INCREASING READING SKILLS AND ON-TASK BEHAVIOR IN ALTERNATIVE SCHOOL STUDENTS THROUGH EMPIRICALLY-SUPPORTED READING INTERVENTIONS: A "BEHAVIOR SUPPORT PLAN" TO CONSIDER

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by

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ABSTRACT

INCREASING READING SKILLS AND ON-TASK BEHAVIOR IN ALTERNATIVE SCHOOL STUDENTS THROUGH EMPIRICALLY-SUPPORTED READING INTERVENTIONS: A "BEHAVIOR SUPPORT PLAN" TO CONSIDER

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Abstract

Reading problems can have an extremely adverse effect on a person's quality of life, opportunities in education and employment, and access to enjoyable activities (Daly, Chafouleas, & Skinner, 2005). Unfortunately, almost 20% of students in the United States have significant difficulty learning to read (Good, Simmons, & Smith, 1998). Federal legislation drafted in an attempt to address this important issue (No Child Left Behind Act of 2002, Reauthorization of Individuals with Disabilities Act 2004) propose initiatives that are unclear to teachers and practitioners in terms of how to best instruct students to become successful readers. For older students, and students identified with emotional disturbance, research in this area is considerably lacking. Many students with emotional disturbance have poor reading skills which follow them into the later grades and adulthood. This cycle of poor reading and difficult classroom behaviors often spirals out of control, with each variable negatively and reciprocally impacting the other.

The purpose of the present study was to investigate of the impact of a two-pronged reading intervention package on specific reading skill acquisition and levels of on-task classroom behavior exhibited by students in an alternative school setting. The interventions used individualized direct instructional techniques with students who were placed in an alternative educational setting as a result of behavioral symptomatology that was considered to be unmanageable in their home school districts. The two interventions focused on improving reading skills through the development of phonemic awareness/basic phonics skills, and repeated readings with error feedback to improve levels of reading fluency. Additionally, the impact of the intervention was also examined in relation to student classroom behaviors believed to be connected to their frustration with the reading process. Two single-subject multiple baseline across subjects research designs were used to assess the effectiveness of the interventions on reading skill development and on-task behavior, and the order of the interventions was reversed for the second experimental condition in order to address the possibility of order effects.

Five upper-elementary and middle school level students completed participation in the study. Results indicated noticeable gains across all students in the area of phonemic segmentation. Assessment results in the areas of word reading, phonetic encoding, and reading fluency showed variable results and flat trend lines, indicating nominal growth in these areas. Additionally, behavioral observation data indicated few patterns of positive behavioral change having resulted from intervention participation. Analysis of study design indicated that the interventions as implemented might have been too short to produce meaningful gains for these

students who had long-established patterns of reading difficulty. Generalization of gains made in segmentation to the overall reading process would likely require greater frequency of intervention with more opportunities for repetition and practice. The results of this study indicate that further research is needed in the area of designing reading interventions for students with identified emotional disturbance who are attending an alternative school setting, both to improve their ability to read and to potentially improve their behavior by providing for more opportunities for success with reading tasks.

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CHAPTER 1
THE PROBLEM

Introduction

Context

This dissertation details the preliminary investigation of the impact of a two-pronged reading intervention package on the acquisition of specific reading skills and levels of on-task classroom behavior exhibited by students in an alternative school setting. This investigation used intensively delivered, individually-based, empirically-supported reading instructional methodology via direct instructional techniques with students who were placed in an educational setting as a result of behavioral symptomatology that was considered to be unmanageable in their home school districts. A single subject research design was used to assess the effectiveness of the interventions on reading skill development and on-task behavior.

Reading problems can have an extremely adverse effect on a person's quality of life, opportunities in education and employment, and access to enjoyable activities (Daly, Chafouleas, & Skinner, 2005). Unfortunately, almost 20% of students in the United States have significant difficulty learning to read (Good, Simmons, & Smith, 1998). Federal legislation drafted in an attempt to address this important issue (No Child Left Behind Act of 2002, Reauthorization of Individuals with Disabilities Act 2004) contain initiatives which are unclear to teachers and practitioners in terms of how to best instruct students to become successful readers.

For older students, and students identified with emotional disturbance, research in this area is lacking. Most intervention research is conducted with younger students, and the foci of effort and research in addressing the needs of students with emotional disturbance are often centered on the management of behaviors. However, many students with emotional disturbance also have poor reading skills which follow them into the later grades and adulthood. Research

has shown that poor reading skills are linked to aggressive and hyperactive behaviors, poor effort, and poor self-concept (Good et al., 1998). This cycle of poor reading and difficult classroom behaviors often spirals out of control, with each variable negatively and reciprocally impacting the other. The question for such students was the driving force behind this dissertation study: Would intensive individual reading interventions based on empirically supported research conducted with students dually diagnosed with both emotional disturbances and reading difficulties serve to improve both their reading skills and levels of on-task appropriate classroom behavior? This approach was thought to be a digression from the more prevalent practice of exerting a great deal of effort on designing individualized behavior support plans and imposing behavior management systems in the classroom, diverting resources from addressing their reading difficulties in the first place.

There is no dearth of research on elements of effective reading instruction. Students need to be instructed at their current reading levels, materials need to be engaging and provide frequent opportunities for practice, and sufficient instructional time must be devoted to reading skill acquisition, practice, and development. The National Reading Panel (2000) identified three instructional areas that are critical to the development of solid reading skills: Alphabetics (phonemic awareness and phonics), reading fluency, and the applied skill of comprehension. For the typically developing reader, instruction in the later grades would mainly be focused on the latter area because older students are assumed to have already developed the foundational skills needed for reading. However, for students with emotional disturbance, a variety of factors may lead to these skills not having yet been mastered by the time the student reaches the upper elementary and middle school settings. As such, this dissertation sought to investigate whether systematically attempting to teach these skills in individualized sessions with students with

emotional disturbance who are identified as having reading difficulty would improve their ability to decode words and read fluently, and perhaps consequently have a positive impact on their classroom behavior due to decreased frustration with the reading process.

Statement of Purpose

The focus of this study was to examine the effect of a multidimensional reading intervention treatment not only on reading acquisition and fluency levels, but also on the level of on-task and compliant classroom behavior exhibited by students with identified emotional disabilities in their classrooms during activities when reading was required. In order to identify treatments that are considered to be empirically supported, evaluators are asked to consider three broad issues: (1) Has the treatment been shown to be beneficial in controlled research? (2) Is the treatment useful in an applied setting and, if so, with what subjects and under what conditions? (3) Is the treatment efficient in the sense of being cost-effective compared to alternative interventions? (Chambless & Hollon, 1998).

Specifically, this intervention package successively implemented two targeted reading interventions to students with emotional disturbance who were identified as poor readers by their classroom teachers. The order of the intervention presentation was varied across subjects to control for order effects. One of the interventions was a series of lessons addressing the phonemic awareness skill of segmentation and basics phonics principles, and the other was an intervention designed to improve fluency by working with students on curriculum-based repeated readings with error feedback. Specifically, ongoing assessment information provided information as to the development of student skill in phonemic segmentation, word reading, application of phonics skills, and reading fluency. Additionally, structured behavioral

observations provided information leading to the examination of whether or not dealing with academic skill deficits is an indirect way to improve overall classroom behavior.

Research Questions

This study will address four research questions, as follows:

Question 1: Will interventions addressing alphabetics skill development and reading fluency improve the reading skill repertoire of students with emotional disturbance and demonstrated reading difficulty who are attending an alternative school?

Question 2: Will the delivery of interventions addressing alphabetics skill development and reading fluency to students with emotional disturbance and demonstrated reading difficulty who are attending an alternative school improve student levels of on-task and compliant classroom behavior during classroom tasks?

Question 3: Does it appear that either the alphabetics instruction or the reading fluency intervention was more effective in improving specific reading skill components for students with identified emotional disabilities and reading difficulty who are attending an alternative school?

Question 4: Did the order in which the interventions were presented have an impact on student achievement or behavioral improvement levels?

Limitations of the Study

This study was narrowly defined and aimed to address a specific concern in a specific setting with a targeted population. The study addressed whether the delivered treatments were efficacious for a specific problem and population, and therefore would only be informative if addressed through clearly defined and tested single-subject methodology (Chambless & Hollon, 1998). Specifically, it examined the effects of a supplementary reading intervention treatment

that was provided in addition to the special education and behavioral supports already existing within the framework of this particular alternative school. The treatments delivered were well-defined and outlined in lesson protocols, making it possible for future research replication (as suggested in Chambless & Hollon, 1998). In light of this narrow focus and clear treatment implementation, single subject methodology was selected for use because of the small population of students in the school, as well as the slightly smaller number of students presenting without the basic, foundational skills needed to be successful readers. Additionally, data about the effectiveness of the intervention with the individual students selected for study participation, as opposed to a large sample, was desired in order to assist in educational planning efforts.

A limitation of this study is the lack of experimental control often associated with an applied setting. Although the use of an applied setting should produce results that are more representative of typical school-based interventions, the applied setting gives way to variations across participants. Some of these variations might include the type of reading instruction to which the student had previously been exposed or to which they were being exposed at the time of the study, the effectiveness of behavioral interventions and incentives put in place for the student, internal motivation to develop reading skills, unidentified mental health factors which might affect the student's availability for instruction, and the amount of practice and feedback on reading skills provided in the alternative school classroom by different instructors. These types of setting variations might indeed negatively impact the degree of internal control and consistency inherent in these results. However, to some degree, factors such as these are difficult to control for when working within any organizational system or when encountering the unpredictability of human subjects. Additionally, time constraints necessitated continuation of the interventions for limited times. Without such constraints, it would have been worthwhile to

continue the interventions until more stable data were observed for several subjects. Finally, three students did not complete the study due to factors such as moving and psychiatric hospitalization, and so their data were not analyzed.

The interventions in this study were designed to address specific subskills which have been demonstrated in the research to be positively, if not causally, connected to an individual's development of reading skills. However, the efficacy of the majority of the proposed interventions was proven in experimental designs involving young students, most of whom did not have identified disabilities. The subjects of this study were quite different in presentation; several were older and all had been involved in the special education system for several years due to having been identified with emotional disturbance. Additionally, the domain of comprehension, which is indeed the hallmark of successful reading, was beyond the scope of this study. Because the skills addressed in the interventions are limited, it is unclear as to whether or not improvement in these specific skill domains will generalize to improvement in overall reading ability and comprehension levels, specifically for students identified with concurrent emotional and reading difficulties.

Significance of the Study

The importance of reading in our society has been clearly established. School psychologists are continuously called on to address the reading needs of students in their schools. The reauthorization of The Individuals with Disabilities Education Act of 2004 calls for exploration of individual student's response to intervention efforts such as those proposed in this study when considering diagnosis as well as when developing appropriate educational plans. Additionally, the federally mandated No Child Left Behind Act of 2002 makes it clear that addressing the reading needs of our nation's students needs to become a national priority.

The National Reading Panel (2000) found that students with learning disabilities benefit from phonemic awareness and phonics instructional programs and techniques. However, because of the limited research available targeted to reading fluency interventions for such students, the panel was unable to conclude as to whether or not fluency interventions were effective in improving the reading skills of students with learning disabilities and recommended it as an area for future research. Likewise, the effects of phonemic awareness, phonics, and fluency training programs with students with emotional disturbances were not explored as part of the National Reading Panel study, most likely because of the paucity of research in this area as well. This dissertation study serves as a preliminary investigation of the effectiveness of targeted reading interventions in improving the reading skills and classroom behavior of students with emotional disabilities and concurrent reading difficulty.

Definitions

Student with an Emotional Disturbance refers to a student who is classified under the Individuals with Disabilities Education Act as having "a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance: (a) inability to learn that cannot be explained by intellectual, sensory, or health factors, (b) an inability to build or maintain satisfactory interpersonal relationships with peers or teachers, (c) inappropriate types of behaviors or feelings under normal circumstances, (d) a general pervasive mood of unhappiness or depression, or (e) a tendency to develop physical symptoms or fears associated with personal or school problems" (United States Department of Education, 2004).

Alphabetics refers to the student's ability to manipulate sounds in words, called **phonemic awareness**, as well as the acquisition and use of letter-sound correspondences, or **phonics** (National Reading Panel, 2000). Phonics is synonymous with the term **letter knowledge** in some research contexts. These skills are the foundational skills of the reading process.

Reading Fluency refers to accurate, fluid decoding and word recognition (Daly et al., 2005). Fluency involves reading with both speed and accuracy.

Reading Comprehension is "the essence of reading" and involves a complex set of cognitive activities, including problem-solving, relating ideas presented in print to the reader's own knowledge base and experiences, and constructing mental representations in memory (National Reading Panel, 2000). In short, comprehension involves gaining meaning from printed text.

Segmentation is a subskill of phonemic awareness, which involves breaking down a word or nonword into its component sounds (McBride-Chang, 1995). This skill does not require the student to analyze written symbols, but rather requires him or her to be attentive to the discrete sound units that make up the word.

Reading with Error Feedback is an empirically-supported fluency intervention that requires students to read a passage at their instructional level several times (typically three), with the teacher verbally correcting the reader's errors as each is made (Chafouleas, Riley-Tillman, & McGrath, 2004).

Curriculum-Based Measurement (CBM) is a way of monitoring student progress that uses materials from the student's curriculum as an outcome measure to provide the teacher with a reliable, valid, and efficient procedure for obtaining ongoing performance data to be used to evaluate instructional programs (Shinn, 1989). Measures are typically presented as samples from the curriculum called **probes**.

Treatment Integrity refers to the degree to which an intervention is carried out as intended (Gresham, 1989).

On-Task Behavior in this study is defined as orientation to schoolwork, frequency of motor behavior and verbal call-out disruptions, and student reaction to teacher directives (adapted from Saudargas & Lentz, 1986)

CHAPTER 2
REVIEW OF SELECTED LITERATURE

To set this investigation in its historical context, selected literature on the importance of reading (including legislative action) with specific reference to students with emotional disabilities will be discussed, including the link between reading skill deficits and off-task or problematic classroom behaviors. Next, elements of effective reading instruction, reading instructional areas, and select targeted reading interventions designed to address the difficulties experienced by students struggling to develop reading skills will be discussed. Finally, the use of continuous progress monitoring and intervention treatment integrity will be reviewed in order to provide the foundational information needed for intervention implementation.

The Importance of Reading

Reading is a process that translates into meaningful personal, social, and economic outcomes for individuals (Good et al., 1998). Reading problems can have an extremely adverse effect on a person's quality of life, opportunities in education and employment, and access to enjoyable activities (Daly et al., 2005). In the United States in 1996, one-quarter of all adults were described as being functionally illiterate, rendering them unable to read a note sent home from their child's teacher or the information contained on a medicine bottle (Riley, 1996). Problems associated with difficulty learning to read include: dropping out of high school, incarceration, lack of civic awareness and involvement, poor health maintenance, and poverty (Juel, 1995; Sarkees-Wircenski & Wircenski, 1994). Children who become adults with low levels of literacy are at an increasing disadvantage in a society that is creating consistently higher demands for proficient reading skills in the workplace (Torgeson, 2000).

Unfortunately, our educational system is not doing an adequate job of graduating students who are proficient readers. Almost 20% of all students in the United States have significant

difficulty learning to read (Good et al., 1998). Students with poor reading skills in the early grades are likely to have poor reading skills further on in their education, sometimes termed the "Matthew effect," based on the bible story where the rich get richer and the poor get poorer (Good et al., 1998). Longitudinal data and recent advances in reading measurement have demonstrated that the reading trajectory for these students diverges early from their peers who are learning to read, and has proven to be somewhat resistant to change (Good et al., 1998). According to a 2003 summary released by the National Center for Educational Statistics, one quarter of 8th and 12th grade students were found to be reading below the "basic" level on 2002 assessments (Daly et al., 2005). It is unlikely that the reality of these reading skills deficits will change for these particular students before they reach graduation age, rendering them at-risk for potential difficulty in adulthood.

As a field, we know considerably less about effectively remediating older students with significant reading disabilities than we do about preventing reading difficulties with younger students. Confounding this issue is the fact that older students with reading disabilities might not have not had adequate instruction, and/or require more intensive reading instruction than they are currently receiving. Additionally, the burden of poor reading skills often leads to low motivation and discouragement (Denton & Vaughn, 2008). Accelerating the reading growth of older students with severe reading disabilities is one of the most challenging tasks facing the field of education today. The level of intensity required for older struggling readers to close the gap with their peers is also likely to be extremely high (Denton & Vaughn, 2008).

No Child Left Behind

The concern for this state of affairs has trickled up to the national level. Because the majority of research on reading interventions has shown that intervening with young students is

most effective, legislation has recently been put into place to attack reading difficulties in the early grades. The *No Child Left Behind Act* (2002) established the "Reading First" program to ensure that more children receive effective reading instruction in kindergarten through grade 3. The program provides funds to help states and local school districts attempt to eliminate reading deficits by establishing high-quality, comprehensive reading instruction in the early years. Built on the foundations of the National Reading Panel (2000) report which synthesized research on effective reading instruction, the program is said to be designed to select, implement, and provide professional development for teachers using scientifically-based reading programs, and to ensure accountability through ongoing screening and classroom-based assessment. Theoretically, this proactive effort could potentially help to diminish the reality that a large number of American students struggle with reading (U.S. Department of Education, 2004). Exactly how the effects of this legislation will trickle down to the individual classroom, however, is unclear at this time.

Individuals with Disabilities Education Improvement Act

Additionally, the reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA, 2004) is proposing a more specific approach to addressing academic difficulties to counter the problems inherent with the current test and place model commonly used in school districts. Placement within special education has not guaranteed academic gains or better quality-of-life outcomes for students with disabilities, and current assessments (standardized IQ and achievement measures) intended to differentiate students with disabilities from low achieving students have not resulted in better instruction for struggling students. Additionally, the discrepancy model used to identify students with learning disabilities has been especially problematic (Canter, 2004).

Response to intervention (RTI) is a problem solving-model that is proposed under the reauthorized IDEA as a way to identify and remediate student difficulties, beginning in the regular education environment. In RTI, a systematic approach will be used by educational teams to review students strengths and needs, identify evidence-based interventions based on those needs, and frequently collect data to monitor student progress and the overall effectiveness of interventions implemented with a student (Canter, 2004). This legislation and problem-solving model will negate the need for parents and districts to wait for a student to fail before the student can receive intervention services, and proposes to ensure that interventions used are based on sound research and not simply what is available.

Application to Students with Emotional Disturbance

For students identified as having an emotional disturbance, there is a clear lack of research on the effects of associated reading disabilities on behavior and learning, a condition which is common in this population. Student with an Emotional Disturbance refers to a student who is classified under the Individuals with Disabilities Education Act as having "a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance: (a) inability to learn that cannot be explained by intellectual, sensory, or health factors, (b) an inability to build or maintain satisfactory interpersonal relationships with peers or teacher, (c) inappropriate types of behaviors or feelings under normal circumstances, (d) a general pervasive mood of unhappiness or depression, or (e) a tendency to develop physical symptoms or fears associated with personal or school problems" (United States Department of Education, 2004). A recent national survey indicated that 9% of all students in public schools have disabilities, with only 8.1% of those receiving services for emotional or behavioral disorders (U.S. Department of Education, 2004).

The academic deficits exhibited by students with emotional and behavioral disorders are well documented in the literature, particularly in the area of reading (Strong, Wehby, Falk, & Lane, 2004). Unfortunately, students with emotional and behavioral difficulties who are educated in a self-contained school setting score even lower on a variety of academic measures, including reading, when compared to similar students who are educated in self-contained classrooms located in general education settings (Strong et al., 2004). Students who lag behind their peers in their ability to consistently apply reading skills receive less practice than their peers in applying these skills, miss opportunities to develop reading comprehension skills, and typically acquire negative attitudes about reading itself (Torgeson, 2000). Understandably, this experience could lead to a feeling of alienation towards the learning process.

Additionally, research has shown that poor reading skills are linked to aggressive and hyperactive behaviors, poor effort, and poor self-concept (Good et al., 1998). These behavioral manifestations are externalized, and therefore may lead way to a diagnosis of emotional disturbance as opposed to a traditional diagnosis of learning disability, or the diagnosis of learning disability becoming the secondary disability category. This differential diagnosis could impact the primary services delivered to the student changing from those focused on reading interventions for a student with a learning disability, to primary interventions focusing on behavioral support for a student identified as emotionally disturbed. With the RTI model, this would hopefully no longer be the case, as efforts would hopefully turn towards intervention possibilities as opposed to the current model in which placement is often determined by disability label. Although the research on effective reading interventions for students with emotional and behavioral difficulties is sparse, several studies have provided preliminary evidence that explicit and specific phonics instruction and/or reading fluency interventions show

promising results (Allen-DeBoer, Malmgren, & Glass, 2006, Strong et al., 2004). Unfortunately, a wide variety of this research is conducted with younger students with social and emotional difficulties (Strong et al, 2004).

The Link Between Reading Skill Deficits and Off-Task and Problematic Behaviors

Erchul and Martens (1997) identified five possible reasons for behavior problems in the classroom. The authors theorized that off-task behavior problems are exhibited by students for the following reasons: (1) the student has not learned a more appropriate behavior that gets the same response as the inappropriate behavior, (2) more appropriate behaviors are ignored, (3) the student gets attention for the problem behavior, (4) the student gains access to something desirable when exhibiting the inappropriate behavior, and/or (5) the student escapes something he or she is requested to do when exhibiting the problem behavior. Under this framework, it could be reasoned that when students experience considerable difficulty with the reading process, that off-task and disruptive behaviors may result because the student does not know how to read with success in order to gain positive attention from the teacher, and so the negative attention resulting from the misbehavior is better than no attention at all. Consequently, a pattern of misbehavior could ensue in order for the student to gain access to this attention. Additionally, the student might escape the reading task required of him or her by exhibiting off-task or inappropriate behavior, which could indeed be reinforcing. Considered within this framework, it is possible that a student's misbehaviors could be continuously reinforced over time by attention and task avoidance, leading to a pattern that could continue throughout the educational career of a student with a reading disability. In time, if the frequency, intensity, and duration of these problem behaviors persists or increases, the student could eventually be classified as a student

with an emotional disturbance. This leads to the question: For students classified as emotionally disturbed who exhibit associated deficits in reading skills; what came first, the reading disability or the emotional disturbance?

Poor reading skills have been linked to the development or exacerbation of concomitant behavioral and/or emotional problems, including aggressive and hyperactive behavior, patterns of poor effort, poor self-concept, and increased rates of school dropout. In considering long-term outcomes, low educational attainment and poor reading skills are associated with high levels of adjudication and recidivism (Drakeford, 2002). As low reading trajectories are established for students in their early years, secondary problems (such as off-task escape avoidance behaviors) can further impede effective instruction (Good et al., 1998). Behavior problems might also limit teachers' attempts to instruct (Staubitz, Cartledge, & Yurick, 2005). Lack of exposure to effective instruction, for whatever reason, puts the student at an even greater risk for learning problems because he or she is not practicing existing skills and receiving feedback that will allow him or her to build on skills already acquired. It becomes almost impossible to tease out what portion of the student's reading deficits are the result of a true reading disability and what portion is exacerbated by escape, avoidance, or frustration behavioral manifestations that cause the student to miss essential instruction. More importantly, intervention efforts might be centered solely on reducing problem behaviors, rather than looking at the initial antecedent to such behaviors and structuring intensive reading interventions that could deal with the reading and behavior difficulties simultaneously.

Common Approaches Used with Students Exhibiting Off-Task Behavioral Problems

The 2004 Amendments to IDEA mandated that the relationship between behavior and learning must not only be considered, but must be acted upon. Individualized Education

program (IEP) teams were mandated to conduct functional behavior assessments (FBAs) to develop positive behavioral support plans (BSPs) for students displaying problematic behaviors. Many such plans, however, lack the depth to do what they were designed to do, and become simply another form that needs to be included in a student's individualized education plan. Likewise, it is unfortunate that when students display off-task or disruptive behaviors in the classroom, a typical IEP team response is to put supports in place to simply reduce the problem behaviors. Looking back to the original antecedent to the behaviors (when the student first displayed the behaviors of concern) and addressing that underlying need, often difficulty with the reading process, might be more beneficial in addressing the dual needs of reading and behavioral difficulties than solely managing behaviors.

Elements of Effective Reading Instruction

Students who are experiencing reading problems have been shown to need explicit, multisensory, direct instructional techniques in order to master the foundational skills involved in the reading process (Howell & Kelley, 2002). Additionally, instruction must be matched to each student's level of proficiency in each of the reading instructional areas.

Direct Instruction

Direct instruction is a model for teaching that emphasizes well-developed and carefully planned and delivered lessons designed around small learning increments and clearly scripted and defined teaching tasks (Engelmann & Carnine, 1982). It is rooted in task analysis, and based on the theory that clear instruction eliminates misinterpretations and increases attention to task, which can greatly improve and accelerate learning (Swanson, 1999). Students with reading difficulties are likely to need small-group intensive intervention that includes direct instructional

techniques in the foundational skills of reading, and they will likely need this intensive intervention over an extended period of time (Denton & Vaughn, 2008).

There is a large amount of research documenting the effectiveness of direct instructional techniques in teaching foundational reading skills. Grossen (2004) documented the effectiveness of a direct instruction reading program in a high-need urban middle school faced with a large number of at-risk students who were performing significantly below grade level and exhibiting maladaptive behaviors. In a review of six studies designed to teach reading skills to older students with learning disabilities, Gersten (1985) concluded that involvement in reading curriculum programs that were based on the model of direct instruction tended to produce higher academic gains than traditional approaches. It was noted in this review that the insistence on complete mastery in each stage of the learning process for each reading subskill appeared to be the most important element of instruction for these students (Gersten, 1985). In a meta-analysis of intervention outcomes of reading research for students with learning disabilities, Swanson (1999) yielded a similar conclusion on a larger scale. In a review of 92 reading intervention studies conducted over 30 years, Swanson found that an instructional model combining strategy and direct instruction most positively influenced reading comprehension performance, while direct instruction alone yielded the most robust improvement in word recognition ability. The strong research based on direct instruction efficacy in reading interventions was the impetus for designing study interventions for this dissertation study that were based on direct instructional methodology.

The Instructional Hierarchy

The instructional hierarchy developed by Haring et al. (1978) has been suggested as a model that has proven useful for understanding why and under which conditions instructional

procedures are effective with students. Students are thought to progress through the four stages of the instructional hierarchy as they move towards becoming successful readers (Daly et al., 2005). (1) At the *acquisition* stage, students are learning novel skills (such as phonemic awareness and phonics) and instruction must be focused on accuracy. Students at this stage need skills to be modeled, and benefit from explicit error feedback (Chafouleas et al., 2004). (2) When students move to the *fluency* stage, they develop an ability to read both accurately and quickly, which requires rapid, fluent application of alphabetic decoding skills. Speed in moving through reading text is emphasized, as this speed will enable the student to apply their reading skills in the more complex cognitive task of comprehension. Students need the opportunity to practice with reinforcement at this stage of learning. (Chafouleas et al., 2004). (3) Next, the student moves on to the *generalization* stage, where he or she is expected to be able to demonstrate both accuracy and speed across new texts, times, and settings. Students must be able to apply their reading skills across a variety of different materials, as well as in different settings in order to demonstrate that they have generalized the skill. Teaching for generalization is a complex undertaking that an educator must plan for across all lessons, meaning that even simple component "acquisition" skills should be taken out of simple drill context by providing examples, differing types of text, and different types of comprehension activities when presenting new skills to students and providing practice exercises. (4) Finally, in the fourth stage of *adaptation*, students are able to modify existing reading skills to meet the demand of new situations or previously unencountered reading challenges (Daly et al., 2005). The student learns to adapt and alter their skills in new and untaught ways, leading them to be able to problem-solve their way through different types of texts across settings (Chafouleas et al., 2004).

It is important to understand the steps involved in this instructional hierarchy when planning reading interventions for students experiencing reading failure so that instruction is properly aligned with their current needs. For example, if a student is making many errors during a reading, it can be assumed that he or she has not acquired the basic alphabetics skills needed to decode the words contained in the reading. If the student is able to decode the words with accuracy but is slow in moving through the passage, fluency should be viewed as the goal of instruction. Finally, if the student decodes with a high degree of accuracy and is able to move through text with ease, yet does not demonstrate an understanding of the content of a reading, comprehension instructional interventions would be appropriate (Daly et al., 2005).

Selection of Instructional Materials

Along with these observations, it is important to choose materials to use with the student that are appropriate for his or her current needs. Instructional materials should provide students with a variety of examples and applications that differ from each other as much as possible, but that still focus on demonstrating the skill being taught (Daly et al., 2005). Finally, instructional materials need to provide students with an abundance of opportunities to practice the target skill, as well as receive feedback on their application of the skill (Daly et al., 2005). Unfortunately, the basal reading series on which most educators rely or are required to use are not always current with research-based instructional practice, and contain optional activities leading to a neglect of key repeated practice or direct instruction exercises that are needed to clarify and solidify skills for most students (National Research Council, 1998). It is important to note, likewise, that when the match between the student's current levels and the reading materials being used for instruction is not a close one, students are unsuccessful and may become off-task and misbehave in the classroom (Daly et al., 2005).

Sufficient Engagement Time in the Reading Process

It might seem obvious to mention that another component of effective reading instruction involves ensuring that sufficient time is being devoted to reading instruction. Time alone is not enough, however, as students also need to be actively engaged in the reading process (Gettinger, 1995). Instruction needs to be responsive to students' needs, based on what students already know, how proficient they are with current goals, and how well they are progressing as a result of a given intervention according to specific measurement devices (Daly et al., 2005). Teachers need to make informed instructional decisions based on reliable feedback about how well the student knows the skill at hand, as opposed to moving through a curriculum or series because it is "time to do so," or because the majority of the students in the class are ready for this movement (Daly et al., 2005). Finally, teachers will need administrative support and encouragement to make meeting the needs of all students in their classrooms an organizational priority, as well as have the resources they will need available if responsiveness to every student's needs is to become a potential reality (Daly et al., 2005).

Reading Instructional Areas

Torgeson (2000) found that a large proportion of children (more than 50%) most at risk for reading failure could be helped to learn by applying the best of what is known about reading instruction. In 2000, the National Reading Panel (NRP) issued a report following a congressional mandate to synthesize and evaluate the voluminous existing research body on reading instruction. As a result of this meta-analytical synthesis, three distinct areas of reading skill development were identified as essential components to an effective reading instructional sequence. These instructional areas are summarized below.

Alphabetics

Alphabetics refers to the student's ability to manipulate sounds in words, called phonemic awareness, as well as the acquisition and use of letter-sound correspondences, or phonics (National Reading Panel, 2000). It is accepted that children who experience difficulty learning to read display an inability to use the phonological structure of language to aid them in reading and writing (Good et al., 1998). Phonemic awareness instruction should focus on teaching students to manipulate discrete sound units (phonemes) in words, including skills such as phoneme isolation, deletion, and segmentation, as well as the ability to categorize and blend phonemic units (National Reading Panel, 2000).

As a next step, phonics instruction includes explicitly teaching students to make correspondences between letters, sounds, and spelling patterns with an emphasis on blending word components to aid in decoding and breaking down these components to aid in spelling (National Reading Panel, 2000). When instruction is successful in having students master these skills, students are able to decode words accurately, leading to improved rates of reading fluency and comprehension (National Reading Panel, 2000). Alphabetic skills as applied during a variety of phonological training experimental studies were found to have a clear causal relationship to learning to read (Bus & van Ijzendoorn, 1999) and be a critical (but not sufficient) part of the reading process (Hulme, 2002).

Reading Fluency

Reading fluency refers to accurate, fluid decoding and word recognition (Daly et al., 2005). The NRP identifies reading fluency as a factor that is a prerequisite for reading comprehension, and sees fluency as an area that is frequently neglected in reading instruction (National Reading Panel, 2000). Laborious decoding understandably takes away from a reader's

ability to understand text. Fortunately, in recent years, researchers have begun to take an interest in the area of reading fluency as an important area for assessment and remediation, with some even identifying it as the best indicator of reading proficiency (Shinn, Good, Knutson, & Tilly, 1992). Guided, repeated oral readings are a common instructional approach to aiding students in developing their reading fluency (Daly et al., 2005).

Reading Comprehension

The NRP identified comprehension as "the essence of reading," because understandably there is no other point to focusing on these combinations of written symbols other than to gather meaning from them. Comprehension involves a complex set of cognitive activities, including problem-solving, relating ideas represented in print to the reader's own knowledge base and experiences, and constructing mental representations in memory (National Reading Panel, 2000). Instructional approaches to building students' comprehension skills are varied and complex, including vocabulary instruction, comprehension monitoring, use of graphic and semantic organizers, question answering with immediate feedback, summarization, and using story structures to guide in content recall (Daly et al., 2005).

The NRP recommends the integration of alphabetics, fluency, and comprehension to create a complete reading program, and states that instructional activities with a primary focus on comprehension (e.g. simply reading storied aloud and answering questions based on that content) will not meet students' needs when they have not yet mastered the prerequisite skills outlined above. Such programs will make the learning task unnecessarily difficult for students and slow down their progress, and might even make the instructional environment a trigger for misbehavior motivated by the student's need to escape difficult task demands (Daly at al., 2005).

Potential Reasons for Difficulty in Acquiring Basic Literacy Skills

There are a variety of opinions as to why students are unable to acquire and master basic skills such as those involved in the reading process. Chafouleas at al. (2004) theorize that such difficulty can be categorized as either a skill deficit or a performance deficit, although a student can demonstrate both a skill and performance deficit simultaneously. A skill deficit occurs when the student has never demonstrated mastery of the components of the skill necessary to complete a task. A performance deficit, on the other hand, occurs when a student has demonstrated mastery of the skill, but does not demonstrate or apply the skill when needed. Daly, Witt, Martens, and Dool (1997) identified five possible reasons for academic failure: (1) lack of motivation, (2) lack of practice, (3) lack of instruction or assistance with skill development, (4) lack of experience applying the skill in a particular context or novel situation, and (5) lack of a match between the difficulty level of the task and the student's current level of functioning. It is understandable then that when students are faced with any of the five aforementioned conditions (or a combination of such), off-task behavior and opportunity for misbehavior increase as a result (Chafouleas at al., 2004).

Another set of authors delineates two primary reasons why students are thought to have difficulty obtaining early literacy skills specifically: (1) a lack of adequate exposure to clear and consistent appropriate instruction, and (2) stable individual characteristics that suggest a need for more intense instruction in literacy skills at an early age (Daly at al., 2005). Lack of exposure could occur because of frequent absences, off-task behaviors while instruction is occurring, or because the student's early grade teachers did not using explicit, systematic instruction to teach such skills. Individual characteristics that could suggest that a child might need modified or intensive phonological awareness or letter knowledge instruction includes lower memory or

rapid retrieval abilities that put such at risk for not acquiring early literacy skills at the same rate as their peers (Daly et al., 2005). For whatever reason, when students experience reading difficulty, the skill breakdown usually occurs at the alphabetic or fluency level, which in turn hampers their ability to comprehend what they are reading at the same level as peers. For this reason, alphabetics and fluency will be discussed in more detail, as they are the foci of the proposed intervention effort.

The Importance of Targeted Intervention

Schools provide specialized programming or remedial services to large numbers of students who are at-risk or experiencing reading failure. Quality, frequent, intense instructional remediation even has the potential to close the reading gap between readers with disabilities and peers who develop reading skills at a normal rate (Torgeson, Alexander, Wagner, Rashotte, Voeller, & Conway, 2001). Individualized instruction, in the form of one-to-one or small group tutoring provided as a supplement to classroom teaching, is one way that has been demonstrated to increase students' achievement. Elbaum, Vaughn, Hughes, and Moody (2000) examined 29 tutoring studies and found that students who received tutoring performed at a level 2/5 of a standard deviation higher than the average level of the comparison group. Although this increase may not be as significant as one would hope, for many students it would be enough to allow them to avoid academic failure. This meta-analysis found that well-designed, reliably implemented interventions can make a significant contribution to increasing reading outcomes for many students whose poor reading skills put them at-risk for academic failure. Successful reading interventions designed for use in one-on-one or small group sessions are plentiful (Bus & IJzendoorn, 1999; Good & Simmons, 1998; Juel, 1996), which led to the desire to offer intervention in an individually-based setting to the students in this proposed study.

Mastery of alphabetics, fluency, and reading comprehension are necessary to become a successful reader. Once a student understands the concept that one symbol or group of symbols corresponds to each basic speech sound in language, they are able to combine symbols and sounds to read the words that are commonly spoken. However, this understanding is not as simple as it may sound, in that each symbol does not strictly correspond with one sound, but can change in the context of various combinations. Consequently, many students have difficulty obtaining the most basic early literacy skills (phonemic awareness and phonics) in the early grades, which leads to a domino effect that decreases the likelihood that these students will achieve grade-level reading skills. These deficits follow students into later grades and adulthood, further compounding their reading difficulties (Daly et al., 2005). While it is important to remember that alphabetics (phonemic awareness and phonics skills) should not be the only component of instruction, it is indeed a critical component on which many readers with disabilities become "stuck."

Alphabetics

As previously outlined, alphabetics consists of phonemic awareness and letter knowledge skills. Phonemic awareness is defined as sensitivity to the sounds in the oral language (Gunn, Simmons, & Kameenui, 1995). Some researchers, however, define the skill of phonemic awareness as more than just sensitivity to these sounds, but as a student's ability to manipulate sounds in the absence of any written print (National Reading Panel, 2000; Torgeson, 2000). Phonemic awareness has been found to be a successful component of reading instruction (Bus & IJzendoorn, 1999; Good & Simmons, 1998; Torgeson, 2000; Wagner, Torgeson, Rashotte, 1994). Torgeson (2000) found phonemic awareness instruction to be the most successful intervention, of several reading intervention programs targeting children experiencing reading

failure, in addressing the needs of the poorest readers. Allen-DeBoer et. al. (2006) found that students with emotional and behavioral disorders realized substantial gains in reading achievement through an intense, systematic, phonics-based reading intervention. The effects of this intervention led to improved oral reading fluency, accuracy, and comprehension.

Rhyming and identifying words with similar initial or ending sounds are the first subskills of phonemic awareness. Skills such as segmenting (breaking a word into component sounds), blending (putting sounds together to make a word), and deleting and substituting sounds are later developed subskills (Daly et al., 2005). Phonemic awareness tasks in one experimental study were found to be ordered by difficulty level from easiest to most difficult in the following manner: rhyming, alliteration, blending, segmentation, manipulation (Chafouleas, Lewandowski, Smith, & Blachman, 1997). Cognitive ability, short-term memory ability, and simple speech perception ability were found in an experimental design using structural equation modeling to explain some of the variance in the construct of phonemic awareness (McBride-Chang, 1999). The other two "less malleable" skills which fit under the umbrella of "Phonological Processing" (with phonemic and phonological awareness) are phonological coding (the ability to hold phonological information in working memory), and phonological retrieval (rate of access to phonological information through rapid naming (Daly et al., 2005).

Phonemic awareness skills are typically obtained by students in kindergarten through the end of first grade. In one study, which examined the age at which the majority of phonemic awareness skills are mastered, the median attainment age was within the 6-year age range (Chafouleas et al., 1997). Research has shown that phonemic awareness skills are the most responsive to intervention with learners across a range of grade and age levels (Daly et al., 2005; National Reading Panel, 2000). The metaanalysis conducted by the NRP (2000) concluded that

phonemic awareness training was consistently replicated and could therefore be viewed as causal in the improvement in students' phonemic awareness, reading, and spelling skills following training. Additionally, it was concluded that the effects of phonemic awareness training on the reading development of disabled students lasted well beyond the end of the training period, leading to generalization of these skills. A metaanalysis of phonological training experimental programs by Bus and van Ijzendoorn (1999) found that training in phonological awareness reliably improves not only a child's phonological awareness, but their reading skills as well. Phonological awareness training programs that were found to be most effective by the NRP (2000) were those that systematically and explicitly taught children to manipulate phonemes, focusing the instruction on one or two phoneme manipulations rather than multiple types, and which taught students in small groups. Most students are thought to require very specific instruction in the subskill of segmentation, or the ability to segment words into their component phonemes, a skill which is highly correlated with beginning reading skills (Gunn et al., 1995).

Once students develop these skills, they are ready to move towards the development of phonological awareness, or letter knowledge skills. Letter knowledge, more commonly referred to as phonics, is the knowledge of the alphabet and its related sounds (Gunn et al., 1995). Phonics refers to an orthographic skill, or knowledge of the written symbols that represent the sounds in language (Daly et al., 2005). Knowledge of letter sounds has been found in the literature to be closely related to phonemic awareness skills (Chafouleas at al., 1997). Research has demonstrated that readers who demonstrate stronger fluency in rapid letter naming are typically differentiated from students with slower letter naming facility as more skilled readers, which related to the concept of fluency being the goal after the acquisition of the letter naming and sound-symbol correspondence developed during the acquisition stage (Daly at al., 2005).

Additionally, the NRP (2000) metaanalysis found that systematic phonics instruction is more effective than instruction that teaches little or no phonics in enhancing children's success in learning to read. This was found to be true, as well in a metaanalysis of phonics interventions programs that supported the conclusion that systematic phonics instruction helps children learn to read more effectively than non-systematic or no phonics approaches (Ehri, Nunes, Stahl, & Willows, 2001). The impact of phonics instruction in these studies was shown to be statistically significant even when introduced in later grades.

Students need to be able to rapidly look at a letter and name it with ease. Additionally, once students have learned that the English language is comprised of a multitude of distinct, flexible sounds through phonemic awareness development, they need to learn that each of these sounds is connected to a letter or letter sequences in the alphabetic system through phonological skill development. Students are taught to be sensitive to these sounds as they correspond to letters and letter combinations in order to be able to manipulate sound segments as they are attached to written print during phonics instruction. Once students begin to practice actual reading, they typically continue to develop both their phonemic/phonological awareness and reading fluency as the two skill domains act symbiotically (Daly et al., 2005). As a result, the early elementary years are considered the best time for instruction in these skills. Phonemic and phonological awareness can be taught and developed, however, with older students who are later determined to have not acquired such skills during their early elementary years. Such students will typically find reading to be a more laborious task in the long run, even with intervention, as compared to their peers who mastered these skills as young students (Daly et al., 2005).

Phonics instruction should stress the acquisition of letter-sound correspondences (or how letters are linked to phonemes) and their use on reading and spelling (National Reading Panel,

2000). However, it is important to remember that the goals of phonics instruction is to apply letter-sound knowledge to actual reading, and so programs that focus solely on teaching these relationships and not using the skills in real readings are unlikely to be very effective (National Reading Panel, 2000). There are generally considered to be two approaches to phonics instruction. Systematic phonics approaches involve explicitly teaching students a sequential set of phonics skill elements along a continuum dependent upon the type of phonics method being used. Some such programs use controlled vocabulary stimuli when expecting students to apply their new skills, while others are less systematic and may require the students to apply skills to a less controlled reading. The systematic phonics approach was found to be most effective in increasing word reading skills in a metaanalysis of phonics interventions by Ehri et al. (2001). With incidental phonics instruction, the teacher does not follow a planned sequence of phonics skills to guide instruction, but rather highlights particular phonetic elements when they opportunistically appear in text (National Reading Panel, 2000). Exactly how intensive phonics instruction needs to be, how many combinations of letters need to be taught, and other factors of phonics instruction are not clearly known at this time (National Reading Panel, 2000). Phonics knowledge can be demonstrated by students through rapid letter naming fluency as well as application of the knowledge of the sounds that letters and letter combinations make.

Similar to phonological awareness, phonics skills are typically acquired by students by the end of the first grade (Daly et al., 2005). Deficits in phonological awareness and phonics skills at an early age clearly puts such older students at risk for later reading difficulty, and potentially places them in danger of developing behavioral problems because disenfranchisement with the reading process provides them with less academic engagement time in the classroom, and more time to become off-task. Fortunately, phonics instruction has been shown to produce

significant benefits across ages, abilities, and socioeconomic backgrounds through grade six and even beyond for children who are having difficulty learning to read. However, for older students the benefits of phonics instruction was more limited to decoding ability than to comprehension skills or spelling ability (National Reading Panel, 2000). Students with identified reading problems might not garnish the same effect size as a result of alphabetics training as a regular education student, but it appears that such a student might need such intervention just as much even if they profit less than a nondisabled reader in the short term (Bus & van Ijzendoorn, 1999). Structured alphabetics interventions used with students with emotional and behavioral difficulties have been shown to result in moderate and variable improvements in basic reading skills of elementary students with emotional disturbance (Barton-Arwood, Wehby, & Falk, 2005).

Reading Fluency

The second instructional area targeted in the NRP (2000) report was that of reading fluency. Because of the bidirectional relationship between alphabetic skills and actual reading, it is important to give students practice in actually applying their skills in a rapid and efficient manner during the reading instructional process (Wagner et al., 1994). Fluency involves reading orally with speed, accuracy, and proper expression (National Reading Panel, 2000). Along with alphabetics, it is a critical component leading to the overall goal of reading comprehension, and another area where readers with disabilities often experience difficulty. Students who are unable to read fluently are unable to read as quickly as their peers because they need to dedicate extensive energy to deciphering the actual words, thus leaving less time and focus for comprehending what they have read and applying this information toward the development of new skills (Chafouleas et al., 2004). Some such students may have received extensive, intense

instruction in phonemic awareness and phonics skills, and so their approach to decoding a word is accurate. However, their pace in doing so might be laboriously slow, which takes away from their overall ability to understand what they are reading because they are moving so slowly through the text that they are unable to hold on to the conceptual essence of what they have already read and relate it to existing background knowledge. Unfortunately, fluency instruction is often neglected in the classroom, leaving these students to continue to struggle in achieving that overarching purpose of the reading process (National Reading Panel, 2000).

The NRP (2000) meta-analysis concluded that guided repeated oral readings with guidance from teachers, peers, or parents had a significant positive impact on word recognition, fluency, and comprehension across a range of grade levels. These results applied to both strong readers and readers experiencing difficulty developing reading skills. There is thought to be a reciprocal causality between alphabetics skills and reading in general amongst some researchers (Bus & van Ijzendoorn, 1999), and so having students practice actual reading in addition to providing direct, systematic instruction in alphabetic skills should serve to strengthen overall reading ability. Recent research indicates that repeated reading interventions used with students with emotional difficulties can yield gains in fluency, and that these gains can also transfer to comprehension ability (Scott & Shearer-Lingo, 2002; Strong et al, 2004, Staubitz et al., 2005, Morgan, Ramp, Anderson, et al, 2007).

Specific Interventions to Improve Alphabetics and Fluency Skills

Children identified with reading disabilities typically "bottleneck" in terms of reading growth in the area of skilled word identification, or the ability to "sound out" words using phonetic skills to help them decipher them, and this breakdown usually persists into the late elementary years and even adulthood (Torgeson, 2000). Because most reading problems occur

at the acquisition and fluency stages of learning, interventions are frequently targeted at improving these skills (Chafouleas et al., 2004). The research body in early literacy frequently references two skills as the strongest predictors of reading achievement: phonemic awareness and letter knowledge/phonics (Daly et al., 2005; National Reading Panel, 2000), commonly referred together as alphabetics. In a metaanalysis of phonological awareness training studies, the acquisition of the alphabetic principal was determined to rest on the foundations of both phonemic awareness and letter knowledge, and so supplementing phonemic awareness instruction with letter or phonics knowledge may be more effective in helping students learn to read than just phonemic awareness interventions alone (Bus & van Ijzendoorn, 1999). Additionally, Bus and van Ijzendoorn (1999) suggest that children with emerging reading problems may profit most from the structured approach of introducing segmenting and blending tasks first, followed by letter-sound correspondences. It is also important to consider that the NRP (2000) has advocated teaching along the continuum of reading skills, and so efforts to strengthen reading fluency appear to be equally as important in terms of developing automaticity with the reading process, as well as giving students the opportunity to practice phonetic skills in context. Consequently, these two skill domains were chosen as the foci of the proposed intervention.

Alphabetics Intervention

Because of the bidirectional relationship of phonological processing and word reading ability, phonemic awareness is assumed to be best taught in conjunction with a phonetic decoding component (Wagner et al., 1994). In a study by Torgeson et al. (2001), older elementary students with learning disabilities were shown to make significant short and long-term gains as a result of interventions that focused on both phonemic awareness and embedded

phonics instruction. When designing a program to teach phonological skills, Good et al. (1998) made the following five criteria recommendations: (1) Provide instruction at the phoneme level, (2) Scaffold tasks and examples according to the range of linguistic complexity, (3) Provide explicit models and production practice opportunities with repetition for each phoneme presented, (4) Start instruction with phonemic sound identification, blending, and segmenting opportunity before culminating in letter-sound correspondence instruction, and (5) Use concrete materials to represent sounds. When scaffolding tasks, it is important to consider that shorter words are easier to manipulate than longer ones, words with no or one consonant cluster are easier to manipulate than words containing several consonant clusters, continuous sounds (/m/) are easier to manipulate than stop sounds (/t/), and the positioning of the phoneme ranges from easiest to most difficult in the following order: initial, final, medial (Good et al., 1998).

Letter naming and consonant-sound identification are also important predictors of learning to read (McCormick, Stoner, & Duncan, 1994). Initial consonant-sound identification was found to count for 34% of the variance in beginning reading ability in a study examining the development of reading in kindergarten students (McCormick et al., 1994). Instruction in phonics skills should teach students letter-sound correspondence/consonant, consonant blend, consonant digraph, short and long vowel, vowel digraph, r-controlled vowel, and complex vowel sound knowledge (as suggested in Ehri, et al., 2001). Additionally, rules regarding phonics, syllabication, and accent need to be presented and practiced with students. Opportunities to link this to reading and spelling should be evident throughout the treatment. This embedded approach is common in structured phonics programs, such as that described in the Torgeson et al. (2001) study. A simple phonics sounds test would have students use their knowledge of letter-

sound correspondence through application of this knowledge in a spelling task using phonetically regular words as stimuli.

Fluency Intervention

Older children who have been poor readers for several years have difficulty "closing the gap" with their normally reading peers because they miss out on the enormous amount of text exposure and word-reading practice delivered in the classroom while they are struggling (Torgeson et al., 2001). Error feedback is a fluency intervention that is commonly used with students working to acquire new skills, as it provides repeated opportunities for practice with feedback. The student is required to read a passage at their instructional level, and the teacher verbally corrects the reader's errors as each is made. The student then repeats the correct word and continues reading. Additionally, if a student is unable to read a word after three seconds, that word is provided for the student so that he or she can then continue reading. The teacher underlines all errors on his or her copy of the probe. This ensues until the student is finished reading the passage. When finished, the student is shown his or her errors, and these are practiced again. In this approach, the student is provided with practice in reading the passage, as well as the opportunity to have errors identified and feedback provided through correct modeling. The student is then requested to read the passage two more times with continued error feedback for additional practice (Chafouleas et al., 2004).

Eckert, Ardoin, Daly, and Martens (2002) found that the use of repeated readings were effective in increasing the oral reading fluency levels of all participants in an experiment in which it was used. Specifically, the students were found to read between 1.3 and 2.4 times as many words correctly per minute on average after having received the repeated reading intervention. For some students in this study, the use of paired contingent reinforcement with

repeated readings was more effective in increasing oral reading fluency rates. This finding suggests that for certain students, the benefits of improving reading alone may not be as motivating as a preferred reinforcer provided in addition to the intervention.

The Importance of Monitoring Progress

In order to examine the effectiveness of an intervention, it is necessary to use a repeated common measure to compare the student's performance on the skill of interest over time. Without continued monitoring of progress, it is impossible to determine if the intervention is effective in meeting the desired goal. Classroom-based assessments for monitoring student growth should include information that the teacher can use to connect assessment information to instructional decisions for that student (Fuchs & Fuchs, 1999). Before the intervention is implemented, a baseline measure of student performance should be gathered using the measure to see where the student is functioning prior to intervention. Data should be continuously collected during the intervention phases. Collecting data post-intervention is helpful in providing information about the generalization of results.

The practice of using materials from the curriculum in which the student is working to build fluency is widely used in the field, and is referred to as Curriculum-Based Measurement (CBM) (see Shinn, 1989). CBM measures are considered to be general outcome measures as they provide teachers with reliable, valid, and efficient procedures for obtaining ongoing performance data, in terms of reading development over time, to be used to evaluate instructional programs. The administration of such measures should be standardized, the focus of the measurement should be on long-term goals, and the testing methods and content should reflect the performance desired from the student at the end of the intervention period. Because data are collected over time, a graph of student progress can be made illustrating overall levels of student

progress. The goal of CBM measures is to provide a trajectory of change in performance over time (Fuchs & Fuchs, 1999, Good et al., 1998).

CBM passages are taken from the curriculum in which the student is already working in the classroom. Because performance is being measured at the student's instructional level, floor and ceiling effects should not occur (Fuchs & Fuchs, 1999). Passages that are descriptive prose (with no illustrations), that contain few unfamiliar names and/or foreign words, and that have little character dialogue typically work best as reading probe passages (Chafouleas et al., 2004). Probes for older students (grade 3 and up) should typically contain approximately 250 words. The examiner's copy of the probe can contain word number totals at the end of each line of text and/or grade level of curriculum material from which the probe was taken, but student copies should be unmarked with such information (Chafouleas et al., 2004). The probe used with the student can not be taken from a passage that was used during instruction, as the independent variable (the intervention) and the dependent variable (progress as indicated on the measure) must remain independent (Fuchs & Fuchs, 1999).

This measure can assess acquisition/response rate, via the number of correct and incorrect responses, or the rate or fluency with which the behavior is performed (Chafouleas et al., 2004). Multiple alternate forms of the measure must be available so that they can be administered before, several times during, and after the intervention has been put in place. These multiple forms of the measure should be of equal difficulty level, different enough so that results are not influenced by practice effects, clearly reflect the skills being taught, and should always require the student to produce a response (Chafouleas et al., 2004, Fuchs & Fuchs, 1999). The measures being used will also match the items, including specific examples, used in the intervention (content overlap), as suggested as an area of importance for measuring the effects of an

intervention in a study by Daly, Martens, Kilmer, and Massie (1996). Finally, it is imperative when designing or selecting measures of reading growth that consideration be given to the sensitivity of the instrument to detect subtle changes in student growth (Fuchs & Fuchs, 1999).

Measuring Alphabetics Knowledge

Phonemic awareness assessment tools used in experimental study vary slightly across content. It appears clear that researchers must clearly define what is meant by "phonemic awareness assessment" when selecting an assessment device so that results can be accurately compared to those of other studies as well as replicated if desired. McBride-Chang (1995) identified three essential components shared by virtually all phonemic awareness assessment tools: (1) the student must listen to one or more orally presented words or nonsense words, perceive it, and then repeat it back to the examiner to ensure that the student's perception was correct, (2) the student is asked to operate on that word or nonsense word (identify a phoneme, add/delete/substitute a phoneme, identify stimuli with phonemic similarities) while holding the auditory stimulus in short-term memory, and (3) the student is typically required to express a verbal response to the above-made request.

In one experimental study, in which McBride-Chang used structural equation modeling to explore the differences between different types of phonemic awareness assessments, it was noted that phonemic awareness assessment tasks should remain consistent across difficulty level to reduce the impact that the short-term memory demand mentioned above might place on the student by keeping the number of phonemes presented auditorally to the student constant across probes. Three or four phoneme strings were less affected by short-term memory effects than five phoneme strings. Phoneme segmentation was found to be the most difficult of phonemic awareness tasks because of the memory burden inherent in this task (McBride-Chang, 1995).

Segmenting nonsense words is considered to be more difficult than segmenting real words (Chafouleas et al., 1997).

Position of the phoneme to be manipulated will affect the difficulty level of the assessment task, in that phonemes in the medial position are more difficult to isolate and manipulate than those in the initial or final positions. Similarly, manipulating consonant sounds that are part of consonant clusters is more difficult than analyzing and acting on single consonant sounds (McBride-Chang, 1995). Linguistic manipulations that affect difficulty level include: (1) number of phonemes in the word, (2) number of phonemes in the initial consonant cluster, and (c) continuant versus noncontinuant phonemes (/r/ versus /t/) (Chafouleas & Martens, 2002). In a study by Chafouleas, VanAuken, & Dunham (2001), items in phonemic awareness assessments were found to differ in difficulty based on the type of linguistic manipulation (number of phonemes and initial consonants, type of sound).

Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Kaminski & Good, 1996, http://dibels.uoregon.edu) is a commonly used phonological awareness assessment tool designed to measure a student's growth in phonemic awareness domains over time. The rationale for creating DIBELS is similar to the rationale for CBM (Good et al., 1998) as previously outlined. DIBELS assessment data are sensitive to changes in student performance as the result of effective interventions, are capable of frequent, multiple administrations, and are time efficient and cost-effective (Good et al.,1998). The DIBELS Phoneme Segmentation Fluency (PSF) measure has been described as demonstrating strong traditional reliability and validity, as well as a sensitivity to student growth over time (Fuchs & Fuchs, 1999). In PSF, the student is asked to segment a spoken word into its component sounds. The student receives credit for each correct sound segment of the word produced. The task is administered for one minute, and the number

of correct sound segments per minute is computed as the student's score (Good et al., 1998). The probes have demonstrated a reliability of .88 for a single probe.

Chafolouleas and Martens (2002) recommend assessing segmentation via an accuracy measure, as opposed to through a fluency task such as that seen in DIBELS assessments. The reasoning behind this recommendation is that segmentation instruction typically focuses on accuracy, and so therefore should be assessed under the same condition. Judging a student's progress based on how fast they can segment words seems unfair when students have not been encouraged to move quickly during instruction. In an experiment in which the authors created such an accuracy segmentation task, it was concluded that the accuracy-based segmentation task created was capable of showing student growth over time via slope, and demonstrated concurrent validity with a criterion reading measure. The segmentation task was found to be the most sensitive task for measuring phonological awareness skills over time in comparison to other accuracy-based awareness measures created for the experiment (rhyming and sound-providing) (Chafouleas and Martens, 2002). Segmentation difficulty was shown in one study to be affected by the number of phonemes the student is requested to identify, with words containing fewer phonemes being less difficult than words containing more phonemes (Chafouleas et al., 2001). Segmenting is suggested in the research as a far better predictor of a child's reading ability than other phonemic awareness tasks (Hulme, 2002). As segmentation instruction in this proposed intervention will emphasize accuracy, it is thought that an accuracy-based assessment would be a better match to the conditions under which instruction will occur.

Segmentation is considered to be a middle difficulty level subskill of phonemic awareness (Chafouleas et al., 1997). In an accuracy-based segmenting assessment, a word would be orally presented to students, and he or she would then be asked to produce each

discrete phoneme in the word using manipulatives as an aid to isolating the distinct sounds. The student would be presented with five markers at the beginning of the assessment. The student would be presented with a word to segment (e.g. "pig"), and would be prompted to move the markers for each of the three phonemes heard (adapted from Ball, 1993 and Chafouleas & Martens, 2002). The score would be obtained by counting the number of phonemes segmented correctly divided by the total number of phonemes present in the stimulus words.

Similar to phonemic awareness assessment, phonological awareness can be assessed by a variety of measures, some of which are clearly more difficult than others. A simple phonics sounds test would have students use their knowledge of letter-sound correspondence through application of this knowledge in a spelling task using phonetically regular words as stimuli. This measure would require the student to apply consonant, consonant blend, consonant digraph, short and long vowel, vowel digraph, r-controlled vowel, and complex vowel sound knowledge to the writing of phonetically regular words. This approach to assessment is similar to that used by Torgeson et al. (2001) in one of the two intervention conditions used in their study, which was an approach that documented positive gains in study participants. In another study, providing students with opportunities for practicing writing the letters they are naming and practicing was found to be an important component in demonstrating knowledge of skills practiced (Chard & Osborn, 1999).

Measuring Reading Fluency

Reading fluency is often measured by counting correctly read words and numbers of errors the student makes on a probe at the same level as the materials used for instruction during a predetermined time of reading (typically one minute). The probe is administered beginning with the teacher explaining the task to the student. The student then begins reading the passage

and the teacher starts the stopwatch. If the student does not begin reading within three seconds, the teacher supplies the word for the student aloud and restarts the stopwatch. When a student does not read a word within three seconds, the teacher supplies the word to the student, marks the word as an error, and the then student continues reading. When the student reads a word incorrectly, is unable to read a given word, mispronounces a word, or substitutes a similar word, the teacher makes note of the error on the teacher copy of the probe by marking a slash through the incorrect word. If a student corrects his or her own error, repeats a word, or pronounces a word in accordance with a regional dialect, the response is considered correct. Inserted words added by the student are ignored. At the end of the 60 second time period, the student is told to stop reading, and the teacher marks the stopping point on the teacher copy of the probe. The oral reading fluency rate is then calculated by counting the total number of words read and subtracting the number of incorrectly read words (Chafouleas et al., 2004).

The Importance of Monitoring Intervention Implementation Integrity

Intervention implementation integrity refers to the degree to which the intervention was implemented as planned. This information is important to consider when putting an intervention in place because whether or not the intervention was implemented as planned provides information about whether a student's performance is truly being impacted by the intervention as it was designed. If the intervention is changed in any way from the way it was originally designed, accurate conclusions about the effectiveness of the intervention and about student performance are impossible to draw (Chafouleas et al., 2004).

Research is grounded in the belief that the results of an experiment are due to the independent variable. Although consideration is given to the impact of confounding variables, it is generally assumed that the reason a specific change occurred relates to the application or

removal of the independent variable. The intervention is typically viewed as the specifics of what conditions were applied or removed in the experiment. Ascribing behavior changes to an intervention assumes that the intervention was implemented with integrity. As a result, treatment integrity, or the degree to which an intervention is carried out as intended, is critical to evaluating the intervention efficacy (Gresham, 1989). However, research has documented that fewer than 20% of intervention articles published adequately measured treatment integrity (Gresham, MacMillian, Beebe-Frankenberger, & Bocian, 2000). Indeed, if interventions provided in the school are intended to provide information about a student's response to its implementation, it is imperative that the student's success or failure is in response to the intervention as designed. Poorly implemented interventions might yield different results than properly implemented interventions, which would likely impact diagnostic and educational programming decisions for individual students.

CHAPTER 3
METHODOLOGY

Method

The method used to examine the research questions outlined in this dissertation study entailed the use of two single subject multiple baseline across participants experiments. The experiments consisted of the application of two specific reading interventions with students identified with emotional disturbance and reading difficulties who attend an alternative school. Experiment 1 applied the reading interventions in an AB order (alphabetics followed by fluency) where experiment 2 applied the interventions in reverse order (fluency followed by alphabetics), BA, to control for presentation order effects.

Participants and Setting

School Setting

The target school was an alternative school operated by a regional educational agency, serving the surrounding districts in one part of a county, in a suburban area of the Northeastern United States. All students in the school were classified as eligible for special education and related services, typically under the category "Emotional Disturbance," and occasionally with secondary diagnoses of "Specific Learning Disability," "Speech and Language Impaired," or "Other Health Impaired." At the time of this study, there were 54 students enrolled in the alternative school. There were 9 students enrolled in the elementary program (all male), 21 students enrolled in the middle school program (19 male, 2 female), and 24 students enrolled in the secondary/transition program (18 male, 6 female). 76% of the students in the school received free and reduced lunch rates. Class size ranged from 3 to 7, with one teacher and one or two instructional assistants.

Students were typically referred to the alternative school because they were considered to be disruptive in the home school (and at times home district) environment to the extent that resources of the home district had been exhausted. Often, students referred to the alternative school had demonstrated behaviors that indicated disregard for the school administration and staff by violating school rules and policies, as well as a disregard for attendance policies in many cases, making them "at-risk" for dropping out. Students in the alternative school were provided with a smaller student population, lower adult to student ratio, as well as specific structure and consistency throughout the school day. The program included academic instruction geared towards the students' current levels of academic functioning, while addressing predetermined behavioral objectives through a consistent school-wide behavioral management system as well as individualized behavior support plans. Students were supported by weekly guidance counseling sessions and ongoing social work services to address mental health issues and to provide referrals to community-based agencies. Transition and work-study programs were included for secondary students. The goal of the alternative school was to provide students with the support necessary to change behaviors so that they could return to their home school with earned credits to continue in their academic program; however, certain students remained at the alternative school until graduation.

Teacher/Principal Investigator

All instruction was delivered by the principal investigator, a doctoral student in school psychology and a state certified school psychologist and state certified special education teacher. This principal investigator was employed at the school as a school psychologist. Prior to pursuing a graduate degree in school psychology, the researcher had worked as a public school special education teacher in emotional and learning support settings in two states. As a teacher,

the researcher had been trained in multisensory reading instructional techniques, and had used these strategies in the classroom for two years with special education students. Specified data collection was conducted by the principal investigator.

Additional Researcher

Treatment integrity checks were completed by a fellow school psychologist. This school psychologist held a Ph.D. in School Psychology from the same university attended by the principal investigator, and was also employed by the agency for which the principal investigator worked. This other school psychologist was informed that the purpose of the study was to examine the effects of the reading interventions on both reading skills and classroom behaviors. This researcher was familiar with the treatment integrity literature as well as the type of interventions being implemented. Expectations and training for integrity checks were reviewed prior to their completion.

Classroom Teachers

Each student-participant's classroom teacher was also informed of the purpose of the study. Teachers suggested students in their classroom who were struggling with the reading process. They assisted with sending the consent forms home with these students. All teachers in the school were already collecting fluency data as part of the agency mandated progress monitoring program in place. Teachers had received extensive training on the use of these reading fluency probing measures. Teachers shared this fluency data with the principal investigator throughout the course of the experiment. Classroom teachers also collected concurrent information related to the dates of treatment sessions for inter-rater treatment integrity frequency comparison purposes. This information was gathered by the principal investigator at the end of each experiment.

Student-participants

All students in the school were identified special education students receiving special education and related services at an alternative school. The primary disability classification of students in the school was Emotional Disturbance, although students might have been identified with other primary or secondary disability classifications.

Students selected for participation in the current study were identified as having reading difficulty by their classroom teacher. It has been suggested in the literature that consideration for special intervention be warranted when a child's performance reveals a dual discrepancy: (1) reading below the level demonstrated by classroom peers, and (2) manifestation of a rate of improvement substantially below that of classmates (Fuchs & Fuchs, 1999). Students selected for the intervention were nominated by their teachers as demonstrating reading difficulty in the classroom as described above, despite interventions that were being provided for all students in the alternative school classroom setting. Interventions in place varied across classroom and teachers. In selecting subjects for the design used in this study (multiple baseline across subjects), it was suggested that the subjects should be alike enough that one might reasonably expect each to respond similarly to the intervention, yet independent enough to one another that one is not likely to change his or her behavior as a result of perceiving changes in one of the other subject's behavior, termed covariance (Richards et al., 1999). This covariance issue was addressed to some degree by selecting students who displayed different behaviors in response to reading demands, different specific reading skill profiles, and who were enrolled in different alternative school classrooms.

Archival data were gathered for each teacher-nominated student to identify date of birth, grade level assignment, and disability classification. Permission to gather this archival

information was granted by the school principal due to the fact that the researcher already had access to this data as a condition of her employment as the school psychologist. Archival research was also collected to identify each student's most recent word reading ability performance as measured by the Woodcock-Johnson III Tests of Achievement, Third Edition (WJ-III) Letter Word Identification subtest, Wechsler Individual Achievement Test, Second Edition (WIAT-II) Word Reading subtest, or Kaufman Test of Educational Achievement, Second Edition (KTEA II) Letter and Word Recognition subtest. All students had one of these tests administered to them within the year prior, as it is considered standard school protocol in preparation for annual IEP development. Results are typically presented in IEPs as grade equivalents. Students with grade equivalents at least one grade level below current grade placement on one of these subtests were considered for inclusion in this study, as this performance was indicative of below-level reading skills. Students with word reading standard scores at or above grade level equivalent were excluded from participation consideration.

Additionally, although there has been a proven relationship established between phonological measures and reading ability, one can not negate the effects of verbal ability on a student's ability to make phonological judgments (Hulme, 2002). General cognitive ability (particularly verbal ability) has been found to correlate with phonological processing tasks (Wagner, Balthazar, Hurley, Morgan, Rashotte, Shaner, Simmons, & Stage, 1987). The ultimate goal of reading instruction is to help children acquire the reading skills needed to comprehend printed material at a level that is consistent with their general language comprehension skills. Decades of cognitive intervention research suggests that it would be unrealistic to expect all children to attain verbal estimates within the average range as the result of special instruction, and so the same would hold true for reading ability comparisons (Torgeson, 2000). For this

reason, archival research was also used to identify the student's Verbal IQs as measured by a Wechsler Scale (WISC-III or WISC-IV), Stanford-Binet (SB-IV) or the Reynolds Intellectual Assessment System (RIAS). Students with verbal abilities below a standard score of 70 were eliminated from consideration for the study, as scores below 70 are suggestive of the presence of mental retardation.

In sum, informed parental consents for experiment participation were sent to parents/guardians of students who met the following criteria: teacher nomination, performance of at least one grade level equivalency below current grade placement on standardized reading assessment completed for IEP development, and history of verbal IQ above a standard score of 70. A sample parent/guardian informed consent form is located in Appendix A. Informed parental/guardian consent was also obtained for permission to audiotape sessions for the purposes of monitoring treatment integrity. A sample of this consent is contained in Appendix B. Eight informed consents were eventually returned indicating parental/guardian permission for participation. These eight students were assigned to either experiment 1 or 2 based on the order in which signed parental/guardian consents were received. Four students were assigned to each experimental condition. Assent to participate in the study was obtained from each student. A sample of this student assent form is contained in Appendix C. Each student in the study was given an identification number for data collection purposes in order to maintain subject confidentiality. Archival data that had been gathered on students for whom parental/guardian permission had not been obtained were destroyed.

Intervention Overview

Two separate single-subject research design experiments were carried out in this dissertation study, with four students participating in each experiment. In experiment 1, students

received the alphabetics intervention followed by the reading with error feedback intervention, while in experiment 2 the order of intervention presentation was reversed (reading with error feedback followed by alphabetics lessons). Experiment 2 began shortly after the conclusion of experiment 1. The reason for this reversed order of presentation was to control for order effects which might have been evident due to subjects participating in one intervention before the other. Essentially, experiment 2 was a duplication of experiment 1 with the exception of the reversal in the order of intervention implementation.

In each experiment, a minimum of three baseline data points were collected immediately prior to the start of the intervention for all students. Subject 1 entered the first intervention phase once three stable data points had been gathered on segmenting, phonics/spelling, and reading fluency probes. Data were collected weekly for all students during the course of the interventions. Once the student who entered the intervention phase before him had three continuous stable data points, the next student entered the first intervention phase, until eventually all students had begun the first intervention. Each student who completed the study received a minimum of nine sessions of each intervention. Students moved from the first intervention to the second when this nine session minimal criteria had been met and when three stable data points had been measured at the end of these sessions. The second intervention ended when the student had participated in at least nine sessions and when three stable data points had been measured at the end of these sessions. Following these three stable data points at the end of the second intervention, students entered the post-intervention data collection phase. Three data points were collected on all students once the second intervention had been terminated to gather data on post-intervention maintenance and generalization levels.

Each experiment took place over approximately a six to eight week period. Lessons were typically conducted three days each week, although sessions took place four days a week when time allowed. Students were removed from their regular classroom to participate in these individualized lessons with the examiner. Sessions occurred individually, and were scheduled to take approximately 15 minutes per student. Select probing occurred at the conclusion of one session weekly, and took an additional five minutes per student. This design resulted in a theoretical total of approximately 15 to 20 minutes of classroom removal three to four days a week for the duration of the experiment. During baseline and post-intervention phases, students were removed from their classes for probing only, which took approximately five to ten minutes.

Materials

Intervention Materials

All lesson tasks were specified on lesson protocols. Included on these lesson protocol forms were integrity checklists and time and date notations. All lessons are included in Appendix D (Alphabetics) and Appendix E (Fluency). Colored chips were used to demonstrate and practice segmentation tasks, and these same chips were used in CBM segmentation assessments. Pencils and paper were required for students to demonstrate understanding of phonetic skills through spelling. Twelve passages from novels read in the classroom as part of each student's curriculum were prepared for the reading with error feedback intervention. A sample of one set of these passages is included in Appendix F. Cassette recorders and tapes were used by the examiner to audiotape lessons for later review by a fellow school psychologist researcher. A stopwatch was needed for certain subtest and probe administrations.

Standardized Reading Assessment Measures

All students were administered the Segmenting Words subtest of The Comprehensive Test of Phonological Processing (CTOPP) as well as the Letter-Word Identification, and Reading Fluency subtests of the Woodcock-Johnson III Tests of Achievement (WJ-III) pre and post-intervention. These data were collected in order to gather standardized, normative data on progress. The Segmenting Words subtest was chosen to be a standardized measure of phonemic segmentation, Letter-Word Identification was chosen to be a measure of word reading, and the Reading Fluency subtest was selected to be a measure of reading fluency. Only one form of each assessment was available to the primary researcher for use in this experiment, and so it was predicted that performance might be influenced to some degree by practice effects as a result of only approximately a six to eight week interval elapsing between administrations. The scores from these subtests were reported using standard scores and percentiles. Test materials, protocols, and a stopwatch were needed for administration. As these instruments are secure and copyrighted, readers having the credentials to view such materials are encouraged to consult the test stimulus materials for examples of items contained in these subtests.

Alphabetics Measures

Segmentation probes. Chafouleas and Martens (2002) identified segmentation tasks that were used with kindergarten and first grade students with diverse phonological awareness skills. Segmentation tasks were found to be sensitive to growth in phonemic awareness in this study. Additionally, segmentation is considered to be the most advanced, and therefore difficult, task in the phonemic awareness hierarchy (McBride-Chang, 1995). Segmentation requires a student to separate a word into its component phonemes. Pairing an object with the task, such as an object to move while stating each sound (Chafouleas & Martens, 2002) makes the task more concrete

for students. For the purpose of this dissertation study, these tasks were modified for use with older students. An example of such an item would be to segment the word "balls" into the sounds /b/ (move object), /au/ (move object), /l/ (move object), and /z/ (move object). McBride-Chang (1995) found that longer (i.e. five or more phoneme) words may be more difficult to segment as they may confound memory ability with phonological segmentation ability. For this reason, only words with four or less phonemes were selected for this study. Additionally, the McBride-Chang (1995) study found that stop phonemes (such as /t/) were more difficult to segment than continuous phonemes, and so stimulus words that contained hierarchically-arranged levels of linguistic difficulty between items were chosen for study probes. The segmentation probes were administered to each student a minimum of three times during the baseline phase, weekly during the intervention phases, and three times post-intervention to measure application of phonemic segmentation skills addressed in the intervention. Scores were reported as a percentage of tasks accurately completed. These probes are contained in Appendix G.

Phonics/spelling probes. CBM phonics/spelling task probes were also administered to each student during the baseline phase, intervention phases, and three times post-intervention to measure application of phonics skills addressed in the intervention. This measure required students to produce initial, medial, and ending letters that make up the phonemes contained in phonemically regular words. The students were orally presented with a phonemically regular word, and were encouraged to spell the word using phonetic skills. For example, when asked to spell the word "bat", the student would write a letter corresponding to each phoneme – b, a, and t. For phonemes that have more than one corresponding letter (e.g. /s/ can be written as "c" or "s"), either alternative will be marked as correct. Students were expected to apply rules

regarding consonant blends, diphthongs, and digraphs covered in the sessions. Pencils and paper were needed for administration. Scores were reported as a percentage of tasks accurately completed. These probes are included in Appendix H. The student response form is included as Appendix I.

Fluency Measure

Teachers at the alternative school were required to collect weekly curriculum-based measurement (CBM) reading fluency data on each student in their class as part of an agency initiative to ensure continuous student progress monitoring. These probes were based on one component of the reading curriculum provided in the classroom. Students were administered three one-minute timed reading probes each week at their instructional level by their classroom teachers. The probes were administered in accordance with current research on CBM implementation standards (One minute samples, 3 second interval for providing unknown words, fluency determined by dividing correctly read words by 60 seconds, accuracy determined by number of correctly read words; Shinn, 1989), and each teacher received training on these standards as part of mandated professional development. The mean of the three probes was recorded as the student's current level of functioning. Both fluency and accuracy data were tracked for each student as a result of this weekly probing, and data were continuously graphed for inspection and review by the classroom teacher. Teachers were expected to adjust curricular levels and develop IEP goals based on this data. Students in the school had become accustomed to the routine of reading progress monitoring procedures.

In light of this existing structure, it did not seem necessary to collect an additional measure of reading fluency apart from that already being collected as part of the students' classroom programs. The measures collected by the teachers were similar to what the researcher

would have created in order to monitor student progress from the repeated readings with error correction element of the intervention for the purpose of this study. For this reason, fluency data were provided on a weekly basis to the researcher by the classroom teachers of student participants during the experimental period. Teachers were informed of the need for the researcher to collect this data, and acceptable procedures for the transfer of each reading fluency probe score average for the subjects was devised with each teacher. The teachers collected student performance on these fluency probes in accordance with school policy continuously during the baseline, interventions, and post-intervention phases.

Behavioral Measure

This study sought to examine the effects of the interventions not only on acquisition of reading alphabetics and fluency skills, but also on the levels of on and off-task behavior noted in the alternative school student subjects in the classroom during reading activities as a result of the effects of the intervention. The State-Event Classroom Observation System (SECOS; Saudargas & Creed, 1980) is a systematic direct observation procedure that provides a framework for gathering information about student behaviors in the classroom. State behavior reliabilities on this measure range from .88 to .97, while event behavior reliabilities range from .71 to 1.00 (Saudargas & Lentz, 1986). This was modified for use in the alternative school classrooms to document the behaviors of interest for this study. Although the SECOS consists of 20 variables, only 5 were used for the purposes of this study: Schoolwork, Motor Behavior, Direction-Opposition, Direction-Compliance, and Call Out. (1) Schoolwork was operationally defined as the student having his eyes and body oriented toward the relevant materials or the teacher. Schoolwork was selected for examination in this study as it was expected to provide information about level of on-task behavior, as well as behavior management issues. (2) Motor Behavior was

operationally defined as the student being engaged in repetitive body movements, such as tapping hands or feet or playing with an object in his desk. Motor behavior was selected for examination in this study because it was expected to provide information about level of disruptive motor behaviors. (3) Direction-Opposition was operationally defined as the teacher giving a direction that is followed by student noncompliance. (4) Direction – Compliance was operationally defined as the teacher giving a direction that is followed by student compliance. These two measures were chosen in order to gain information about student behavior when a request was presented. (5) Call Out was operationally defined as the student calling out to the teacher. This behavior was selected for examination because it was expected to provide information about disruptive verbal behavior (Saudargas & Creed, 1980).

SECOS data were collected by the principal investigator, who had received training in the implementation of this system during graduate courses, and who had experience in using the tool in applied practice. Data on duration of time focused on school work and time spent engaging in motor behavior was collected using momentary time sampling methodology. Frequency recording was used to record occurrences of direction opposition or compliance, and calling out during sampled intervals. Three one-minute, ten-second momentary time sampling trials were used to record the occurrences of these identified behaviors. A tape recording signaling beeps in an earpiece was used to ensure that the researcher was sampling behavior at the specified ten-second intervals.

SECOS data were collected on each student in their alternative school classroom over the course of the pre-intervention, intervention, and post-intervention periods. Two measures were collected on each student at the beginning of the experiment during the baseline phase. One pre-intervention measure was collected in a class during which the student was expected to apply and

demonstrate reading skills (henceforth referred to as "reading class"). One other SECOS measure was collected during a class where reading skills were not critical to the activity at hand (henceforth referred to as "math or art class"). These measures provided a baseline estimate and comparison of the behaviors of interest in an environment requiring reading and in an environment where reading requirements were less demanding. During the intervention phase, SECOS data collection occurred weekly for each student, with data collection varied by week in reading classes and math or art classes. The reason for collecting this data during the intervention phase was to compare classroom behaviors of interest pre-intervention to those being exhibited while the intervention was in place. Finally, two post-intervention measures of SECOS data were collected on each student two weeks post intervention, one during a reading class and one during math or art class. These measures allowed for the examination of the generalization of behaviors noted during the intervention phase. A pencil and the audiotaped recording of intervals with corresponding earpiece were required for data collection. Data were documented as duration for schoolwork and motor behaviors, and as frequency for compliance/noncompliance and calling out behaviors. SECOS recording forms that were used for data collection are included in Appendix J.

Alternative Curricular Measure

In order to explore if potential improvements in reading were related to the intervention, and not just a by-product of increased student motivation to achieve due to the extra attention he received as a result of being part of the intervention group, an alternative curricular probe was used. Math computation (multi-digit addition and subtraction) probes were completed by the students weekly during baseline before starting the intervention, weekly during the intervention phases, and once after the interventions had been terminated. The performance of each student

on these math probes was compared with his performance on reading probes for comparison purposes. As students were receiving both the typical reading and math instruction designed for them in their respective alternative school classrooms, similar performance trends in reading and math in light of the supplemental reading intervention were hypothesized to be suggestive of the positive effects of specialized attention being paid to the study students, or potentially the ineffectiveness of the reading intervention. Scores on the alternative curricular measure were reported as a percentage of problems answered correctly. These probes are included in the Appendix K.

Treatment Integrity Measures

To examine the level of treatment integrity inherent in instructional delivery, integrity checks were conducted throughout all phases of this study. Treatment integrity is important when making conclusions about the effectiveness of the intervention, as well as to make intervention parameters clear in the case that replication is a future goal. For the purposes of this study, treatment integrity encompassed two related concepts: adherence and exposure. For this study, adherence was defined as the presence or absence of critical components of the given intervention. Exposure was defined as the length and frequency of intervention sessions (Dane & Schneider, 1998).

Adherence. Adherence checklists were developed to correspond to each lesson as marks made upon completion of steps delineated on the lesson protocols. These checklists mirrored the critical components prescribed in the steps of the lesson. Critical components were the activities and tasks that were central to serving the purposes of the interventions, which were training in alphabetics and fluency skills. As these components were seen as necessary parts of the interventions, they were clearly outlined for both the alphabetics and fluency interventions on

lesson protocols. The critical components of the interventions included: phonemic awareness modeling and practice in segmentation and phonics instruction on select consonant and vowel sounds in alphabetics, and repeated reading with corrective error feedback during fluency lessons.

Permanent product measures of adherence were marked by the teacher/principal investigator when each step was completed during lesson delivery. Additionally, these checklists were simultaneously checked for 50% of sessions by the fellow school psychologist while reviewing audiotapes of lesson sessions. The permanent product/adherence checklists for the alphabetics and fluency lessons are embedded within the lessons provided in Appendices A and B. The adherence checklists indicated whether the teacher/principal investigator addressed the tasks outlined in the lesson protocol by requiring the teacher/principal investigator to mark whether the task was completed, and whether or not the individual students correctly or incorrectly completed the final item in the task. If the task was completed by the teacher/principal investigator, a plus sign was marked on the lesson protocol (+). If the teacher/principal investigator did not complete the task, a (-) sign was marked. When audiotaped lessons were reviewed, the additional researcher checked for treatment adherence and marked a (+) next to the teacher/principal investigator's mark to indicate that a step had occurred, or a (-) if the step had not been completed. Treatment adherence was reported as percentage of steps that were marked as having occurred (+) by both the teacher/principal investigator and the additional researcher.

Exposure. Duration is another important aspect of exposure. If an intervention is designed to occur for 30 minutes, then differing the specified duration of the lesson (e.g. providing the intervention for more or less time than specified) might change the impact of the

intervention. Lesson duration was measured by the teacher/principal investigator by marking a start and stop time on each lesson protocol. The start time was subtracted from the stop time and the difference was recorded as the duration of the lesson. Sums of intervention minutes were calculated for each subject.

Frequency, in terms of number of sessions, is a second important measure of exposure integrity. If an intervention is designed to occur nine times, then altering the intended frequency of the treatment (e.g. providing the intervention more or less often) might change the impact of the intervention. The teacher/principal investigator recorded frequency of the sessions by noting the dates on which lessons were delivered at the top of the lesson protocol. For a second measure of frequency, classroom teachers also noted the dates when students left the room for the intervention, and this information was collected at the end of the intervention period. Teacher/principal investigator and classroom teacher indications of frequency were calculated by summing the number of intervention dates. The teacher/principal investigator and classroom teacher measures of frequency were compared for interobserver agreement.

Research Design

Single-subject research methodology was used in this study to examine the effects that the two empirically-supported reading interventions had on both the development of reading skills and the increase of on-task behavior during class instruction. Single-subject design was chosen for several reasons. First, since the methodology was first defined 40 years ago, single-subject research has proven to be relevant for defining educational practices and establishing evidence-based practice for individual students (Horner, Carr, Halle, McGee, Odum, & Wolery, 2005). In special education applied settings, particularly with the NCLB and RTI legislative push previously discussed, the effectiveness of an intervention with a particular student is

knowledge that should drive IEP development. Secondly, within an applied setting, it is virtually impossible in terms of time, financial demands, and subject pool to conduct a large N study that will answer the questions plaguing the practitioner on a daily basis. Single-subject research is a way to obtain a level of experimental rigor beyond that of the traditional case study while still offering utility within the infrastructure of the applied setting (Horner et al., 2005; Chambless & Hollon, 1998).

Specifically, two multiple baseline across subjects designs were used to examine the effects of two empirically-supported reading interventions on the following variables: students' performance on three standardized subtests of reading achievement (WJ-III Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words); segmentation, phonics via spelling, and reading fluency performances on curriculum-based measures; curricular-based progress in an alternate curricular area; and finally, student behavior in the classroom. In experiment 1, four students received the alphabetics intervention followed by the fluency intervention, and in experiment 2, four different students received the fluency intervention followed by the alphabetics intervention. The interventions delivered in the two experiments were the same; only the order of intervention implementation was changed to allow for the examination of order effects.

The first multiple baseline design was divided into four phases: (a) Phase I, Baseline, (b) Phase II, Application of Alphabetics Intervention, (c) Phase III, Application of Fluency Intervention, and (d) Phase IV, Post-Intervention. The second multiple baseline design was similarly divided: (a) Phase I, Baseline, (b) Phase II, Application of Fluency Intervention, (c) Phase III, Application of Alphabetics Intervention, and (c) Phase IV, Post-Intervention. In addition, the teacher/principal investigator completed a debriefing phase with each classroom

teacher and student-participant after completion of the interventions. Varying the length of the baseline phases and the order of presentation of the interventions provided information about the individual effects of the two interventions on the subjects, as well as information about the importance of order of intervention presentation. Standardized reading achievement data via three subtests was collected on each subject pre and post interventions. Additionally, four types of data were collected across the four phases of each experiment: (1) Curriculum-based reading achievement (segmentation, phonics/spelling, and fluency), (2) Student behavior in both reading and non-reading intensive classroom activities (on-task, motor disruption, verbal disruption, and response to direction), (3) curriculum-based performance in an alternate curricular area to examine the effects of just extra positive attention alone, and finally, (4) treatment integrity data on implementation of the designed interventions (adherence and exposure).

Experimental Design

Experiment 1

Baseline phase. The first phase in experiment 1 was a baseline phase. There were three research days devoted to collecting the minimal baseline data required for all students. This phase was designed to measure the students' current levels of reading skills in segmentation, phonics/spelling, fluency (all having 3 or more data points), as well as skill demonstration in an alternate curricular area (at least one data point). One measure of each of the following standardized subtests was also administered to each student during the baseline phase: WJIII Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words. Additionally, a measure of baseline behavior was collected for each student in a class involving reading demands and in a class in which minimal reading demands were present. The length of the baseline phase was varied for each student, depending upon when three stable data points on the

segmentation and alphabetics probes had been gathered and when the prior student ended baseline and entered the intervention phase. Students had data collected on the same cycle, regardless of whether or not they were still in the baseline phase or had entered the intervention phases, providing for similar data presentation across varied phases.

Alphabetics intervention phase. Following these varied-length baseline phases, students began to receive the individualized alphabetics intervention in the intervention phase. Each student received a minimum of nine alphabetics sessions. The sessions were designed to instruct the students on discrete alphabetics skills and were not hierarchically ordered or scaffolded for skill difficulty. There were two components to the alphabetics intervention: segmentation instruction and phonics/spelling instruction. These two lessons were both delivered in the same intervention session, which was approximated to take 15 minutes.

In the segmentation lessons, students were instructed on how to segment words comprised of four or fewer phonemes, and were given opportunities for practice and feedback on their segmentation application. These lessons were based on adaptations of tasks and items suggested by McBride-Change (1995). In the phonics/spelling lessons, students were instructed on letter-sound correspondence (consonants, vowels, blends, digraphs, and diphthongs), and were shown how to use this knowledge to read combinations of these letters and letter units. Students were also shown how to apply such phonics knowledge to the spelling of words containing the sounds covered in the respective lesson. Students received opportunities for practice and feedback on their phonics reading and spelling application skills.

All alphabetics lessons (with embedded treatment integrity checklists) are presented in Appendix D. There were 12 lessons. Each student received a minimum of nine sessions, plus additional sessions if stable data points were not established at the end of those nine sessions.

Permanent product treatment integrity data were completed by the teacher/principal investigator during each session. All sessions were audiotaped for later review by the fellow researcher to get an interrater measure of treatment integrity for approximately half of the sessions. Once a student had completed at least nine alphabetics lessons and had demonstrated three stable data points on the segmentation and phonics probes, he entered the fluency intervention phase.

Fluency intervention phase. The fluency intervention was delivered after the alphabetics intervention in experiment 1. Students began to receive the fluency intervention immediately after the alphabetics intervention. Again, there were 12 lessons. Each student received a total of nine through 12 individual fluency sessions, depending on stability of data. These fluency lessons were approximated to take 15 minutes per individual student per session to complete.

All reading fluency lessons followed the same reading with error feedback protocol, which is provided for review in Appendix E. This format was based on the work of Chafouleas et al. (2004). The sessions began with the teacher/principal investigator introducing the reading and explaining task directions. The student was then prompted to read through the passage for the first time. Any student errors were then immediately corrected. Also, unknown words were supplied for the student within 3 seconds of hesitation. Students were encouraged to commence reading at the beginning of the sentence containing the error after error feedback was provided. The teacher/principal investigator noted these errors on the fluency passage form so that they could be shown and modeled to the student, and then repeated by the student three times after the first reading was complete. Students completed this process two more times with the same passage to receive additional practice. Error correction for the second and third readings of the passage was similar to that seen in the first reading in that students were provided with feedback on errors and hesitations after three seconds and then encouraged to resume reading at the

beginning of the sentence containing the error. However, in the second and third readings, the student was not required to repeat the error words three times at the end of the reading.

Passages that were used for each student as reading samples during each of the nine or more fluency intervention sessions were obtained from novels identified as part of the students' classroom curriculums by their teachers. Once the subjects were identified, the teacher/principal investigator selected 12 curricular passages from a classroom novel for each student, and provided excerpts of at least 250 words for each student in a context without pictures. Students had not been previously exposed to the text, which was leveled according to their current instructional reading levels. A sample of these passages, from the novel Number the Stars by Lois Lowry (1989) is available for review in Appendix F.

As was seen in the alphabetics intervention implementation, permanent product treatment integrity data were completed by the teacher/principal investigator during each session. All sessions were audiotaped, and more than half of the sessions were also later reviewed by the fellow researcher to get an interrater measure of treatment integrity for reviewed sessions.

Once students had completed a minimum of nine fluency interventions and established three stable data points on the fluency probes, the fluency intervention was discontinued and the student entered the post-intervention phase. Additional reading with error feedback sessions were delivered if needed until three stable data points had been attained at the end of this phase.

Post-intervention phase. Data were collected for each student for three points post-intervention in order to examine the maintenance of skill and behavioral levels after both interventions had been withdrawn. This post-intervention phase provided an opportunity to measure the students' current levels of reading skills in segmentation, phonics/spelling, fluency, as well as skill demonstration in an alternate curricular area. One follow-up measure of each of

the following standardized subtests were also administered to each student during the post-intervention phase: WJ-III Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words. Additionally, a final measure of baseline behavior was collected for each student in a class involving reading demands and in a class in which minimal reading demands were present.

Debriefing. Following the completion of the study, classroom teachers and each student-participant was debriefed about the nature, goals, and results of the experiment by the principal investigator. At this point, the principal investigator answered any questions that the teachers or students had about the study. Additionally, parents/guardians were provided with a written summary of their child's performance on assessment measures. A sample of this parent/guardian feedback letter is contained in Appendix L.

Experiment 2

Baseline phase. The first phase in experiment 2 was a baseline phase identical to experiment 1. There were three research days devoted to collecting the minimal baseline data required for all students. This phase was designed to measure the students' current levels of reading skills in segmentation, phonics/spelling, fluency (all having 3 data points), as well as skill demonstration in an alternate curricular area (one data point). One measure of each of the following standardized subtests were administered to each student during the baseline phase: WJIII Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words. Additionally, a measure of baseline behavior was collected for each student in a class involving reading demands and one in a class in which minimal reading demands were present. The length of the baseline phase was varied for each student, depending upon when three stable data points on fluency probes had been gathered and the when the prior student ended baseline and entered

the intervention phase. Students had data collected on the same cycle, regardless of whether or not they were in the baseline phase or had entered the intervention phases, providing for similar data presentation across varied phases.

Fluency intervention phase. The fluency intervention was delivered first in experiment 2. Each student received a total of nine individual fluency sessions. These fluency lessons were approximated to take 15 minutes per individual student per session to complete.

All reading fluency lessons followed the same reading with error feedback protocol, which is provided for review in Appendix E. This format was based on the work of Chafouleas et al. (2004). The sessions began with the teacher/principal investigator introducing the reading and explaining task directions. The student was then prompted to read through the passage for the first time. Any student errors were immediately corrected. Also, unknown words were supplied for the student within 3 seconds of hesitation. Students were encouraged to commence reading at the beginning of the sentence containing the error after error feedback was provided. The teacher/principal investigator noted these errors on the fluency passage form so that they could be shown and modeled to the student, and then repeated by the student three times after the first reading was complete. Students completed this process two more times with the same passage to receive additional practice. Error correction for the second and third readings of the passage were similar to that seen in the first reading in that students were provided with feedback on errors and hesitations after three seconds and then encouraged to resume reading at the beginning of the sentence containing the error. However, in the second and third readings, the student was not required to repeat the error words three times at the end of the reading. A sample of passages taken from classroom curriculum that were used for each student as reading samples during each of the nine or more fluency intervention sessions is available in Appendix F.

As was seen in experiment 1, permanent product treatment integrity data were completed by the teacher/principal investigator during each session. The other researcher again reviewed audiotaped lessons to get an interrater measure of treatment integrity for approximately half of the sessions.

Once students had completed a minimum of nine fluency interventions and established three stable data points on the fluency probes, the fluency intervention was discontinued and the student entered the alphabetics intervention phase. Additional reading with error feedback sessions were delivered if needed until three stable data points had been attained at the end of this phase.

Alphabetics intervention phase. Following the fluency intervention, students began to receive the individualized alphabetics intervention in the intervention phase. Each student received a minimum of nine alphabetics sessions. The sessions were designed to instruct the students on discrete alphabetics skills and were not hierarchically ordered or scaffolded for skill difficulty. There were two components to the alphabetics intervention: segmentation instruction and phonics/spelling instruction. These two lessons were delivered in the same intervention session, which was approximated to take 15 minutes.

In the segmentation lessons, students were instructed on how to segment words comprised of four or fewer phonemes, and were given opportunities for practice and feedback on their segmentation application. These lessons were based on adaptations of tasks and items suggested by McBride-Change (1995). In the phonics/spelling lessons, students were instructed on letter-sound correspondence (consonants, vowels, blends, digraphs, and diphthongs), and were shown how to use this knowledge to read combinations of these letters and letter units. Students were also shown how to apply such phonics knowledge to the spelling of words

containing the sounds covered in the respective lesson. Again, students received opportunities for practice and feedback on their phonics reading and spelling application skills.

All alphabetics lessons (with embedded treatment integrity checklists) are presented in Appendix D. There were 12 lessons. Each student received a minimum of nine sessions, plus additional sessions if stable data points were not established at the end of those nine sessions. Permanent product treatment integrity data were completed by the teacher/principal investigator during each session. Additionally, slightly more than 50% of sessions were also reviewed via audiotape by the fellow researcher to get an interrater measure of treatment integrity. Once a student had completed at least nine alphabetics lessons and had demonstrated three stable data points on the segmentation and phonics probes, he entered the post-intervention phase.

Post-intervention phase. Data were collected for each student for three points post-intervention in order to examine the maintenance of skill and behavioral levels after both interventions had been withdrawn. This post-intervention phase provided an opportunity to measure the students' current levels of reading skills in segmentation, phonics/spelling, fluency, as well as skill demonstration in an alternate curricular area. One follow-up measure of each of the following standardized subtests was also administered to each student during the baseline phase: WJ-III Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words. Additionally, a final measure of baseline behavior was collected for each student in a class involving reading demands and in a class in which minimal reading demands were present.

Debriefing. Following the completion of the study, classroom teachers and each student-participant was debriefed about the nature, goals, and results of the experiment by the principal investigator. At this point, the principal investigator answered any questions that the teachers or students had about the study. Additionally, parents/guardians were provided with a written

summary of their child's performance on assessment measures. A sample of this parent/guardian feedback letter is contained in Appendix L.

Variables in the Study

Independent Variables

The independent variables in the study were the alphabetics and fluency interventions. These interventions were delivered to all students for a minimum of nine consecutive sessions, the start, conclusion, and order of which was varied between subjects. The alphabetics intervention served to improve students' phonemic segmentation and phonics applications to spelling skills through modeling, practice, and feedback, and the reading fluency intervention served to improve overall levels of students' reading fluency through repeated reading practice with error feedback. These interventions have been outlined in the description above, as well as delineated in the lesson formats in Appendices D and E.

Dependent Variables

The five dependent variables in this study were: (1) student performance on standardized reading subtests (WJ-III Letter-Word Identification and Reading Fluency, and CTOPP Segmenting Words), (2) student performance on reading probes (segmentation, phonics/spelling, and fluency), (3) student performance on an alternate curricular measure probe, (4) student behavioral data (on-task, disruptive motor and verbal behaviors, and student reaction to directions), and (5) treatment integrity (adherence and frequency). Student performance on standardized reading subtests was examined in terms of pre-intervention and post-intervention performance. Treatment integrity data were examined during intervention implementation. Student performance on reading probes and alternate curricular probes, as well as student

behavioral data, was examined across baseline, intervention implementation, and post-intervention phases.

Each variable was operationally defined in relation to its use in this study. Student performance on standardized measures was operationally defined as the comparison of (converted) standard score performance on normative measures of word reading, reading fluency, and segmenting subtests. Student performance on reading probes and alternate curricular measure probes was operationally defined as the trend of accuracy performance on the curriculum-based measures. Student behavioral data were operationally defined as the duration of on-task and motor behaviors and the frequency of student compliance and noncompliance to teacher directions and call-outs over the course of the baseline, intervention, and post-intervention phases. Finally, treatment integrity data were operationally defined as the percentage of intervention components completed correctly and recorded in the treatment integrity measures based on interrater observations, as well as the frequency of treatment sessions.

CHAPTER FOUR
RESULTS

Student Participants

Subject Recruitment

Cover letters and consent form packets were initially sent to eight students who had been identified as having met eligibility criteria for experiment participation (teacher nomination, at least one grade equivalency below current grade placement on most recent IEP reading decoding assessment, and Verbal IQ of 70 or above.) One subject was immediately identified when his consents were returned to the teacher/principal investigator within a few days. Due to the low return rate from other identified potential subjects, phone calls were made to the parents/guardians of the remaining seven identified students after the cover letter and consent packets had been sent home. The teacher/principal investigator was able to speak with five of the seven parents she attempted to contact, and shortly thereafter four more consents were received. The first four students who had returned consents were assigned to experiment 1. The remaining student for whom consent had been obtained was assigned to experiment 2. Mid-way through experiment 1, teachers were again solicited for names of students who they believed could benefit from receiving the interventions. Five new students were recommended and determined to meet eligibility criteria for study participation. Cover letter and consent forms were then sent home to these students and followed up with parent/guardian phone calls from the teacher/principal investigator. Finally, three more consent forms were returned, and these three students were then identified as the remaining students assigned to experiment 2. As such, both experiments began with four student participants.

Subject Attrition

Three students completed experiment 1 (Subjects 1, 2, and 3.) Subject 4 moved and left the school after the baseline period and having participated in six sessions of intervention 1. Two students completed experiment 2 (Subjects 5 and 6.) Subject 7 discontinued participation after the baseline period and having completed three sessions of the first intervention due to parental request for participation termination. The parent in this case expressed concern about the student having missed class time due to study participation, and requested that his son be withdrawn from the study. Subject 8 discontinued participation in the experiment after the baseline period and having received seven sessions of the first intervention as he was hospitalized due to mental health issues. He then attended a partial hospitalization program following this hospitalization. Due to his ongoing needs, he did not complete the school year at the alternative school.

In sum, five of the eight students who started the study were able to complete all experimental phases. It is this data that were analyzed for the purposes of this study. The data from the three students who did not complete both interventions were coded but not analyzed. The attrition rate for this study was 37.5%.

Subject Characteristics

All five student participants were male. In experiment 1, all three students were enrolled in the same class in the elementary program. Efforts made to identify student participants from different classrooms were unsuccessful due to poor return of the consents that had been distributed. In experiment 2, both students were in the middle school program, but had different teachers. All subjects were identified with a primary disability classification of Emotional Disturbance. Subject 1 was also identified with secondary disability classifications of Specific

Learning Disability and Other Health Impairment (Attention Deficit Hyperactivity Disorder.) Table 1 summarizes other characteristics of the five students for whom data were analyzed. In sum, all students had reading decoding scores on the Kaufman Test of Educational Achievement, Second Edition (KTEA-II) at grade equivalency levels of second to third grade at the time of their last Individualized Education Plan (IEP). Verbal IQs for four of the subjects were clearly above a standard score of 70, yet Subject 5 just made this eligibility cut-off with a standard score of 72 on the Wechsler Intelligence Scale for Children-Third Edition (WISC-III.)

Table 1. Subject Characteristics Summary

Subject	Age at Baseline	Grade	Teacher	Reading Decoding	Verbal IQ
1	12.1	6	K	2.1 (KTEA-II)	VIQ 86 (WISC-III)
2	11.1	5	K	3.2 (KTEA-II)	VIQ 91 (WISC-III)
3	11.6	5	K	3.5 (KTEA-II)	VIQ 81 (WISC-III)
5	12.6	6	J	2.10 (KTEA-II)	VCI 96 (WISC-IV)
6	14.9	7	N	2.1 (KTEA-II)	VIQ 72 (WISC-III)

Note. K, J, and N are initials corresponding to the first name of the student's teacher; KTEA-II = Kaufman Test of Educational Achievement, Second Edition, WISC = Wechsler Intelligence Scale for Children (Third or Fourth Editions); Reading Decoding scores are presented as grade equivalencies, and Verbal IQ scores are standard scores.

Data Evaluation

Treatment Integrity

Table 2 illustrates the treatment integrity exposure and adherence data collected for all students across both interventions. In terms of exposure, treatment frequency data were obtained

by comparing the number of sessions recorded as having occurred by the teacher/principal investigator with the number of times the classroom teacher reported the student had been removed from the classroom to participate in intervention sessions. There was 100% agreement between the number of sessions recorded by the teacher/principal investigator and the number of class removals recorded by the students' classroom teachers across all subjects. Students typically received nine sessions of each intervention (alphabetics and fluency), with the exception of Subject 1 who received ten sessions of each intervention, and Subject 2 who received nine alphabetics sessions and ten reading fluency sessions. These additional sessions were implemented due to what was believed to be inconsistent data in experiment 1. In retrospect, the nine sessions per intervention would have been sufficient for Subjects 1 and 2.

Treatment integrity data were also collected for each subject in terms of exposure, in minutes, to each intervention. These data were collected by calculating the minutes spent in each session by subtracting the start time from the end time noted on each lesson protocol by the teacher/principal investigator. The numbers of minutes spent on each session were then summed across each intervention and presented as a total number of minutes the student had spent completing tasks related to a particular intervention. The range of total minutes needed for subjects to obtain stable data in the alphabetics lessons fell between 176 and 260 minutes. The range of total minutes needed for subjects to obtain stable data in the fluency intervention ranged between 190 and 237 minutes. Some of the variance in exposure time was thought to be related to individual student characteristics, such as motivation, processing speed discrepancies, and varied number of redirections needed to improve focus during intervention sessions.

In considering this treatment exposure in minutes, it is evident that the initial approximation that each intervention session would take 15 minutes to implement was an

Table 2. Treatment Integrity Data

	Intervention 1			Intervention 2		
Subject	Treatment Frequency	Treatment Exposure in Minutes	Treatment Adherence[a]	Treatment Frequency	Treatment Exposure in Minutes	Treatment Adherence[a]
1	10	260	99%	10	237	92%
2	9	176	97%	10	229	98%
3	9	215	98%	9	194	92%
5	9	203	88%	9	176	100%
6	9	190	92%	9	193	93%

Note. Subjects 1, 2, and 3 received the alphabetics lessons followed by fluency lessons. For subjects 5 and 6, that order was reversed (fluency followed by alphabetics.)
[a]n = 65% of alphabetics lessons and 55% of fluency lessons were checked for inter-rater treatment adherence.

underestimation of treatment time. When the sum of treatment exposure in minutes for each subject was calculated and then divided by the total number of sessions, it was found that it actually took an average of 22 minutes per session to implement alphabetics lessons. Additionally, when this same calculation was performed in reference to reading with error feedback lessons, it was determined that it took an average of 22 minutes per session to implement fluency interventions as well. These longer than projected sessions unfortunately led to fewer data collection points in the area of behavioral observations, due to the time constraints of the teacher/principal investigator.

Finally, inter-rater treatment integrity data were collected for each session in terms of adherence to lesson protocols. These data were collected to ensure that the interventions were delivered in the way in which they were designed consistently across all subjects. During each intervention session, the teacher/principal investigator marked each step on the lesson protocol

that was completed with a (+). These sessions were also audiotaped for later review by the additional researcher, a school psychologist familiar with the treatment integrity literature base. This researcher reviewed a random sample of audiotapes to provide an additional check that the lessons were carried out as designed. Steps that were rated by both the teacher/principal investigator and the additional researcher as having occurred were then summed and divided by the number of steps listed on the lesson protocol to yield a percentage of lesson adherence per sessions checked. These individual lesson adherence percentages were then summed for all reviewed lessons per subject, and finally averaged by dividing this sum by the number of reviewed sessions to result on an overall level of adherence per subject per intervention.

In all, the additional researcher reviewed 30 of the 46 audiotaped alphabetics lessons conducted on Subjects 1, 2, 3, 5, and 6 (65%). Treatment adherence for these lessons ranged between 93%- 100%, with an average of 97.4%. For intervention 2, the additional researcher reviewed 26 of the 47 taped fluency lessons conducted with Subjects 1, 2, 3, 5, and 6 (55%). Treatment adherence for fluency lessons ranged between 88%-98%, with an average of 92.4%. The mean agreement rate between the teacher/principal investigator notations of adherence and adherence noted by the additional researcher was greater than 99%. The most frequent reason for not completing a step on the lesson protocol was time limitation. On several occasions, it was necessary to have a student return to his class before the lesson protocol was completed due to exceeding time allotted before the next class transition (e.g. class movement a special class or lunch.)

Student Reading Achievement

Standardized Measures

All five students were administered the Comprehensive Test of Phonological Processing (CTOPP) Segmenting Words subtest, and the Woodcock-Johnson III Tests of Achievement (WJ-III) Letter-Word Identification and Reading Fluency subtests before the interventions were implemented during the baseline phases, and after the interventions were complete during the post-intervention phases. WJ-III scores were reported as standard scores. The CTOPP Segmenting Words subtest yields scaled scores that were then converted to standard scores for comparison purposes. Table 3 summarizes the performance of all subjects on these assessments.

Table 3. Standardized Assessments at Baseline and Post-Intervention Phases

	CTOPP Segmenting Words[a]		WJ-III Letter-Word Identification		WJ-III Reading Fluency	
Subject	Baseline	Post-Intervention	Baseline	Post-Intervention	Baseline	Post-Intervention
1	75	100	88	80	79	84
2	85	105	72	95	92	101
3	80	95	71	86	73	82
5	90	100	82	84	80	91
6	80	90	52	65	74	82

Note: For these standard scores, mean = 100; standard deviation = 15.
[a]n = CTOPP subtest scores are scaled score. These scores represent conversion to standard scores.

These results suggest that each student improved his ability to segment words as measured by the CTOPP Segmenting Words subtest by a range of a 10-25 point increase in standard score points between baseline and post-intervention administrations. It is important to consider that some of this observed difference could potentially be attributed to practice effects

resulting from using the same form at baseline and post-intervention phases, as well as through the practice received simply through the repeated segmentation probing that was identical in structure to task requirements of this subtest. The greatest ranges of improvement in segmentation, as measured by this CTOPP subtest, were noted in the students who participated in experiment 1. Students in experiment 1 participated in the alphabetics intervention, which included segmentation skills, in the first intervention phase.

In reviewing the results for standardized word reading assessment, as measured by the WJ-III Letter/Word Identification subtest, four out of five students showed some level of improvement between baseline and post-intervention administrations. The range of improvement for these students was a 2 to 23 standard score point increase. Subject 1, however, did not show improvement in the standardized measure of word reading. The increase in performance on the standardized word reading assessment was most significant for Subjects 2 and 3 (experiment 1), who again received the alphabetics lessons first. As was the case with standardized segmentation performance, these results could also have been impacted by practice effects, as the same version of the assessment was administered at baseline and post-intervention phases.

Reading fluency standardized assessment results, as measured by the WJ-III Reading Fluency subtest, did not yield results with a range of improvement similar to either of the aforementioned measures. While all six students did demonstrate some degree of standard score increase between the baseline and post-intervention periods, the range of increase was between 5 and 11 standard score points. Level of improvement was varied across experimental conditions, and did not appear to be influenced by intervention order effects. Again, as was the case with the

other two standardized measures, reading fluency standardized assessment results may have been impacted by practice effects.

Alphabetics Measures

Phonemic segmentation probes. Phonemic segmentation probes were administered to each student during the baseline phases, weekly throughout the interventions, and during the post-intervention phases. These probes required the student to separate a word with four or less phonemes into discrete sound units. These probes were designed to directly relate to the skills that were taught during the segmentation portion of alphabetics instruction. Examples of these probes are contained in Appendix G. Segmentation scores were obtained by calculating a percentage of phonemes correctly segmenting during each probe, and thus reported as a percentage of accurate segmentation.

Data were graphed in order to allow for visual examination of trends across student participants. Visual inspection criteria as it related to study graphs involved the consideration of several factors. First, the magnitude of changes across phases was considered in terms of changes in mean levels of performance, or shifts in the average rate of skill acquisition (Kazdin, 1982). Additionally, visual inspection of graphs provided information related to the rate of these changes, in terms of trend and latency of change. Examining data trends involved analyzing data for evidence of systematic increases or decreases in performance over time (Kazdin, 1982.) Kennedy (2005) suggests looking for slopes in data fields, and classifying them as positive (upward), flat, or negative (downward). Variability, or the deviation of data points from the overall trend, was also taken into account. Finally, considering the rate of latency between the onset of one condition and resultant changes in performance was another important aspect of the visual inspection process (Kazdin, 1982).

Graphs were separated into experimental conditions to allow for examination of possible order effects, since alphabetics lessons were followed by fluency lessons in experiment 1, and fluency lessons were followed by alphabetics lessons in experiment 2. Figure 1 illustrates the performance of students in experiment 1 (Subjects 1, 2, and 3) on phonemic segmentation probes. Figure 2 shows the performance of students in experiment 2 (Subjects 5 and 6) on these same measures of phonemic segmentation.

Visual inspection of data indicates that all five students showed improvement in their ability to segment words over the course of the study as evidenced by positive slopes. These data support levels of improvement that were observed on baseline and post-intervention CTOPP Segmenting Words subtest performance for all subjects.

Additionally, it appears that students from experiment 2 (fluency followed by alphabetics) showed a greater magnitude of positive change in their ability to segment phonemically regular words. While the performance trend of experiment 2 subjects (Subjects 5 and 6) was initially somewhat flat during the baseline and fluency intervention phases, a positive latency effect, or performance spike, for both subjects was noted once the alphabetics intervention was introduced. This higher level of performance was maintained, as well, during the post-intervention phase. This rate of growth for these two subjects was reflective of their attainment of Average level performance on the post-intervention CTOPP Segmenting Words subtest administration.

While the three students in experiment 1 did demonstrate relative gains in their segmentation performance as measured by these probes, the magnitudes of their changes were not as rapid. Subject 1 showed a baseline performance on segmentation probes that was strong. This was an interesting finding, as this level of performance was not reflective of his CTOPP

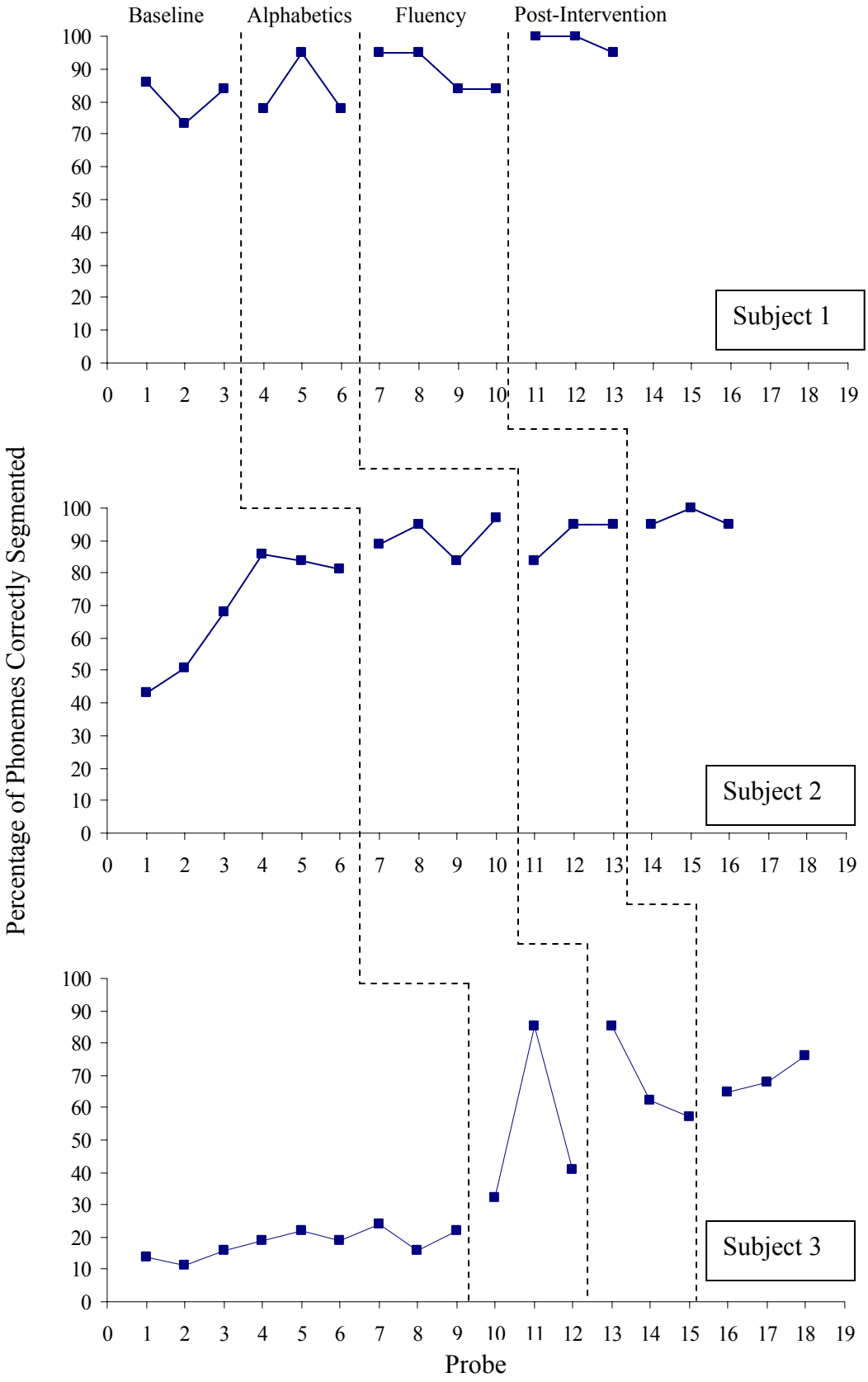

Figure 1. Experiment 1: Phonemic segmentation data.

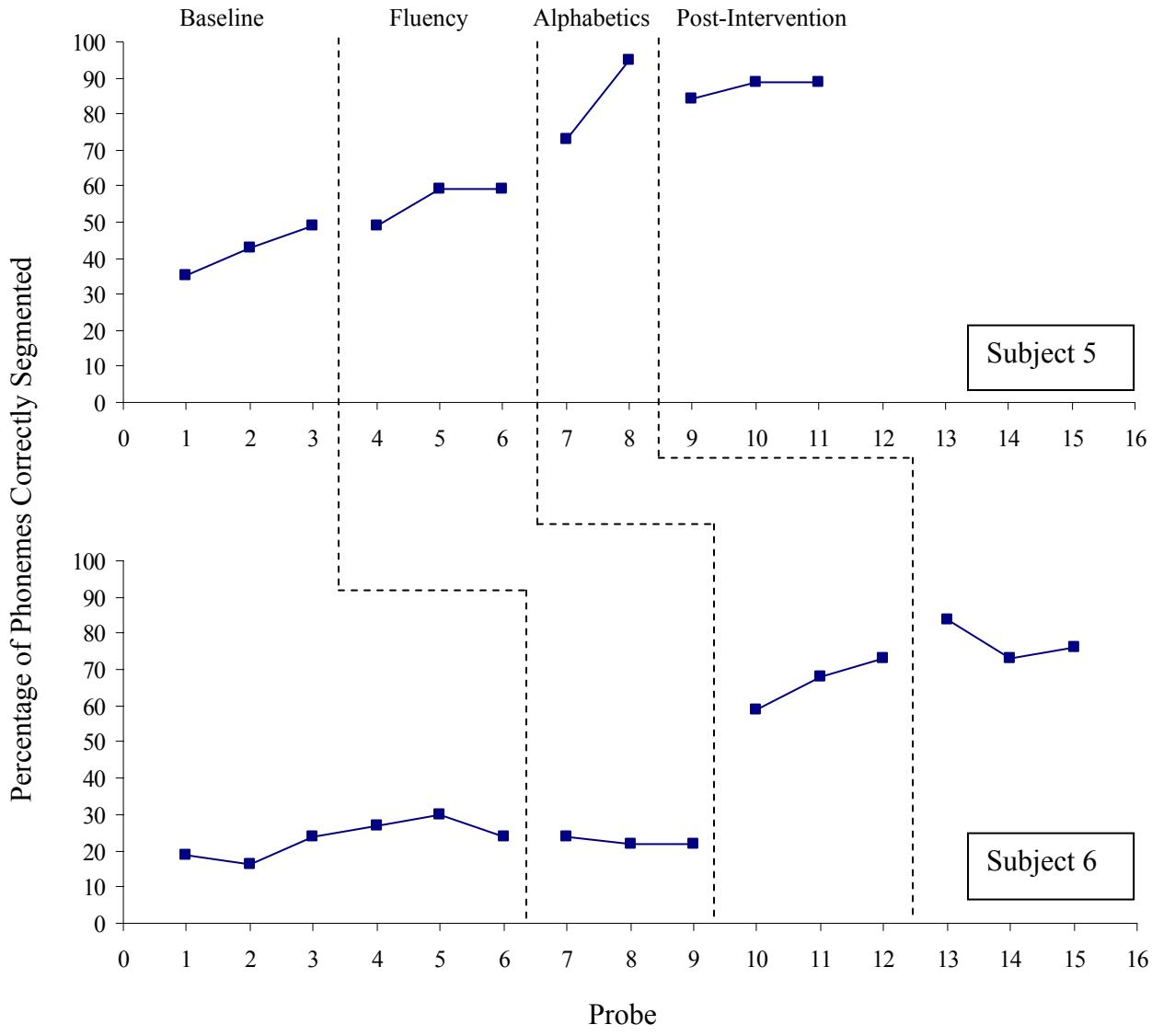

Figure 2. Experiment 2: Phonemic segmentation data.

not as rapid. Subject 1 showed a baseline performance on segmentation probes that was strong. This was an interesting finding, as this level of performance was not reflective of his CTOPP Segmenting Words baseline performance, which fell in the Well Below Average range compared to typical peers. This student was able to maintain this strong performance across all phases. His CTOPP Segmenting Words post-intervention performance was indicative of the strength

demonstrated across segmentation probes, and his performance rose to the Average level compared to same-age peers. Subject 2's performance indicated a slow but steady upward trend. Subject 3's performance showed the greatest degree of variability, yet still demonstrated a positive slope. It was interesting to note, as well, that this positive trend continued for these three subjects after the alphabetics intervention was discontinued and the fluency intervention phase began. It could be that the segmentation probing alone was providing continued practice in this skill, allowing students to continue to make gains in this area.

It had been hypothesized that a high magnitude change, or spike in performance, would have been observed in the area of segmentation shortly after the introduction of the alphabetics intervention. In this study, this was observed to be the case to a greater degree for students who received the alphabetics intervention following the fluency lessons, although an upward trend was observed for all subjects across both experimental conditions.

Phonics/spelling probes. Students were also administered phonics/spelling probes during the baseline phases, weekly throughout the interventions, and during the post-intervention phases. These probes required the student to apply the basic phonetic skills they had learned during the phonics section of the alphabetics lessons by spelling phonetically regular words correctly. Students were required to produce initial, medial, and ending letter/letter combinations to represent discrete phonemic units in words containing four or less phonemes. This activity was identical to exercises the students had completed during the lessons, although used new words as prompts. Words that contained phonemes that could be represented using two different letters (e.g. /j/ written as "j" or "g") were scored correct in either form. Examples of these probes are contained in Appendix H. A sample of the form on which students wrote

their responses is included in Appendix I. Phonics/spelling probe scores were obtained by calculating a percentage of correctly spelled words during each probe.

Data were again graphed in order to allow for visual examination of trends across student participants. Graphs were separated into experimental conditions to allow for examination of possible order effects, since alphabetics lessons were followed by fluency lessons in experiment 1, and fluency lessons were followed by alphabetics lessons in experiment 2. Figure 3 illustrates the performance of students in experiment 1 (Subjects 1, 2, and 3) on phonics/spelling probes. Figure 4 shows the performance of experiment 2 (Subjects 5 and 6) students on identical phonics/spelling probes.

When analyzing the graphs illustrating student performance on phonics/spelling probes, it does not appear that either intervention had a significant effect on student ability to apply basic phonetic principles to the spelling of phonetically regular words. There also did not appear to be any impact of intervention order.

Specifically, Subject 1 demonstrated a high degree of variability on phonics/spelling tasks, with a relatively flat slope. Subject 2 demonstrated relatively strong phonetic spelling skills beginning with baseline assessments, and was able to maintain this high level of performance at the post-intervention level. It might be that the task demands in this intervention and related probes were not challenging enough for this particular student. Subjects 3, 5, and 6 began the interventions with accuracy rates ranging in the 60%-90% range, and showed that same level of varied performance across all phases, resulting in a flat slope as well. The inconsistent performance of these subjects indicated that they had likely not fully mastered the skills designed to be addressed through the alphabetics interventions.

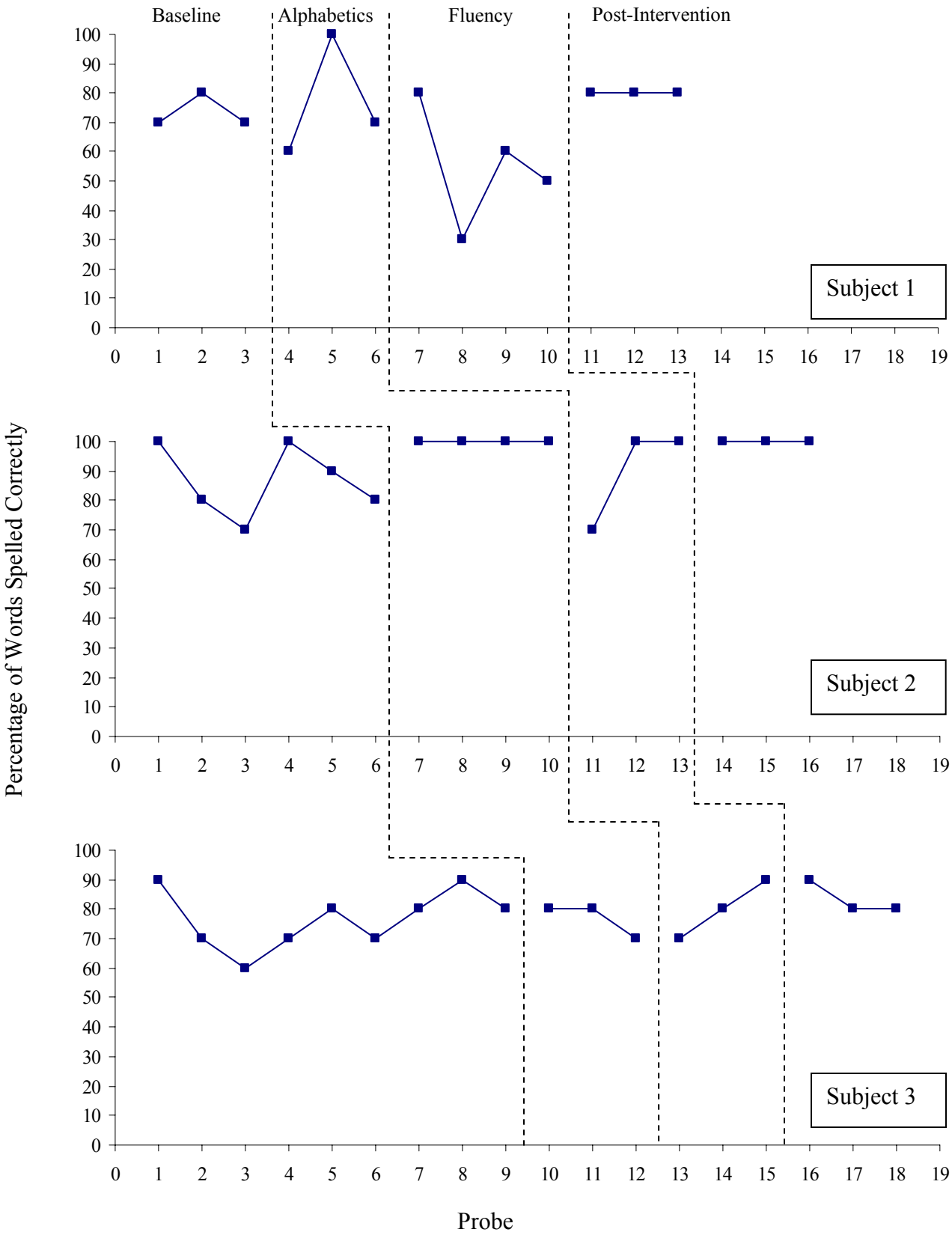

Figure 3. Experiment 1: Phonics/spelling data.

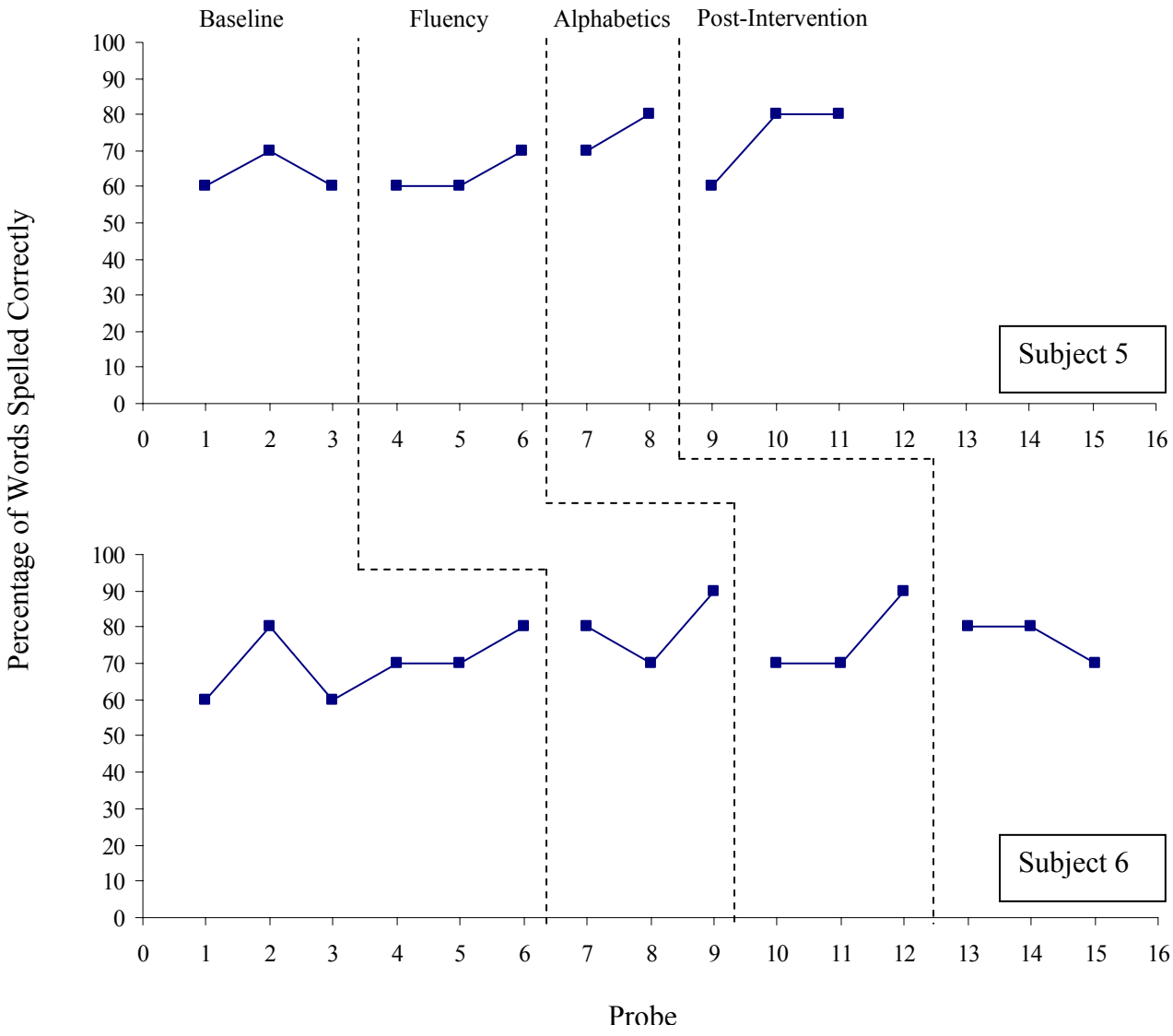

Figure 4. Experiment 2: Phonics/spelling data.

In considering the nature of the phonics/spelling probes, it could be that other factors involved in the encoding of words (which is what the probes actually measured) using phonics skills; such as motor coordination, visual spatial abilities, segmentation skills, and auditory memory, might have confounded overall performance. While the task was designed to produce an artifact of student performance for the purposes of this study, requiring students to demonstrate their phonics knowledge and mastery through encoding was not in fact as pure a

measure of phonetic ability as a straight word reading task, such as that seen on the WJ-III Letter/Word Identification subtest. Considering the WJ-III Letter-Word Identification subtest baseline and post-intervention performances of all five subjects, it appears that three out of five subjects (Subjects 2, 3, and 6) made greater improvements in word reading than they did on this measure of phonics/spelling encoding.

It had been hypothesized that the alphabetics lessons, in addition to the segmentation skill expectations previously addressed, would lead to an increase in student ability to apply phonics skill knowledge to writing/encoding phonemically regular words. In this study, that did not appear to be the case and in fact, standardized word reading baseline and post-intervention performances showed a higher magnitude of growth for three subjects than probe data did. For the other two subjects (Subjects 1 and 5), improvements in word reading and encoding were not observed as a result of these interventions.

Reading Fluency Assessment

Classroom teachers assessed students weekly in reading fluency in accordance with agency progress monitoring requirements. As part of this school-wide process, students were given three one-minute timed reading probes each week at their instructional level. They were directed to read through a leveled passage, and while they were doing so, teachers recorded words read incorrectly. Unknown words were supplied after three seconds. At the end of the one-minute probe, teachers would calculate the number of words read correctly, and mark this information in their progress monitoring binders. Averages of weekly performance were calculated and plotted on graphs by classroom teachers, allowing them to visually monitor the reading fluency progress of students in their class. This information was gathered from these binders by the teacher/principal investigator for the purposes of monitoring reading fluency

during the baseline phases, weekly throughout the interventions, and during the post-intervention phases. Data obtained included number of words read correctly per minute and reading level at which student was being probed.

As seen with previous probe data, data were graphed in order to allow for visual examination of trends across student participants. Graphs were separated into experimental conditions to allow for examination of possible order effects, since alphabetics lessons were followed by fluency lessons in experiment 1, and fluency lessons were followed by alphabetics lessons in experiment 2. Figure 5 illustrates the performance of students in experiment 1 (Subjects 1, 2, and 3) on reading fluency probes. Figure 6 illustrates the reading fluency performance of students in experiment 2 (Subjects 5 and 6.).

An inspection of reading fluency data graphs indicates a relatively flat trend of performance across all phases for all five subjects. Additionally, student performances on these probes were marked by a great degree of variability. It does not appear that either intervention, or the order in which the interventions were presented, had any significant effect on students' overall reading fluency performance. These data were relatively consistent with WJ-III Reading Fluency subtest data, which showed minimal growth for all students between the baseline and post-intervention phases.

It had been hypothesized that the reading with error feedback intervention would have led to increased student performance on reading fluency probes. It is likely that this brief intervention did not address the many component skills that are required to build on the complex task of reading fluency with the needed repetition and depth necessary to observe meaningful change, especially for these students who had long established patterns of reading difficulty.

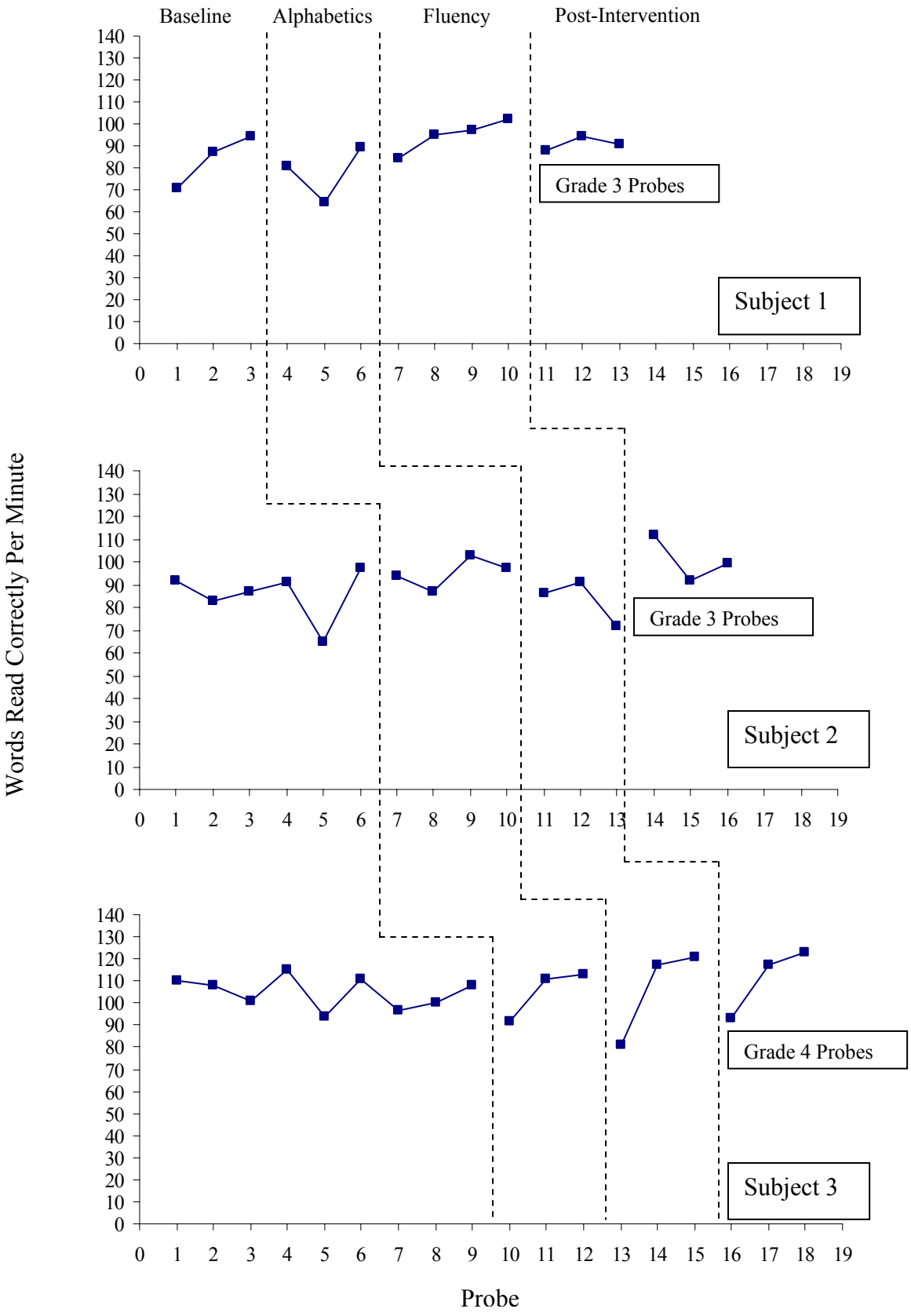

Figure 5. Experiment 1: Reading fluency data.

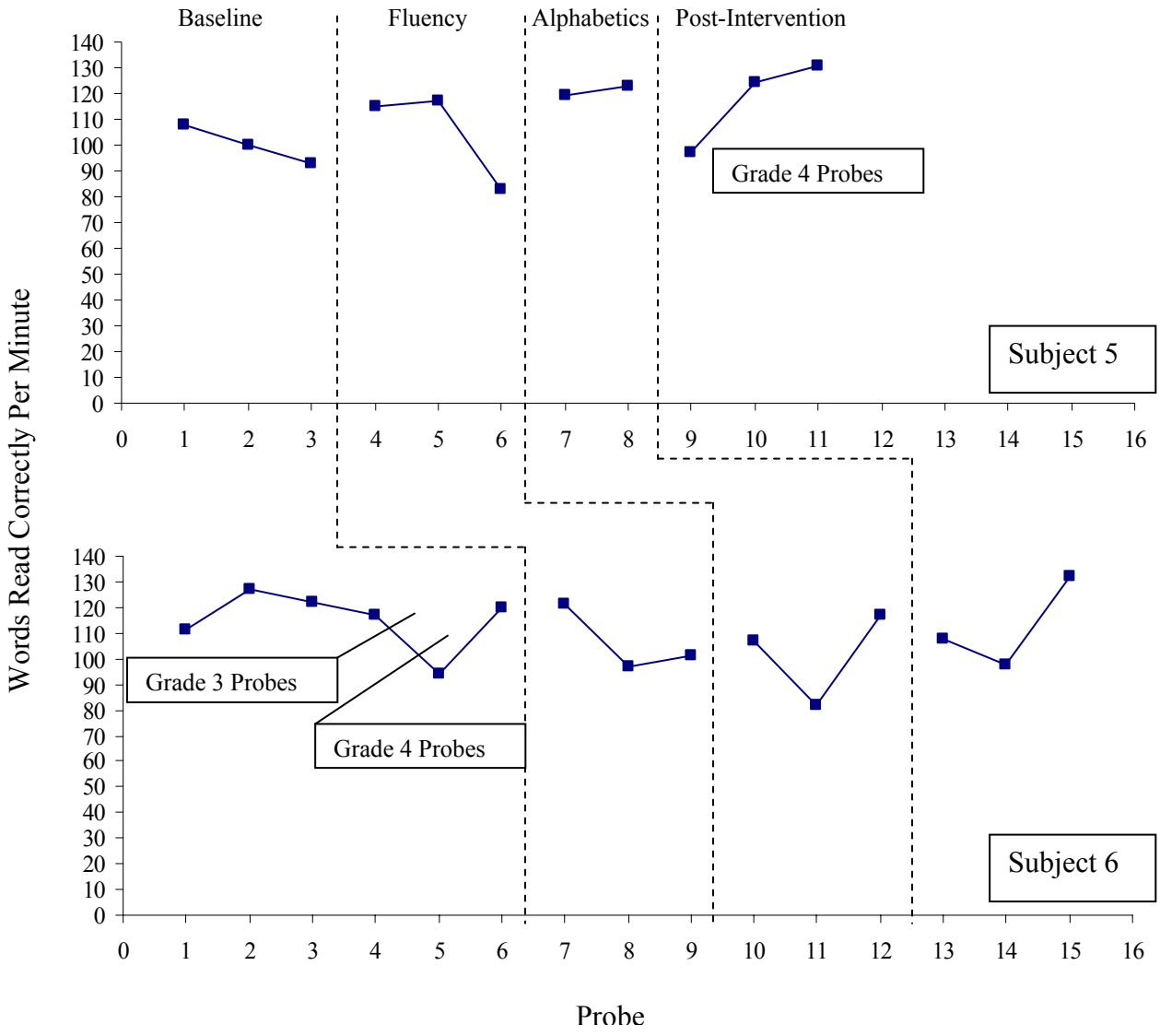

Figure 6. Experiment 2: Reading fluency data.

Student Behavior

Behavioral observation rating data were collected by the teacher/researcher during the baseline, intervention, and post-intervention phases of this study in order to examine any potential effects of the intervention process on student behavior. It was hypothesized that the combination of potential improvement in reading skills and/or the mere act of receiving

individualized attention by participating in the study could have had a positive impact on classroom behavior. These data were collected both in a class that had high reading demands (termed "Reading Class"), and in a class that had lower levels of reading expectations (termed "Math" or Art" class) to examine if any positive behavioral effects noted were generalized across settings. Observations by the teacher/principal investigator were varied between these two types of settings.

The State-Event Classroom Observation System (SECOS; Saudargas & Creed, 1980) was used as a systematic direct observation tool to provide the framework for collecting such behavioral data in the subjects' classrooms. Five variables were examined in this study. Duration of time was calculated for "Schoolwork" (having his eyes and body oriented towards the task-relevant materials or the teacher) and "Motor Behaviors" (being engaged in repetitive body movements such as tapping hands or feet or playing with an object). Schoolwork duration data were believed to be reflective of on-task behavior, while Motor Behavior ratings were indicative of potential disruptions and distractions during class time (although it was noted at times that motor movements did not necessarily preclude the student from being engaged in schoolwork.) Frequency data were collected for three variables: "Direction-Opposition" (teacher direction followed by noncompliance), "Direction-Compliance" (teacher direction followed by compliance), and "Call Out" (disruptive verbal behavior). These variables provided data regarding levels of compliance, as well as information about frequency of distracting verbal outbursts. Data were collected for one-minute samples at ten second intervals, with three one-minute measures collected per observation session. An example of the SECOS form used to collect these data is contained in Appendix J.

Data were again graphed in order to allow for visual examination of trends across student participants. Graphs were separated into experimental conditions to allow for examination of possible order effects, since alphabetics lessons were followed by fluency lessons in experiment 1, and fluency lessons were followed by alphabetics lessons in experiment 2. Graphs were also divided by both type of data collected (duration or frequency), as well as type of class in which it was collected, for clarity of visual inspection.

School-Work and Motor Behaviors: Duration Data

Figures 7 and 8 illustrate the SECOS behavioral data collected of students in experiment 1 (Subjects 1, 2, and 3). Figure 7 contains a line graph of duration data ("Schoolwork" and "Motor Behaviors") during reading classes. Figure 8 contains the same data for experiment 1 subjects, but in math or art classes. Following these two figures are similar graphs to present the same data for students in experiment 2. Figure 9 contains "Schoolwork" and "Motor Behaviors" duration data for Subjects 5 and 6 in reading classes, and Figure 10 contains this data for Subjects 5 and 6 in non-reading (math or art) classes.

Behavioral observation data collected for the purposes of this study were marked by a great deal of variability. As the data were collected by the teacher/principal investigator in student classrooms, behavioral inconsistencies were believed to have been affected by a wide array of external factors. Examples of such included: type of demand placed on the student, events that had occurred prior to the observation intervals, events that were planned to occur close to the end of observation intervals, motivation, time of day, day of week, classroom composition, changes in schedule, medication issues, personality and mood factors, social-emotional concerns, family system factors that were influencing the student outside of the school setting, etc. This was not a surprising finding considering the characteristics of the students

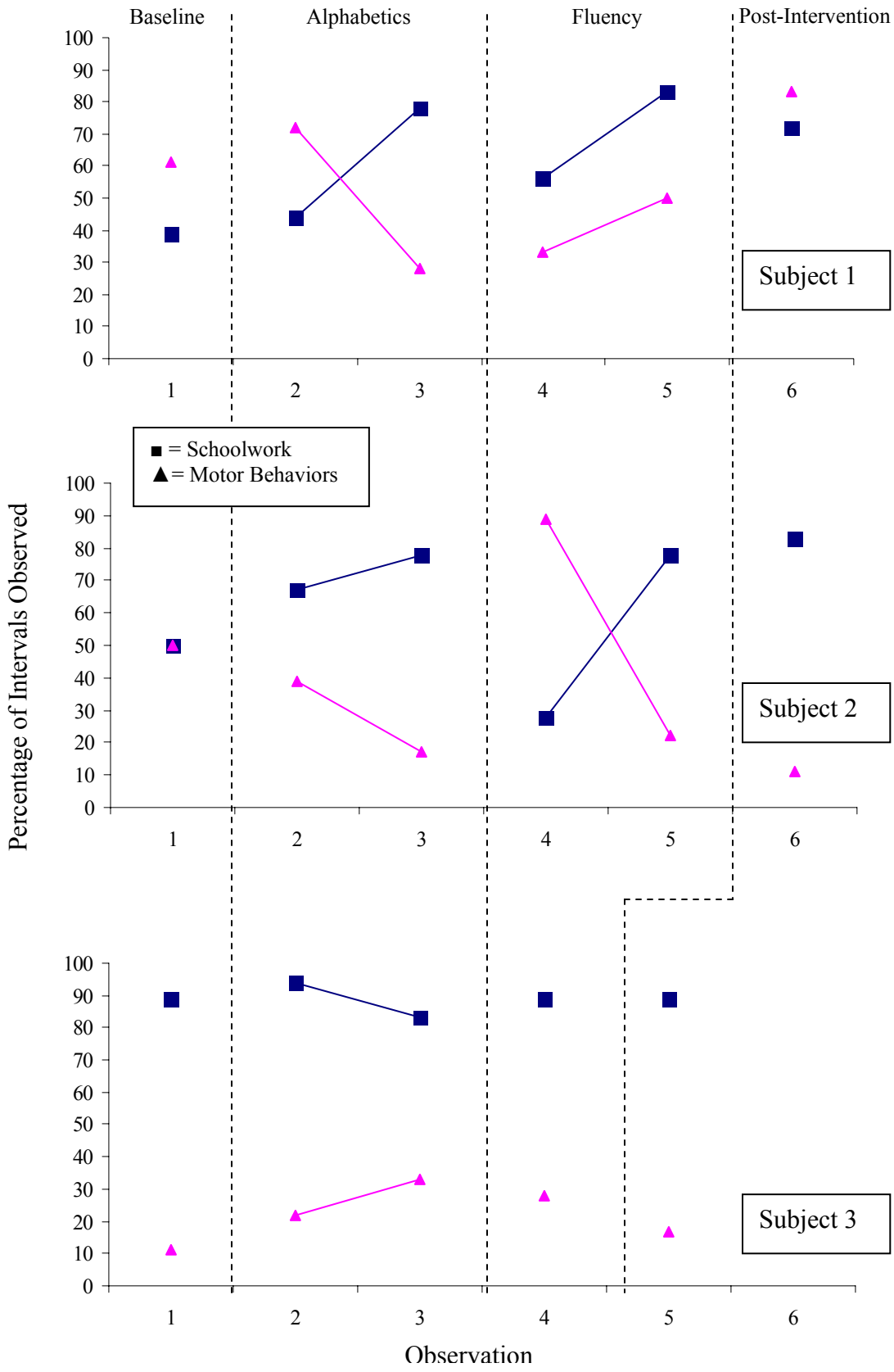

Figure 7. Experiment 1: SECOS data for schoolwork and motor behavior in a **reading** class.

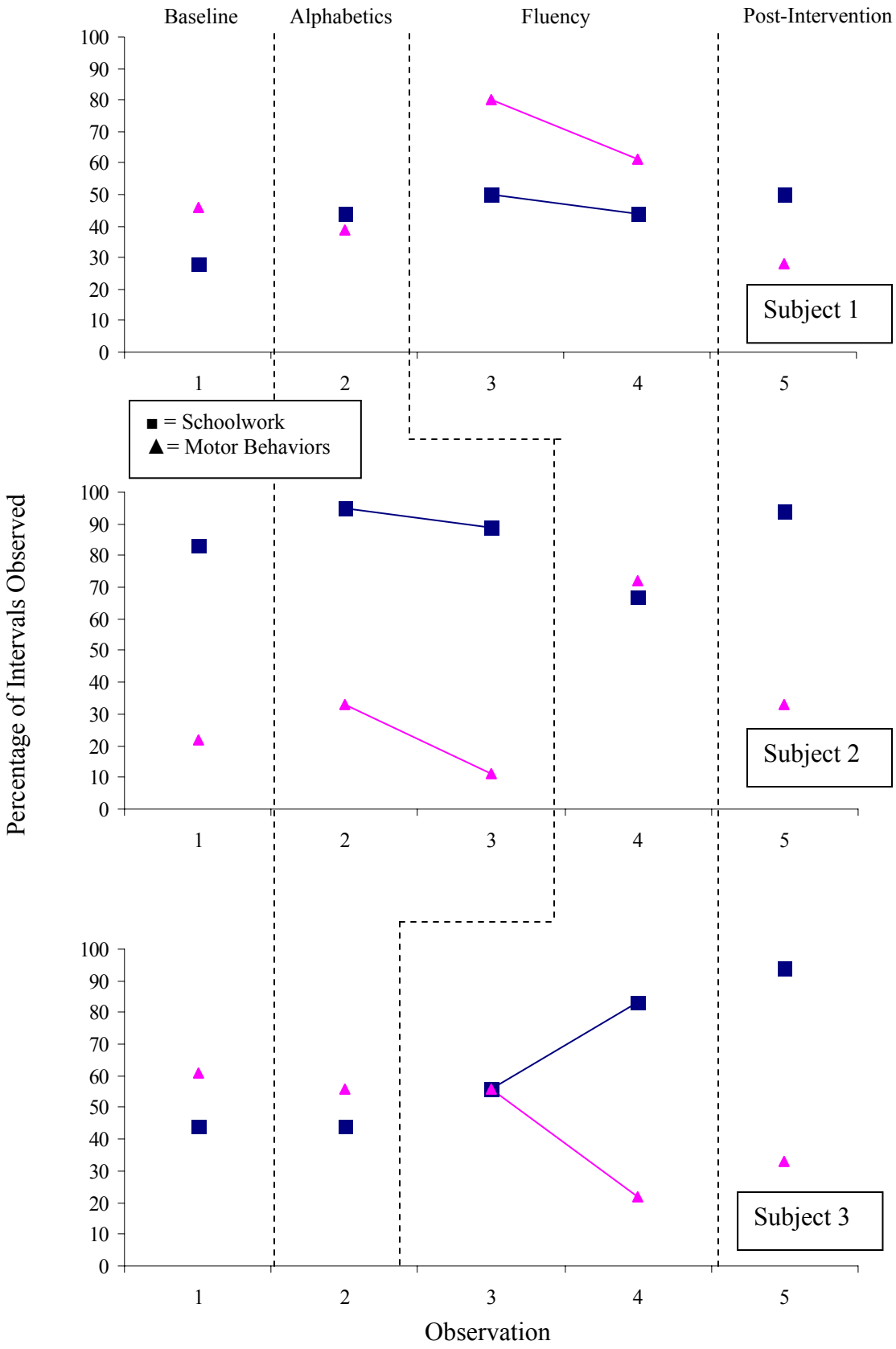

Figure 8. Experiment 1: SECOS data for schoolwork and motor behavior in a **non-reading** class (math or art).

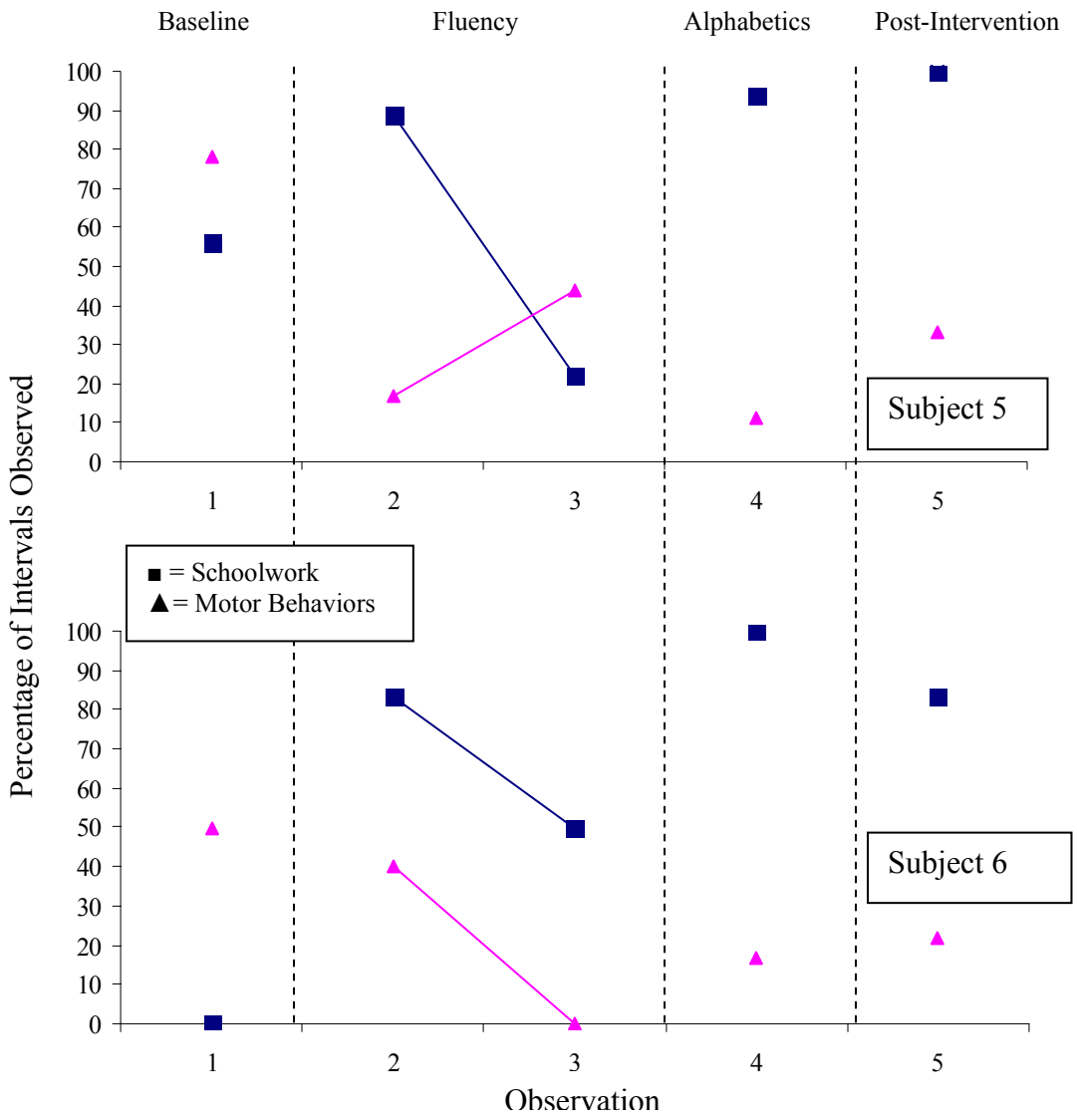

Figure 9. Experiment 2: SECOS data for schoolwork and motor behavior in a **reading** class .

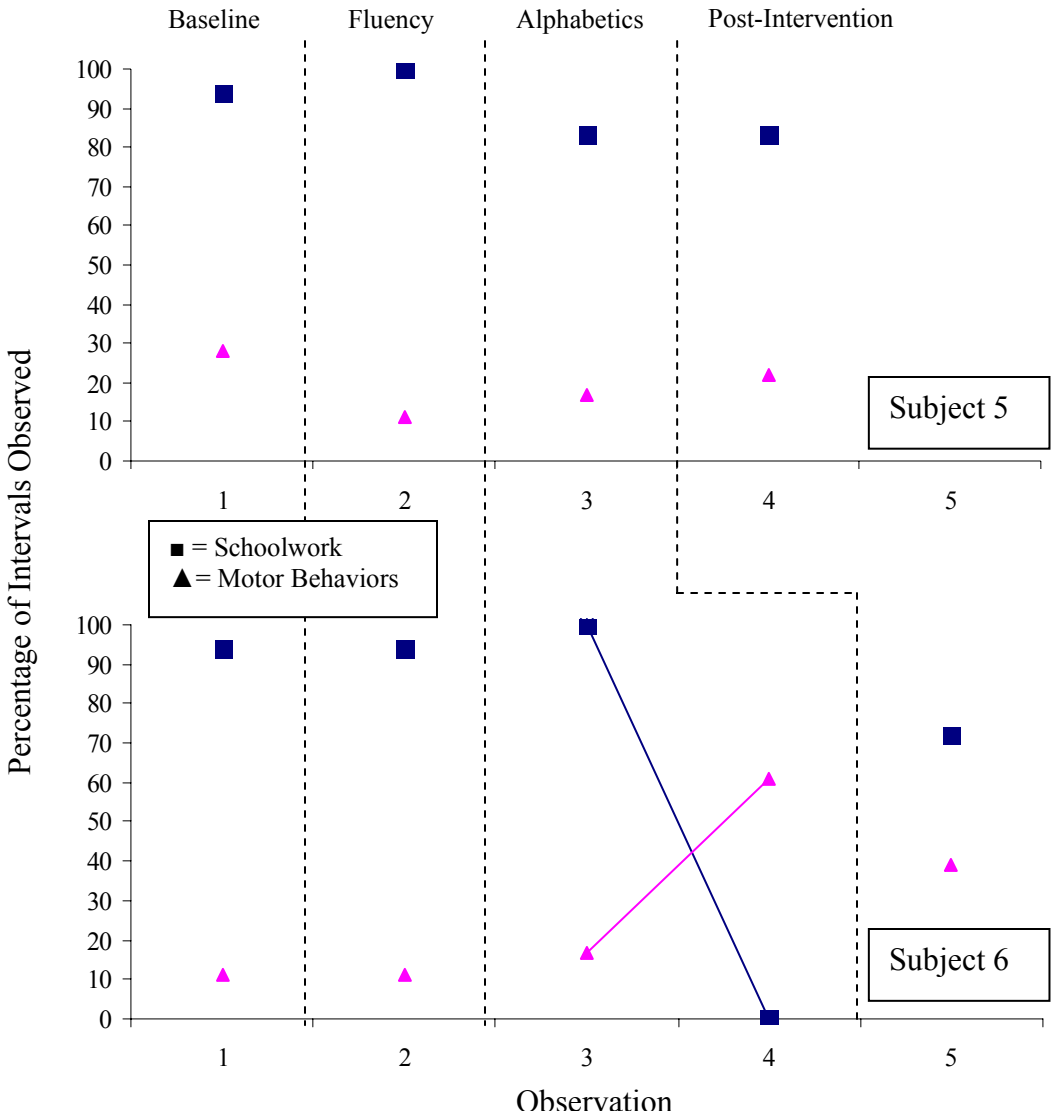

Figure 10. Experiment 2: SECOS data for schoolwork and motor behavior a **non-reading** class (math or art).

included for participation in this study. Difficulties with social-emotional regulation, adjustment, and transitions were often the reasons necessitating their attending an alternative school setting in the first place. Due to the high degree of variability and lack of pattern or trend observed in the data, it does not appear that the interventions, or the order in which the interventions were presented, had an impact on student ability to attend to schoolwork or control disruptive motor

movements in the classroom. In looking at individual behavioral data profiles, it was difficult to make generalizations across students in either experimental condition. Behavior was greatly impact by intra-individual and/or environmental factors.

In reviewing data from students in experiment 1, Subject 1 showed a great deal of inconsistency in his ability to attend to schoolwork and reduce levels of motor behavior across reading and non-reading settings. It was noted that a slight upward slope was observed in his ability to remain focused on schoolwork during reading class, but the same trend was not noted in non-reading observation intervals. Subject 2 typically displayed higher levels of on-task behavior than Subject 1 in both reading and non-reading classes, with the exception of one reading class during which he was directed to "take time" to process his behavior. This request was made due to his refusal to comply with a request to stop engaging in repetitive motor movements that were causing distraction to other students. In this student, it was noted that an increase in motor movements was associated with a decreased focus on schoolwork. Conversely, focus on schoolwork typically resulted in fewer repetitive motor movements. Subject 3's classroom behavioral presentation was quite different than that observed in the other two students in his experimental condition. This student demonstrated a high degree of consistent focus on schoolwork and relatively low levels of motor behavior in reading class observations. This student appeared to understand the behavioral expectations of the classroom, and appeared motivated to earn rewards in the context of the classroom behavior management system. In his math classes, where he had the same teacher, he showed an overall upward trend in his attention to schoolwork activities and a concurrent reduction in the display of the repetitive motor movement of playing with an object in his desk during instruction. This particular student appeared to be motivated by the teacher/principal investigator's presence in the classroom during

the observation periods, and demonstrated "reactivity" by improving his behavior after looking around the room and smiling at the teacher/researcher when he noticed she was there. This student also demonstrated the same relationship between schoolwork and motor behaviors as seen in Subject 2: When motor behaviors increased, levels of focus on schoolwork decreased and vice versa.

Students in experiment 2, Subjects 5 and 6 also displayed this relationship between schoolwork and motor behaviors. Subject 5 displayed consistently high levels of focus on schoolwork and low levels of disruptive motor behaviors in non-reading classes. He also demonstrated relatively high levels of schoolwork behavior in his reading class, with the exception of the one day in which he was sent to time out for a significant verbal outburst. Once placed in time out, he had difficulty settling down and was unable to complete any of the work he had brought with him during the remaining observation intervals. Subject 6 demonstrated a positive slope in the area of schoolwork behaviors in reading class over the course of the study, and was able to decrease his disruptive motor behaviors as well in this content area. His level of focus on schoolwork showed a negative slope or trend, however, in non-reading classes. This slope was impacted by an incident during one observation period which necessitated his removal from class when he threw a book across the room while refusing to do what was asked of him.

In sum, the interventions implemented did not result in a pattern of positive impact on student behavior in either reading or non-reading classes. Positive effects were thought to be more related to reactivity to the observer or student activity preferences, rather than to the interventions themselves. Significant outbursts caused wide variation in data during several observation intervals. A relationship was evident across all subjects between increased on-task behavior as it pertained to schoolwork and decreased levels of disruptive motor behaviors.

Finally, it is important to note that most students were observed in each type of class only four through six times. It would have been beneficial to have more observation points to gather a more solid understanding of changes that may have resulted from the implementation of these interventions. Unfortunately, this did not occur during this study due to time constraints on the teacher/researcher, which are common in an applied setting.

Direction-Opposition, Direction-Compliance, and Call Out Behaviors: Frequency Data

Figures 11 and 12 illustrate the behavioral frequency data collected of students in experiment 1 (Subjects 1, 2, and 3). Figure 11 contains a bar graph of frequency data ("Direction-Opposition," "Direction-Compliance," and "Call Out") collected during reading classes. Figure 12 contains the same data for experiment 1 subjects, but in math or art classes. Following these two graphs are similar graphs to present the same data for students in experiment 2. Figure 13 contains "Direction-Opposition," "Direction-Compliance," and "Call Out" frequency data for Subjects 5 and 6 collected in reading classes, and Figure 14 contains this data for Subjects 5 and 6 in non-reading (math or art) classes.

As was seen with the SECOS duration data collected for this study, there was again a great deal of variability within and between students for the behaviors in which frequency counts were tallied: direction followed by opposition, direction followed by compliance, and calling out behaviors. These behaviors were also believed to have been more impacted by intra-individual and environmental confounding variables than they were by intervention participation. No behavioral patterns existed which were believed to be directly related to receiving the intervention lessons.

In further examination of the frequency data from experiment 1 subjects, no clear behavioral trend or slope was noted in Subjects 1, 2, or 3. Subject 1 displayed varied levels of

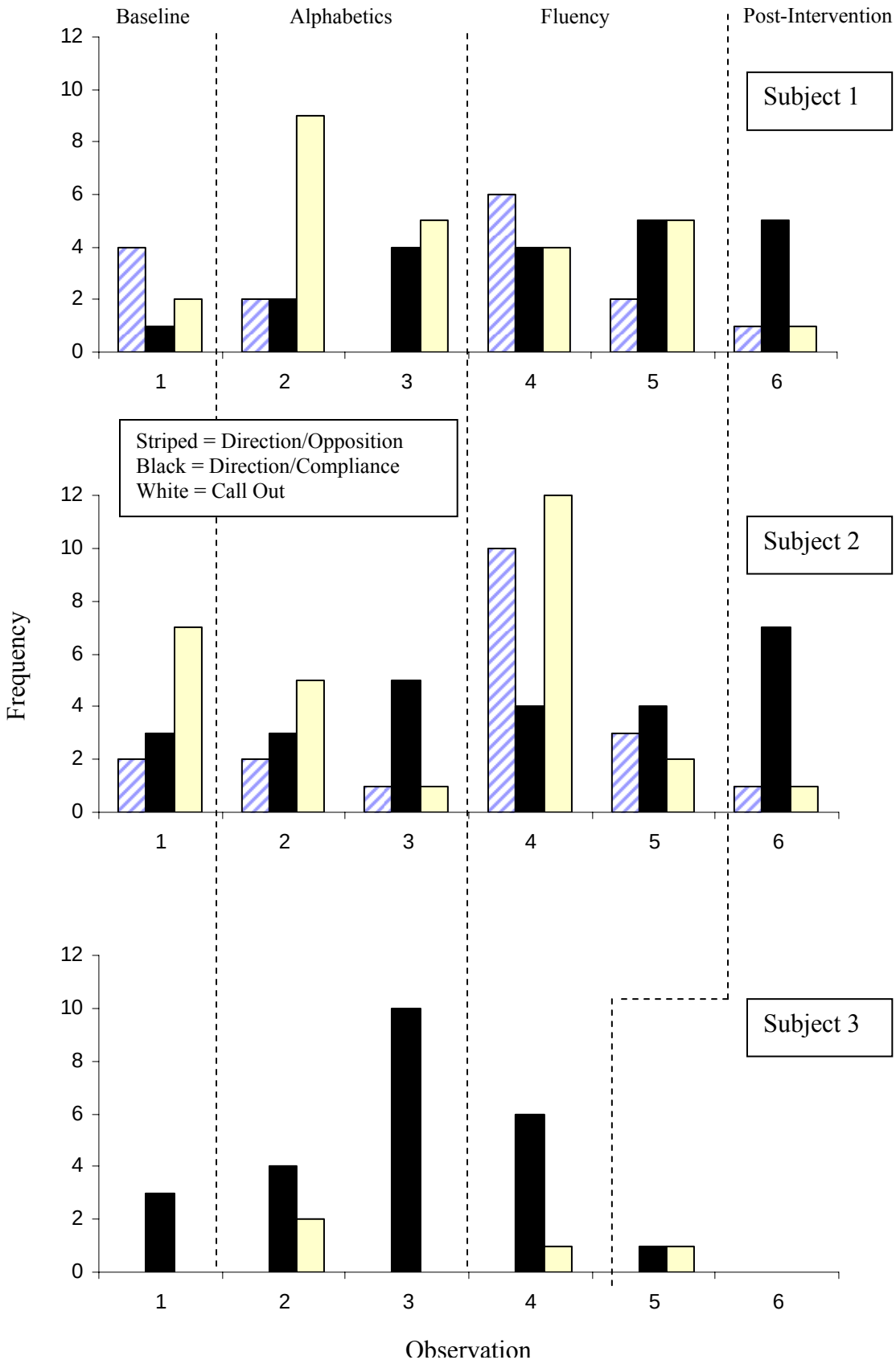

Figure 11. Experiment 1: SECOS data for direction-opposition, direction-compliance, and call out in a **reading** class.

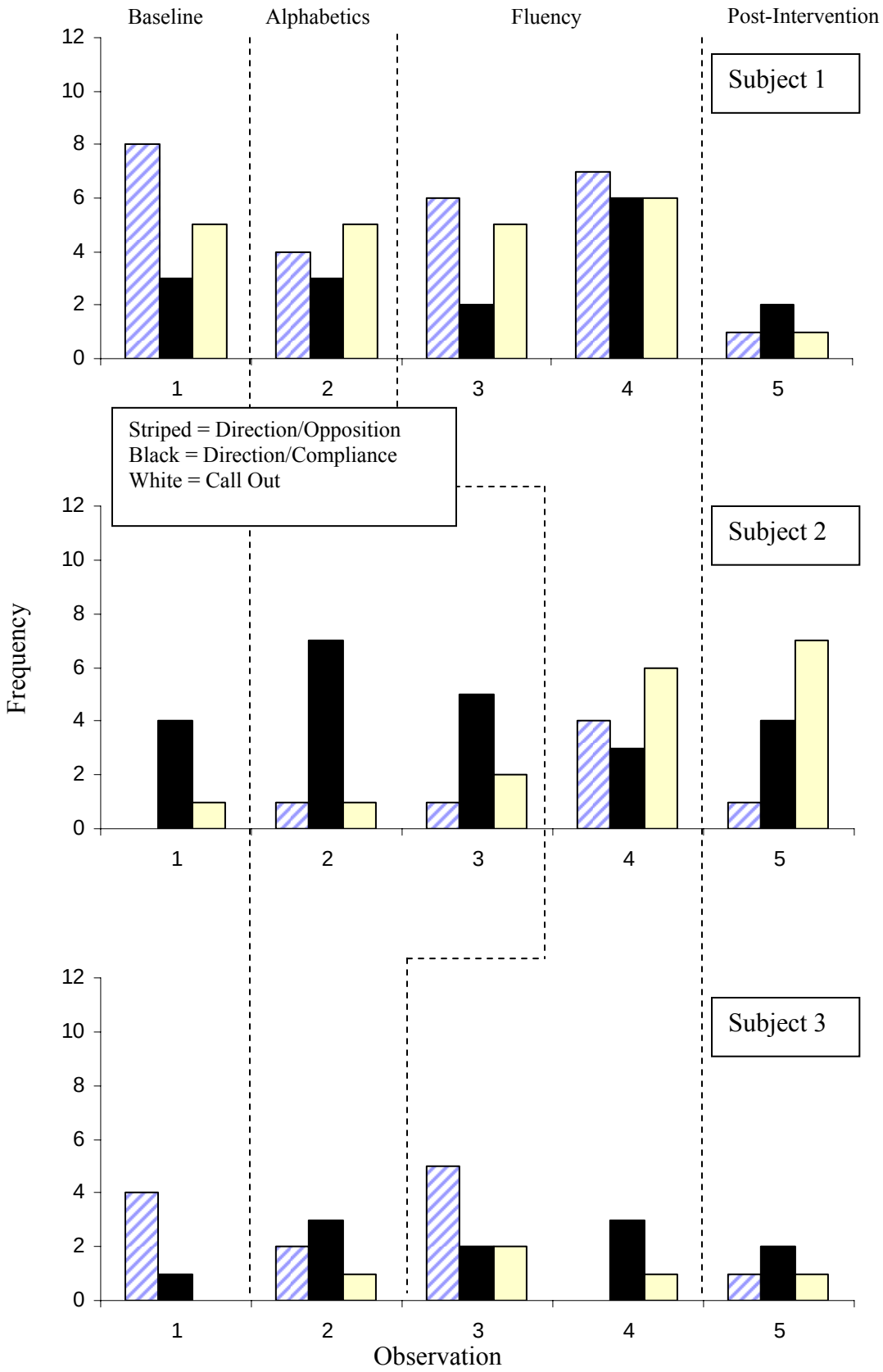

Figure 12. Experiment 1: SECOS data for direction-opposition, direction-compliance, and call out in a **non-reading** class (math or art).

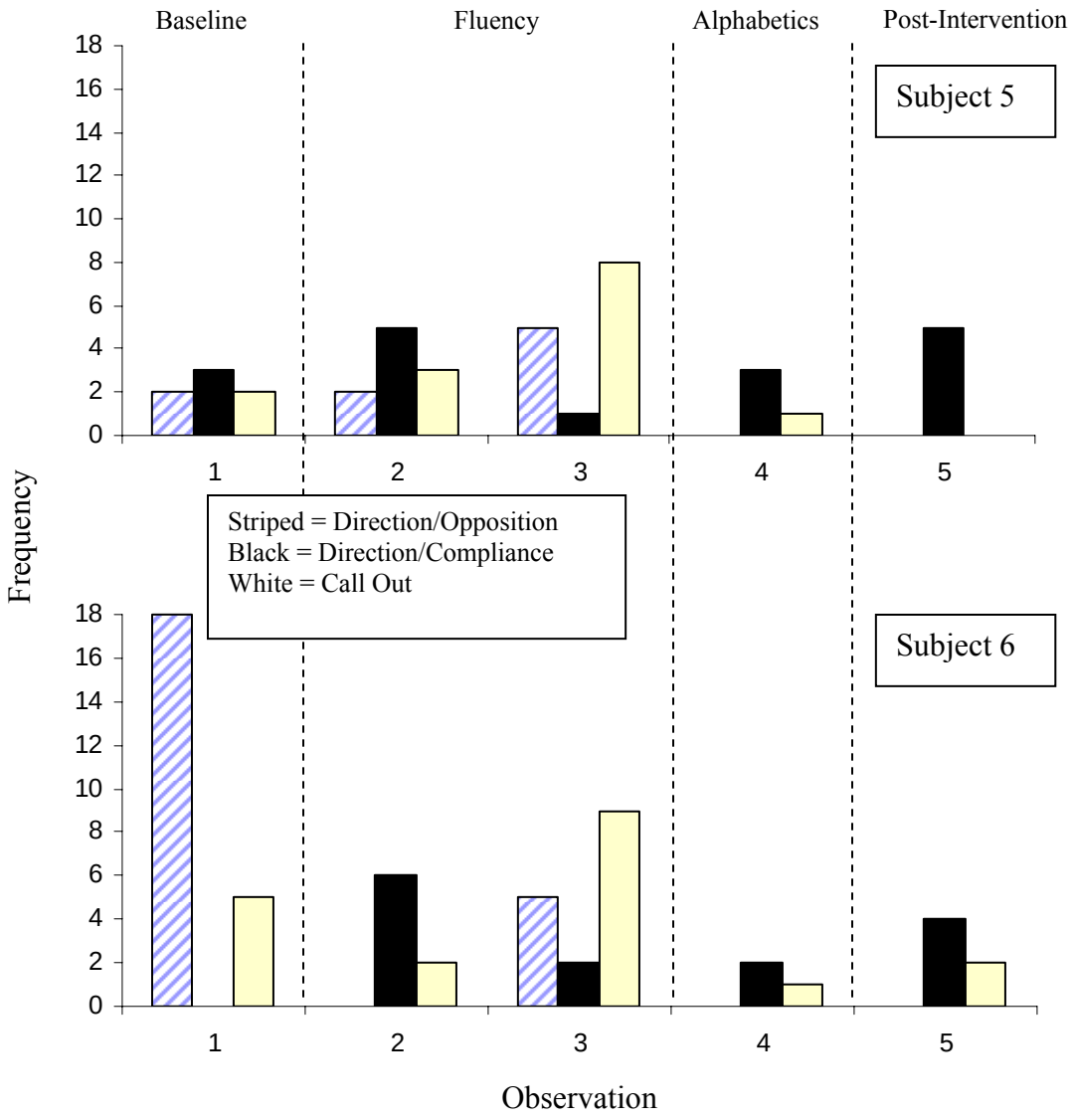

Figure 13. Experiment 2: SECOS data for direction-opposition, direction-compliance, and call out in a **reading** class.

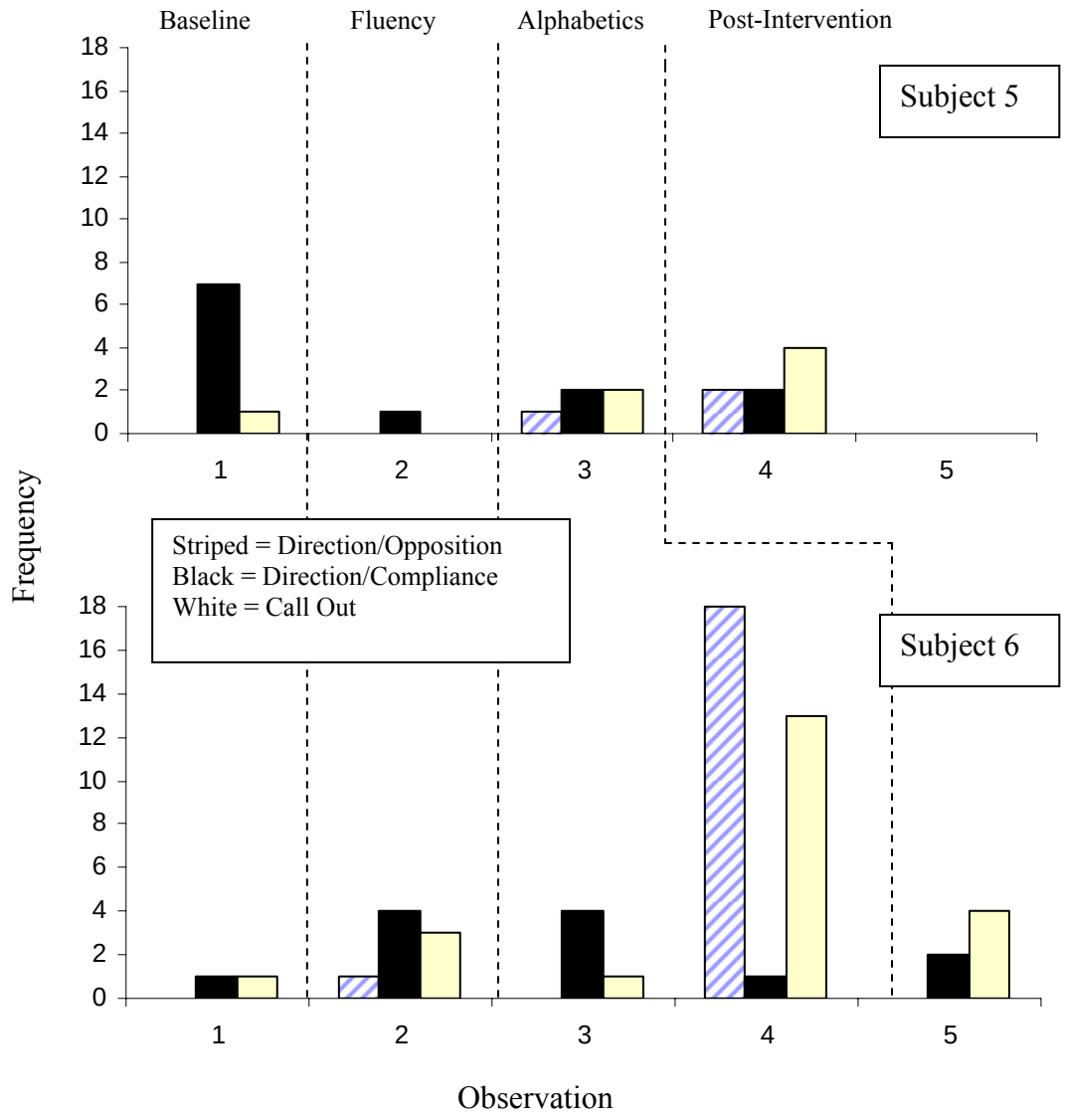

Figure 14. Experiment 2: SECOS data for direction-opposition, direction-compliance, and call out in a **non-reading** class (math or art).

compliance and opposition reactions to teacher directives. He displayed a high level of calling out behaviors across all observed intervals. Subject 2 displayed higher levels of compliance than opposition, and when engaged in opposition behaviors, had a tendency to increase his calling out. Subject 3 displayed higher levels of compliance during reading classroom activities than he did during non-reading classroom instruction. He did not frequently call out in class.

A clear pattern of data change was not apparent in the frequency data collected for Subjects 5 and 6 either. Subject 5 displayed more incidents of compliance than noncompliance, and relatively few incidences of calling out. Subject 6 was generally compliant, with the exception of times when he would have extreme verbal outbursts accompanied by noncompliance or refusal, and need to be removed from the class. These incidents of noncompliance were accompanied by a higher rate of calling out behavior.

As discussed in terms of duration behaviors data, the interventions implemented did not result in a pattern of positive impact on student frequency behavior in either reading or non-reading classes. The only real connection between data that appeared to emerge was an increase in calling out behavior accompanying noncompliance to teacher directions, and this is a logical and expected relationship. Again, it is important to note that most students were observed in each type of class only four through six times. More data collection intervals in terms of behavioral observation data might have been helpful in identifying or negating any behavior changes of real magnitude. It had been hypothesized that participation in the study would lead to overall improvements in appropriate student behavior as a result of decreased frustration with the reading process and increased motivation due to attention received as a result of participating in individualized intervention session. In this study, this was in fact not the case.

Alternative Curricular Measures

Finally, students were administered alternative curricular measures throughout study phases in order to examine if potential improvements in reading were in fact related to the intervention, or if they were a by-product of increased student motivation to achieve due to the extra attention he received as being part of the intervention group. Multi-digit addition and subtraction probes were given to students during baseline, across interventions, and during the

post-intervention periods. Performance was reported as a percentage of problems solved accurately. Alternative Curricular Measure probes are contained in Appendix K.

This data were also graphed in order to allow for visual examination of trends across student participants. Graphs were separated into experimental conditions to allow for examination of possible order effects, since alphabetics lessons were followed by fluency lessons in experiment 1, and fluency lessons were followed by alphabetics lessons in experiment 2. Figure 15 contains graphs of students from experiment 1 on these probes. Figure 16 contains the same data for the students from experiment 2.

As was seen in the data from student behavioral observations, there was no clear pattern of data that emerged on graphs of student performance on these alternative curricular probes. Most students displayed performances that were marked by a flat slope, and any slight upward trend that was noted indicated a low magnitude of change that was probably more related to repeated practice and feedback on these skills in the classroom than to intervention participation. It had been hypothesized that study participation could positively impact student performance in reading, and perhaps generalize to other academic areas as a by-product of increased attention and motivation. This finding was not supported by the data collected in this study.

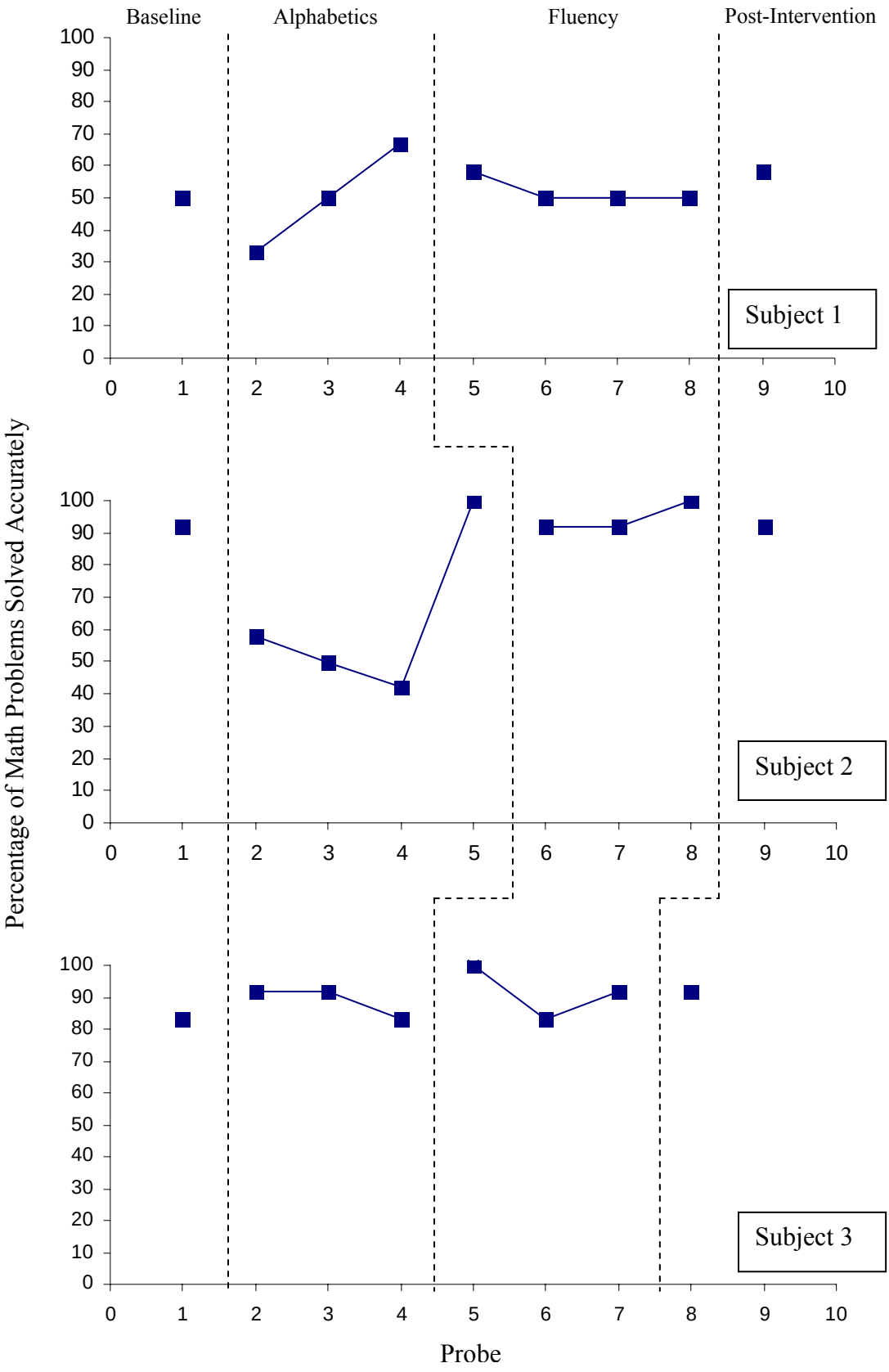

Figure 15. Experiment 1: Alternative curricular measure.

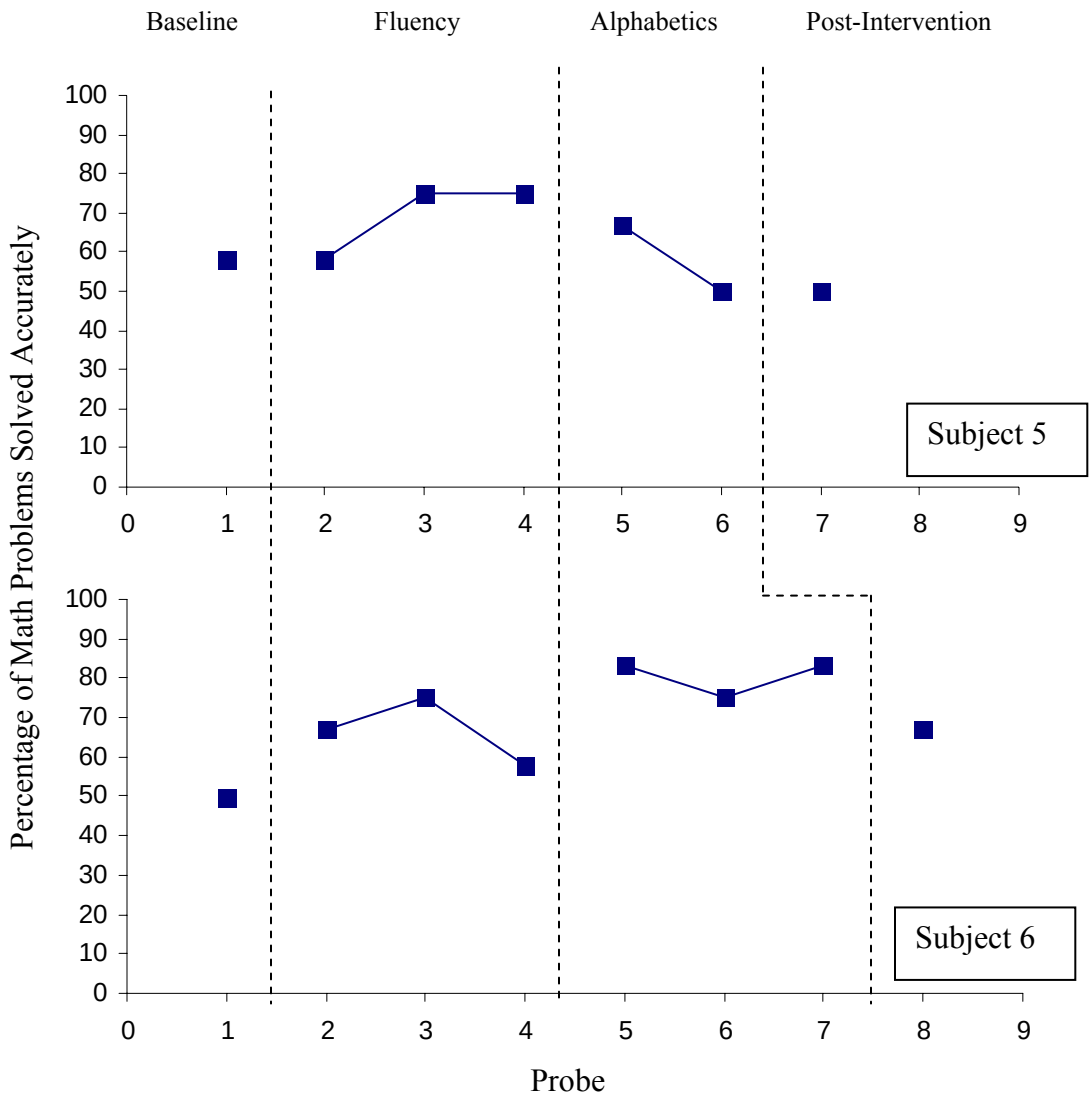

Figure 16. Experiment 2: Alternative curricular measure.

Calculation of Effect Sizes

Single subject research designs have typically not used statistics to support conclusions for intervention effectiveness, rather tending to rely on strict visual inspection of graphed data, but the topic recently has begun to receive increased attention (Olive & Smith, 2005). Limitations to using visual inspection alone in data analysis have been discussed in the literature.

The major issue pertains to the lack of concrete decision rules for determining whether a particular demonstration shows or fails to show a reliable effect (Kazdin, 1982). Bias and subjectivity can influence visual inspection, although this is not typically the case when intervention effects are very strong and increases are to a high rate. However, changes to this extreme were not evident in this study.

Effect size statistics were calculated on study data in an attempt to supplement the visual analyses of trends that were conducted when reviewing study graphs. Examples of the use of effect sizes were evident in the literature and reviewed by the principal investigator during the data analysis phase (examples seen in Olive & Smith, 2005, and Beeson & Robey, 2006). It is important to consider that these results should be reviewed with a degree of caution due to the fundamental statistical assumption violations that can arise when working with a small sample size (Kennedy, 2005). This is particularly true in this study in the area of student behavior, where there were relatively few data points to consider due to the alternating data collection between types of setting. Additionally, these statistical tests could detect subtle and minor changes in performance and identify them as significant (Type 1 errors,) even though those changes might have been rejected through visual inspection alone (Kazdin, 1982). Statistical analyses can in fact detract from the goal of single subject research in that the outcome of such is not to discover variables that could produce reliable effects that are therapeutically important (Kazdin, 1982). For these reasons, the analysis of these effect size statistics should only be considered alongside the structured visual inspection conclusions regarding this study that were detailed in the previous results sections.

Effect size calculations were obtained according to three common methods detailed in the literature: Percentage of non-overlapping data (PND), Percentage Improvement, and Standard

mean difference (SMD). These will be discussed below. When a multiple baseline design is used, it is recommended that an effect size be calculated for each person, setting, or behavior in the study (Olive & Smith, 2005).

Percentage of Non-Overlapping Data (PND)

The percentage of non-overlapping data (PND) effect size formula (as outlined in Olive & Smith, 2005) was applied to phonemic segmentation, phonics/spelling, and reading probe data, as well as SECOS behavioral observation data in the duration areas of schoolwork and motor behavior in both reading and non-reading classes. These calculations are presented in Table 4. PND computations were not completed on behavioral frequency data or alternative curricular measure data because there were not enough data points in these two domains to reliably calculate this statistic on these variables.

The percentage of non-overlapping data effect sizes for phonemic segmentation, phonics/spelling, reading fluency, and SECOS schoolwork data were calculated by first identifying the lowest baseline data point for each subject in each area. Then, the number of points that fell above that lowest baseline point were tallied (non-overlapping data). Finally, the proportion of non-overlapping data points was divided by the total number of data points to arrive at the percentage of non-overlapping data points, expressed as a percentage. An assumption of this statistical procedure is that effect sizes can not be computed for data sets where a zero is present during the baseline period. The percentages calculated are representative of the proportion of data points that show an increase in a desirable academic skill or appropriate classroom behavior compared to the lowest baseline data point (Olive & Smith, 2005).

The procedure for calculating the PND for the SECOS motor behavior data was slightly different, in that for this area, a decrease in behavior was desired. For this reason, the number of

points that fell below the lowest baseline point were tallied as non-overlapping data points, and then divided by the total number of data points. This type of calculation is warranted when a decrease in the target behavior is the goal of an intervention. In effect, these percentages show the number of data points that show a decrease in distracting motor behavior in the classroom throughout experimental phases.

Table 4. Percentage of Non-Overlapping Data (PND) Effect Size Calculations

Subject	Phonemic Segmentation Probes	Phonics/ Spelling Probes	Reading Fluency Probes	SECOS Schoolwork: Reading	SECOS Schoolwork: Non-Reading	SECOS Motor Behavior: Reading[a]	SECOS Motor Behavior Non-Reading[a]
1	100	61.5	92.3	100	100	66.7	60
2	100	93.7	100	83.3	80	83.3	40
3	100	100	83.3	50	100	20	100
5	100	72.7	90.9	80	50	100	100
6	100	100	93.3	Not Calculated[b]	60	100	20

Note: All numbers expressed as percentages rounded to one decimal place.
[a]n = Percentage of overlapping data points that showed an increase in motor behavior from the baseline period.
[b]n= Not calculated because there was a 0 in baseline data.

PND effect size data reflected similar findings to that noted through visual inspection analysis. 100% of students showed a growth from the baseline period in the area of phonemic segmentation. In the area of phonics/spelling, Subjects 2, 3, and 6 showed effects sizes greater than 90%, reflecting the upward trend that was noted in these graphs for these students. Subjects 1 and 5 performed less consistently, and thus had more data that overlapped (or fell below) their lowest baseline point. In the area of reading fluency, all students showed improvement in 80% or more of their fluency assessments past their lowest baseline performance. As was observed in

the visual analysis of behavioral graphs, there was no trend noted in behavioral change as a result of these interventions. Student performance in this area was extremely inconsistent.

It is important to consider when reviewing this PND data that these percentages reflect any score that did not overlap with the lowest baseline point, no matter how significant the change. For this reason, it may appear that the student showed performance above baseline for 100% of non-overlapping data points, but this information itself does not indicate the magnitude or significance of that change (Type I error). For example, PND data for a student who increased only 1 percentage point for all probes past the lowest baseline phase would show 100% PND effect size, yet it would be clear to any practitioner that a change of this small magnitude would not be clinically significant or educationally relevant for this particular student. The lack of information regarding strength of change is a significant limitation of this type of effect size calculation. Additionally, students who began at the baseline level with high performances (baseline points that were not all that low) indicated lowed PND scores because there was a smaller margin for improvement, rendering this statistic to be somewhat misleading in these cases.

Percentage Improvement

Percentage reduction (PR: also referred to at times in the literature as Mean Baseline Reduction, MBR) is another effect size often used to evaluate single-subject treatment effectiveness (Olive & Smith, 2005). This effect size is calculated by subtracting the average of the last three treatment points from the average of the last three baseline points. This number is then divided by the average of the last three baseline points and then multiplied by 100 to arrive at a percentage of baseline reduction. This effect size is designed to be used when the goal of an intervention is to reduce undesirable behavior.

This statistical presentation was adapted for the purposes of this study due to the fact that a reduction in behavior or performance was not the desired effect, but rather an increase in performance from the baseline period was the goal of intervention. When the above calculation was performed, the PR calculation resulted in a negative number due to the fact that most students had improved their performance from the baseline period. However, this number was still reflective of the percentage of change that had taken place between baseline and end of the treatment phases. For this reason, the calculation was considered without the negative sign, and was rather viewed as the percentage of improvement from the baseline period.

Percentage improvement effect sizes were calculated for segmentation, phonics/spelling, and fluency probes. They were not calculated for behavioral or alternative curricular measure data sets because there were not enough data points in the baseline period to meet the assumptions for this statistic. Percentage improvement effect size data are presented in Table 5.

Table 5. Percentage Improvement Effect Size Calculations

Subject	Phonemic Segmentation Probes	Phonics/ Spelling Probes	Reading Fluency Probes
1	21.4	9.14	8.3
2	15.5	11.1	19.8
3	236.2	0	4.42
5	106.4	15.8	16.7
6	187.8	4.6	2.18

Note: PR calculation modified to reflect positive change or percentage of improvement. All numbers expressed are percentage of increase at the end of treatment phase from average baseline performance.

These percentages of improvement from the baseline phase support results that were discussed during the visual inspection of graphs. The greatest percentages of improvement were

noted in the area of segmentation, particularly for Subjects 3, 5, and 6. These high percentages of improvement reflect the magnitude of the upward trend that was noted for these subjects. The percentage of improvement was not as high for Subjects 1 and 2 in the area of segmentation because they started at the baseline phase with relatively strong levels of performance. The percentages of improvement in the areas of phonics spelling and reading fluency are weak when compared to those seen in segmentation, and are reflective of the variability of data and relatively flat trend lines that were observed across all subjects in these areas. These percentages of improvement calculations support the finding that the only significant change observed as a result of study participation was in the area of phonemic segmentation. However, it is important to consider that the insensitivity that this statistic has to small changes might in fact depress any type of therapeutically important changes that might have been noted for certain subjects in other areas. Small changes can still be clinically important to individuals, and would not be observed using this effect size calculation.

Standard Mean Difference

The final effect size statistic that was used for study analysis was standard mean of difference (SMD). SMD effect sizes were calculated for segmentation, phonics/spelling, and fluency probes. They were again not calculated for behavioral or alternative curricular measure data sets because there were not enough data points in the baseline period to meet the assumptions for this statistic. Standard mean difference effect size data are presented in Table 6.

SMD was calculated by subtracting the mean of the baseline phase from the mean of the intervention phase and then dividing by the standard deviation of the baseline. This calculation included all baseline and intervention points, outlined in the literature as a SMD_{all} calculation (Olive & Smith, 2005). Effectively, these calculations provided information regarding the

strength of the treatment effect by comparing the means during the baseline period to the mean of data collected throughout the intervention in order to examine change brought on by an intervention.

Table 6. Standard Mean Difference (SMD) Effect Size Calculations

Subject	Phonemic Segmentation Probes	Phonics/ Spelling Probes	Reading Fluency Probes
1	0.857	-1.56	0.291
2	1.24	0.744	0.374
3	9.98	0.163	0.131
5	3.52	0.813	1.48
6	4.17	0.932	-0.947

This method of effect size calculation is recommended as the most superior inferential statistic for use with single subject research because it takes into account all of the data and not just the baseline and last three treatment data collection points, providing for a more complete measure of overall treatment efficacy. If only three of the final treatment data points had been considered, the variability of the data would have been masked and perhaps led to an inflated effect size. Additionally, the calculation resulted in an actual effect size value (*d*) that is more easily understood than PND or Percentage Improvement statistics (Olive & Smith, 2005).

Analysis of SMD effect sizes indicates the greatest strength of effect as seen in prior analyses in the area of segmentation for Subjects 3, 5, and 6. Subjects 1 and 2 showed a positive, yet weaker, SMD effect in the area of segmentation. Weak (and at times, negative) SMD effect sizes were noted across phonics/spelling and fluency areas, indicating the trend of minimal

progress that was made in these areas overall across subjects. However, as was discussed when considering percentage improvement effect sizes, this statistic is also not sensitive to small changes in data trends that might in fact be therapeutically important to the individual subject. As such, these findings should only be considered as support for trends and results noted during the visual inspection of graphs.

CHAPTER 5
DISCUSSION

Summary of Purpose and Results

This dissertation detailed the preliminary investigation of the impact of a two-pronged reading intervention package on the acquisition of specific reading skills and levels of on-task classroom behavior exhibited by students in an alternative school setting. This investigation used intensively delivered, individually-based, empirically-supported reading instructional methodology via direct instructional techniques with students who were placed in an educational setting as a result of behavioral symptomatology that was considered to be unmanageable in their home school districts. One of the interventions was a series of alphabetics lessons addressing the phonemic awareness skill of segmentation and basics phonics principles, and the other was a fluency intervention designed to improve reading fluency by working with students on curriculum-based repeated readings with error feedback. Both experimental groups received both interventions in reversed order.

Five students completed participation in the study. A single subject multiple baseline research design was used to assess the effectiveness of the interventions on reading skill development and on-task behavior. The focus of this study was to examine the effect of the treatments not only on reading acquisition and fluency levels, but also on the level of on-task and compliant classroom behavior exhibited by the students in their classrooms. It was hypothesized that the difficulty with reading that these students exhibited was directly impacting their classroom behavior, and as such improvement in reading skills would serve to increase levels of appropriate classroom behavior for study participants.

Specifically, the study addressed the following research questions:

(a) Will interventions addressing alphabetics skill development and reading fluency improve the reading skill repertoire of students with emotional disturbance and demonstrated reading difficulty who are attending an alternative school?

(b) Will the delivery of interventions addressing alphabetics skill development and reading fluency to students with emotional disturbance and demonstrated reading difficulty who are attending an alternative school improve student levels of on-task and compliant classroom behavior during classroom tasks?

(c) Does it appear that either the alphabetics instruction or the reading fluency intervention was more effective in improving specific reading skill components for students with identified emotional disabilities and reading difficulty who are attending an alternative school?

(d) Did the order in which the interventions were presented have an impact on student achievement or behavioral improvement levels?

Student Reading Achievement

In order to address the first research question, student reading achievement was measured through the use of standardized assessments and specific subskill probes. Standardized measures were administered at the baseline and post-intervention phases, and probing occurred weekly throughout all experimental phases. Gains were most significant in the area of phonemic segmentation, as was evident in the improvement noted between the two administrations of the standardized segmentation subtest, as well as the upward trend noted across all students on the phonemic segmentation probes. In the area of word reading, three of the five students indicated

moderate improvement on the standardized assessment. Students did not appear to make progress in the area of using phonetic skills to spell phonemically regular words (phonemic encoding). Improvement in the area of reading fluency was minimal, as well, both on the standardized and probed measures of this skill. Thus, these data support the hypothesis that phonemic segmentation can be improved through the use of a short-term structured intervention in students with emotional disabilities who are attending an alternative school setting. The interventions as implemented in this study were not effective in producing meaningful gains which were generalized to the areas of word reading or fluency.

Student Behavior

Students were observed in their classrooms by the teacher/principal investigator during reading classes as well as in classes where reading demands were not high. A structured behavioral observation system was used in order to collect data during these focused observations. Student behavioral data were collected in the areas of focus on schoolwork and duration of time engaged in disruptive and/or distracting motor behaviors. Additionally, frequency data were collected to explore both opposition and compliance responses to teacher directions, as well as number of times that students called out in class. The data collected illustrated a high degree of variance, and no clear pattern was evident across subjects. Likewise, no trends were noted in student focus and level of motor movement between reading and non-reading focused classes. Data were affected to a great degree by observation periods where students demonstrated extreme variance in behavioral regulation, leading to outlier data points. As would be expected, a relationship was evident between focus on schoolwork and motor behaviors: lower levels of motor behavior were associated with higher levels of on-task behavior. Oppositional behavior was also associated with a higher number of verbal outbursts.

One student appeared to have made slight gains in his ability to remain focused on his schoolwork, but this appeared to be more related to reactivity from having the observer in the room than it was to the interventions themselves. In sum, no behavioral improvements were indicated as a result of these interventions. It was hypothesized that more frequent behavioral data collection could have potentially been helpful in identifying behavioral trends or patterns.

Treatment Effectiveness

The results of this study suggest that the alphabetics lessons were partially effective in improving specific skill development for students with emotional difficulties who were attending an alternative school setting. The intervention was designed to address both segmentation and phonics skills. An upward trend was noted for all students in the area of phonemic segmentation, both on standardized and probed assessments of this skill. However, observable gains were not observed in the areas of word reading or phonetic decoding, indicating that this part of the alphabetics lessons did not produce meaningful gains. The second intervention, reading with error feedback, was designed to address reading fluency and did not produce significant improvements in either standardized or probed reading fluency assessment. Additionally, neither intervention led to marked improvement in student behavior or performance gains in an alternative curricular area.

Intervention Order Effects

It is unclear as to whether or not the order that the interventions were presented had any bearing on student achievement or behavior. In considering the data, gains were only noted in the area of phonemic segmentation. For subjects in the second experimental condition, an increased magnitude in change was noted in the area of segmentation after a short latency once the alphabetics intervention was introduced. It is important to consider this finding, however, in

light of the fact that the reading fluency intervention was not effective in producing meaningful gains in either condition, so it was impossible to view phase changes of any magnitude or level. As only the alphabetics intervention impacted student performance, it is difficult to consider the impact of intervention order effects in this study.

Effect Size Calculations

Effect size calculations were completed on study data using Percentage of Non-Overlapping Data (PND), Percentage Improvement, and Standard Mean Difference (SMD) formulae as outline in Olive & Smith, 2005. These non-regression calculations supported the findings that were noted during the visual inspection of study graphs. Specifically, in the area of phonemic segmentation, 100% of data points were non-overlapping indicating growth from baseline, a high percentage of increase between baseline and the end of intervention was noted, and relatively strong standard mean differences were calculated indicating growth between baseline and the intervention phases in this area. The same effects were not observed in the areas of phonics/spelling probes, reading fluency assessment, or student behavior, supporting the visual inspection conclusion that relatively little improvement was noted in these areas as a result of having participated in intervention sessions.

Limitations

There are several limitations to consider in this study. The difficulty that comes from working in an applied setting affected study implementation in a variety of ways. Time constraints prevented the teacher/researcher from completing all steps in lesson protocols on several occasions. It was difficult at times to take the time a student may have needed to thoroughly master a lesson concept due to the need to adhere to the students' classroom schedules. Additionally, due to the underestimation of time that would be needed to complete

each intervention session, behavioral observation data collection suffered. Effectiveness may have been increased if more behavioral observations had occurred, allowing the teacher/primary investigator to include more data points in final graphs leading to easier analysis of trends and changes in behavior, as well as to decrease influence of data outliers caused by extremes in student behaviors. Additionally, monitoring of teacher data collection during fluency probing would have led to greater reliability of these scores.

Time constraints also impacted these interventions in that data analysis suggested that the treatments may not have always been applied with the frequency or intensity that these particular students appeared to need. This study was designed to allow for data collection over the course of a one-year period. Intervention delivery and data collection in this study were time-consuming, and had to be performed in conjunction with (and without negatively impacting) the primary investigator's job requirements as the school psychologist. Additionally, the study was designed to contain two experimental groups to allow for the exploration of potential order effects. Providing these interventions more often to fewer students in one experimental condition might have allowed for observation of the effects of increased frequency of the interventions. It is likely that if the interventions were implemented over a greater amount of time with increased frequency to fewer students, reading achievement and behavioral observation data might have illustrated clearer trends and patterns. For example, in a study by Allen-DeBoer et al. (2006), positive results were seen with a direct instruction phonics and fluency intervention that was delivered daily for 30 minute sessions over a period of ten weeks. Extension of intervention phases would have provided students with additional repetition and practice with the skills presented. More stable data points at the end of intervention phases would have provided evidence of mastery or non-mastery. Likewise, extension of baseline

phases could also have been beneficial, in that short baseline periods could have also potentially compromised the internal validity of the study design. In retrospect, it might have been a wise decision to stop an intervention where a high degree of stable performance was evidenced in order to allow for more time for the second intervention and/or more time to provide more sessions to other students who may have required more frequent treatment delivery to reach mastery.

A common methodological problem in multiple baseline designs occurs when phases are altered before a clear pattern emerges (Kazdin, 1982). Unfortunately, this methodological problem existed in this study to some degree. If extreme scores occur, it is unwise to shift phases (Kazdin, 1982), nor should phases have been shifted at times in this study when at least three stable data points were not clearly evident at the end of the phase. Unfortunately, time constraints necessitated phase changes on some occasions in this study when they may not have been warranted, compromising overall methodological design. Additionally, lengthening the baseline phases to allow for a comparison condition would have strengthened the results of the research design and experimental effects (Chambless & Hollon, 1998.) It was the case in this experiment that the teachers repeatedly requested for extended baseline students to begin the intervention once the first student had started receiving intervention lessons, and baselines may not have been extended long enough to meet the demands of the multiple baseline design. There is an ethical risk involved with conducting a multiple baseline design with several subjects in one experimental condition in that the extended baseline phases needed to meet fundamental research design criteria can be considered to be a withholding of treatment.

Another influence of time limitations was seen in the area of overall treatment effectiveness. In this study, the area of segmentation was the only dependent variable that was

significantly impacted by the interventions implemented. This variable was the most discrete and specific area addressed in the study. Word reading, reading fluency, and student behavior are much more complex and multi-layered variables that can be broken down into a wide variety of subskills. Segmentation skills were likely the only variable positively impacted due to the discrete nature of these skills. Task analysis of the other dependent variables, along with more opportunities for repetition and practice in chained subskills in these areas, might have led to greater overall student growth and generalization of reading subskills to the larger reading context. The variability that was evident in student data might have been reduced with longer data collection across all phases with these more targeted interventions. With the relatively large variability exhibited by students in this study, stronger intervention effects would have been needed to infer that a systematic change had occurred (Kazdin, 1982).

Finally, time limitations led to the decision for the teacher/researcher to collect data probes only weekly during all phases of this study. In examining the great degree of variability evident in the data sets for these subjects, it appears that it would have been beneficial to probe students at every session to gather more reliable data. More frequent data collection would have led to more reliable and clearly evident trends in data. Additionally, more data points combined with extension of treatment phases would have provided more stable and reliable data that would lead to increased confidence for future researchers deciding to attempt replication of the study interventions. In single-case designs, it is often the case that crucial decisions about the design can be made only as the data are collected (Kazdin, 1982). There were simply not enough data points across all dependent variables to adequately allow for inferential analysis and such decision making in all cases in this study. The fundamental design issue of when to change phases as to maximize the clarity of data interpretation was affected by the small number of data

points caused by time limits, and as such some fundamental requirements of a multiple baseline design might not have been met.

Another limitation to this study was the amount of influence which the teacher/researcher had on implementation, results, and analysis. The principal investigator of this study was the teacher/researcher, and she was responsible not only for implementing the interventions, but also assessing the effectiveness of such. This high degree of study involvement could have easily led to contamination effects. There is the possibility that she conducted intervention sessions in such a way as to confirm her implicit hypotheses. There could have been "drift" from original study definitions, as this was unmonitored by a second rater. An issue related to this is the relationship that the principal investigator had with student participants. The teacher/principal investigator was an employee of the school, and thus interacted with the subjects on a relatively consistent basis outside of the context of this study both before and after it took place. Reactivity to the teacher/principal investigator was directly observed in this study on one occasion, and likely was evident on other occasions. Additionally, since the students were told that the purpose of the study was to collect information that would eventually lead to the teacher/principal investigator graduating, it is possible that the students altered their behavior in an attempt to "help" this adult whom they might have perceived as having some amount of influence over them. Likewise, the principal investigator also had a previously established relationship with the teachers in this study, all of whom seemed eager to help her gather the data she needed to complete her degree. These preexisting relationships between the principal investigator and study participants and teachers might limit the ability to generalize the results of this study to future interventions geared towards students with emotional disturbance who are attending an alternative school setting.

Finally, an underlying assumption of this study was that identifying the critical components necessary for success with the reading process for students with identified emotional disturbance who are attending an alternative school setting was possible. However, when reviewing the research leading up to the development of this study, it was evident that research in this area was lacking specific to this population. Few specific empirically-supported studies which clearly outline these critical components were available when designing this study. As a result, the principal investigator attempted to synthesize the research on reading interventions in general and extrapolate it to this population. In doing so, it could be that critical components of the reading process for these particular students were actually overlooked due to preference or perceived belief about the interventions themselves by the principal investigator. It is clear that more research is needed in this area.

Implications for Future Research

The hypothesis that addressing the academic needs of students with identified emotional disturbances can lead to positive behavioral change is a concept that deserves further study. Due to the high levels of comorbidity between emotional difficulties and learning problems, it is unwise for any educator to attempt to address one of these issues without addressing the other. Specifically, the results of the current study suggest that short-term intervention in the area of segmentation can lead to gains in this specific skill area for students with identified emotional disturbance. The extent to which this finding extends and generalizes to other areas of the reading process is unclear and warrants further exploration. Although the results of this study suggest that the alphabetics intervention alone led to improvement in phonemic segmentation skills, the data for impact of the interventions on the areas of word reading, phonics skill application, and reading fluency were weak and contained a large amount of variability.

Discarding these interventions as having the potential to provide therapeutic benefit to these students would be a disservice to them and other students with identified emotional and reading difficulties. A good area for future research would be to replicate this preliminary investigation and apply these interventions with a similar population, but to extend all phases of the study and utilize more sessions to address student needs. Overlooking weak but reliable effects can have unfortunate consequences in that interventions in the initial stages of development could be discarded before they could be developed further. Interventions with reliable but weak effects could eventually lead to more potent effects if investigators developed them further (Kazdin, 1982). Additionally, the interventions were conducted by a school psychologist in a 1:1 setting with students, and this luxury is not always available in traditional applied settings. Future studies should explore the possibility of using teachers as interventionists through developing empirically-supported treatments that they find acceptable. Treatment utility, or effectiveness, is best shown when a treatment can be shown to work in actual clinical practice under naturalistic conditions (Chambless & Hollon, 1998), and in schools teachers (not school psychologists) are typically the "clinicians" working with students to improve their reading skills. Treatments that are straightforward, easy to learn, and that cost the least, such as the interventions outlined in this study, are likely to be preferred and actually used in applied settings (Chambless & Hollon, 1998).

Additionally, the number of empirically supported interventions designed to address the reading needs of students with identified emotional difficulties are few and far between. Further research should explore the efficacy of other empirically-supported reading interventions with this population to add to the literature base of what is effective for these students. Research suggests that these interventions need to be delivered quickly and efficiently owing to the

sometimes transient nature of this population (Allen-DeBoer et al., 2006). Additionally, the use of student graphing of progress could be explored as a way to increase student motivation (as seen in Allen-DeBoer et al., 2006). Peer-mediated instruction could be explored as an effective means for completing repeated reading interventions (as in Staubitz et al, 2005). In implementing these interventions, clearly-defined methodology marked by stringent data collection and treatment integrity monitoring checks should be put in place while conducting well-designed interventions. Attempting to implement these interventions with students without these standards will lead to conclusions about interventions that are not empirically validated. This will open the door for ineffective interventions. In doing so, interventions that are implemented with integrity will assume a degree of student failure, when in fact the lack of response could be better attributed to poor intervention design and selection. Creating effective reading programs for students with identified emotional and reading needs will provide them with not only a way to improve their literacy skills, but also a way to reduce the risk of long-term negative outcomes.

Implications to the Field

School psychologists are under increasing pressure to classify students with disabilities based on their response to interventions rather than eligibility definitions. Data about interventions that are effective with populations such as this will aid the school psychologist in setting up school-wide interventions for students facing classification decisions. When such interventions are in place in a school, and students undergoing an evaluation have participated in such, the school psychologist will be able to examine the data of student performance before, during, and after the intervention to determine if in fact a response to the intervention took place. Data about response to interventions such as those implemented in this study will also provide

information allowing the psychologist to rule out other possible classifications. Without knowledge of what is empirically supported to work for particular students, this process can not take place.

Additionally, school psychologists could play an important role in ensuring that students with emotional and behavioral problems are receiving appropriate instruction to address their reading needs, and that school staff is not dealing with behavioral concerns to the exclusion of academics. Teachers report that separating behavioral challenge from academic problems is difficult when working with students with emotional difficulties (Barton-Arwood et al. 2005). The balance between behavior management and academic instruction can be influenced by the school psychologist in applied settings. Consultation with members of the school staff when working with this population will allow school psychologists to address the integration of management procedures with academic programs so that both needs receive intervention, and students are able to demonstrate higher levels of participation during reading instruction (Strong et al, 2004).

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Appendix A

Sample Parent/Caregiver Consent Form

TEMPLE UNIVERSITY
A Commonwealth University

Department of Psychological Studies in Education

Second Floor, Ritter Annex (004-00)
Philadelphia, Pennsylvania, 19122
Phone: (215) 204-6012
Fax: (215) 204-6013

PARENT/CAREGIVER CONSENT FORM

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

Investigators
Catherine A. Fiorello, Ph.D., Associate Professor, School Psychology Program, 215-XXX-XXXX
Julie F. Dwyer, M.Ed., Doctoral Student, School Psychology Program, 1-800-XXX-XXXX xXXXX

Purpose of the Study
I understand that the purpose of this research is to examine the effects that individually-delivered reading decoding and fluency interventions will have on alternative school students' reading skills and behavior.

How the Children Were Selected
I understand that my child was selected based on teacher referral as a student exhibiting difficulty with reading. Average readers and students not identified with a classification of emotional disturbance will not be included in the study.

General Experimental Procedures
I understand that my child will receive individualized reading instruction by a certified teacher/school psychologist for approximately 20-minute sessions, three times per week, for approximately 16-24 sessions as needed. I understand that this means my child will miss normal classroom activities, but that all attempts will be made to make this a convenient time for the teacher and student. I understand that my child will be asked if he or she would like to participate, and will not have to do so even if I consent. Measures of the reading skills being studied, as well as my son/daughter's behavior, will be collected on an ongoing basis by Ms. Dwyer. This assessment data will provide information as to my son/daughter's progress, as well as whether or not the lessons are working. Several lessons will be audiotaped to ensure that the lessons are being implemented correctly. Information on student progress and how well the lessons are working will be collected at every session by Ms. Dwyer, and I understand that a written summary of results will be shared with me at the conclusion of the study. My child's name will never appear in connection with any of the data collected. All data will be kept confidential, and audiotapes will be destroyed at the conclusion of the study. Results of the study that may be presented or published will discuss results without identifying my child individually.

PARENT/CAREGIVER CONSENT FORM, page 2

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

Possible Risks
I understand that a risk for my child is the loss of time spent on a different activity. My child may become frustrated when asked to practice material that is difficult, but I understand that the investigator will reassure my child and allow him or her to stop if upset.

Benefits
I understand that my child will receive individualized, direct 1:1 instruction in reading with a certified teacher/school psychologist. Information on how well the lessons are working will be collected at every session. I will receive a written summary of my child's progress and what worked best for my child. This information will also be shared with his or her teacher and could be helpful in planning future reading goals.

Confidentiality/Anonymity
I understand that all papers and information from this research study will be kept confidential according to federal, state, and local laws and regulations. My child's name will never appear in connection with any of the information collected. I understand that files and information from the study may be reviewed by the University's Institutional Review Board or by federal agencies to make sure that the investigators are doing the study properly and obeying federal regulations. I understand that the results of this study may be presented or published. If so, my child and my child's school will not be identified by name or anything else that will indicate who they are.

Disclaimer/Withdrawal
I understand that I am free to decide whether or not my child participates in the study. I understand that even if I consent, my child is free to decide whether or not to participate. I further understand that not participating in the research or dropping out of the research will yield no negative consequences for my child in the future by the investigators or by Temple University.

Compensation
I understand that neither my child nor I will receive compensation for participation in this project. I understand that although my child will receive reading instruction, it is specific to this project. This reading instruction program may or may not be successful for my child.

PARENT/CAREGIVER CONSENT FORM, page 3

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

Injury
I understand that if my child were injured at any time during this study, I would be free to remove him or her. I am free to discontinue participation at any time and would choose to do so were he or she injured.

Termination
I understand that I am free to drop out of the research at any time and will experience no side effects. I understand that my child will receive individualized reading instruction for approximately 16 to 24 sessions, with the number of sessions based on how long he or she needs to achieve the reading goals of the study.

Institutional Contacts
I understand that if I wish further information regarding my child's rights as a research subject, I may contact Mr. Richard Throm, Institutional Review Board Manager and Coordinator, in the Office of the Vice President for Research of Temple University, 3400 N. Broad Street, Philadelphia, PA, 19140, 215-XXX-XXXX.

Questions
I understand that I may ask the investigators questions about the research and my child's participation and that these questions will be answered to my satisfaction before I agree to have my child participate. I may also contact Catherine A. Fiorello, Ph.D., Associate Professor, School Psychology Program, at 215-XXX-XXXX.

Final Statement and Signature
This study has been explained to me. I have read the consent form and I agree to have my child participate. I have been given a copy of this consent form for my records.

Child's Name (please print)	Date of Birth	Teacher's Name

Parent/Guardian's Name (please print)	Parent/Guardian's Signature	Home Phone Number	Date

Principal Investigator's Name (please print)	Principal Investigator's Signature	Date

Appendix B

Sample Parent/Caregiver Consent Form for Permission to Audiotape

TEMPLE UNIVERSITY
A Commonwealth University

Department of Psychological Studies in Education

Second Floor, Ritter Annex (004-00)
Philadelphia, Pennsylvania, 19122
Phone: (215) 204-6012
Fax: (215) 204-6013

PERMISSION TO AUDIOTAPE

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

Investigators
Catherine A. Fiorello, Ph.D., Associate Professor, School Psychology Program, 215-XXX-XXXX
Julie F. Dwyer, M.Ed., Doctoral Student, School Psychology Program, 1-XXX-XXXX xXXXX

I give Julie F. Dwyer, M.Ed., permission to audiotape my son or daughter as reading lessons are being delivered as part of the above study. I understand that the audiotapes will be used to determine if lessons are being implemented correctly and carried out the way they were intended to be delivered. The audiotapes will not be used as an indication of my son or daughter's progress in the reading curriculum.

The audiotapes will be reviewed after the lessons have been completed either by Ms. Dwyer or another school psychologist who is a graduate of the School Psychology Program at Temple University who is assisting her with the study. I understand that the tapes will be kept confidential according to federal, state, and local laws and regulations. My child's name will never appear in connection with any of the information collected on the audiotapes. I understand that audiotapes from the study may be reviewed by the University's Institutional Review Board or by federal agencies to make sure that the investigators are doing the study properly and obeying federal regulations. Results of the study that may be presented or published will discuss results without identifying my child individually.

When will my child be audiotaped?
I give my permission for my child to be taped for the entire duration (approximately 20 minutes per session) during which each reading lesson is being implemented.

How long will the tapes be used?
I give my permission for these tapes to be used from April 2006 through April 2007. The data will be stored for three (3) years after completion of the study.

What if I change my mind?
I understand that I can withdraw my permission at any time. Upon my request, the audiotapes will no longer be used. This will not affect my relationship with Ms. Dwyer or the XXXXX School in any way.

PERMISSION TO AUDIOTAPE, page 2

Compensation
I understand that neither my child nor I will receive compensation for participation in this project.

Injury
I understand that if my child were injured at any time during this study, I would be free to remove him or her. I am free to discontinue participation at any time and would choose to do so were he or she injured.

Institutional Contacts
I understand that if I wish further information regarding my child's rights as a research subject, I may contact Mr. Richard Throm, Institutional Review Board Manager and Coordinator, in the Office of the Vice President for Research of Temple University, 3400 N. Broad Street, Philadelphia, PA, 19140, 215-XXX-XXXX.

Questions
I understand that I may ask the investigators questions about the research and my child's participation and that these questions will be answered to my satisfaction before I agree to have my child participate. I may also contact Catherine A. Fiorello, Ph.D., Associate Professor, School Psychology Program, at 215-XXX-XXXX.

Final Statement and Signature
This study has been explained to me. I have read the permission to audiotape form and I agree to have my child be taped as a participant in the study. I have been given a copy of this consent form for my records.

Child's Name (please print)	Date of Birth	Teacher's Name

Parent/Guardian's Name (please print)	Parent/Guardian's Signature	Home Phone Number	Date

Principal Investigator's Name (please print)	Principal Investigator's Signature	Date

Appendix C

Sample Student Assent Form

TEMPLE UNIVERSITY
A Commonwealth University

Department of Psychological Studies in Education

Second Floor, Ritter Annex (004-00)
Philadelphia, Pennsylvania, 19122
Phone: (215) 204-6012
Fax: (215) 204-6013

STUDENT ASSENT FORM

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

Catherine A. Fiorello, Ph.D., Associate Professor, School Psychology Program, 215-XXX-XXXX
Julie F. Dwyer, M.Ed., Doctoral Student, School Psychology Program, 1-800-XXX-XXXX xXXXX

Read to Student:

"As you know, my name is Ms. Julie and I'm a school psychologist here at the XXXXX School. I also used to be a teacher. Your [Mom, Dad, etc.] said it would be OK for me to work with you on some reading lessons. You were also chosen by your teacher to get extra help with your reading. Helping you to improve your reading skills could lead to you focusing better in class. I am doing this research to help me graduate from Temple University. If you choose to participate, you will work 1:1 with me (Ms. Julie) for about 20 minutes, three days each week, on reading lessons. This means you may miss activities that the other students in your class are doing when you go to these reading lessons.

You will also be asked to do such things as answer questions and practice your reading skills. Sometimes another school psychology student from my school will ask you these questions. Some of the activities you are going to be asked to do are easy, and some are going to be hard. I just ask that you do the best you can. Your name and school will be kept private and will not be connected to your work. If you do not want to participate you do not have to. You are free to decide whether or not you want to participate. If you do not participate, you will not get into trouble with school, your teacher, or me (Ms. Julie.) If you ever become frustrated or need to take a break, please let me know.

Do you understand that I am asking you to participate in reading activities with me? [Discuss questions as needed.] Would you like to do these reading lessons and activities with me? [Wait for child's response.] If you change your mind later, you can just tell me and we'll stop."

STUDENT ASSENT FORM, page 2

Increasing Reading Skills and On-Task Behavior in Alternative School Students through Empirically-Supported Reading Interventions: A "Behavior Support Plan" to Consider

After Student Response

If the child says no, bring him or her immediately back to class.

If the child says yes, welcome him/her, and inform him or her of when the lessons will be starting.

Child's Statement and Signature of Consent
I understand what I am being asked to do today. I know that I can ask to stop at any time. I will try my best on these activities. I agree to participate in this research study.

Child's Name (please print)

Child's Signature

Today's Date

Appendix D

Alphabetics Lessons 1-12

Alphabetics Lesson 1

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **fad, lag, rag**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **rod, sin, wet, fan, led, ran, rot, sit, will, fat**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants and corresponding sounds. Consonants are presented on index cards**: b, c, d, f, g, h, j, k, l**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. **short a, short e**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **hag, gag, keg**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **lad, fad, bell, cab, gal**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 2

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **leg, rat, rug**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **sip, wish, fed, let, red, rum, sod, yes, fin, lid**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants and corresponding sounds. Consonants are presented on index cards: **m, n, p, q, r, s, t, v, w, x, z**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. l**ong a, long e**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **pass, man, ran**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **tep, zen, san, wen, vat**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 3

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **rig, sad, sum**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **fit, lip, rim, sat, sun, fun, log, lot, rip, set**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following digraphs and corresponding sounds. Digraphs and consonants are presented on index cards: **ch, sh, th, wh, b, m, t, s, m, n, l**
2. _____ Teacher introduces the following vowel sound: Letter(s) representing the sound are presented on index cards. **long i, long o**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **shom, chib, mith**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **nosh, chol, thin, whob, chot**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 4

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **pet, cot, net**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **bag, cap, dig, jet, pin, tin, bat, cat, dip, jog**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following blends, consonants and corresponding sounds. Consonants and blends are presented on index cards: **bl, cl, fl, gl, pl, br, cr, s, t, d, b, m, n,**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. **short i, short o, long u**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **glod, flib, clus**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **glom, brum, flon, glut, plon**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 5

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **city, fork, lazy**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **round, silk, soft, weld, baby, brass, cart, dark, jump, pond**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants, blends and corresponding sounds. Consonants and blends are presented on index cards: **dr, fr, gr, pr, tr, sk, sl, c, b, d, f, g, h, l, n**
2. _____ Teacher introduces the following vowel/digraph sounds: Letter(s) representing the sound are presented on index cards. **short o, ie, ee, oa, ay**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **gree, skay, slay**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **free, gray, sloan, die, loan**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 6

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **tiger, fact, found**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **left, sand, silly, swim, wind, bank, bump, cast, drop, just**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants, digraphs and corresponding sounds. Consonants are presented on index cards: **z, p, q, r, s, t, v, w, ch, sh, th wh**
2. _____ Teacher introduces the following vowel/digraph sounds: Letter(s) representing the sound are presented on index cards. **ai, ee, ie, oa, ay, ea, long o, long u**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **veesh, chay, show**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **thay, shup, wheez, paiz, sie**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 7

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **pizza, tiny, belt**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **bunny, class, gasp, kept, plan, trap, fast, frog, letter, sent**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants/blends and corresponding sounds. Consonants are presented on index cards: **str, scr, spr, sw, st, sp, sl, m, r, s, t, l, g**
2. _____ Teacher introduces the following vowel sound: Letter(s) representing the sound are presented on index cards. **short a, long e, ou, oo, oi, ew, ow**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **stroo, spew, scrag**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **scrow, strew, sler, stew, slat**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 8

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **skip, spell, yarn**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **best, busy, crib, grin, pant, prop, twig, felt, into, lump**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants/digraphs and corresponding sounds. Consonants are presented on index cards: **b, l, s, r, t, w, z, n, p, ch, sh, th, wh**
2. _____ Teacher introduces the following vowel sound: Letter(s) representing the sound are presented on index cards. **au, aw, ew, ou, oo, long i, long o**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **chil, shor, boot**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **blew, thaw, raw, shout, shoo**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 9

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **scan, smog, step**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **black, blot, camp, cold, gust, pest, tent, flop, last, rest**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants and corresponding sounds. Consonants are presented on index cards: **b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, u, v, w, x, y, z**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. **short a, short e, short i, short o, short u**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **big, pot, dag**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **tug, jut, lit, bat, ref**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 10

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **dance, task, girl**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **school, pony, soda, chips, movie, baby, cars, bugs, sneak, rest**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants/digraphs and corresponding sounds. Consonants are presented on index cards: **b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, z, ch, sh, th, wh**
2. _____ Teacher introduces the following vowel sound: Letter(s) representing the sound are presented on index cards. **long a, long e, long i, long o, long u, ar, er, ir, ur, or**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **when, star, shor**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **pos, tar, her, fir, for**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 11

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **snow, steak, desk**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **test, rat, tune, brat, find, horse, penny, three, soup, play**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants /blends and corresponding sounds. Consonants are presented on index cards: **b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z, bl, cl, fl, gl, pl, br, cr, dr, fr, gr, pr, tr, sk, sl, sp, st, sw, spr, scr, str**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. **ar, er, ir, ur, ai, ee, oa, ea, ay, long i, short a**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **tree, sway, spree**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **bloat, flea, slur, stag, brat**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Alphabetics Lesson 12

Student's Identification Number: _____
Date of Lesson: _____
Start Time of Lesson: _____
End Time of Lesson: _____

Phonemic Segmentation Task (10 minutes)

Note: Chips are to be used to represent phonemes.

1. _____ Teacher models segmentation of the following words: **peg, pot, sand**
2. _____ Teacher prompts students to segment words modeled in step 1.
3. _____ Teacher prompts students to segment the following words independently: **mind, hug, less, thump, found, mill, cab, tank, dust, funny**
4. _____ Teacher provides feedback for each error, then prompts student to segment the word again.
5. _____ All ten practice words are completed.
6. _____ Students are praised for effort.

Phonics Task (10 minutes)

1. _____ Teacher introduces the following consonants/digraphs and corresponding sounds. Consonants are presented on index cards: **b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z, ch, sh, th, wh**
2. _____ Teacher introduces the following vowel sounds: Letter(s) representing the sound are presented on index cards. **long a, long e, long i, long o, long u, ar, ir, oo, oy, au, aw, ew**
3. _____ Teacher manipulates cards in consonant-vowel-consonant (CVC) presentation and encourages the students to sound out the words and nonwords. Ten practice items are presented.
4. _____ Students are given paper and pencil to practice writing phonemically regular words containing consonants and vowels covered in lesson. Teacher first models using phonics skills and segmentation to write word. **char, both, root**
5. _____ Teacher presents five practice words to students. Students are encouraged to write each word. Answers are compared and feedback is given. Incorrect responses practiced again. **hoop, shaw, mirth, shewn, when**
6. _____ Students are praised for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Appendix E

Reading Fluency Lessons Form

Reading Fluency Lesson _____ (1-12) (15 Minutes)

Student's Identification Number:_____

Date of Lesson: _____

Start Time of Lesson: _____

End Time of Lesson: _____

CBM Passage Title: _____

Steps in lesson to be completed by teacher/researcher:

1. ____ Introduces reading, explains directions.

2. ____ Prompts student to read through passage for first pass.

3. ____ Errors are corrected and noted on record form. Student is immediately encouraged to continue reading at beginning of sentence containing error.

4. ____ Unknown words supplied for student within 3 seconds and noted on record form. Student is immediately encouraged to continue reading at beginning of sentence containing error.

5. ____ Errors and unknown words are shown and modeled to student. Student looks at each error word and repeats word three times.

6. ____ Encourages student to read through passage for second pass.

7. ____ Uses error correction during second pass. This involves supplying the error word to the student once and encouraging him or her to continue reading from the beginning of sentence containing the error.

8. ____ Encourages student to read through passage for third and final pass.

9. ____ Uses error correction during third pass. This involves supplying the error word to the student once and encouraging him or her to continue reading from the beginning of sentence containing the error.

10. ____ Praises the student for effort.

Directions: Score a plus (+) if the teacher/researcher completes the task, score a minus (-) if the teacher/researcher does not complete the step.

Appendix F

Sample Reading Fluency Passage

Number the Stars Passage 1

The two soldiers turned away. Quickly Annemarie reached down again and grabbed her sister's hand before Kirsti could resist. Hurrying the little girl along, she rounded the corner. In a moment Ellen was beside her. They walked quickly, not speaking, with Kirsti between them, toward the large apartment building where both families lived.

When they were almost home, Ellen whispered suddenly, "I was so scared."

"Me too," Annemarie whispered back.

As they turned to enter their building, both girls looked straight ahead, toward the door. They did it purposely so that they would not catch the eyes or the attention of two more soldiers, who stood with their guns on this corner as well. Kirsti scurried ahead of them through the door, chattering about the picture she was bringing home from kindergarten to show Mama. For Kirsti, the soldiers were simply part of the landscape, something that had always been there, on every corner, as unimportant as lampposts, throughout her remembered life.

"Are you going to tell your mother?" Ellen asked Annemarie as they trudged together up the stairs. "I'm not. My mother would be upset."

"No, I won't, either. Mama would probably scold me for running on the street."

She said goodbye to Ellen on the second floor, where Ellen lived, and continued on to the third, practicing in her mind a cheerful greeting for her mother: a smile, a description of today's spelling test, in which she had done well.

Taken from <u>Number the Stars</u> by Lois Lowry (1989.)

Appendix G

Segmentation Probes 1-12

Segmentation Probe 1

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Baby	4	
2	Brass	4	
3	Fad	3	
4	Sum	3	
5	Jump	4	
6	Pond	4	
7	Rat	3	
8	Bank	4	
9	Bump	4	
10	Cast	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 2

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Drop	4	
2	Jug	3	
3	Pizza	4	
4	Kid	3	
5	City	4	
6	Gasp	4	
7	Lazy	4	
8	Round	4	
9	Ten	3	
10	Soft	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 3

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Weld	4	
2	Fact	4	
3	Bug	3	
4	Left	4	
5	Sand	4	
6	Jog	3	
7	Swim	4	
8	Wind	4	
9	Cap	3	
10	Frog	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 4

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Belt	4	
2	Bunny	4	
3	Sod	3	
4	Gasp	4	
5	Kept	4	
6	Log	3	
7	Trap	4	
8	Rod	3	
9	Frog	4	
10	Letter	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 5

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Sent	4	
2	Skip	4	
3	Spell	4	
4	Rum	3	
5	Best	4	
6	Busy	4	
7	Crib	4	
8	Grin	4	
9	Dog	3	
10	Jam	3	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 6

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Twig	4	
2	Blot	4	
3	Camp	4	
4	Let	3	
5	Gust	4	
6	Pest	4	
7	Tent	4	
8	Rig	3	
9	Pot	3	
10	Open	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 7

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Sound	4	
2	Can	3	
3	Want	4	
4	Flop	4	
5	Fed	3	
6	Rest	4	
7	Kid	3	
8	Mound	4	
9	Short	4	
10	Best	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 8

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Flap	4	
2	Melt	4	
3	Top	3	
4	Dress	4	
5	Rot	3	
6	Lag	3	
7	Damp	4	
8	Band	4	
9	Past	4	
10	West	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 9

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Leg	3	
2	Dug	3	
3	Camp	4	
4	Truck	4	
5	Twig	4	
6	Bunny	4	
7	Fun	3	
8	Dark	4	
9	Roast	4	
10	Baby	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 10

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Flag	4	
2	Flop	4	
3	Sag	3	
4	Snag	4	
5	Cat	3	
6	Twig	4	
7	Yarn	4	
8	Dad	3	
9	Rest	4	
10	Found	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 11

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Just	4	
2	Drop	4	
3	Rim	3	
4	Gold	4	
5	Rag	3	
6	Kind	4	
7	Den	3	
8	Kept	4	
9	Cart	4	
10	Drop	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Segmentation Probe 12

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student: I am going to say a word. You show me how many sounds you hear in the word by moving one chip for each sound that you say. Let's try one for practice. The word is *map*. *Map* has three sounds, /m/ /a/ /p/. (Move one chip for each sound you say.) Now it's your turn. How many sounds does the word _____ have?

Item Number	Stimulus Word	# of Phonemes in Word	# of Phonemes Correctly Segmented
1	Just	4	
2	Smog	4	
3	Letter	4	
4	Red	3	
5	Gas	3	
6	Fact	4	
7	Sand	4	
8	Step	4	
9	Can	3	
10	Land	4	
		TOTAL: 37	**TOTAL:**

Accuracy Score: _____%

Total # of Phonemes Correctly Segmented (Column 4) divided by Total # of Phonemes in Words (Column 3)

Appendix H

Phonics/Spelling Probes 1-12

Phonics/Spelling Probe 1

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Flag		
2	Fig		
3	This		
4	Den		
5	Show		
6	Gal		
7	Shot		
8	Pen		
9	What		
10	Run		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 2

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Clot		
2	Hog		
3	Glow		
4	Bed		
5	Prim		
6	Cow		
7	Slip		
8	Did		
9	Stew		
10	Fat		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 3

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Brow		
2	Hat		
3	Dress		
4	Hen		
5	Blur		
6	Mat		
7	Flat		
8	Jig		
9	Stir		
10	Kin		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 4

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	This		
2	Zip		
3	When		
4	Win		
5	Skip		
6	Vat		
7	Trod		
8	Weld		
9	Spit		
10	Pin		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 5

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Brat		
2	Nod		
3	Grit		
4	Ten		
5	Trip		
6	Red		
7	Blip		
8	Sat		
9	Sprig		
10	Wig		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 6

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Week		
2	Flop		
3	Chip		
4	Sap		
5	Grip		
6	Dad		
7	Day		
8	Hut		
9	Crash		
10	Stun		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 7

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Scrod		
2	Pod		
3	Greg		
4	Hill		
5	Drew		
6	Girl		
7	Nut		
8	Fish		
9	Shin		
10	Pie		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 8

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Brew		
2	Gig		
3	Plug		
4	Dirt		
5	Wit		
6	Melt		
7	Thin		
8	Gas		
9	Drip		
10	Beg		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 9

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Feed		
2	Bin		
3	Sheet		
4	Tan		
5	Say		
6	Don		
7	Feet		
8	Gap		
9	Toad		
10	Yip		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 10

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Toy		
2	Zen		
3	Ship		
4	Yarn		
5	Chip		
6	Flog		
7	Blur		
8	Ton		
9	Rip		
10	Cot		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 11

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Pay		
2	Rap		
3	Road		
4	Tag		
5	Need		
6	Tip		
7	Paid		
8	Tot		
9	Stir		
10	Sod		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Phonics/Spelling Probe 12

Student's Identification Number:_____

Date of Probe: _____

Directions to be read to the student:

Item Number	Stimulus Word	Student Response	Correct = 1 Incorrect = 0
1	Shut		
2	Hip		
3	Chug		
4	Gut		
5	Trip		
6	Foot		
7	Skip		
8	Till		
9	Bran		
10	Rob		
			# Correct:

Accuracy Score: _____%

Correct divided by 10

Appendix I

Response Form for Phonics/Spelling Probes

Student Response Form – Phonics/Spelling

Name: _____ Date: _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

Appendix J

SECOS Data Collection Form

SECOS Form

Rater: **Date:** **Start Time:**

Student ID: **Type of Class:** **Stop Time:**

States	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**%**
School Work																			
Motor Behavior																			
Event	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**#**
Direction - Opposition																			
Direction - Compliance																			
Call Out																			

Rater: **Date:** **Start Time:**

Student ID: **Type of Class:** **Stop Time:**

States	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**%**
School Work																			
Motor Behavior																			
Event	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**#**
Direction - Opposition																			
Direction - Compliance																			
Call Out																			

Appendix K

Alternative Curricular Measure Probes 1-5

Alternative Curricular Measure 1

Name: _____ Date: _____

Solve.

567 **- 471** **----------**	**417** **- 390** **---------**	**328** **+ 376** **----------**
189 **+ 671** **----------**	**561** **- 137** **----------**	**598** **+ 237** **---------**
938 **- 178** **----------**	**874** **+ 421** **----------**	**621** **- 212** **---------**
371 **- 217** **--------**	**365** **+ 562** **--------**	**263** **+ 519** **--------**

Alternative Curricular Measure 2

Name: _____ Date: _____

Solve.

935 **- 621** **----------**	**834** **- 619** **---------**	**846** **+ 376** **----------**
739 **+ 671** **----------**	**711** **- 137** **----------**	**972** **+ 237** **---------**
234 **- 178** **----------**	**730** **+ 421** **----------**	**456** **- 212** **---------**
712 **- 217** **--------**	**441** **+ 562** **--------**	**623** **+ 519** **--------**

Alternative Curricular Measure 3

Name: _____ Date: _____

Solve.

935 **- 189** **----------**	**834** **- 388** **---------**	**943** **+ 376** **----------**
739 **+ 858** **----------**	**741** **- 137** **----------**	**972** **+ 188** **---------**
234 **- 109** **----------**	**539** **+ 421** **----------**	**906** **- 212** **---------**
712 **- 587** **--------**	**441** **+ 743** **--------**	**623** **+ 549** **--------**

Alternative Curricular Measure 4

Name: _____ Date: _____

Solve.

731 **- 567** **----------**	**854** **- 467** **---------**	**835** **+ 376** **----------**
866 **+ 858** **----------**	**721** **- 137** **----------**	**972** **+ 655** **---------**
844 **- 109** **----------**	**539** **+ 672** **----------**	**742** **- 212** **---------**
712 **- 174** **--------**	**441** **+ 632** **--------**	**623** **+ 911** **--------**

Alternative Curricular Measure 5

Name: _____ Date: _____

Solve.

541 **- 509** **----------**	**854** **- 831** **---------**	**275** **+ 376** **----------**
841 **+ 858** **----------**	**890** **- 137** **----------**	**507** **+ 655** **---------**
561 **- 109** **----------**	**732** **+ 672** **----------**	**521** **- 212** **---------**
712 **- 419** **--------**	**441** **+ 319** **--------**	**739** **+ 911** **--------**

Appendix L

Sample Parent Feedback Letter

TEMPLE UNIVERSITY
A Commonwealth University

Department of Psychological Studies in Education

Second Floor, Ritter Annex (004-00)
Philadelphia, Pennsylvania, 19122
Phone: (215) 204-6012
Fax: (215) 204-6013

Reading Intervention Assessment Report

Student Name: XXXX **Date of Report**: 12/19/06

Student Birth Date: XXXXX **Grade**: 5

Examiner: Julie F. Dwyer, M.Ed., NCSP, School Psychologist

Thank you for allowing XXXXX to participate in the reading intervention I completed as part of my doctoral dissertation research. XXXXX received 19 one-on-one sessions to work on his reading segmentation, phonics, and fluency skills. He was a true pleasure to work with over the course of the sessions, and demonstrated good effort to improve his reading skills.

His results on the assessments given as part of the intervention process were as follows:

Standardized Assessments

XXXXX was administered three subsets before the intervention started to measure his performance in the areas of phonemic segmentation, word decoding, and reading fluency. These same three measures were administered to him when the interventions were finished to measure his progress. His performance, in percentiles, is contained in the following chart:

CTOPP Segmenting Words		**WJ-III Letter/Word Identification**		**WJ-III Reading Fluency**	
Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**	**Pre-Test**	**Post-Test**
16	63	20	37	30	52

These results indicate that XXXXX's performance improved in all areas as assessed by these instruments.

Weekly Probes

XXXXX's ability to segment words, apply knowledge of phonics to spelling words, and his fluency were also assessed weekly throughout the assessment using brief probes. His performance on these probes is summarized in the following chart. The results are presented as an average of the amount of tasks he was able to complete correctly both before the intervention and after the intervention for segmenting and phonics/spelling, and as the number of words he was able to read correctly per minute at his instructional level for reading fluency.

Segmenting Words Probes		Phonics/Spelling Probes		Reading Fluency Probes	
Pre-Test Average	**Post-Test Average**	**Pre-Test Average**	**Post-Test Average**	**Pre-Test Average**	**Post-Test Average**
66%	97%	88%	100%	87 wcpm	101wcpm

These results support the data described above, indicating that XXXXX has made improvement in his segmenting, applying phonics to spelling, and reading fluency skill sets.

Behavioral Data

Finally, XXXXX's level of on-task behavior in class was measured weekly to determine if potential improvement in reading skills and/or the individualized attention he received by participating in this reading study had positive effects on ability to attend in class. The following table contains his percentages of on-task behavior during one reading and one other class both before and after the intervention for comparison purposes

Reading Class On-Task Level		Non-Reading Class On-Task Level	
Pre-Intervention	**Post-Intervention**	**Pre-Intervention**	**Post-Intervention**
50%	83%	83%	94%

These results indicate that XXXXX was slightly more on-task when observed in his classroom following the intervention.

Summary

XXXXX appears to have made positive strides in his reading segmentation and phonics skills, as well as his reading fluency. It is hoped that he will continue to make positive gains in these areas in the months and years to come.

Thank you again for allowing XXXXX to participate in this intervention. If you have any questions regarding these results, please do not hesitate to contact me at XXX-XXX-XXXX on any Tuesday.

Sincerely,

Julie F. Dwyer M.Ed. NCSP
Certified School Psychologist
XXXXX School