the intervention had to have the intensity adjusted during the Treatment Evaluation phase, in this case by increasing the frequency of the tutoring sessions. Hope’s PND was 25 percent, which rates the intervention as ineffective (Scruggs & Mastropieri, 1998). However, this statistic should be interpreted with caution as her highest baseline score was 83 CWPM, which was considerably higher than the other two baseline scores of 71 and 77. See Figure 3.2.

Jenna’s median baseline score was 66 (CWPM) during the problem analysis phase. Based on the expected growth rate of +1 word per week, her 16-week goal was set for 96 CWPM. Overall, 82 percent of her median weekly scores fell at or above the aimline. As seen in Figure
4.2, no three consecutive data points fell below the aimline during the 18-week intervention period, and thus it was not necessary to adjust the intensity of the RR intervention. Jenna’s highest score of 101 occurred during the 13th week of intervention. Jenna’s percentage of PND for the intervention was 61 percent. Based on the criteria for PND outlined by Scruggs and Mastropieri (1998), the rating of the intervention was “questionable.” After the intervention period, five weeks of progress monitoring was conducted. During these five weeks, 60 percent of the median weekly data points fell at or above the aimline. Visual analysis of the data points reveal a steady upward trend, suggesting that Jenna made consistent progress with the RR intervention.

Kip’s median baseline score was 96 (CWPM). His goal for the 16-week intervention was set for 112 CWPM. Kip made steady progress with his oral reading fluency, with his highest score of 131 CWPM occurring during the 10th week of the RR intervention. Based on his growth being well above the aimline and the literature-based criteria of 100 CWPM, it was decided at the 12th week of intervention to decrease the intensity of his intervention. The frequency of the intervention was adjusted to one time per week instead of twice per week. When tutoring occurred two times per week, 100 percent of Kip’s weekly median scores fell at or above the aimline. When the intervention intensity was decreased, 70 percent of the data points fell at or above the aimline. However, these scores were still above the literature-based criteria of 100 CWPM. When Kip’s scores did fall below the aimline, he was shown the graph and informed that if three weekly data points fell below the aimline, the intervention would change back to two times per week. This resulted in an increase seen in the 19th week of intervention. Two weeks of progress monitoring occurred after 22 weeks of intervention, which resulted in weekly scores of 128 and 117 CWPM, scores that were above the literature-based criteria and 16-week goal. Visual analysis of Kip’s progress revealed that he made steady and consistent gains in oral reading fluency. Summary statistics demonstrated that the RR strategy was an effective intervention. The PND for the 22 weeks of intervention was 82 percent, which falls into the “effective” category outlined by Scruggs and Mastropieri (1998). See Figure 5.2.

Oral reading fluency growth rates. Curriculum based measurements using oral reading fluency probes were conducted during the fall, winter, and spring of the school year. The participants’ scores were used to monitor fluency growth rates. Examining growth rates assesses whether the treatment results generalized into other settings. Growth rate is the average number of CWPM per week a student has increased between the reading benchmark assessments. In order to examine the growth rates, a reference point for typical growth rate is necessary. From
winter 2005 to spring 2005, it was determined that the average growth rate from the selected elementary school was +0.67. The goal for the four participants was +1 CWPM per week. Deno et al. (2001) states that a typical special education student achieves a growth rate of +0.5 CWPM per week, while a student receiving highly effective special education services should achieve a growth rate of +1.39 CWPM per week.

Craig’s growth rate from fall ’03 to winter ’04 was +1.2. His growth rate decreased to +0.6 from winter ’04 to spring ’04. Between spring ’04 and fall ’04, his growth rate decreased again to -0.32. His growth rate from fall’04 to winter ’05 was +.73. Intervention began after the winter ’05 benchmark, and his growth rate increased to +1.2. See Table 1.

Hope’s growth rate was +1.2 CWPM per week from fall ’03 to winter ’04. Her growth rate increased to +1.27 from winter ’04 to spring ’04. However, between spring ’04 and fall ’04, her growth rate decreased to +0.23. Between fall ’04 and winter ’05, there was no change in her growth rate. Intervention began after the winter benchmark. Her growth rate had a significant increase from winter ’05 to spring ’05, with an increase to +1.0 CWPM per week. See Table 1.

From the fall of ’03 to the winter of ’04, Jenna’s growth rate was +.71. Her growth rate decreased from winter of ’04 to spring of ’04, with a rate of -.7. Between spring ’04 and fall ’04, Jenna’s growth rate was -.05. Intervention began after the fall ’04 benchmark assessment. During intervention, her growth rate from the fall of ’04 to the winter of ’05 increased substantially to .80. However, between winter ’05 and spring ’05, her growth rate decreased to -.07 CWPM per week. See Table 1.

Between fall ’03 and winter ’04, Kip’s oral reading fluency growth rate was +2.2 CWPM per week. From winter ’04 to spring ’04, his growth rate decreased to +.87. His growth rate continued to decrease from spring ’04 to fall ’04, with an oral reading fluency rate of +.36 CWPM per week. Intervention for Kip began after the fall ’04 benchmark assessment. During intervention, from fall ’04 to winter ’05, his growth rate increased to .93. Finally, from winter ’05 to spring ’05, his growth rate decreased to -.6. See Table 1.

Overall, the group mean oral reading fluency growth rate across all participants prior to intervention was +.2 CWPM per week. After intervention, the oral reading fluency growth rate across all participants increased to +.54 CWPM per week.

Discussion

Interpretation of the Findings

This research was driven by four separate questions. The first sought to answer if the findings in these four case studies validated previous brief assessment research findings for
accurately identifying interventions for oral reading fluency. The results of this study confirmed these findings. Across all participants, at least one treatment strategy resulting in a 30 percent increase over baseline scores was identified. This validates the research findings of Gates, Thomason, and Harvey (2007), who found that when using brief experimental analysis to select reading interventions, no one intervention is best for all students. For three of the four participants, at least one of the treatment conditions placed their oral reading scores over the literature-based criteria of 100 CWPM during the treatment strength phase of the study. In Hope’s case, the intervention package that she received was not successful at meeting this goal. While her scores did not go above 100 CWPM during the treatment strength phase, her scores were above her baseline scores. The brief assessment model allows for the delivery of specific treatments based on student needs. These findings provide further evidence to the already existing research base that the use of a brief assessment model is an accurate means to identify reading interventions (Jones & Wickstrom, 2002; Wilbur & Cushman, 2006; Malloy, Gilbertson, & Mazfield, 2007).

The second question posed by this study asked if the use of the problem validation phase involving comparing students to classroom peers was an accurate means to identify students with oral reading fluency problems. There are few research studies published that have examined the use of the problem validation model. The results of this study show that comparing students to classroom peers was a successful way to identify at-risk students. Results from problem identification phase are consistent with teacher interview data and classroom observations. The teacher interview results indicated that all four participants were rated to be either “below grade level” or “very below grade level” in the area of reading compared to classroom peers. When comparing curriculum-based measurement data collected from each classroom, three out of the four students had oral reading fluency scores that were significantly below classroom peers (Figure 1). Results from classroom observations revealed that three out of the four students had on-task behaviors similar to classroom peers. Hope had slightly lower on-task behaviors, being on-task 65 percent of the time compared to peers who were on-task 89 percent of the time. Using the problem validation screening, it was possible to isolate that oral reading fluency was the main academic concern for Craig, Hope, and Jenna. While his teacher indicated that Kip’s reading skills were “below grade level,” his problem validation screening revealed that he was not discrepant from classroom peers. However, he was included based on his past involvement with literacy interventions and teacher concerns. This suggests that using the problem validation process concomitantly with a thorough teacher interview may result in improved student
identification for intervention services. Again, out of the four participants identified using the problem validation model, three achieved improved oral reading fluency rates through the brief assessment and intervention process (Hope did not make significant gains). Thus, the problem validation screening results in the identified problem of low oral reading fluency skills, and the oral reading intervention process resulted in improvements in the identified area of concern. This is consistent with the current research on the use of the problem validation screening process and the Brief Assessment model (Daly et al., 1997; Witt, 2001; VanDerHeyden, Witt, & Naquin, 2002). Like these previous research studies, the results from this study indicate that the use of the problem validation phase was an accurate and time efficient means to identify skill deficits compared to the traditional means of referring students for assistance.

The third question asked if linking the problem validation phase with the RTI process would assist in the process of eligibility determination for learning disabilities. Based on results obtained from this study, the problem validation phase has potential for being useful in determining eligibility needs in the referral process. The problem validation phase uses classwide screening as attempts to isolate individual student needs. Thus, if teachers and parents share a concern that a student is not performing at levels commensurate with same-age peers and grade-level standards, the problem validation screening can assist decision making teams. The problem validation phase was useful in identifying three out of the four students who needed oral reading fluency interventions. Based on Kip’s problem validation results, he would not be a student that would be referred for further academic assistance. His academic skills, based on the screening, placed his skills as commensurate with classroom peers. Results from the problem validation phase when used in a RTI process may be used to make more efficient decisions. Teams may be able to gather information as to which students need targeted interventions to continue in the RTI process. According to VanDerHeyden, et al. (2002), the fourth component in the problem validation process is to intervene. Resources may be best utilized when only students who are identified as being discrepant from classroom peers receive the individual oral reading fluency intervention.

The last question sought to answer the question if combining single-case and increasing intensity designs add to the strength of intervention development and the eligibility determination for specific learning disabilities. The results from this study did confirm that the use of increasing-intensity designs was a successful means of meeting individual student intervention needs. For all but one participant (i.e., Hope), visual analysis of the reading fluency intervention indicated that the participants demonstrated growth and consistently had oral
reading fluency scores that were at or above their aimline. This supports existing research that using techniques such as brief experimental analysis can assist in reading fluency growth. Daly, Bonfiglio, Mattson, Persampieri, & Forman-Yates (2006) also found that treatment packages selected using brief experimental analysis resulted in increases in oral reading fluency and comprehension for three selected students. However, when using single-case design statistics, the intervention results vary. When examining growth rates across the tutoring sessions, two participants, Craig and Hope, exceeded the school-wide growth rate of +0.67 CWPM. Jenna and Kip both demonstrated growth rates that were below the school-wide growth rate. When examining the participants together, the combined growth rate prior to intervention was +0.2 CWPM. After intervention the four students combined growth rate was +0.54 CWPM. Using percentage of nonoverlapping data (PND) as an evaluation criteria, only Kip’s oral reading fluency progress was deemed effective. Both Craig and Jenna had PND data in the questionable range, while Hope’s PND of 25 percent placed her intervention effectiveness in the ineffective range.

The interventions used in this study were chosen based on individual student need. During the time in which the research was collected, none of the participants had been referred to the school intervention-based service team. Based on this information, it would be impossible to determine if the intervention results from the use of the increasing-intensity designs would assist the team in making decisions regarding special educational eligibility. However, there is information from this study that would be useful when considering eligibility for services. When considering a student for eligibility, a single-case, increasing-intensity design would be beneficial for decision making because this design allows for the frequency and intensity of the intervention to be analyzed to determine the necessary level of support to create student growth. Information gathered during the intervention process would be an asset to decision making. For example, if Kip was brought to a team to be considered for special education eligibility, the team would have information suggesting that the intervention of repeated readings one time per week was successful in maintaining oral reading fluency growth. The intervention implemented was “effective” as defined by summary statistics. Thus, the data may point to the decision that Kip may benefit from continued repeated reading interventions, as he meets oral reading fluency benchmarks, and may not need additional support through special education services. Another illustration highlights the usefulness of gathering growth rate data during the intervention process. Two of the students, Craig and Hope, had growth rates that were above classroom peers. According to the research of Fuchs and Fuchs (1998), a dual discrepancy would then not exist,
meaning these two students would not be considered for special education services based on their level of growth being above peers.

Individualized interventions are often considered the top tier of intervention service delivery in schools. As outlined in the newest revision of IDEIA, response-to-intervention data may be used in determining eligibility for specific learning disabilities (IDEA, 2004). The language written on the current eligibility page (Part B) for determining a specific learning disability includes “The student is not making sufficient progress to meet age or state approved grade-level standards in one or more of the areas identified below when using a process based on the student’s response to scientific, research-based intervention” (Federal Registrar Part II, 2006, p. 46543). When using research-based interventions, it is critical to match the intensity of the intervention to the intensity of the problem (Gresham, 2004). This study illustrates the considerations put forth by Barnett et al. (2004); that is RTI must include a decision-making process that increases or decreases the intensity of interventions in graduated amounts when determining special education needs.

Limitations of Study

The above research does contain several limitations, and thus, the results must be interpreted with caution. The first limitation to this study was the limited sample size. While use of the single-case design sought to determine intervention effectiveness for the four selected participants, and control for internal validity issues, the small sample size does not allow generalizations to be made to a larger population. The small sample size also only reflected Caucasian students at a suburban elementary school in third and fourth grade.

The second limitation resulted from the inability to control for extraneous or environmental factors. One factor included following the elementary school schedule. The research timeline was influenced by holiday breaks, field trips, and student absences. In addition, there were some weeks when tutoring sessions occurred only once or sometimes not at all. It could not be ensured that each participant was delivered the exact number of tutoring sessions that had been planned for. While attempts were made to control for and isolate as many variables as possible, such as comparing the participants to classroom peers who received the same classroom instruction and classroom environment, outside variables may also have influenced results. For example, such factors as extra attention from classroom teachers, levels of parental support, and individual levels of motivation, were not controlled for. Specifically, Hope and Craig received reading instruction for 30 minutes daily in a small group setting at the same time
as the research was being conducted. According to their teachers, Hope and Jenna were getting nightly reading assistance from their parents as part of their daily school assignments.

The last limitation was the 16-week period for the interventions was not obtained for all four participants. The treatment evaluation phase was shorter than planned for both Craig and Hope. Specifically, for Hope, the intensity of her intervention was increased to three times per week. However, this change was only implemented for two weeks before the end of the study. Progress monitoring data were collected on the two participants, Jenna and Kip, who received the full 16 weeks of intervention. For all participants, long-term outcomes were not measured, such as generalizations into other academic content area and continued oral reading fluency progress during the following school year.

Directions for Further Research

There are several considerations for future research. The first would be a means to collect maintenance and generalization data regarding student progress over time. It would be beneficial to gather benchmark data from the following school year to track the participants’ growth rate compared to classroom peers. These long-term outcome data would be important for building a foundation for the use of the problem validation phase and increasing intensity designs with oral reading fluency interventions.

As the new IDEIA regulations permit states to utilize the response-to-intervention process for determination eligibility for a Specific Learning Disability, future research could be extended by using the problem validation phase and increasing intensity designs in eligibility determination. The data from the above case studies present valuable information about a student’s response to an empirically-based intervention, and would be relevant data for the use in eligibility determination (Vaughn & Fuchs, 2003; Kovaleski, 2004). In 2002, Ohio adopted a set of standards that stated that each school district was to provide interventions to students prior to conducting an evaluation for special education. The state also indicates that the intervention data be used to determine eligibility for special education services and the intensity of services (Operating Standards for Ohio’s Schools Serving Children with Disabilities, 2002). Further, effective January 8, 2002, the No Child Left Behind Act, among other things, required the use of scientifically-based instruction and interventions with a proven record of effectiveness (www.nochildleftbehind.gov). The data collected from this study are valuable to developing more systematic guidelines in an RTI process eligibility determination. With Response-to-Intervention process being a new means to identify students for special education services, the use of the Problem Validation model is a promising means for selecting students who need
intervention services (VanDerHeyden et al., 2002; Marlot & Telzrow, 2007) while the Brief Assessment model allows schools to select a research-based intervention based on specific student needs (Gates, Thomason, & Harvey, 2007). Using increasing intensity designs would allow a school team to determine the intervention intensity, both in extra instructional time and strength of the intervention program (Barnett et al., 2004). This process outlines one way in which schools could adopt the RTI process for determining eligibility for special education services. In their recent article, Fuchs and Fuchs (2007) outline a three-tiered approach for serving students who are at-risk for reading failure. In this proposed model, reading fluency growth rates are used to determine a student’s responsiveness to standard protocol interventions. When students do not meet the criteria in reading “an instructionally focused evaluation” is completed in addition to the multidisciplinary evaluation for special education (Fuchs & Fuchs, 2007, p. 7).

In addition, replication of this study using a larger and more diverse sample size would add additional research data to the already limited published research on the use of single-case designs and the RTI process with diverse student populations (Linan-Thompson, Vaughn, Prater, & Cirino, 2006; Mallow, Gilbertson, & Maxfield, 2007). Future research could incorporate students from different grade levels, students of different cultural and ethnic backgrounds, and students from both urban and rural school settings.
References


National Reading Panel (2000). *Teaching children to read: An evidenced based assessment of
the scientific research literature of reading and implications for reading instruction.

Ohio Department of Education (2002). Operating standards for Ohio’s schools serving children with disabilities. (State Board of Education and Ohio Board of Education).
Columbus, OH: Author.


readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability. *Journal of Educational Psychology*, 88, 601-638.
Table 1.

*Oral Reading Fluency Growth Rates*

<table>
<thead>
<tr>
<th>Name</th>
<th>Fall 03- Winter 04</th>
<th>Winter 04- Spring 04</th>
<th>Spring 04- Fall 04</th>
<th>Fall 04- Winter 05</th>
<th>Winter 05- Spring 05</th>
<th>Exceed</th>
<th>Exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(14 weeks)</td>
<td>(15 weeks)</td>
<td>(22 weeks)</td>
<td>(15 weeks)</td>
<td>(15 weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Craig</td>
<td>+1.2</td>
<td>+0.6</td>
<td>-0.32</td>
<td>+0.73</td>
<td>+1.2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hope</td>
<td>+1.2</td>
<td>+1.27</td>
<td>+0.23</td>
<td>0</td>
<td>+1.0</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Jenna</td>
<td>+.71</td>
<td>-0.7</td>
<td>-0.05</td>
<td>+.80</td>
<td>-.07</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Kip</td>
<td>+2.2</td>
<td>+0.87</td>
<td>+0.36</td>
<td>+.93</td>
<td>-.6</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*Note.* Bold indicates growth rate occurred during treatment phase
Figure 1. Phase I Problem Validation results for each participant.

Legend

- Participant
- Peers
- Literature-Based Criteria
Figure 2.1. Craig’s Brief Experimental Analysis and Treatment Strength results.

Figure 2.2. Craig’s Treatment Evaluation (Intervention) results.
Figure 3.1. Hope’s Brief Experimental Analysis and Treatment Strength results.

Figure 3.2. Hope’s Treatment Evaluation (Intervention) results.
Figure 4.1. Jenna’s Brief Experimental Analysis and Treatment Strength results.

Figure 4.2. Jenna’s Treatment Evaluation (Intervention) results.
Kip

Figure 5.1. Kip’s Brief Experimental Analysis and Treatment Strength results.

Figure 5.2. Kip’s Treatment Evaluation (Intervention) results

BL= Baseline  IN= Incentive  RR= Repeated Reading  PD= Listening Passage Preview/Phrase Drill  EM= Easier Material
Dear Parent or Guardian:

Your child, ____________________________, has been selected by his/her teacher to participate in an Academic Tutoring Program through Miami University’s School Psychology Program. This program will focus on enhancing the reading skills of your child by providing individual tutoring sessions (30 minutes each, approximately two days/week). As described on the attached Consent Form, the sessions will be provided by Miami graduate students and supervised by me, the university trainer. All tutoring will be held at your child’s school. The information gathered on your child’s tutoring performance will be part of a research project and supervised by me as well. We hope that the data collected during this project will generate useful information for parents and teachers in serving the needs of students with reading difficulties.

If you’d like to include your child in this tutoring program, please read and sign the attached Consent Form and return it to your child’s teacher at your earliest convenience. If you have any questions, please feel free to contact me or your child’s teacher.

Sincerely,

Katherine Wickstrom, Ph.D.
Assistant Professor
School Psychology Program
(513) 529-6624
wickstkf@muohio.edu
PARENT/GUARDIAN CONSENT FORM

**Purpose:** The purpose of this tutoring program is to determine the most effective strategies for enhancing the reading skills of your child. Over the course of 25 weeks, your child will be provided individualized tutoring that is matched to his/her strengths. Tutoring will be provided by graduate students in Miami University’s School Psychology Program. It is hoped that the information gathered during this tutoring program may potentially generate more useful information for parents and teachers in serving the needs of students with reading difficulties.

**Procedures:** Your child will receive four types of tutoring: (a) providing rewards for increased performance, (b) providing practice in reading, (c) providing error correction and drill, and (d) matching the curriculum to your child’s reading skills. We will carefully assess which of these is the most effective in increasing oral reading skills. All 30-minute tutoring sessions will be held at your child’s school (approximately twice a week). These sessions will be scheduled with your child’s teacher. In addition, your child’s teacher will be interviewed and your child’s school records will be reviewed in order to obtain information on your child’s academic performance. Interviews and tutoring sessions will be audio-taped. Classroom observations will also be conducted in order to obtain information on the classroom environment. You, along with teachers, will be asked to complete a brief questionnaire at the end of the tutoring program.

**Right to Privacy:** In order to maintain individual confidentiality, written and tape recorded information will be coded and the identity of your child will remain confidential throughout the project. Information collected will be maintained in a private office at Miami University. Your child’s name will not appear on any record. However, a summary report will be provided to you and your child’s teacher(s) at the end of the tutoring program.

**Participant’s Rights:** You and your child’s involvement in this research project is voluntary. You have the right to withdraw from this project at any time. Withdrawal from this project will not adversely affect you or your child in any way. If you have any questions or concerns, or would like more information about the program, please contact your child’s teacher and/or the university trainer, Dr. Katherine Wickstrom (513-529-6624). If you have any questions regarding your rights as a participant in this project, you may also contact the Office for the
Advancement of Scholarship and Teaching (529-3734 or <humansubjects@muohio.edu>) at Miami University.

I HAVE READ AND UNDERSTAND THE PURPOSE OF THE PROJECT, THE PROCEDURES INVOLVED, AND MY RIGHTS AS THE LEGAL GUARDIAN OF A PARTICIPANT. I AGREE TO ALLOW MY CHILD TO PARTICIPATE IN THIS PROJECT.

__________________________________________
Signature

__________________________________________
Date

_______________________________
Child’s Full Name (please print)
APPENDIX C

TEACHER INTERVIEW FORM

Name of Child: ____________________________________  Age: ______
Grade: ________ Grades retained (if applicable): ________________
Does the child have an identified disability (please describe)? ____________________________________________
Does the child receive Title I services?: ______
Is the child on medication (please describe)? ________________________________________________________
Does the child require glasses or large print? ______
Please mark an “X” in the box that provides the best estimate of the child’s skills:

**Reading**
In the area of reading skills, this child is in what range compared to other children in your classroom?

<table>
<thead>
<tr>
<th>Lowest 10%</th>
<th>Lower 20-30%</th>
<th>Middle 40%</th>
<th>Upper 20%-30%</th>
<th>Highest 10%</th>
</tr>
</thead>
</table>

In terms of grade level expectations, this child’s oral reading skills are:

- Well Below Grade
- Below Grade
- At Grade Level
- Above Grade
- Well Above Grade

**Written Expression**
In the area of writing skills, this child is in what range compared to other children in your classroom?

<table>
<thead>
<tr>
<th>Lowest 10%</th>
<th>Lower 20-30%</th>
<th>Middle 40%</th>
<th>Upper 20%-30%</th>
<th>Highest 10%</th>
</tr>
</thead>
</table>

In terms of grade level expectations, this child’s writing skills are:

- Well Below Grade
- Below Grade
- At Grade Level
- Above Grade
- Well Above Grade

**Mathematics**
In the area of math skills, this child is in what range compared to other children in your classroom?

<table>
<thead>
<tr>
<th>Lowest 10%</th>
<th>Lower 20-30%</th>
<th>Middle 40%</th>
<th>Upper 20%-30%</th>
<th>Highest 10%</th>
</tr>
</thead>
</table>

In terms of grade level expectations, this child’s math skills are:

- Well Below Grade
- Below Grade
- At Grade Level
- Above Grade
- Well Above Grade

**Academic Engagement**
This child’s participation and work habits are in what range compared to other children in your classroom?

_____________  ___________  ___________________  ___________________  ___________________
### Disruptive Classroom Behavior

In terms of following classroom rules, this child is in what range in comparison to other children in your classroom?

<table>
<thead>
<tr>
<th>Lowest 10%</th>
<th>Lower 20-30%</th>
<th>Middle 40%</th>
<th>Upper 20%-30%</th>
<th>Highest 10%</th>
</tr>
</thead>
</table>

### Critical Social

In the area of social skills, this child is in what range in comparison to other children in your classroom?

| Lowest 10% | Lower 20-30% | Middle 40% | Upper 20%-30% | Highest 10% |
**PROBLEM IDENTIFICATION (CONT.)**

Mark the general domain(s) that is your primary concern. For each marked area of primary concern, please mark specific skill areas for further assessment and intervention.

<table>
<thead>
<tr>
<th>General Domain</th>
<th>Skill Areas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Reading</td>
<td>Word Recognition</td>
<td>Phonics/Pre-literacy</td>
</tr>
<tr>
<td></td>
<td>Fluency</td>
<td>Dictation</td>
</tr>
<tr>
<td></td>
<td>Grammar/syntax</td>
<td>Penmanship</td>
</tr>
<tr>
<td>□ Writing</td>
<td>Basic Add/Sub</td>
<td>Basic Multi/Div</td>
</tr>
<tr>
<td></td>
<td>Geometry</td>
<td>Fractions</td>
</tr>
<tr>
<td>□ Math</td>
<td></td>
<td>Classwork accuracy</td>
</tr>
<tr>
<td></td>
<td>Volunteers answers</td>
<td>Giving correct answer when called upon</td>
</tr>
<tr>
<td></td>
<td>Attending to other students when they answer</td>
<td>Homework accuracy</td>
</tr>
<tr>
<td></td>
<td>Knowing appropriate placement in materials</td>
<td>Homework completion</td>
</tr>
<tr>
<td></td>
<td>Following oral directions</td>
<td>Following written directions</td>
</tr>
<tr>
<td></td>
<td>Note taking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attending to teacher lecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preparation/materials ready</td>
<td></td>
</tr>
<tr>
<td>□ Academic Engagement</td>
<td></td>
<td>Passive off-task</td>
</tr>
<tr>
<td></td>
<td>Using free time</td>
<td>Transitioning from one activity to another</td>
</tr>
<tr>
<td>Classroom Behavior</td>
<td>Responding to teacher/peer feedback</td>
<td>Talking out</td>
</tr>
<tr>
<td></td>
<td>Accepting consequences for misbehavior</td>
<td>Beginning work without delay</td>
</tr>
<tr>
<td>□ Critical Social</td>
<td>Stealing</td>
<td>Damages others’ property</td>
</tr>
<tr>
<td></td>
<td>Tantrums</td>
<td>Obsessive-Compulsive</td>
</tr>
<tr>
<td></td>
<td>Physically assaults</td>
<td>Inappropriate sexual</td>
</tr>
<tr>
<td></td>
<td>adults</td>
<td>Self-abusive</td>
</tr>
<tr>
<td></td>
<td>Extreme symptoms</td>
<td>Injures others with weapons</td>
</tr>
<tr>
<td></td>
<td>Sad affect/depressed</td>
<td>Inappropriate affect/Cries</td>
</tr>
<tr>
<td></td>
<td>Physically aggressive</td>
<td>Somatic complaints</td>
</tr>
<tr>
<td></td>
<td>with peers</td>
<td></td>
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</tbody>
</table>
### PROBLEM ANALYSIS

**Motivation**

- Does child need numerous prompts to complete work?
- Does work accuracy improve with extra incentives or praise?
- Does work completion improve with extra incentives or praise?

**Skill Fluency**

- Estimate time allowed each day for independent silent reading.
- Is independent practice work completed (regardless of accuracy)?
- Is homework completed (regardless of accuracy)?
- Estimate time each day child spends reading aloud.
- Does child participate during classwide instruction (e.g., choral responding, raising hand)?

**Skill Acquisition**

- Estimate time each day spent in small group instruction.
- Is child participation during classwide instruction (e.g., choral responding, raising hand) accurate?
- Estimate time each day spent listening as others (e.g., peers, teacher) read aloud.
- Is the child on-task during teacher instruction?
- Is independent seatwork accurate (regardless of completion rate)?
- Is homework accurate (regardless of completion rate)?

### NEXT STEPS

**Thank you for responding to these questions.** In order to assess the severity of potential academic concerns, it is necessary to administer a 3-minute math exercise and a 3-minute writing exercise to the entire class. Would you be willing to administer these timed exercises?

A classroom observation will also be conducted to assess the child’s level of engagement. What is the best time to observe the child completing independent seatwork related to the area of academic concern?
## APPENDIX D

### Fidelity Checklist for BASELINE

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Session No.</th>
<th>Date:</th>
<th>Phase</th>
<th>Assessed instructional performance</th>
<th>CWPM:</th>
<th>Errors</th>
<th>IOA:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

54
Fidelity Checklist for
BRIEF ASSESSMENT

Incentive
Session No. _____ Date: ________________ Phase ________________
Selected passage. Code ________________
Goal set: 1.30 X baseline median = ______
Reward coupon selected: ________________
  Instructions (make reference to goal)
Assessed instructional performance CWPM: ______ Errors ______
  IOA: ______
  Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Repeated Reading
Session No. _____ Date: ________________ Phase ________________
Selected passage. Code ________________
  Student read instructional passage 3 times
  Instructions
Assessed instructional performance CWPM: ______ Errors ______
  IOA: ______
Fidelity Checklist for INCENTIVE

Incentive
Session No. __________ Date: ________________ Phase ________________
Selected passage. Code
Goal set: ___ Grade 1-2: 60 CWPM < 5 errors or ___ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: __________
___ Instructions (make reference to goal)
Assessed instructional performance CWPM: ____ Errors ________ IOA: ________
___ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes

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Fidelity Checklist for INCENTIVE

Incentive
Session No. __________ Date: ________________ Phase ________________
Selected passage. Code
Goal set: ___ Grade 1-2: 60 CWPM < 5 errors or ___ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: __________
___ Instructions (make reference to goal)
Assessed instructional performance CWPM: ____ Errors ________ IOA: ________
___ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes
### Fidelity Checklist for REPEATED READING

**Repeated Reading**

Session No. _____  Date: ________________  Phase ________________

Selected passage. Code ____________

Assessed general performance CWPM _____ Errors ______  
____ Student read instructional passage 2 times 
____ Instructions 

Assessed instructional performance CWPM: _____ Errors ______  

**Notes**

### Fidelity Checklist for REPEATED READING

**Repeated Reading**

Session No. _____  Date: ________________  Phase ________________

Selected passage. Code ____________

Assessed general performance CWPM _____ Errors ______  
____ Student read instructional passage 2 times 
____ Instructions 

Assessed instructional performance CWPM: _____ Errors ______  

**Notes**

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Fidelity Checklist for
LPP/PHRASE DRILL

LPP/Phrase Drill
Session No. _____ Date: ________________ Phase ________________
Selected passage. Code ________________
Assessed general performance CWPM _____ Errors _____
___ Examiner read story once aloud while child follows along on copy.
___ Student read phrase containing error three times each, with immediate correction
___ Instructions
Assessed instructional performance CWPM: _____ Errors _____

IOA: _____

Notes

Fidelity Checklist for
LPP/PHRASE DRILL

LPP/Phrase Drill
Session No. _____ Date: ________________ Phase ________________
Selected passage. Code ________________
Assessed general performance CWPM _____ Errors _____
___ Examiner read story once aloud while child follows along on copy.
___ Student read phrase containing error three times each, with immediate correction
___ Instructions
Assessed instructional performance CWPM: _____ Errors _____

IOA: _____

Notes
Fidelity Checklist for
INCENTIVE + REPEATED READING

Incentive + Repeated Reading
Session No. ______ Date: __________________ Phases ________________
Selected passage. Code ___________
Assessed general performance CWPM ______ Errors ________ IOA: ______
Goal set: ___ Grade 1-2: 60 CWPM < 5 errors or ___ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ___________
____ Student read instructional passage 2 times
____ Instructions (make reference to goal)
Assessed instructional performance CWPM: ______ Errors ________ IOA: ______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes

Fidelity Checklist for
INCENTIVE + REPEATED READING

Incentive + Repeated Reading
Session No. ______ Date: __________________ Phases ________________
Selected passage. Code ___________
Assessed general performance CWPM ______ Errors ________ IOA: ______
Goal set: Grade 1-2: 60 CWPM < 5 errors or ___ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ___________
____ Student read instructional passage 2 times
____ Instructions (make reference to goal)
Assessed instructional performance CWPM: ______ Errors ________ IOA: ______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes
Fidelity Checklist for
INCENTIVE + LPP/PHRASE DRILL

Incentive + LPP/Phrase Drill

Session No. _______ Date: ________________ Phase ________________

Selected passage. Code ________________
Assessed general performance CWPM ______ Errors _______ IOA: _______
Goal set: Grade 1-2: 60 CWPM < 5 errors or ____ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ________________
____ Examiner read story once aloud while child follows along on copy.
____ Student read phrase containing error three times each, with immediate correction
____ Instructions (make reference to goal)
Assessed instructional performance CWPM: ______ Errors _______
____ IOA: _______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes

Fidelity Checklist for
INCENTIVE + LPP/PHRASE DRILL

Incentive + LPP/Phrase Drill

Session No. _______ Date: ________________ Phase ________________

Selected passage. Code ________________
Assessed general performance CWPM ______ Errors _______ IOA: _______
Goal set: Grade 1-2: 60 CWPM < 5 errors or ____ Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ________________
____ Examiner read story once aloud while child follows along on copy.
____ Student read phrase containing error three times each, with immediate correction
____ Instructions (make reference to goal)
Assessed instructional performance CWPM: ______ Errors _______
____ IOA: _______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes
Fidelity Checklist for
INCENTIVE + REPEATED READING + LPP/PHRASE DRILL

Incentive + Repeated Reading + LPP/Phrase Drill
Session No. ______  Date: ______________  Phase ______________
Selected passage. Code ______
Assessed general performance  CWPM ______  Errors ______  IOA: ______
Goal set: Grade 1-2: 60 CWPM < 5 errors  or  Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ______
____ Examiner read story once aloud while child follows along on copy.
____ Student read phrase containing error three times each, with immediate correction
____ Student read passage 2 times
____ Instructions (make reference to goal)
Assessed instructional performance  CWPM: ______  Errors ______  IOA: ______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes

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Fidelity Checklist for
INCENTIVE + REPEATED READING + LPP/PHRASE DRILL

Incentive + Repeated Reading + LPP/Phrase Drill
Session No. ______  Date: ______________  Phase ______________
Selected passage. Code ______
Assessed general performance  CWPM ______  Errors ______  IOA: ______
Goal set: Grade 1-2: 60 CWPM < 5 errors  or  Grade 3+: 100 CWPM < 7 errors
Reward coupon selected: ______
____ Examiner read story once aloud while child follows along on copy.
____ Student read phrase containing error three times each, with immediate correction
____ Student read passage 2 times
____ Instructions (make reference to goal)
Assessed instructional performance  CWPM: ______  Errors ______  IOA: ______
____ Incentive provided if earned, or consolation reward if score exceeds previous high score, or no reward

Notes

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APPENDIX E

EXPERIMENTAL CONDITIONS

Baseline and all other conditions

1. Use the instructional passage.

2. Turn on audiotape. Record case #, experimental condition, session, passage code.


Say to the student: “(Point to the first word) When I say ‘go’ begin reading aloud at the top of this page. Read across the page [demonstrating by pointing] until I say ‘stop.’ 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? (Make sure student understood your directions). Go.”

At 60-s mark, put a slash (/) after the last word. Say “stop” after approximately twice the number of words has been read

A. If the student makes an error, mark through the word on the scorer. Errors include mispronunciations, substitutions, and omissions. If the student hesitates for more than 3 seconds, tell them to “go on,” and count as an error. If the student skips an entire line, immediately redirect them back to the beginning of the line.

B. “Mistakes” that are NOT counted as errors are self-corrections, inserted words, dialect, and repetitions.

4. Repeat twice more.
5. Turn tape recorder off.

6. **Scoring:** Calculate the number of words read correctly. Calculate the number of errors.

7. **Immediately after each session:** Complete *Fidelity Checklist* and *Data Collection Form*. Plot **median data point CWPM** on graph. Label tape.

**Cautions:**

1. Do NOT supply the word!
2. If a student “spoils” administration, repeat another. Spoiling occurs if child is distracted for > 3 secs by a noise, a question, or refusals, or if the child skips an entire line after one redirection.
3. “Flip-flops” count as one error.
**Incentive**

1. Use instructional passage.

2. Determine proper goal from baseline.

   If baseline condition was 0 – 11 CWPM, goal is to increase by 4.

   If baseline median (or previous incentive condition) was 12 +, multiply by 1.4 (goal is to increase by 40%). For example, if baseline median was 21, goal is 29.

3. Present child rewards from “Goodie Bag.”

4. Before giving child reading instructions, tell the child:

   “Now I want to see how good you can read when I give you a goal. Last time you read _____ words right in one minute. This time, if you can get at least _____ words right in one minute I will give you a reward. What reward would you like to work for today?”

5. Give the child instructions for reading the passage (from baseline). These may be shortened.

6. Student reads instructional passage. Stop him/her them at approximately 40% past their baseline mean (______ CWPM).

7. If student achieves goal, provide reward. If student did not earn reward, provide them with encouragement and a consolation reward.

8. Score errors and correct words per minute. Complete fidelity checklist.

**Repeated Reading**

1. Use instructional passage.
2. Tell the child:

“Now I want to see how good you can read with extra practice. Read this story three times. If you get to a word you do not know, just do your best. I can’t give you the word, but I will listen carefully as you read.”

3. Have the student read passage three times. Stop them at approximately 40% past their baseline mean (______ CWPM). Provide no help, only encouragement.

4. With the instructional passage, give the child probe instructions (these may be shortened) and have him/her read for one minute.

5. Score errors and correct words per minute. Complete fidelity checklist.

**Listening Passage Preview/Phrase drill**

1. Use instructional level passage.

2. Tell the child:

“How I want you to follow along while I read this story.” Hand student copy of instructional passage.

3. Read the passage once at normal pace (approximately 100 words per minute) while student follows along.

4. Tell the child:

“This time I want you to read the story aloud while I listen.”

5. Have the student read the instructional passage. Stop him/her at approximately 40% past BL mean (______ CWPM). Use a highlighter to mark errors.
6. After the student has completed the passage, point to each error on their copy and read the word to them (maximum 15 words).

“Let’s go over the words you had problems with… This word is ____. This is ____.”

7. Have the student read short phrases that contain each error word three times, correcting errors immediately.

“Now, I want you to read each word that I point to. (Point to phrases). Again…”

8. Use the instructional passage and give the student reading probe instructions (shortened).

9. Score errors and correct words per minute. Complete fidelity checklist.

**Easier Material**

1. Use **lower level** instructional passage.

2. Give the student probe instructions for reading the passage (these may be shortened).

3. Stop him/her at approximately 40% past BL ( ____CWPM).

4. Score errors and correct words per minute. Complete fidelity checklist.
APPENDIX F

SCHOOL REPORT

Name: Kip              School: Fairfield South Elementary
Grade: 3rd            Age: 9-2
Date of Report: 5/28/05  Report Submitted By: Meghan Geer, M.S.
Supervising School Psychologist: Katherine Wickstrom, Ph.D.

Kip is a 9 year-old third grade student at Fairfield South Elementary. Kip was referred for intervention supports by his classroom teacher and school administration due to problems related to low oral reading fluency. Parental consent for these services was obtained from Kip’s parents in October of 2004. A review of Kip’s cumulative school folder revealed that problems with reading skills emerged in the first grade. Kip had previously received Title I services for two consecutive years. Kip has never been retained, and was enrolled at Fairfield throughout grades first through third. There is no record of previous evaluations, and Ms. Baltzell, Kip’s third grade teacher, confirmed that Kip has never been diagnosed with a learning disability.

Kip’s teacher reports that he follows rules appropriately in class. Kip came to intervention sessions with a positive attitude. He often expressed an interest in improving his reading skills and was dedicated to meeting the set goals. Kip wants very much to succeed and is a very pleasant child to work with.

Assessment Strategies

Curriculum-Based Measurement (CBM). Curriculum-based measures are short-duration tests of proficiency in the areas of oral reading fluency, written expression, and math calculations. In reading, the child is asked to read aloud for 1-min from three randomly selected grade level passages. Performance is summarized as the average number of words read correctly per minute. In written expression, a story starter (“My friends and I rode our bicycles to the pond.”) is provided, and the child is given 3 minutes to finish the story. Performance is typically summarized in terms of fluency (e.g., total words written, total
correct word sequences per 3 minutes) and quality (e.g., percentage of correct word sequences). In math, a sheet of 25 mixed grade-level math operations is provided. Performance is summarized as the total number of digits correctly calculated during a 3-min period. For each CBM measure, the child’s scores can be compared to classroom, school-wide, and/or literature-based standards.

**Cloze Procedure.** A cloze procedure is a CBM measure that examines comprehension. A CBM reading passage is modified so that every 7\textsuperscript{th} word is deleted and replaced with a blank. Performance is summarized as the percentage of correctly filled-in blanks during a 5 minute time period in which students complete the blanks with words that make sense in context.

**Behavior Observation System (BOS).** The BOS is a systematic observation measure using an interval recording system. The observation measures the percentage of task and instructional engagement of the targeted students and peers during a series of consecutive 10-second intervals. Besides on-task behaviors, motor and verbal behaviors are also recorded.

**Teacher Interview Form (TIF).** The TIF is a structured teacher interview form that includes three sections. Section I requires the teacher to rate the child’s current level of functioning in six areas (reading, written expression, math, academic engagement, disruptive classroom behavior, critical social-emotional indicators), compared to classroom peers and grade level expectations. Section II is a checklist of more specific areas of concern. Section III is a functional assessment of the instructional environment.

**Problem Identification**

*Multi-skill, Multi-Method Assessment*

Concerns were expressed that Kip was experiencing problems in school as a result of low oral reading fluency. To assess these concerns, a problem validation assessment and a problem identification interview were completed.

Kip’s teacher, Ms. Baltzell, completed the Teacher Interview Form. In terms of Kip’s reading skills, Ms. Baltzell rated his skills compared to classroom peers as in the middle 40 percent and rated his skills in terms of grade level expectations as below grade level. In the area of written expression, Ms. Baltzell identified his writing skills in the 20 to 30 percent compared to peers and also rated writing at grade level. Ms. Baltzell rated his mathematics, academic engagement, and his crucial social skills in the middle 40 percent and at grade
level. When asked about the general domains that were her priority concerns, Ms. Baltzell identified word recognition and comprehension in the area of reading.

A Problem validation assessment was used because it incorporates assessment and decision-making, and relies on data from both classroom norms and national norms based on literature-based criteria. To complete this process, CBM data were collected from the school administrators, which contained classroom and individual student data from the fall collection of CBM measures in the area of oral reading fluency, written expression, and math. Refer to Figure 1, top left panel for a detailed graph representing the results of the problem validation screening. On the oral reading fluency measure, Kip read 95 correct words per minute (CWPM) while the classroom peer average CWPM was 97. The literature-based criteria for third grade oral reading fluency is 100 CWPM.

The problem validation assessment revealed that Kip was not discrepant from his classroom peers in the area of oral reading fluency, but that his rate of reading, 95 CWPM, was below the literature-based criteria of 100 CWPM. In written expression, math and on-task behavior, Kip performed at approximately the same level as his peers, and also exceeded the literature-based criteria for on-task behavior. The data concerning Kip’s discrepancy in the area of oral reading fluency also were consistent with the information gathered in the teacher interview that reading was the teacher’s priority concern, and that the teacher rated Kip’s reading skills as below grade level, while math and academic engagement were both rated at grade level compared to peers.

The results of the problem identification data revealed that the problem identified is low oral reading fluency. Progress in this area was measured using CBM reading passages and assessed using general and immediate CBM reading measures.

**Reading passages.** Passages were created from a variety of reading series. Readability of the reading passages was determined using Fry Readability Index, which provides a general grade level or reading based on the number of sentences and the number of syllables per 100 words.

**General CBM reading measures.** The correct words per minute on the first reading of a CBM probe served as the general reading measure. A general score represents Kip’s reading performance prior to any intervention or practice with the reading passage. A word is read correctly if is pronounced correctly in 3 seconds. While Kip reads the passage, the
school psychology trainee marked the student’s errors on a separate probe. If he paused or hesitated for more than 3 seconds, the school psychology trainee told Kip to “continue reading” and the word was marked as an error. Errors also included mispronunciations, substitutions, and omissions. Self-corrections, inserted words, dialect, and repetition were not counted as errors. The school psychology trainees did not provide Kip with a correct word if he hesitated.

**Immediate CBM reading measures.** The number or correct words per minute on the final reading of CBM probe represents the immediate reading measure. Immediate reading measures demonstrate the effects of the intervention on the passage.

**Reliability of Measurement**

To assess reliability of the curriculum based measurement scores, all measurements gathered during intervention were audiotaped. Approximately 33% of taped sessions were listened to by secondary observer/coder to score agreement on CWPM. The reliability of the two observers was calculated by dividing the lower estimate by the higher estimate, and multiplying by 100. The mean reliability was 99% (range, 97% to 100%).

**Problem Analysis and Intervention Design**

To determine what environmental and/or instructional variables were related to Kip’s low oral reading fluency, a brief assessment was conducted after establishing a stable baseline of Kip’s reading rate. The instructional effects of four common strategies on Kip’s oral reading fluency were measured, including incentive (IN), repeated reading (RR), listening passage preview/phrase drill (LPP/PD), and easier material (EM). To begin the brief assessment, Kip’s goal was determined using the baseline data of CWPM. The goal was set by multiplying the median of the last three baseline data points (96) by 1.3, which corresponds to a 30 percent increase. An effective treatment is one that increases student performance by 30 percent and produces less than 6 errors in third grade and above. Refer to Figure 1, top right panel for brief assessment and treatment strength results.

**Incentive.** The purpose of the incentive condition was to assess if Kip would improve his reading performance due to an incentive. This condition helped determine if his difficulty with reading is due to a lack of motivation (performance deficit) or a lack of necessary reading skills (skills deficit). After Kip read a passage, he chose a reward (a small toy) if he reached the set goal.
Repeated reading. The purpose of the repeated reading treatment condition was to assess whether increased opportunities to respond to reading material would increase Kip’s reading performance. In this condition, Kip read the CBM passage four times.

Listening passage preview/phrase drill. The purpose of this treatment condition was to assess if learning trials, which included modeling, correction, and rehearsal, would increase Kip’s reading fluency performance. The school psychology trainee read the passage aloud. Kip then read the passage aloud while the school psychology trainee highlighted errors. The school psychology trainee then read error words aloud to the student. Lastly, Kip read the phrases containing the errors three times.

Easier material. The purpose of the easier material treatment condition was to determine whether lowering the difficulty of curriculum reading materials would increase Kip’s reading performance. Kip read a 2nd grade CBM passage, which was one grade below his instructional level.

After administering the brief assessment conditions, the most effective, least intrusive intervention was identified. Visual analysis of the brief assessment (See Figure 1, top right panel) revealed that repeated reading was the most effective least intrusive condition that produced the greatest increase in fluency (122 CWPM, 0 errors). The intervention of repeated reading also allowed Kip to reach the literature-based criteria of 100 CWPM. Given this information, it was hypothesized that Kip’s problems in reading fluency were due to lack of sufficient opportunities to practice and become familiar with readings.

Intervention Goals

After conclusion of the brief assessment, intervention goals for Kip’s oral reading fluency were set. Kip’s intervention should give him ample opportunity to learn and practice new words and become comfortable with old. The goal for Kip was to increase his reading fluency by at least one word per week (the expected rate for third grade). The goal at the end of 22 weeks of intervention was 118 CWPM, which would place him above the literature-based criteria for third grade.

Problem Analysis and Intervention Design

Experimental Design

An A-B “accountability” design was employed to evaluate the effects of the repeated reading intervention on Kip’s oral reading fluency. The use of A-B designs allowed for
comparison of Kip’s oral reading fluency before and after implementation of the intervention. This design involved three weeks of baseline data collection (A), one week of treatment strength, and 22 weeks of the treatment phase (B), repeated reading.

Baseline. The first condition (A) in the design was collection of baseline data. During each session, the school psychology trainee administered 6 CBM passages with appropriate breaks between administrations. Sessions were conducted two times per week for 30 minutes each. Weekly means of the medians were graphed for baseline. This continued until a “stable” baseline was established and confirmed with the university supervisor. The three baseline points were 96, 105, and 91 CWPM, with 96 CWPM being the median of the baseline (see Figure 2).

Repeated Reading (RR). The second condition (B) consisted of the repeated reading intervention. During the intervention, Kip read a selected CBM passage aloud while the school psychology trainee recorded his general performance (the CWPM on the first reading). Kip would then read the same passage two more times aloud for practice. During the fourth and final reading, the school psychology trainee recorded his instructional performance (the CWPM on the final reading).

Procedures

The intervention procedures were implemented solely by the school psychology trainee, Meghan Geer. The repeated reading intervention occurred in a small room located near Kip’s third grade classroom. Each intervention session lasted approximately thirty minutes, and was implemented two times per week for 22 weeks. After 12 weeks, due to Kip’s successful progress, the intervention was changed to one session per week. The intervention continued one day per week until the intervention was complete at the end of 22 weeks.

Treatment Integrity

Intervention scripts were created to monitor the degree of implementation (refer to attached intervention scripts). Treatment integrity was measured as the percentage of steps followed. During each intervention session, the school psychology trainee completed a fidelity checklist for the repeated reading intervention. Analysis of self-reported fidelity sheets revealed an adherence to intervention steps 100% of the time.
Social Validity

During baseline data collection, Kip was administered a cloze procedure, a measure of Kip’s comprehension skills. During baseline, Kip correctly completed 68.4% of the sentence blanks. After conclusion of the intervention, Kip completed 86.4 % of the sentence blanks. This increase in percentage of blanks reveals an increase in Kip’s reading comprehension skills and a generalization of acquired skills. Kip’s reading rate on DIBELS also increased during the intervention. Kip’s fall DIBELS score was 95 CWPM, his winter score was 109 CWPM, and his spring score was 106 CWPM. This increase in correct words read per minute on DIBELS, a separate reading fluency measure, corresponds with increases in his oral reading fluency during the intervention. Also during the second term, Kip’s classroom reading grades increased from an overall grade in Term 1 of 88.8 % to 94.8%. Increases in Kip’s reading abilities were most evident during the time when he was receiving two days per week of the repeated reading intervention.

Treatment Effects

Evidence exists that Kip’s target behavior, low oral reading fluency, improved as a result of the repeated reading intervention. When examining Kip’s goal against the aimline, his weekly means were above the aimline for the first 12 weeks of intervention, meaning he met the goal of expected growth rate of one new correct word per week. After the intervention was changed to one session per week, there was more variability in his weekly scores, but overall, Kip continued to meet his expected growth rate. At the end of the intervention, Kip’s score was 119 CWPM, which exceeded his goal at the end of the intervention of 118 CWPM. This reading fluency rate places Kip above the literature-based criteria for the third grade. Examining the data results formatively shows that 81.8 % of the data points fell above the aimline. After the intervention was complete, Kip maintained his growth. During two weeks of progress monitoring, Kip’s weekly scores were 128 CWPM and 117 CWPM, which are both above the benchmark for third grade.

However, the best indicator of treatment effects when using growth indices is growth rate. Kip’s growth rate for the 22 weeks of intervention was 1.04 correct words per minute. The realistic goal rate for 3rd grade students is 1.0 CWPM. Kip met the realistic growth rate of one new word a week, suggesting the intervention effects are positive and helping him improve his reading fluency rate.

Recommendations

Based on the past 22 weeks of intervention, the following recommendations are made:
1. The use of repeated reading may have strengthened Kip’s self-confidence and motivation to read independently, at home, and in front of others in class. His progress during intervention as well as comments he made regarding his this improvement suggest that feeling better about his skills makes Kip more interested in reading. Therefore, encourage Kip to practice reading materials repeatedly to develop fluency.

2. Kip was very motivated to reach his goals during the intervention. To continue progress over the summer and to prepare him for 4th grade, it may be beneficial for Kip to chart his reading progress over the summer, such as setting goals for a certain amount of pages to be read each week.

3. Kip may benefit from reading materials for pleasure—let him choose books/magazines that interest him to build his reading fluency. Trips to the library during the summer may encourage Kip to read materials that interest him.

4. Spend time engaged in reading when using the computer. Internet sites such as www.readingatoz.com, which has free downloadable level books for free as well as fluency passages that could be used for continued use of repeated reading at home. Another helpful Internet site is www.starfall.com, which has reading activities ranging for beginning to advanced readers. On this particular site, Kip may be interested in the “I’m reading” section, where he can read comic and folk tales in interactive books. The site also reading activities such as crosswords and word searches. A final Internet site that Kip may find engaging is www.scholastic.com/kids/. This website is full of links to popular children’s books, activities, and games.

5. It is important to first note that these findings from the repeated reading intervention suggest that Kip’s performance on structured reading tasks may be responsive to additional practice and repeated exposure to the same material as well as some guidance and one-on-one attention. Thus, it is recommended that increased practice be incorporated into school activities that require independent reading tasks. An example might be to enlist a peer whose reading skills are slightly more advanced than Kip’s, so they can read and identify words together. Once Kip has read a passage once with a peer, he can practice it on his own independently before going over it in reading group. Designating time for practice and repeated reading in the classroom will allow for Kip to continue improving his oral reading fluency.
It was a pleasure spending time with Kip over the past school year. He is a hard working and enjoyable student who consistently put forth his best effort. If there are any questions regarding this report or the intervention, please feel free to contact Meghan Geer or Katherine Wickstrom with any questions.

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