A canine audience: The effect of animal-assisted therapy on reading progress among students identified with learning disabilities

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A Canine Audience: The Effect of Animal-Assisted Therapy on Reading Progress
Among Students Identified with Learning Disabilities

by

Julie Omodio Griess

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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Dedication

I would like to dedicate this dissertation to my two beautiful daughters, Riley and Maya, who witnessed that education is an ongoing journey and remind me that life is about having fun and feeding the ducks.
Acknowledgments

I would like to express my sincere gratitude to Dr. Ann Cranston-Gingras for her continual support and belief in me throughout my process. She has provided me with an exemplary model of high-standards and balance in higher education. Dr. Betty C. Epanchin afforded a solid foundation through hands-on experiences and opportunities both in and beyond the University environment. Dr. John Ferron generously shared his knowledge of single subject design, expanding my knowledge of quantitative research methods. Dr. James King shared his enthusiasm for “thinking outside the box” and continually supported my research interest in Animal-Assisted Therapy. Dr. Jeannie Kleinhammer-Tramill generated thoughtful questions to encourage a deeper level of understanding of my research.

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A Canine Audience: The Effect of Animal-Assisted Therapy on Reading Progress Among Students Identified with Learning Disabilities

Julie Omodio Griess

ABSTRACT

This study explored the use of animal-assisted therapy with students identified with a learning disability and limited reading success. Initially, reading progress was defined as the participants’ comprehension rate obtained from an oral Informal Reading Inventory (IRI) passage. The nature of the Informal Reading Inventory requires the introduction of more difficult reading passages as the student’s comprehension rate increases, potentially masking the overall effect of the intervention. Due to this factor and erratic student performance, which is a common characteristic of students with learning disabilities, obtaining consistent comprehension rates was difficult. Therefore, progress was defined only as total amount of time the student was engaged in reading under each condition.

A reversal replication, single case design was implemented to determine the effects of reading to the therapy dog on the students’ reading progress as measured by total amount of time read. The analysis indicated a statistically significant increase in the total amount of reading time as determined by the participants in the presence of the therapy dog. Positive student feedback about their experience reading with the therapy dog supported the effect of the intervention on reading progress.
Chapter One
Introduction

Reading is fundamental to function in our literate society yet, only thirty-three percent of our nation’s fourth graders and twenty-six percent of eighth graders are reading at a basic achievement level (2008). The National Center for Education Statistics defined basic reading achievement as “partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade” (IES National Center for Education Statistics, 2009). Lewis (2003) claimed that an estimated one-half million American high school students graduate with only rudimentary reading skills. Among this group of low achievers in reading are students identified as having specific learning disabilities (Kavale & Reece, 1992). Over the last several decades, several national studies suggest that unless these at-risk students participate in effective intervention programs and receive a solid reading foundation, they risk slower reading development and falling further behind their peers (Musti-Rao & Cartledge, 2007; Stanovich, 1986). Dropout data also indicate that students who are behind in reading are at higher risk for unemployment and adjudication (Cornwall & Bawden, 1992; Werner, 1993).

Additionally, there are broader social implications for students who reach young adulthood not having attained proficiency in reading. Low literacy has been linked to crime and unemployment rates. The National Institute for Literacy (National Institute for Literacy, 1998) reported that seventy percent of prisoners fall into the two lowest levels of proficiency. Furthermore, most jobs in our country require a ninth-grade reading level yet twenty percent of Americans are reading at the fifth-grade level (National Institute for
Corcoran and Davis (2005) stated that seventy-five percent of students in third grade identified as poor readers will continue to be ‘low achieving’ in ninth grade and likely into adulthood. In addition, many studies indicate a link between low reading achievement and students with disabilities (Fuchs et al., 2000; Fuchs et al., 2001; Kavale & Reece, 1992).

In response to declines in academic achievement, the No Child Left Behind Act (NCLB), a modern revision of the 1965 Elementary and Secondary Education Act, was implemented to increase accountability for schools and teachers. A major component of NCLB was a call for accountability at the local level. Florida, like many states, responded to declining student achievement and calls for increased accountability at all levels by introducing the Florida Comprehensive Assessment Test (FCAT) to track and measure students’ reading achievement as outlined by the NCLB mandates (Florida Department of Education, 2009a). Subsequently, many teachers have devoted a majority of instructional time to the reading curriculum and have been required to adhere to clear instructional guidelines as outlined by NCLB. However, for many students, the outcomes have not indicated strong responses to the strict interventions (Neal & Schanzenbach, 2007). In 2008, twenty-eight percent of Florida’s third grade students scored below a three average on a five point scale and the average of fifth graders who scored a three or higher, dropped by five points (Florida Department of Education, 2008). Despite increased instructional efforts to improve achievement, recent scores do not reflect significantly improved results. Clearly, students scoring at the bottom tier of the FCAT assessment are in need of intensive academic intervention to prevent them from falling farther behind. This group includes a significant number of students with learning disabilities (Florida
In 2008, data indicated that of the 13,640 tenth grade students identified with a specific learning disability, 77% did not pass the reading portion of the FCAT (Florida Department of Education, 2009b).

The *No Child Left Behind Act* (U.S. Department of Education, 2009a) has mandated that schools meet Adequate Yearly Progress (AYP) and measure performance for all students. This Act redefines the federal role in K-12 education and proposes to help close the achievement gap between disadvantaged, disabled and minority students and their peers (U.S. Department of Education, 2009a). Moreover, from its inception, NCLB has required public reporting of the results of such achievement tests, not only in the aggregate, but also disaggregated by race, ethnicity, socioeconomic status, disability, and English language learner status (Borkowski & Sneed, 2006). Borkowski and Sneed (2006) stated that the disaggregation of information is critical to ensure that our nation’s public schools are serving all groups of students, regardless of their background characteristics or special needs. NCLB mandates that schools provide standardized assessment data that demonstrates Adequate Yearly Progress (AYP) for the total student population (U.S. Department of Education, 2009a). In determining AYP, states and schools also must ensure that 95 percent of the total student population is assessed and that 95 percent of students in various subgroups, economically disadvantaged students, students from racial and ethnic groups, students with disabilities, and students with limited English proficiency are also tested (Borkowski & Sneed, 2006). Each of the subgroups must demonstrate progress toward 100 percent proficiency, whereas failure of any subgroup to make AYP means failure for the school or the district (Borkowski & Sneed, 2006).
Programs, such as Reading First, which were designed to increase reading achievement scores, have failed to produce the gains to merit the financial reinvestment (Gamse et al., 2008). Consequently, research has indicated that the Reading First interventions and efforts to improve poor reading achievement have not had a significant impact on students’ reading comprehension reflected in the standardized test scores, particularly in grades 1-3 (Gamse et al., 2008). These programs were designed to increase motivation and achievement scores, yet have not produced the intended outcomes. It is evident that there is a need to look at new approaches to reading instruction for struggling students.

Over the past 30 years, students identified with a learning disability have increased by about 150% and represent 5% of all students in school (Scruggs & Mastropieri, 2002). For a majority of these students, reading is a struggle, yet educators lack clear direction on best instructional practices for students with learning disabilities (Swanson, 1999). Evidence indicates that educators need to focus on early intervention and address reading challenges in the primary years otherwise these students who experience early and persistent reading failure are less likely to read in and out of school (Fuchs et al., 2001). New instructional strategies to increase reading and over-all academic achievement for students with learning disabilities are needed. One approach is through the use of Animal-Assisted Therapy. Although this approach is receiving increased attention (Jalongo et al., 2004; Newlin, 2003a) it has not been systematically studied with this population of low achieving readers with learning disabilities.

Animals have played a pivotal role with various populations in therapy settings ranging from psychotherapy patients to children with autism (Jalongo et al., 2004;
Levinson, 1984; Rollin, 2006). Rollin (2006) stated that animals act as “nonjudgmental, fountains of love and loyalty,” and it is through this connection that the use of dog assisted interventions could hold promise for impacting a child’s reading development. Although animal-assisted therapy has been used in various medical and therapeutic settings, limited research exists with students identified with a learning disability. This study will explore the effect of therapy dogs on reading progress for students identified with learning disabilities.

Statement of the Problem

Several major research studies indicate that the focused instruction and concentration on reading comprehension and reading improvement as mandated by NCLB is not reflected in our children’s reading achievement scores (McGill-Franzen et al., 2006; Pinnell et al., 1995). Poor reading development is correlated with long-term effects on behavior. Morgan et al.’s (2008) study highlighted this effect and indicated that poor reading ability in first grade acted as a significant predictor of problem school behavior in third grade, therefore addressing the need for early preventative approaches to improve a student’s reading problems (Morgan et al., 2008).

Educators have dedicated hours of classroom instruction utilizing the various federally funded reading curriculum programs, yet have made minimal achievement progress, particularly with students with learning disabilities (Gertsen et al., 2001; McGill-Franzen et al., 2006). It is evident that new techniques must be explored to meet the diverse learning needs of students with learning disabilities in our public school system. One approach that appears to hold promise is Animal-Assisted Therapy. This approach is being used to some extent in various settings and with children from different
backgrounds, yet hasn’t been systematically studied with students with learning disabilities. Furthermore, the use of single-case research, the design used for this study, has not been applied with this intervention.

Purpose

This study explored the effect of Animal-Assisted Therapy on reading progress and student perceptions of the experience. Participants were intermediate grade elementary students with learning disabilities in a public elementary school in west central Florida.

Rationale

Limited research exists regarding the use of Animal-Assisted Therapy. Additionally, research specifically focusing on Animal-Assisted Therapy as a targeted reading intervention with students having a learning disability is extremely sparse. Therefore, this study systematically explored Animal-Assisted Therapy as a potential means for reading improvement among students with learning disabilities.

Research Questions

The following research questions were addressed in this study:

1. Does canine Animal-Assisted Therapy affect reading progress among students identified as having learning disabilities?

2. What are the perceptions of students identified as having a learning disability regarding the use of canine Animal-Assisted Therapy in relation to their reading progress?

Limitations

The nature of the design itself has limitations as a single-case design (Kazdin, 1982) and in transferability since it was conducted in one public school setting in a west
Central Florida school district. The participants were selected based on pre-determined criteria established by the researcher.

Definition of Terms

For the purpose of this study, the following terms were defined to provide clarity:

1. Animal Assisted Therapy (AAT): a goal-directed intervention in which an animal that meets specific criteria is an integral part of a treatment process (Delta Society, 2009)

2. Dog Handler: an individual specifically trained to work with a dog in a controlled setting

3. Florida Comprehensive Achievement Test (FCAT): is the statewide criterion referenced assessment given annually to Florida students in grades 3-11 designed to measure annual progress of the Sunshine State Standards (Florida Department of Education, 2009a)

4. Informal Reading Inventory (IRI): an informal and diagnostic reading assessment that collects information of multiple aspects of a student’s reading skills (Paris, 2003)

5. No Child Left Behind (NCLB): The No Child Left Behind Act of 2001 reauthorized the Elementary and Secondary Education Act of 1965 (ESEA) affecting primary and secondary schools with an emphasis on reading instruction and reading achievement. NCLB is based on the four principles: “accountability for results, more choices for parents, greater local control and flexibility, and an emphasis on doing what works based on scientific research” (U.S. Department of Education, 2009a)

6. Learning Disability: Individuals with Disabilities Act 2004 (IDEA) defined a learning disability as “a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an
imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia” (Teaching LD, 2009)

7. Proficient Reader: a reader who draws upon a range of abilities such as decoding and comprehending new vocabulary to assist in gathering information about the text to make meaningful connections (National Accessible Reading Assessment Projects (NARAP), 2007)

8. Running Record: an assessment method that measures and tracks a student’s reading process and provides evidence of how well children are learning reading level by examining accuracy rates and types of errors made (Clay, 2005)

9. Registered Therapy Dog: A dog, a minimum of one year old, with a sound temperament that passes a temperament evaluation, which includes the American Kennel Club’s Canine Good Citizen Test (CGC). The test includes an evaluation of the dog’s behavior around people with the use of service equipment, such as a wheelchair or crutches (Therapy Dogs International, 2009)

Organization of Remaining Chapters

The remainder of this dissertation is organized in the following manner. A review of related literature is addressed in chapter two to provide a context and establish a need for the study. Existing research related to low reading achievement and students with learning disabilities is reviewed. Research regarding the interventions using animal-assisted therapy with students in general education and those identified with learning disabilities is reviewed to confirm that this study will contribute to the research in the field of special education and animal-assisted therapy.
Chapter three provides the methodology used to conduct the study. A description of the procedure, measurement instruments, data collection processes, study validity and reliability, and method of analysis are thoroughly explained. Population characteristics, information about the participants and a detailed analysis is provided.

Chapter four reports the findings of the study. Data obtained from the Informal Reading Inventory assessments, intervention observations, interview data, procedural reliability, inter-rater agreement, and data analysis are shared and explained.

The fifth chapter, the discussion section, describes the purpose, results and implications of this research study. An overview is provided of the findings and how the study addressed the problem. A discussion of the results, a comparison with cited literature, limitations of the study, and implications for future research and practice are presented.
Students with learning disabilities often struggle with reading fluency and reading comprehension, as well as other components of the reading process. Innovative instructional approaches and research-based strategies have been implemented as a means to increase reading achievement among students with learning disabilities. Animal-Assisted Therapy is one approach that has been used in various capacities, but limited research exists regarding its use in the area of reading achievement with students with learning disabilities.

The following section includes a review of relevant literature regarding learning disabilities and highlights the research gap in reading interventions for students with learning disabilities and those with low reading achievement. Research regarding the use of Running Record and its relationship to the Informal Reading Inventory used in this study (Clay, 1985) with students identified with learning disabilities is provided. A brief history of animal-assisted therapy is discussed demonstrating a gap in empirical research that examines the effect of animal-assisted therapy to benefit students with learning disabilities and low reading achievement.

Reading Theory

Reading is a receptive and selective language process with an essential interaction between language and thought in reading, (Goodman, 1967, 1975). In reading, the ability to comprehend a variety of texts at a high level determines the level of a student’s proficiency (Faggella-Luby & Deshler, 2008). Goodman (1975) explained that proficient
readers use a minimal amount of effort to achieve effectiveness and minimize dependence on visual detail.

The process of learning to read can be described in cycles where the focus of the reader is on meaning or context so that each cycle blends with the next bringing the reader closer to meaning (Goodman, 1975). The cycles: optical, perceptual, syntactic, and meaning allow the reader to employ the five processes of the brain to obtain the greatest amount of information with minimal effort. The processes, which have an intrinsic sequence, are recognition-initiation, prediction, confirmation, correction and termination (Goodman, 1975). Reading does not come easily for all learners and some students struggle with the acquisition of these processes. Goodman (1975) highlighted that short circuits occur when reading does not conclude with meaning. There are various explanations for such short circuits, and Goodman (1975) speculates that instruction could be the cause of some of the short circuits.

Reading instruction, particularly beginning instruction, plays a vital role in creating and enhancing the conditions that will bring the reader’s natural language-learning competence into play (Goodman & Goodman, 1979). Instruction does not teach children to read, but rather reading instruction helps children to learn (Goodman & Goodman, 1979). By the age of five, children differ markedly in their success in reaching these developmental goals (Entwisle & Alexander, 1993). Therefore, Entwisle and Alexander (1993) further emphasized that children must develop many linguistic and cognitive skills before they enter elementary school to make later academic learning possible. Honig (1997) claimed one approach of effective instruction is to use programs grounded in best practices which enable 85-90 percent of students to read and
comprehend grade-level material by the middle of first grade. Teaching plays a vital role to help students understand reading concepts and reading acquisition skills, however, some students continue to struggle with reading.

Success in literacy learning during the primary grades is indicative of later literacy achievement (Fletcher & Lyon, 1997). Seventy-four percent of children who perform poorly in reading in third grade continue to do so into high school, further underlining the importance of preparing children to enter school ready to learn (Fletcher & Lyon, 1997). Some students do well in school and get satisfaction from the praise of teachers and systemic rewards, however that is not the case for all learners (Goodman, 1998). Shanahan (2008) stated that early differences in reading achievement can have lasting effects on a child’s schooling, either limiting or accelerating learning success. Hiebert and Taylor (2000) claim that struggling readers can make educational gains in reading with appropriate early interventions, which have implications on reading proficiency for children who enter school with low literacy levels. However, there is no educational policy to teach these struggling readers who often fall through the cracks (Aaron et al., 2008).

Students reading below grade level miss essential details and knowledge obtained through reading grade-appropriate texts (Roberts et al., 2008). Roberts et al. (2008) explained that many older, struggling readers lacked early effective reading instruction and will continue to fall further behind without the appropriate intervention. Additionally, Roberts et al. (2008) claimed that these struggling readers are often grouped with students identified with learning disabilities due to the lack of effective reading instruction in the primary grades and may be categorized with students with learning disabilities. Thus it is
making it difficult to claim that struggling readers’ low achievement is a result of a learning disability (Honig, 1997).

**Learning Disabilities and Reading Achievement**

According to the U.S. Department of Education (2009b), of the almost 6 million students receiving special education services, approximately 2.6 million are identified with a specific learning disability. In a recent study, Fusaro and Shibley (2008) examined reading achievement of eighth grade students with learning disabilities and found that these students scored lower than their non-disabled peers on the reading portion of the Pennsylvania System of School Assessment (PSSA). This finding supported Horn’s (2003) research that many students with learning disabilities have reading deficits. Although controversy continues to exist surrounding the identification process of students with learning disabilities, it is unquestionable that a vast majority of these students have difficulty learning to read (Gertsen et al., 2001; Kavale & Reece, 1992).

Historically, low reading achievement and learning disabilities have been linked to poor educational outcomes. Kavale and Reece’s (1992) meta-analysis of Iowa students found that students with learning disabilities had achievement difficulties with reading being the academic area in which most students demonstrated difficulty. Furthermore, the study highlighted that most students with learning disabilities were among the lowest of achievers falling about three to four years behind grade level (Kavale & Reece, 1992). Additionally, a meta-analysis by Fuchs et al. (2000) revealed that the reading achievement of students identified with a learning disability is significantly different than that of other low-achieving students. These findings suggest that students with learning disabilities have more severe reading problems than their non-disabled peers (Fuchs et
Fuchs et al. (2001) indicated that if students experience “persistent failure with reading skills acquisition, they will be less likely to read in and out of school.” Therefore, with the lack of interest in reading, the foundational skills, such as vocabulary growth and schematic development elements necessary for proficient reading comprehension, are affected (Fuchs et al., 2001). When these students are not reading for enjoyment they are not practicing the skills acquired through reading instruction.

In a recent study that examined struggling readers in urban high schools, researchers compared the reading scores of proficient and of struggling readers across subgroups such as race, ethnicity, socio-economic status and disability category (Hock et al., 2009). Findings indicated that struggling readers scored significantly lower than the proficient readers, with the greatest variance in fluency and comprehension. Students identified with learning disabilities scored lower in word level and fluency than “adolescent struggling readers.” Therefore, the authors recommended comprehensive instructional interventions that address improving reading skills in the area of fluency, comprehension, and vocabulary (Hock et al., 2009). Additionally, the study addressed the importance of creating screening assessments for use in the upper elementary and middle school grades to identify reading challenges that were not detected in the early elementary grades (Hock et al., 2009).

Nelson and Manset-Williamson (2006) explained that students in the upper elementary grades identified with reading disabilities are often at risk for developing motivational problems related to reading. Decline in motivation has been attributed to poor reading achievement in students, especially as they reach the upper elementary grades (Nelson & Manset-Williamson, 2006). An example of this decline in motivation is
highlighted in a study that found that 40% of poor readers at fourth grade level would rather clean their room than read (Juel, 1988). One rationale for the change in motivation could be attributed to the nature of reading instruction and school based reading tasks as students progress through school. The foundation of reading instruction in the upper elementary and middle school grades shifts from learning to read, to reading to learn (Allington & Johnston, 2002).

Students with learning disabilities are faced with academic and social challenges which often result in low self-esteem (Elbaum & Vaughn, 2003). Due to continual academic challenges, most students with learning disabilities often experience limited success or failure in and out of the classroom (McDermott et al., 2006). Elbaum and Vaughn (2003) explored the self-concepts of students with learning disabilities following an intervention and found that the intervention had had positive effects on students with low self-concepts. This research highlighted the need for interventions for students identified with low self-concepts and learning disabilities.

Attitudes toward reading can have a lasting effect on future reading development and progress (Lazarus & Callahan, 2000). In a study that examined the attitudes of learning disabled and non-disabled elementary school students, Lazarus and Callahan (2000) found that learning disabled students’ attitudes toward recreational reading declined across the primary to intermediate grades. Although primary grade students with learning disabilities liked recreational reading more than non-disabled fourth or fifth graders, both groups indicated a decline in interest as they progressed through school (Lazarus & Callahan, 2000). These findings are critical in that they highlight links between attitude and achievement for students with learning disabilities, which could
inform instructional practices to create programs that positively affect reading attitudes across all grade levels.

Students with reading difficulties are in a negative cycle that hinders reading growth, therefore teachers must help break the cycle and move them from dependent to independent readers (Dayton-Sakari, 1997). Watching readers and teacher-tutors during one-to-one instruction in a university reading clinic, Dayton-Sakari (1997) observed that the teachers rather than the children, were the ones doing the physical and mental work of reading while the struggling readers remained passive. An effective approach to reading instruction is to engage the whole child and allow the reader to take control of the learning, including the student’s emotional needs, yet these needs are often overlooked. However, Dayton-Sakari (1997) observed that affect consistently supersedes cognition and believes educators must accommodate the emotional needs of students before they are successful at reading instruction and can begin teaching students to become proficient readers.

Research related to interest in reading highlights a correlation between interest and achievement (Lenters, 2006). As students progress through school, a shift occurs in how reading instruction is delivered and assessed. Older or adolescent students are aware of the academic relationship now assigned to reading therefore replacing the joy of reading with a pressure to perform (Lenters, 2006). Bintz (1993) assigned the term “resistant reader” to describe this behavior among struggling students. Additionally, the emphasis on textbook instruction and content driven reading material contributes to students’ lack of interest in reading (Reeves, 2004), yet students expressed a motivation to read when provided with authentic purposes for reading (Ivy, 1999).
Poor motivation and self-esteem are common characteristics shared by students identified with learning disabilities. Such concepts are likely to contribute to limited academic success and often discourage students to perform at or above their learning potential. Through the use of cognitive behavioral therapy (CBT), students identified with learning and motivational difficulties showed significant improvement in reading scores as well as in motivation and self-esteem (Toland & Boyle, 2008). An intervention of CBT was introduced to a group of students with low self-esteem and taught the students how thoughts affected actions. The benefits of positive thoughts yielded a feeling of control over their learning, which began a positive cycle between beliefs and results (Toland & Boyle, 2008). Many students with poor motivation may fall into a negative spiral, which could be challenging to reverse. Teaching students to articulate emotions related to reading will provide them with the emotional awareness and maturity of how their thoughts have a direct impact on their academic progress and if necessary, seek assistance with challenging subjects or content.

Reading Interventions for Students with Learning Disabilities and Low Reading Achievement.

As described in chapter one, the No Child Left Behind Act (U.S. Department of Education, 2009a) has mandated that schools meet adequate yearly progress and measure performance for all students. Although the premise of NCLB is to benefit all students, the expectation that all students are capable of achieving the high standards at the expected rate has been questionable. External circumstances can also contribute to limited literacy skills for children that are not exposed to a print rich environment and raised in communities with limited language skills. These students often enter school less prepared
than their peers who have had exposure to and practice with early literacy skills (Hay et al., 2007). Hay et al.’s (2007) research indicated that exposure to literature is not the only determining factor contributing to early literacy skills, but rather the communication about the context and rich dialogue that also have a direct impact on the development of a child’s reading skills. Additionally, research has indicated that young children with learning disabilities make greater progress with multifaceted interventions and combined approaches (Hay et al., 2007).

To meet the standard that local resources must focus on proven educational methods, one of the required uses of Reading First funding is to provide a research-based program of reading instruction to children from K-3 grade who may have reading difficulties, are at risk of being referred to special education based on these difficulties, have been evaluated but not identified under the IDEA, are being served under the IDEA as a child with a severe learning disability (SLD) related to reading, or are deficient in essential components or reading skills (U.S. Department of Education, 2009a). States must provide evidence that additional funding resources are being utilized for professional development to meet the educational needs of students identified with special needs (U.S. Department of Education, 2009a).

In response to the national mandates, states have implemented interventions to provide effective reading instruction for all students, yet little data exists on the impact of such practices for students with disabilities (Elbaum et al., 2000). Elbaum et al.’s (2000) meta-analysis of grouping formations for reading instruction found that same-age or peer tutoring had moderate effect sizes and a positive impact on ways teachers use student pairing for students with disabilities. The peer tutoring session should be used as practice
sessions, not in place of teacher instruction and hold the potential to improve the social relationships for children (Elbaum et al., 2000). The analysis indicated that students with disabilities benefited from participating in cross-age tutoring of a child that is one grade below the tutor.

The Mentoring in Ohio for Reading Excellence Project (Project MORE) implemented a reading tutor program to investigate the effect on reading achievement of students with reading disabilities (Osborn et al., 2007). The tutors received instructional materials that supported classroom instruction and met with the participants three to four times per week, for sessions lasting about thirty minutes. Findings from the study indicated a statistically significant increase in reading achievement of students with learning disabilities and a one month gain for every month of intervention (Osborn et al., 2007).

Simmons et al. (1995) examined the effects of peer tutoring and explicit teaching on the reading achievement of students with learning disabilities. The study indicated that low achieving students in general education settings read for only 18% of the time allocated for reading instruction. Participants received training on the purpose of the peer-tutoring program and, although the tutors corrected miscues, they were instructed to use positive feedback following the sessions (Simmons et al., 1995). Statistically significant effects on peer tutoring suggested that this intervention was an effective supplement to teacher instruction and benefits included increased opportunities to respond, additional practice, increased time on task and on-going performance monitoring (Simmons et al., 1995).
With the NCLB mandates, educators are held accountable to provide effective reading instruction and have a responsibility to maintain or improve their students’ reading scores. Seo et al.’s (2008) qualitative study explored beginning teachers’ ability to engage students during instruction as well as teacher effectiveness in reading instruction in general education settings. The research concluded that how teachers create a classroom climate had an effect on student engagement. Teachers who were quick to recognize a student’s need for assistance, had a supportive environment, and effective reading instruction had the highest level of student engagement (Seo et al., 2008). Findings from this study supported previous research that highly engaging special education teachers resembled exemplary reading teachers in general education settings. The most effective special education teachers were those that used higher-order thinking strategies and provided explicit reading instruction (Seo et al., 2008).

Teachers are faced with a challenge to meet the needs of every student and students identified with learning disabilities often provide additional challenges. It is the teacher’s responsibility to research strategies that are effective and meet the needs of the diverse academic population. Reading instruction often occurs through grouped instruction, either through heterogeneously and homogenously formed groups (Clay, 1993; Poole, 2008). Research has shown that although grouping strategies may be more manageable instructionally, such approaches have not demonstrated having a positive effect on reading achievement (Clay, 1993; Poole, 2008). Individualized reading instruction or effective variations to the homogenous grouping are recommended as effective approaches with the emphasis on maintaining student interest in reading and reading instruction (Clay, 1993; Poole, 2008; Swanson, 1999).
The Failure Free Reading Program, provides a foundation for reading instruction for students identified with reading difficulties through the use of age-appropriate materials, repetition, and immediate feedback (Rankhorn et al., 1998). An analysis of the program’s effects on reading achievement for students identified with learning disabilities reported a 50% decrease in the number of students identified with discrepancies in reading performance and intellectual ability following participation in the study (Rankhorn et al., 1998). Significant reductions of discrepancies between reading performance and intellectual ability were found, resulting in a decline in the number of students who once qualified for special education services.

Informal Reading Inventories, Running Records Research and Students with Learning Disabilities

Marie Clay described Running Records as, “a systematic procedure for recording reading behaviors observed during text reading, a tool for recording then interpreting how children work on text, an observational lens directed to text reading” (Clay, 2001). Although Running Records are challenged by several researchers due to the lack of conformity to standardized tests, Clay (2001) further described Running Records as, “an observational tool or research methodology which gathered detailed data on changes in literacy processing over short intervals of time from subjects who were reading or writing continuous texts” (p. 46). Stafford (2000) explained that Running Records are an “effective assessment that analyzes students' thinking and literacy and informs instructional planning” (p. 57). Additionally teachers can use the data to “facilitate students’ development of reading strategies and use the information to provide documentation of each student's literacy development and journey” (Stafford, 2000).
An Informal Reading Inventory (IRI), designed more than fifty years ago, assesses students’ reading progress and collects quantitative and qualitative reading data (Paris, 2003). The IRI contains a reading accuracy component through the use of Running Record analyses (Paris, 2003). Running Records are used as a component among the battery of reading assessments in an Informal Reading Inventory. Running Records provide different information than that gathered from comprehension or word tests, providing a different perspective of the student’s progress (Clay, 2001).

Rather than focusing on variation in test scores, Running Records provide the teacher with individual changes that can be observed in daily readings and can be used to monitor a student’s individual progress (Clay, 2001, 2005). Designed to be taken as a child reads orally, the Running Records are a systematic, un-timed test of contextual reading accuracy and provide evidence of how well children are utilizing the concepts of print to make sense of the text (Clay, 2005; Fawson et al., 2006). Clay (2005) indicated research has shown that a child should be reading at an instructional level, 90- 94% accuracy rate, in order for effective literacy learning to occur.

Yates and Nagel (1997) piloted a Running Record assessment program for seven first grade classes in the Central School District because the teachers felt the current assessments did not provide the necessary information to understand the reading progress of their first grade students. The information generated from the Running Records helped the teachers to create a six-point reading developmental scale as the district-wide standards of accomplishment expected for first-grade readers by the last month of school (Yates & Nagel, 1997). As a result of the pilot program, Yates and Nagel (1997) reported
that the results were promising in that the teachers believed that the Running Records provided clearer reading skills information on each student.

As a part of the Ohio Literacy Initiative and low reading proficiency scores, McComb Elementary School developed a Running Record assessment that realigned standards from elementary through high school (Stafford, 2000). Running Record assessments were completed three times a year, progress was recorded on individual charts and the information was placed in students’ portfolios. As a result of the program, teachers saw notable progress in their students who were “at-risk but did not qualify for special programs” (Stafford, 2000). The results of this case study indicated that students developed more interest in reading and teachers were individualizing their reading instruction to better meet the needs of their students (Stafford, 2000). Specifically, Stafford (2000) indicated that through the use of the Running Records, one low functioning student improved two reading levels during the five-month study and another student was recommended for a special education placement.

Ross (2004) examined the effects of teachers’ use of selected instructional material on student achievement. In the controlled experiment, claims from effective schools research of the benefits of the use of Running Records were tested. The results indicated that participation in the Running Record treatment had a greater positive effect in reading and writing than did the action research condition. The schools that were assigned to the Running Record treatment improved their reading and writing scores and outperformed the schools that were assigned to a similar treatment condition in reading and writing (Ross, 2004).
In a recent study, Running Records were compared to the commonly used standardized assessments as a valid measure of reading ability. Burgin and Hughes’ (2009) used Running Records as daily formative assessments to estimate the reliability scores of an annual assessment called the Developmental Reading Assessment. The findings demonstrated that Running Records are a valid and reliable measure of reading ability and the researchers proved that Running Record assessments provided a better measure of reading ability than standardized multiple-choice assessments. The research provided further support for the use of Running Records as valid and reliable measures for both formal program evaluation and informal classroom assessment. Additionally, the classroom teachers that conducted the assessments indicated that the assessment could be completed with minimal classroom disruption (Burgin & Hughes, 2009).

Ludwig et al. (2008) designed a study that examined the use of Running Records and the Dynamic Indicators of Basic Early Literacy Skills, DIBELS, with struggling readers and the manner in which this information would assist teachers with reading instruction. The goal of the study was to demonstrate how the data from Running Records and DIBELS would inform instruction and affect student achievement (Ludwig et al., 2008). Since initial Running Record data indicated students were not reading on grade level, the school’s reading intervention specialist facilitated weekly meetings to assist the teachers’ understanding of student achievement (Ludwig et al., 2008). Following Running Record data collection, classroom teachers’ use of interventions was included in the study. The results demonstrated a positive correlation between the DIBELS and Running Record assessments, both of which informed instructional
practices and had a positive effect on the individualized instruction for struggling readers (Ludwig et al., 2008).

*Animal-Assisted Therapy*

Historically, the use of domestic animals in therapy for humans dates back to the ninth century when the Greeks used hippotherapy, therapy with the help of a horse, with terminally ill patients (Miller, 2004). In the 1850’s, English mentally ill patients were introduced to pets as a technique to learn to care for another living being. This program was developed to assist the patients with self-control because these weaker beings were dependent upon them for their basic survival needs (Levinson, 1997).

Later, the role that domestic animals played in family life became a focus when Bossard (1944) published his work from a sociological perspective. Bossard (1944) described animals as a source of unconditional love and an outlet for people’s desire to express that love, as well as a teacher for children on topics related to personal hygiene and as well as companions. It was this article that sparked the public’s interest in human-animal interactions, generating interest that has not since diminished.

Levinson (1962), an American child psychologist, expanded on Bossard’s work to include therapy settings through “pet-therapy: or “pet-oriented child psychology.” Levinson’s work with animals occurred rather accidentally when his dog, Jingles, remained in the room during a therapy session with a mother and child. When the dog ran to the child and displayed affection toward the child, the child responded with similar affection. Through the dog’s interactions, Levinson was able to build a rapport with the child, which resulted in the child’s rehabilitation (Levinson, 1997). Although his colleagues ridiculed Levinson for his interest in animal therapy, he continued to research
and write about the effects of this intervention (Mallon et al., 2000). Levinson’s pioneer work generated an interest for further animal-assisted therapy research in the mental health industry.

Wilson, created the term biophilia, or innate interest in life. Essentially biophilia is a result of co-evolution with other animal species and humans’ biologically based attraction for nature and all its life forms (Melson, 2000). Melson (2000) explored the implications of the biophilia hypothesis for understanding the role of animals in children’s development and how animals influence children. In the analysis, Melson (2000) considered three developmental questions and reviewed evidence to draw implications for animal-assisted therapy with children. The findings suggest that humans have an “emotional attraction to animals and natural settings and this energy should motivate children’s drive to extract meaning from the world around them” (Melson, 2000). Additionally, Melson (2000) found that: “biophilia suggests that children readily view animals and minded actors, individuals with intentions and desires whose actions are, at least potentially, intelligible from their mental states. Furthermore, biophilia posits that humans are intrinsically motivated to decode the meaning of animal behavior and in doing so, gain insight into their own minds” (p. 380).

The implications of biophilia include intrinsically motivated children that aren’t attached to the animal with heightened effects with animals (Melson, 2000). Therefore, biophilia supports research regarding the effect of animal-assisted therapy (AAT) with children. Currently, AAT programs are being used in various settings with a variety of animals. Animals such as horses, cats, rabbits, dogs, dolphins, and birds are considered acceptable companions depending on the necessary treatment and on individual
preference (Granger & Kogan, 2000). The type of animal and therapy received depends on the needs of the individual and purpose of the therapy provided.

The Delta Society is an international, non-profit organization that supports AAT and related research. Their mission is to connect individuals with animals with the intent that the human will be healthier, more independent, and enjoy an enhanced quality of living. The Delta Society’s objective of AAT is to increase public awareness of the benefits of animals for family health and human development; to reduce the obstacles that prevent animals from being involved in everyday life; to provide animal-assisted therapy to more people; and to increase the number of well-trained service dogs available to people with disabilities (Delta Society, 2009). Key features of the program include specific, individualized goals and measurable progress. Although the individual typically determines goals of the AAT, some objectives may include improved mental health, reduced anxiety, increased verbal interactions, improved knowledge of concepts and educational improvements (Delta Society, 2009).

Horses have been used as an animal-facilitated therapy to provide therapeutic psychotherapy activities to patients with disabilities, such as cerebral palsy, with the objective to improve self-confidence and social competence (Beck, 2000). One form of horse therapy, called hippotherapy, is based on the idea of transfer of movement from horse to patient and is used as treatment in strategy in physical, occupational and speech-language therapy sessions for individuals with disabilities (American Hippotherapy Association, 2009; Beck, 2000; Granger & Kogan, 2000). Hippotherapy has been shown to improve muscle tone, balance, posture, coordination, motor development as well as emotional well-being (American Hippotherapy Association, 2009).
Dolphins have been used as therapy animals primarily due to their intelligence level and stress-reducing capabilities (Granger & Kogan, 2000). Movement through water is therapeutic and found to be helpful to increase motor skills and flexibility, as well as with depression and anxiety (Granger & Kogan, 2000). Founded in 1986 by Dr. Ludmila Lukina of the Ukraine, dolphin-assisted therapy was designed to find use of specially trained dolphins to rehabilitate individuals suffering from nervous diseases, which are not well covered by conventional medical approaches. Dolphin-assisted therapy also benefited individuals diagnosed with cerebral palsy, depression, and phobias to aide them in becoming socially adapted and in increasing mobility. Additionally, research supported change in functioning for children diagnosed with attention deficit and autism spectrum disorders who participated in the dolphin-therapy program. It is believed that the dolphin's acoustic signals contributed to the therapeutic effects in humans as a result of the dolphin therapy (Dolphin Assisted Therapy, 2009).

The use of animal-assisted therapy for children with autism spectrum disorder is relatively new yet growing in popularity. As recent as 1997, a Canadian training organization, National Service Dogs, was credited with placing the first service dog with a child with autism (Burrows et al., 2008). National Service Dogs trains 10-16 dogs per year and is responsible for placing 92 dogs with children with autism (Burrows et al., 2008).

In the first study to explore the effect of the service dog program with children with autism spectrum disorders, Burrows et al. (2008) reported that the animals were able to provide assistance to the child, mostly related to safety both in and outside of the residential setting. The dogs were trained to prevent the child from running away from
any given situation, but also assisted the child by alerting the parent of a dangerous
situation, providing comfort and companionship to the child (Burrows et al., 2008).

In 1947, the Ross family purchased a dairy farm sixty miles from New York City
to be used as an independent boarding school for young children. Green Chimneys
Service incorporated the dairy farm into the daily lives of the children not realizing the
therapeutic benefits to be gained by the children in working with the animals (Green
Chimneys, 2009; Melson, 2000). Over the years, the Service transformed into a
Residential Treatment Center for children with emotional disorders and learning
disabilities and became a special education school, called the Green Chimneys School
(Green Chimneys, 2009). Many of the residents experienced limited success in school,
were suicidal, depressed, lived in poverty, and had histories of neglect, abuse and
suffered from psychosocial stressor in their home, school and communities (Melson,
2000). The school continually evolved to meet the needs of the students and residents, but
the exposure to the animals remained consistent because the staff realized the benefits of
the interactions (Melson, 2000).

Currently, the school is a year-round home to over one hundred emotionally
troubled children between the ages of 6 and 21 who have been referred by child-welfare
agencies, school counselors, or psychiatric hospitals (Green Chimneys, 2009; Peterson,
1997). The goal of the school is for the students to learn to care for pets and plants and
develop a sense of responsibility, with animals as the mediators between the adult and
child to create a non-threatening experience (Peterson, 1997). The benefits of the
program can be seen in the actions of the students when they return to their homes to
attend community schools and become productive members of their community (Peterson, 1997).

*Animals in Literacy Interventions*

Animal-assisted therapy has been most commonly used in private settings or treatment facilities, including programs such as Green Chimneys’ residential setting. Many programs are offered at public libraries or community-based programs. In Baltimore, *Fidos for Freedom* extended their program into the school system to provide a reading literacy program “that improves the reading skills of elementary school students by encouraging them to read one-on-one with a therapy dog in a relaxed learning environment” (Fidos for Freedom, 2009; Hughes, 2002). *Therapy Dogs International* (TDI) offers a reading tutoring program, *Tail Waggin’ Tutors* that brings certified therapy dogs into the classroom. Their website claimed that reading scores were improved as a result of the animal-assisted therapy sessions, however, empirical research data is not provided (Therapy Dogs International, 2009).

Recently, animal-assisted therapy has been introduced into the public school setting as a technique to assist students within their learning environment. A public school in Wilmington, North Carolina partnered with *Carolina Canines* to provide “listening partners” to student in need of extra reading assistance. Fifteen students who were identified as reading below grade level were invited to participate in the Paws for Reading program. Although not an empirical study, the students’ reading progress was measured by the Accelerated Reader assessment and findings indicated an improvement of two grade levels in reading at the end of the school year. In addition to the reading
growth, teachers noted an increase in self-confidence of the students that participated in the program (Newlin, 2003).

In 1999, a registered nurse created a program that is now referred to as R.E.A.D. (Reading Education Assistance Dogs) through the Intermountain Therapy Animals (ITA). The program was established to help children improve their literacy and reading self-confidence while reading to a dog. Through a pilot study at an elementary school in Salt Lake City, Utah, the facilitators observed a significant change in the children’s reading scores and overall performances of students that were reading below grade level at the time of the study. In addition to the improvement in reading scores, additional improvements were observed which included: increased reading comprehension, greater self-confidence, completed homework assignments, decline in truancy and absenteeism, and a strong relationship with animals (Intermountain Therapy Animals, 2009).

Summary

There is strong support in the research literature for a connection between reading failure and poor life outcomes. Consistent reading failure has a negative effect on a student’s future academic success, and has been linked to dropping out of school. Additionally, the effect poor literacy has on attitudinal challenges and academic motivation of students identified with learning disabilities’ was explored. The literature linked students with poor literacy levels as having low self-esteem or limited achievement motivation.

Research regarding the use of animal-assisted therapy has indicated positive benefits for individuals with a variety of limitations or disabilities. Yet limited research exists in the area of the effect of animal-assisted therapy on reading progress with
students identified with learning disabilities. This study sought to fill this gap and provide empirical data on the effect of animal-assisted therapy on students identified with learning disabilities and low reading success.
Chapter Three
Method

The research questions were developed following a thorough review of the literature and are the foundation for this study. The research questions guided the methodology and have influenced the research protocol. The following topics are discussed: Research Procedures, Single-Case Design and Follow-Up Interviews, Data Analysis, Results, and Research Implications.

Research Questions

Does canine Animal-Assisted Therapy affect reading progress among students identified as having learning disabilities?

What are the perceptions of students identified as having a learning disability regarding the use of canine Animal-Assisted Therapy in relation to their reading progress?

Population Characteristics

The target population for this study was students in grades third through fifth identified with a learning disability and at risk for reading failure. From the population sample, four students identified with a learning disability and receiving special education services as outlined in their Individualized Education Plan (IEP) were selected to participate in the study. A learning disability is defined as a discrepancy between intellectual capacity and academic achievement which results in a failure to learn and stated that while students with a learning disability possess the necessary cognitive tools to process information, they do so inefficiently (Gertsen et al., 2001).
Sampling Procedure

Sampling scheme. Voluntary participation and purposeful sampling were used for this study. The purpose of this study was to better understand the phenomena of animal-assisted therapy with elementary-age students identified with a learning disability specifically in the area of reading achievement. This study was designed to obtain an in-depth understanding of the students selected, not to achieve population validity (Gall et al., 1996). This sample was selected to provide rich information for the purpose of the study (Gall et al., 1996).

The study was conducted in a suburban public elementary school located in a large school district in the southern region of the United States. The study was conducted during school hours and on school property in a commonly used area of the school that was free of or had little distractions.

Sample size. This study used a single case design with a sample size of four students. The participants were selected based on the following criteria. Participants were identified with learning disabilities, ranging from moderate to severe, and a diagnosed deficit in reading fluency and comprehension. Special education teachers recommended students with poor reading skills based on confidential assessment data or below grade level scores on reading Running Record and Informal Reading Inventory assessment measures. Teacher recommendations of students who displayed a strong aversion to reading orally and minimal reading confidence were solicited. Students with low standardized test scores were given first priority for selection.
Sample characteristics. To assist with further research related to this topic, demographic data is provided for the school district and particular elementary school in which the study was conducted. Characteristics of the participants are also described in detail.

Setting. This study was conducted in a suburban public school district located in a west central Florida school district. As of June 2010, it is the 11th largest district in the state and 58th largest county in the country. The district serves 67,136 students in the 82 traditional school settings (45 elementary, 15 middle schools, 12 high schools, and 4 education centers) and is experiencing tremendous growth at a rate of more than 2,400 students annually.

At the time of this study, over 17,000 minority students were served in the district, of which the Hispanic population represents the largest percentage at 14%. English Language Learner (ELL) students have increased over 127% since 1999, representing 3.8% of the student population. In 2006-2007, graduation rates were slightly higher than the state’s average at 73.7%, yet the dropout rate was slightly higher than the state’s at 3.5% compared to 3.3% in Florida. Forty-two percent of students with disabilities received a standard diploma, which was slightly above the state’s average of forty percent.

The elementary school, in which the study was implemented, is in its second year of existence. It has a total population of 796 students of which 11% are African American, 52% Caucasian, 20% Hispanic, 6% Asian and 9% are considered ‘other.’ Students with disabilities represent 10% of the total population (School District of Pasco County, 2008). In 2007-2008, the school reported a 22.5% free and reduced lunch rate with a total student population of 796 students (School District of Pasco County, 2008).
The use of Animal-Assisted Therapy is a common practice in the elementary school and a program in existence prior to the initiation of this study.

**Participants.** At the onset of the study, four participants qualified and were selected to participate in the study, however, after an initial assessment and upon consultation with dissertation committee members, one participant was omitted from the study. It was concluded that the participant’s additional processing disability would affect his ability to process and respond to the reading comprehension questions. The three selected participants were currently enrolled in the elementary public school in which the study was conducted. The age and grade levels varied between fourth and fifth grade since the severity of their disability and presence of an IEP determined their eligibility in the study. However, students solicited for participation in the study were reading on a similar grade level so that the selected Informal Reading Inventories are appropriate among the three participants. Although the school was currently using AAT and received support from the principal, these participants did not participate in the dog therapy program in previous semesters. The participants in this study were not a representative sample of all students identified with learning disabilities in reading or literacy because students with emotional or behavioral disabilities were excluded from this study. All participants were native English speakers to exclude any potential language barriers.

**Selection-eligibility criteria.** The researcher presented the study to the school administration and special education teachers and explained the eligibility criteria requirements. Surveys were distributed to the administrators and special education teachers to use as a tool to solicit their top four candidates that met the eligibility requirements for the study (Appendix A). The results from survey assisted the teachers
and administrators in recommending participants with low reading achievement scores, as well as interest in dogs, and little or no interest reading independently or orally. The survey asked for verification of an Individualized Education Plan (IEP) identified as Specific Learning Disability (SLD), and students with grade level communication skills. It was important that the students have at least grade level verbal skills in order to effectively communicate feedback for the follow-up questions at the conclusion of the study.

The students were identified as having high or low communication skills, which were based on the criteria outlined in the IEP. For example, if a student did not receive any speech and language therapy, they were ranked as ‘high.’ However, if a student received speech and language therapy weekly as outlined in the IEP, they were ranked as ‘low.’ Students at the low end or below the minimum score of the county’s reading and assessment matrix, were targeted as a potential participant (Appendix B). Based on the list of recommended participants generated by the special education teachers and administrators, the researcher selected a convenience sample of three students as participants for the study. A letter, explaining the premise of the study and participation commitment, was sent home with the selected participants for the parents’ or guardians’ consent.

Consent. To ensure confidentiality and protect all participants in this study, approval was sought through the Institutional Review Board, IRB, from the University of South Florida and from the county in which the study was conducted (Appendix C). The researcher also sought written consent from the school administrator, special education and general education teachers, participants and parents or legal guardians of the participants in order
to participate in the study. Full disclosure of the study was provided in writing and copies distributed to all participants, parents/legal guardians, teachers, and school and county district administrators (Appendix D).

*Single-case design.* A single-case, A-B-A-B (Gall et al., 1996; Kazdin, 1982) research design was used to analyze the effects of the independent variable (therapy dog, Animal-Assisted Therapy) on the dependent variable (reading progress defined by amount of time spent reading). Single-case experimental studies allow the researcher to describe cause-and-effect relationships between independent and dependent variables (Neuman & McCormick, 2000). Neuman & McCormick (2000) explained that the emphasis of single-case design is on examining the functional relationship between an independent and dependent variable for a particular individual, wherein the dependent variable focuses on measurable behaviors that are important for student success. The individual data analysis is an important characteristic of a single-case design since individual differences can often be masked when data are averaged and reported as a group, therefore single-case design maintains the human variability as a solution to specific problems (Neuman & McCormick, 2000). Furthermore, Neuman and McCormick (2000) explained that single-subject experimental design can provide literacy researchers with a mechanism for examining the theoretical nature of reading.

The reversal replication design (ABAB) has been used in several applied settings and compares the baseline (A1) with the intervention (B1) phase to determine if the changes are statistically significant. The reversal design provided an acceptable degree of experimental control through the use of brief treatment withdrawal between treatment conditions. Gast and Tawney (1984) stated this design “permits the most powerful
demonstration of experimental controls because it requires the repeated introduction and withdrawal of an intervention strategy,” (p. 200). Furthermore, the reversal design is the most straightforward evaluation paradigm showing causality (Tawney & Gast, 1984). Essentially, the reversal replication ABAB design makes and tests predictions about a performance under various conditions and is a powerful tool for demonstrating intervention effects (Kazdin, 1982).

This study was conducted over a 13-week period, beginning in October and ending in January, which included the two-week winter break. The duration of each of the four phases (baseline $A_1$, intervention $B_1$, withdraw $A_2$, and reintroduced intervention $B_2$) was 9 sessions or two to three weeks with the beginning dates of each phase being specifically chosen. Significant weeks were designated for phase change transitions to occur between phases $A_1$, $B_1$, $A_2$ and $B_2$ (Table 1). The particular order of students to begin the phase was randomly determined by drawing names out of a hat. The A-B-A-B design consisted of nine sessions in each phase with a study total of 36 sessions. Nine sessions per phase and 36 sessions overall was incorporated into the study design to ensure that there was a sufficient amount of time to collect data. Todman and Dugard (2001) state that at least eight sessions are needed per phase with an overall of at least 36 sessions, supporting the duration of this study.

Each reading session lasted a maximum of twenty minutes, which is the recommended amount of time to improve reading fluency (Levin, 2006). However, the session concluded earlier if the participant had completed the reading passage or requested to terminate the session. The length of each session was capped at twenty minutes due to prevent minimum interruption to the participants’ classroom instruction.
and to maintain consistent attention of the therapy dog throughout each session. The
sessions were held in a corner of the common area between the shared classrooms to
minimize distractions or interruptions. During the initial phase, the participants read
orally to the principal investigator. The dog was introduced during the intervention phase
and removed during the transition or A2 week. The participants were guided to select
books at an independent reading level and could bring multiple books if they selected a
book with a few pages.

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<th>Weeks</th>
<th>Phase</th>
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<tr>
<td>1, 2, 3</td>
<td>A1 (Baseline): participants read to adult, 9 sessions</td>
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<tr>
<td>4, 5, 6</td>
<td>Phase B1 (Intervention): participants read to dog, 9 sessions</td>
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<tr>
<td>7, 8, 9</td>
<td>Phase A2 (Withdrawal): participants read to adult, 9 sessions</td>
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<tr>
<td>10, 11, 12</td>
<td>Phase B2 (Intervention Reintroduced): participants read to dog, 9 sessions</td>
</tr>
<tr>
<td>13</td>
<td>Complete post-study IRI/Conduct Follow-up Interviews</td>
</tr>
</tbody>
</table>

Each session was video-recorded to assist with inter-rater reliability calculations
and for reference during the follow-up interviews. The videos also prevented any
potential interruptions to the observations on the part of the researcher. The researcher
was present during each intervention and withdrawal phase of the study. A log was used
to record data from the phases using a timed interval observation, in which the researcher
recorded observations every 2 minutes. Information about the participants’ and dog’s
behavior was noted to assist the researcher with information that may be useful for future data analysis (Appendix E).

*Research Procedure*

Systematic and detailed procedures were followed in order to accurately answer the proposed research questions. In order to ensure careful manipulation of the independent variable, as well as ease of replication, the procedures of this study are described. Limitations of this design pertain to ethical considerations due to the nature of removing an effective intervention (Tawney & Gast, 1984). Precautions were taken with this study to ensure the health and safety of the participants, elementary school staff and peers.

The initial procedure of the study was to identify the participants that met the predetermined requirements and seek written consent (Table 2 and Appendix A). Prior to the first study phase, data on each participant was collected from an Informal Reading Inventory (IRI) pre-intervention assessment to determine a reading baseline score. The IRI contains reading word lists and leveled reading material from the pre-primer level to high school levels and establishes reading grade levels. A survey designed to help determine a student’s instructional needs in the areas of word recognition, word meaning, reading strategies and comprehension, the IRIs are used as an instructional guide for student placement in reading groups and for individualized reading instruction (Nilsson, 2008). The IRIs contain an informal assessment of oral reading accuracy based on Running Records which is tailored to each student without an emphasis on comparative data (Paris, 2003). A Running Record is a “tool for coding, scoring and analyzing a child’s precise reading behaviors” (Fountas & Pinnell, 1996). Running Records are a
quick method to obtain information about a child’s reading behavior and is obtained when a teacher listens and codes the child’s oral reading performance of a reading passage (Fountas & Pinnell, 1996).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Grade Level</th>
<th>IEP</th>
<th>FCAT/SAT (Reading)</th>
<th>Verbal Skills</th>
<th>Interest in dogs</th>
<th>Native English</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>M</td>
<td>5th</td>
<td>Y</td>
<td>Below Grade Level</td>
<td>M</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>B</td>
<td>F</td>
<td>4th</td>
<td>Y</td>
<td>Below Grade Level</td>
<td>H</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>M</td>
<td>5th</td>
<td>Y</td>
<td>Below Grade Level</td>
<td>H</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

The protocol for administering the Running Record is as follows. A student was given a reading passage at a specified level and instructed to read it orally or silently. Upon completion, questions were asked to collect information about how the student comprehended the passage. The comprehension rate was calculated by determining the difference between total correct questions divided by the total comprehension questions from the passage. If the student obtained a score above 80%, a passage at the next level was provided. This process continued until the student no longer demonstrated an increase in comprehension above 80%. The level at which the student’s comprehension no longer increased was considered their instructional level and subsequent passages were provided at this level until the student demonstrated an increase in reading comprehension.

A decision was made between the researcher and reading professor on the dissertation committee that the accuracy rate was not a true indication of the students’
reading level based on the following circumstances. Students initially scored high on accuracy, but obtained low scores on comprehension, which indicated that although they read the passage well, the students did not understand the meaning of the passage. Therefore the researcher decided to rely on the comprehension rate as the measure to determine the score for each passage. The data collected were used to ensure that each participant read passages at a 80% or higher comprehension rate (Clay, 1993; Fountas & Pinnell, 1996). A student reading at a 69% or below is attempting to read text that is too difficult. Informal Reading Inventory data was calculated following each oral reading session and individual scores were plotted on a graph to provide a visual representation of the student’s progress.

Once consent was received, the participants began with phase one of the study. To ensure treatment integrity, each phase and reading session was videotaped then reviewed by an independent reviewer following the completion of the study to code the extent to which the protocol (Appendix H) was followed. This protocol was followed to ensure the researcher’s neutrality throughout the study. Prior to the sessions, the principal investigator consulted with the participants’ teachers to document external factors or personal circumstances outside of school that may have occurred in the participants’ classrooms and home environment, and which may have impacted their behavior and learning.

The sessions began once the participants selected a book. The participants were aware of their independent reading level based on school-wide and classroom assessments and asked to select books on their independent reading level from the school or classroom library, which categorized books according to reading levels. Classroom
teachers were also asked to assist students in selecting appropriate leveled books from the school library to be used during the reading sessions. If a selected book was above or below the independent reading level, the researcher would encourage the participant to select a different book.

During the baseline phase, the participants selected a book from the school or classroom library on her or his independent reading level to read with the adult reading partner, the study’s principal investigator, in the designated reading area of the common area between classrooms. This area was free of distractions, on the carpet or floor, and a comfortable setting for the student and adult. The adult listened to the story without taking notes and provided assistance with a word or context if asked. The role of the adult was to listen and not comment or engage in conversation unless initiated by the participant. Following each adult reading session, the student was then asked to move to quieter location, free of distractions and away from the initial reading area, and seated at a table or desk. The adult reading partner conducted the Informal Reading Inventory assessment with the participant. The participant was instructed to do her or his best and seek assistance if necessary. These sessions were also videotaped and reviewed by an independent reviewer. At the conclusion of the assessment, the student was escorted back to class and the next participant began the reading session.

During the intervention phase, the participants were introduced to the therapy dog and dog handler. The handler invited and encouraged the students to pet the dog prior to reading, and explained that the dog is interested in hearing the story. The participants were instructed to read to the dog and that the handler was only there to help the dog. However, should they need assistance with an unfamiliar word or concept, the handler
provided assistance, but only if asked. The participants selected a book on her or his independent reading level to read with the dog in the designated reading area of the common area between classrooms. On subsequent days, the participants read one text each day of the treatment and continued the treatment once a day for a total of nine sessions. The study’s principal investigator was situated at close proximity of the AAT sessions to collect observational data at two-minute intervals (Appendix E). Changes in behavior, body language or tone of the participants were noted and used to inform the qualitative analysis of the intervention. Following each reading session, the researcher escorted the student to the designated assessment area and collected IRI data from each participant.

During the transition week, the dog was removed and during reading sessions in which the participants read with the adult reading partner, the researcher, in the same area as the AAT sessions. Following the reading session, the student was escorted to the assessment area of the common area and IRI data were obtained.

Following the second phase of the intervention, the students were individually interviewed to describe their experience with the Animal-Assisted Therapy sessions. The interview questions were used to explore the students’ perception of both the Animal-Assisted Therapy and adult reading session.

Method of Analysis

Data collection. Approximately forty Informal Reading Inventories, IRI, which contain three 100-word passages of varying reading difficulty, were selected and used to assess the students’ reading progress. Participants were randomly assigned an IRI to read during each data collection session, as random assignment of different Informal Reading
Inventories limited practice effects. To ensure integrity of scores, an independent rater reviewed seven sessions, or twenty percent, of the videotaped sessions and assigned students a reading performance score. The following formula was used to calculate inter-rater agreement: Total Number of Agreements divided by the (Total Number of Agreements + Disagreements) multiplied by 100 (Kazdin, 1982). Inter-rater agreement was calculated at 94% agreement based on the scores obtained from these calculations and the calculations of the independent rater (Table 3).

Table 3. Inter-rater Reliability: Running Record Passages

<table>
<thead>
<tr>
<th>Student-Passage</th>
<th>Number of agreements</th>
<th>Total number of agreements + disagreements</th>
<th>Percent of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-passage 1</td>
<td>10</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>A-passage 2</td>
<td>10</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>B-passage 1</td>
<td>6</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>B-passage 2</td>
<td>4</td>
<td>5</td>
<td>80%</td>
</tr>
<tr>
<td>C-passage 1</td>
<td>8</td>
<td>8</td>
<td>100%</td>
</tr>
<tr>
<td>C-passage 2</td>
<td>6</td>
<td>8</td>
<td>75%</td>
</tr>
<tr>
<td>C-passage 3</td>
<td>10</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>

Single-case design. This study was designed to detect change from one phase to the next without showing serial dependency (Kazdin, 1982). A visual inspection of graphical data was conducted to determine if the intervention had an effect and patterns were analyzed (Kazdin, 1982; Kennedy, 2005). Although it is often reported that less Type I errors are made in visual analyses of data trends as compared to statistical analysis (Kazdin, 1982), conflicting studies have also shown the opposite to be true (Matyas & Greenwood, 1990).
Therefore, a meta-analysis was incorporated to aggregate data after the visual analysis to give information about the overall effect and the effect of the individual cases (Van den Noortgate & Onghena, 2003), which allowed for stronger predictions about trends, rather than the dependence on a visual analysis of the data. For example, Van den Noortgate and Onghena (2003) described a simple hierarchical linear model as “one or more regression equations at each level in which the characteristics of the units from that level are used as predictors in describing the coefficients of the equations of the level just below” (p. 329).

*Follow-up questions.* Participants were asked individual follow-up questions at the conclusion of the second phase of the intervention. An unstructured interview was initiated through the use of open-ended questions (Fontana & Frey, 2000). Video clips of the phases were used to prompt recall of students’ interactions with and without the dog. Specific clips were selected based on the level of engagement with the dog and presence of dog in the video sample. The presence of the researcher in the frame was the main selection criteria for the withdrawal video sample. The questions were used as a guide to seek information from the students about their experience reading with and without the dog (Gall et al., 1996). Each session was tape recorded to maintain the integrity of the participants’ responses. The following questions were explored:

1. Tell me about reading to Beckett.
2. Tell me about reading with, me, Ms. Griess.

The students’ responses were then transcribed and analyzed for themes across the responses (Seidman, 1998). The interviews were analyzed or opened to expose the thoughts and ideas of the student participants (Strauss & Corbin, 1998). Following the
analysis, the themes were coded to categorize or classify the responses looking for similarities among the responses (Seidman, 1998). Similar events or experiences were labeled as phenomenon and identified with their own codes. This process continued until all concepts or themes were categorized (Strauss & Corbin, 1998). Axial coding determined subcategories and were used as a means to establish themes across the interviews, which later emerged as a theme grounded in data (Strauss & Corbin, 1998). The theory of the students’ experience based on the responses provided data on the personal experience of the individual participants.

**Presentation of results.** The findings of this study were analyzed as follows. Initially, a visual analysis of the data were graphed and analyzed through the use of descriptive statistics. Following the descriptive analysis, inferential statistics were explored (*Figure 1*).

![Figure 1. Description of Analysis Process](image)

A visual analysis of the graphical data was presented by graphing the pre and post Informal Reading Inventory assessment scores (*Figure 2*) and total oral reading time (*Figure 3*) for each participant. The reading assessment data were visually analyzed for
trends and performance variability noted at the onset and conclusion of the study and was presented as follows. The vertical axis includes the score obtained on the Informal Reading Assessment at the given grade level. The horizontal axis indicates the time of the assessment in terms of order in which the IRI was administered.

An additional visual analysis was conducted to determine the total amount of reading time as controlled by the participants during each of the study phases and the consistency of the patterns across phases (Kazdin, 1982) and was presented as follows. The vertical axis includes the total reading time in minutes and the horizontal axis documented the data point within the given phase. Descriptive statistics of the data were calculated and provided for both sets of data, however due to the limited amount of data points obtained from pre and post assessments inferential statistics could only be calculated for the reading time data.

**Figure 2.** Sample Reading Pre and Post Assessment Graph

*Note: the value in each data point indicates grade level*
Cohen’s $d$ was computed by dividing the difference between the treatment means by the standard deviation of the baseline phase (Cohen, 1998; Patten, 2007). In addition, inferential statistics in the form of a hierarchical linear model (HLM) analysis of each participant’s reading time was computed to estimate and test the individual and overall effect sizes (Van den Noortgate & Onghena, 2003). An analysis was conducted of the participants’ responses to the follow up questions. As previously described in this document, responses were categorized by and presented to highlight the participants’ various descriptions of their experience reading to the dog. Inter-rater reliability was calculated to ensure consistent and accurate analysis of the interview data.

**Summary.** This study explored the use of animal-assisted therapy with students identified with a learning disability and limited reading success. Through the use of Informal Reading Inventories, data on each participant’s reading progress were collected and
analyzed. Follow-up questions were asked and analyzed to provide additional information about the participants’ various descriptions of their experience in the study.

The purpose of this study was to explore the following questions: (a) Does canine Animal-Assisted Therapy affect reading progress among students identified as having learning disabilities? and (b) What are the perceptions of students identified as having a learning disability regarding the use of canine Animal-Assisted Therapy in relation to their reading progress? The results are provided in the following chapter.
Chapter Four
Results

This study was designed to explore the effect of Animal-Assisted Therapy on reading progress among students identified with a learning disability. Data were collected and analyzed based upon the students’ performance on Informal Reading Inventory reading passages, the amount of time engaged in reading and the students’ responses to follow-up questions about their perceptions about reading to a dog.

Analysis of Data

A single-case research design was used to determine the amount of change in the dependent variable, reading progress. Initially reading progress was measured by calculating a comprehension rate on the Reading Running Record portion of the Informal Reading Inventory. The rate is determined by computing the total correct responses to comprehension questions divided by the total number of comprehension questions on the given Informal Reading Inventory. Scores were then separated into oral and silent comprehension performance and graphed for visual analysis.

The initial visual analysis of the comprehension performance indicated erratic reading comprehension results typical of students identified with learning disabilities (Figure 4). The nature of the Informal Reading Inventory requires the introduction of more difficult reading passages as the student’s comprehension rate increases, potentially masking the overall effect of the intervention. As a result of these erratic results, upon consultation with the dissertation committee, a decision was made to only use amount of time spent reading as the measure of reading progress. This analysis was a better measure
of engagement not reading progress for the participants of this study due to the nature of their learning disabilities. A visual analysis was conducted of the participants’ total reading time as determined by each participant during each reading session with and without the therapy dog. This visual analysis data noted changes occurred in the participants’ total reading time. Additionally, the participants’ scores from the participants’ pre and post Informal Reading Inventory reading passages were calculated and graphed for visual analysis.
Figure 4. Informal Reading Inventory Oral Reading Scores-Participants A, B & C

In addition to the visual analysis, descriptive statistics were computed for the mean and standard deviation of the baseline, the intervention and the withdrawal reading engagement data. The mean was chosen as the statistical measurement because it
provides the estimation for the central tendency during each phase and as a comparison of engagement patterns between phases of the study (Kennedy, 2005).

Cohen’s $d$ was calculated to reflect the magnitude of the difference between the means of the treatment phases (Cohen, 1998; Patten, 2007). This effect size is calculated on a standardized scale, which result in a meaningful comparison of the results (Patten, 2007). For this study, Cohen’s $d$ was calculated using the difference of the treatment phase ($B_1$ and $B_2$) means, divided by the standard deviation the baseline phase ($A_1$) (Dunst, Hamby, & Trivette, 2004):

$$d = \frac{(M_{B_2} - M_{B_1})}{SD_{A_1}}$$

Although there is no agreed upon standard for interpreting the magnitude of effect sizes, the values assigned to $d$, Cohen’s (1998) guidelines report values in terms of small, medium, large (Table 4) (Dunst, Hamby & Trivette, 2004). The use of this scale with single case data has been questioned since these values are based on between-person variation and not specific to a within-person variation as reported in single case design studies (Gresham, McIntyre, Olson-Tinker, Dolstra, MCLAughlin & Van, 2004). However, Dunst, Hamby & Trivette (2004) support calculating magnitude of treatment effects in single case designs in order to produce a measure similar to effect sizes computed from data in studies using other research designs. Therefore, Cohen’s (1998) values were assigned to effect sizes obtained in this study.
Inferential statistics were then computed using a hierarchical linear model (HLM) analysis, which pooled the data from the three cases using a regression equation at each level (Van den Noortgate & Onghena, 2003). The data were analyzed for statistical significance utilizing a hierarchical linear model (HLM) program to provide information about the overall effect as well as the effects for the individual cases (Van den Noortgate & Onghena, 2003). Van den Noortgate and Onghena (2003) support the use of a hierarchical linear model for single-case designs, which provide information of the “overall or mean effect and determinants of the effect” (p. 327).

More specifically, the use of a two-level model in which measurements are grouped within cases is demonstrated by the following equation:

\[ Y_{it} = \beta_{0i} + \beta_{1i} \times \text{phase} + r_{0i} \]

\[ \beta_{0i} = Y_{00} + u_{0i} \]

\[ \beta_{1i} = Y_{10} + u_{1i} \]

The values of the equation are defined where \( Y_{it} \) is the time spent reading by the \( i^{th} \) participant at the \( t^{th} \) time. Phase is a dummy coded indicator of phase (0=baseline, 1= treatment). \( \beta_{0i} \) is the average baseline level for the \( i^{th} \) participant. \( \beta_{1i} \) is the treatment effect or shift between the baseline and \( t_s \) for the \( i^{th} \) participant. \( Y_{00} \) is the average baseline level

<table>
<thead>
<tr>
<th>Value of d</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>Small</td>
</tr>
<tr>
<td>0.50</td>
<td>Medium</td>
</tr>
<tr>
<td>0.80</td>
<td>Large</td>
</tr>
</tbody>
</table>

Table 4. Label Values of \( d \)
across the three participants. $Y_{00}$ is the average $t_x$ effect across the three participants. $R_{0i}$, $u_{0i}$ and $u_{ii}$ are the error terms assumed to be normally distributed (Noortgate & Onghena, 2003).

The hierarchical model was estimated in SAS (2008) with the MIXED procedure using a restricted maximum likelihood estimation and the Kenward-Roger adjusted degrees of freedom. The effect size of the cases are of specific interest in this study.

**Individual Results**

**Participant A**

The results from Participant A’s pre and post Informal Reading Inventory oral reading passage scores are presented (Figure 5). Prior to and following the data collection phases, a reading passage was provided at the indicated grade levels and the scores were calculated using the total number of correct responses divided by the total number of questions on the assessment to determine the initial and final reading grade level for the participant. A decision was made to use the scores from the oral reading passages rather than the silent passages, as this is the most common method in which students’ reading progress is measured (Clay, 2001; Goodman, 1975). The graph indicates Participant A’s pre-assessment oral reading level at a third grade as 80% accurate. The post-assessment data indicates the student is reading between a 4th and 5th grade level with a 70% accuracy rate. Based on a visual inspection, the data indicates that Participant A increased one grade level from the onset of the data collection phase to the conclusion of the study.

The results of Participant A’s total reading time are presented (Figure 6). Reading time was based on the students’ total amount of reading time as documented by the researcher during baseline, intervention and withdrawal phases. Means and standard
deviations were computed for the reading time for each phase as well as the effect size using Cohen’s $d$ to compare across cases. An analysis of the effect was interpreted using guidelines established by Cohen (1988).

The visual analysis of Participant A’s graphed results (Figure 6) indicates a positive change in the amount of reading time per session as determined by the participant in the presence of the dog. From baseline $A_1$, to intervention $B_1$, the student elected to read for a longer duration averaging 12.00 minutes in phase $B_1$. During the withdrawal phase $A_2$, a drop in reading time is noted, and an increase is then noted on the final intervention phase $B_2$ averaging 14.67 minutes in phase $B_2$. Additionally, the final intervention phase $B_2$ indicates a consistent pattern of total reading time as being above ten minutes per session. The visible drop in the sixth and seventh session of $B_1$ and the fifth session of $B_2$ was the result of the participant’s text selection. These passages were less than fifteen pages, therefore not requiring the participant to read more than seven minutes during these particular sessions. Additionally, during the second withdrawal phase $A_2$, the student consistently selected books with fewer than twenty pages, resulting in a lower overall reading time. It is noted during phase $B_2$ the student selected books, which required more reading time to complete, therefore averaging fourteen minutes per session.
Figure 5. Participant A Pre and Post Oral Reading Assessment Data

*Note: the value in each data point indicates grade level

Figure 6. Participant A Total Reading Time Data
Descriptive analysis. A comparison of the means for each phase demonstrated an observed increase in total reading time (Table 5). The baseline mean of 11.33 minutes increased to 12.00 minutes for the first intervention phase and 14.67 minutes for the second intervention phase. The mean of the combined intervention phases was 13.33 minutes, 2.33 minutes above the baseline mean of 11.33 minutes. Minimal variability was noted between the first intervention phase, with a standard deviation (SD) of 4.77 and a SD of 4.24 in the second intervention phase, indicating an increase in the total reading time during the intervention phases.

To demonstrate the level of treatment effect of the intervention, the effect size using Cohen’s $d$ was calculated. The results indicated a large effect of 0.97 between treatment phases. A difference of 0.67 minutes from baseline to the first intervention phase was obtained indicating a 6% increase in reading time. An increase of 3.34 minutes or a 30% increase in amount of time read from baseline to final intervention phase was obtained.

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Phase A₁</th>
<th>Phase B₁</th>
<th>Phase A₂</th>
<th>Phase B₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>11.33</td>
<td>12.00</td>
<td>8.44</td>
<td>14.67</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.06</td>
<td>4.77</td>
<td>5.50</td>
<td>4.24</td>
</tr>
<tr>
<td>Effect Size: Cohen’s $d$ (label)</td>
<td></td>
<td></td>
<td></td>
<td>0.97 (large)</td>
</tr>
</tbody>
</table>

Inferential analysis. The data were analyzed for statistical significance utilizing a hierarchical linear model (HLM) program written with SAS PROC MIXED code
(Appendix G) (SAS, 2008). The empirical Bayes estimate of Participant A’s change in reading time ($\beta_{1A}$) was 2.88 minutes. The t-test of this change showed statistical significance ($t(81.7) = 2.08, p = .040$). The obtained p-value of 0.04 is less than the preset alpha level of .05 concluding that the study results were shown to be statistically significant, rejecting the null hypothesis.

Summary of participant A. Following the visual and statistical data analysis for Participant A, results indicate that the total amount of reading time increased during the intervention phases. The data suggests the presence of a treatment effect, supporting the effects of Animal-Assisted Therapy on reading progress for this Participant identified with a learning disability.

Participant B

The results from Participant B’s pre and post Informal Reading Inventory oral reading passage scores are presented (Figure 7). The graph indicates Participant B’s pre-assessment oral reading level at a third grade as 70% accurate. The post-assessment data indicates the student is reading at a third grade level with an 80% accuracy rate. Based on a visual inspection, the data indicates that Participant B had ten percent increase in reading comprehension accuracy from the onset of the data collection phase to the conclusion of the study.

The results of Participant B’s total reading time are presented (Figure 8). Reading time was based on the students’ total amount of reading time as documented by the researcher during baseline, intervention and withdrawal phases. Means and standard deviations were computed for the reading time as well as the effect size using Cohen’s $d$
for each phase of the study. An analysis of the effect was interpreted using guidelines established by Cohen (1988).

The visual analysis of Participant B’s graphed results (Figure 8) indicate a positive change in the amount of reading time per session as determined by the participant during the intervention phase. From baseline $A_1$, to intervention $B_1$, the student elected to read for a longer duration averaging 17.56 minutes in phase $B_1$. During the withdrawal phase $A_2$, a significant drop in reading time is noted, and an increase is then noted on the final intervention phase $B_2$ averaging 14.11 minutes in phase $B_2$. Additionally, this participant selected and read the same reading series throughout the study. Upon completion of one book, the participant then selected the next book within the same series. Although the participant consistently selected the same book, her interest in reading varied based on the events that occurred prior to the sessions. This participant exhibited several emotional responses to peer and teacher interactions prior to our reading sessions. It was common for this participant to share un-related personal information prior to and during the sessions, and when the researcher redirected the conversation, a notable change in behavior was observed, therefore resulting in a decreased reading time for the session.
**Figure 7.** Participant B Pre and Post Oral Reading Assessment Data

*Note: the value in each data point indicates grade level*

**Figure 8.** Participant B Total Reading Time Data
Descriptive analysis. A comparison of the means for each phase demonstrated an observed increase in total reading time (Table 6). The baseline mean of 12.22 minutes increased to 17.56 minutes for the first intervention phase and 14.11 minutes for the second intervention phase. The mean of the combined intervention phases was 15.83 minutes, 3.61 minutes above the baseline mean of 12.22 minutes. Relatively high variability was noted between the first and second intervention phases, with a standard deviation (SD) of 3.84 in the first intervention phase and a SD of 4.62 in the second intervention phase. This variability can be attributed to external factors that occurred prior to or following the treatment sessions, which affected the participant’s behavior during the treatment phases.

To demonstrate the level of treatment effect of the intervention, the effect size using Cohen’s $d$ was calculated. The results indicated a large effect of 2.15 between treatment phases. A difference of 5.34 minutes or a 44% increase from baseline to the first intervention phase was obtained. A difference of 1.89 minutes or a 16% increase from baseline to final intervention phase was obtained.

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Phase A$_1$</th>
<th>Phase B$_1$</th>
<th>Phase A$_2$</th>
<th>Phase B$_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>12.22</td>
<td>17.56</td>
<td>7.78</td>
<td>14.11</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.86</td>
<td>3.84</td>
<td>2.22</td>
<td>4.62</td>
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<tr>
<td>Effect Size:</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cohen’s $d$ (label)</td>
<td></td>
<td></td>
<td></td>
<td>2.15 (large)</td>
</tr>
</tbody>
</table>
Inferential analysis. The data were analyzed for statistical significance utilizing a hierarchical linear model (HLM) program written with SAS PROC MIXED code (Appendix G) (SAS, 2008). The empirical Bayes estimate of Participant B’s change in reading time ($\beta_{1a}$) was 5.06 minutes. The t-test of this change showed statistical significance ($t(81.7) = 3.67, p=.0004$). The obtained p-value of 0.0004 is less than the preset alpha level of .05 concluding that the study results were shown to be statistically significant, rejecting the null hypothesis.

Summary of participant B. Following the visual and statistical data analysis for Participant B, results indicate that the total amount of reading time significantly increased during the intervention phases. The data suggests the presence of a treatment effect, supporting the effects of Animal-Assisted Therapy on reading progress for this Participant identified with a learning disability.

Participant C

The results from Participant C’s pre and post Informal Reading Inventory oral reading passage scores are presented (Figure 9). The graph indicates Participant C’s pre-assessment oral reading level at a third grade as 70% accurate. The post-assessment data indicates the student is reading between a sixth and seventh grade level with a 60% and 75% accuracy rate, respectively. Based on a visual inspection, the data indicates that Participant C had an increase in three grade levels from the onset of the data collection phase to the conclusion of the study.

The results of Participant C’s total reading time are presented (Figure 10). Reading time was based on the students’ total amount of reading time as documented by the researcher during baseline, intervention and withdrawal phases. Means and standard
deviations were computed for the reading time as well as the effect size using Cohen’s $d$ for each phase of the study. An analysis of the effect was interpreted using guidelines established by Cohen (1988).

The visual analysis of Participant C’s graphed results (Figure 10) indicates a consistent pattern of reading time across all four phases. The average of phases A\textsubscript{1} and A\textsubscript{2} was 13.89 minutes. Reading time in phase B\textsubscript{1} increased to seventeen minutes and phase B\textsubscript{2} increased to 16.33 minutes. Student C had a slight increase in total reading time during the intervention phases however, the drop in the final session of phase B\textsubscript{2} is a result of the participant’s completion of the selected text.

![Student C-Pre&Post Assessment Oral Scores](image)

*Figure 9. Participant C Pre and Post Oral Reading Assessment Data

*Note: the value in each data point indicates grade level
Figure 10. Participant C Total Reading Time Data

Descriptive analysis. A comparison of the means for each phase demonstrated an observed increase in total reading time (Table 7). The baseline mean of 13.89 minutes increased to 17.33 minutes for the first intervention phase and 16.33 minutes for the second intervention phase. The mean of the combined intervention phases was 16.83 minutes, 2.94 minutes above the baseline mean of 13.89 minutes. Minimal variability was noted between the first and second intervention phases, with a standard deviation (SD) of 3.04 and a SD of 4.24 in the second intervention phase, indicating a positive trend in the total reading time during the intervention phases.

To demonstrate the level of treatment effect of the intervention, the effect size using Cohen’s $d$ was calculated. The results indicated a small effect of 0.35 between treatment phases. A difference of 3.44 minutes from baseline to the first intervention
phase was obtained indicating a 25% increase in reading time. A difference of 2.44 minutes or an 18% increase from baseline to final intervention phase was obtained.

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Phase A₁</th>
<th>Phase B₁</th>
<th>Phase A₂</th>
<th>Phase B₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>13.89</td>
<td>17.33</td>
<td>14.11</td>
<td>16.33</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.85</td>
<td>3.04</td>
<td>4.62</td>
<td>4.24</td>
</tr>
</tbody>
</table>

Effect Size:
Cohen’s d (label) .35 (small)

Inferential analysis. The data were analyzed for statistical significance utilizing a hierarchical linear model (HLM) program written with SAS PROC MIXED code (Appendix G) (SAS, 2008). The empirical Bayes estimate of Participant C’s change in reading time ($\beta_{1A}$) was 2.95 minutes. The t-test of this change showed statistical significance ($t(81.7) = 2.14$, $p=.036$). The obtained p-value of 0.036 is less than the preset alpha level of .05 concluding that the study results were shown to be statistically significant, rejecting the null hypothesis.

Summary of participant C. Following the visual and statistical data analysis for Participant C, results indicate that the total amount of reading time increased during the intervention phases. The data suggests the presence of a treatment effect, supporting the effects of Animal-Assisted Therapy on reading progress for this Participant identified with a learning disability.
Analysis of Pooled Data

An analysis of the combined data from the three participants was analyzed using the hierarchal linear model (HLM). Results indicated a statistically significant increase for the three participants’ total reading time during the intervention phase as compared to the baseline phase. The estimate of the variance between the baseline phase mean is 3.35 minutes. The estimate of the variance of the treatment effect is substantial at 16.06 minutes (Table 8). Although the overall intercept is small, the overall effect is large and statistically significant (p < .0001). An increase of 4.04 minutes from the combined mean time of 11.30 minutes was obtained ($Y_{10} = 4.04$, $t (2.38) = 5.01$, $p = .026$). A p-value of .03 was calculated, indicating a statistically significant p-value based on p < .05, therefore rejecting the null hypothesis (Table 9).

<table>
<thead>
<tr>
<th>Covariance Parameter</th>
<th>Subject</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Z value</th>
<th>Pr&gt;Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>Person</td>
<td>3.35</td>
<td>3.89</td>
<td>0.86</td>
<td>0.195</td>
</tr>
<tr>
<td>Phase</td>
<td>Person</td>
<td>0.16</td>
<td>1.80</td>
<td>0.09</td>
<td>0.465</td>
</tr>
<tr>
<td>Residual</td>
<td></td>
<td>16.06</td>
<td>2.26</td>
<td>7.11</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

| Effect   | Estimate | Standard Error | DF | t value | Pr > |t| |
|----------|----------|----------------|----|---------|------|-----|
| Intercept| 11.30    | 1.19           | 2.38| 9.50    | 0.006|
| Phase    | 4.04     | 0.81           | 2.38| 5.01    | 0.026|
Summary of Descriptive and Inferential Analysis

The data from the descriptive and inferential statistics indicate a statistically significant effect from the use of Animal-Assisted Therapy on reading progress among the three participants identified with a learning disability. This single-case, ABAB, design provided consistent increases in reading progress across the targeted population. The results from this study indicate the potential for this study to be replicated with a larger population of students identified with mild learning disabilities.

Follow-Up Interview Data

Upon completion of the reading data collection (i.e., B2), the participants were asked to respond to two follow-up questions to explain their experience in the study. The questions explored were:

1. Tell me about reading to Beckett.
2. Tell me about reading with me, Ms. Griess.

Inter-rater agreement. Following the interviews, the data were transcribed and themes emerged related to the participants’ perceptions of their experience reading to the dog and with the researcher. The following formula was used to calculate inter-rater agreement:

Total Number of Agreements divided by the (Total Number of Agreements + Disagreements) multiplied by 100 (Kazdin, 1982). The researcher and an outside co-rater came to a consensus with a 95% agreement rate on the themes and sub-themes (Table 10). The themes that emerged from reading with the dog are: (1) increased motivation and enjoyment, (2) development of emotional bond and sentimental attachment. The themes that emerged from reading with the researcher include: (1) varying levels of
interest, (2) emotional bond, and (3) effect of book and book selection. Each area will be discussed along with the sub-themes that emerged from each theme.

<table>
<thead>
<tr>
<th>Researcher’s Original Themes and Subthemes</th>
<th>Number of Agreements</th>
<th>Total number of agreements and disagreements</th>
<th>Percent of inter-rater agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Motivation and enjoyment</td>
<td>3</td>
<td>4</td>
<td>75%</td>
</tr>
<tr>
<td>- fun/enjoyable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- attention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of Emotional Bond and Sentimental Attachment to dog</td>
<td>4</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>- sentimental attachment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- instilled positive feelings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(human qualities)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varying Levels of Interest</td>
<td>1</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>Emotional Bond</td>
<td>2</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Relationship to Text</td>
<td>1</td>
<td>1</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Reading to Beckett*

*Increased motivation and enjoyment.* The participants’ perception of reading to the therapy dog supports the existing literature on the effects of Animal-Assisted Therapy (Levinson, 1962; Melson, 2000). The participants reported reading to the dog as, “fun, awesome and cool.” Fun or enjoyment was a common theme, yet the participants had
different explanations of fun experiences reading to Beckett. The comments included, “it was fun to get to pet her because she’s soft.” Another response was, “reading to the dog was fun because I never got to read to a dog before.” When asked to elaborate on what was fun, a participant indicated that he liked giving him (Beckett) treats. Two participants indicated a sense of enjoyment in petting or attending to the dog while reading by stating, “I liked petting her while reading,” and “I get to pet her because I love dogs.” All participants expressed a sense of motivation in reading to Beckett and described reading to the therapy dog as a fun activity.

Emotional bond and sentimental attachment. Participants described a feeling of an emotional bond and sentimental attachment between themselves and therapy dog. They described their experience in terms of friendship and related their experience as developing a relationship with the dog. The sessions provided positive feelings and a sense of an emotional bond and sentimental attachment to the therapy dog. The participants indicated that reading to the dog “made me feel good” and it was like “reading with a friend.” Two participants expressed that reading to Beckett reminded them of their own pets stating “he (Beckett) reminded me of my dog before he died.” This sentiment was echoed by another student that stated, “this (reading to Beckett) reminded me of my dog and cat before my cat died.”

A sense of sentimental attachment was expressed through the participants’ past and current experiences with a pet. This attachment was expressed as “it was awesome (reading to Beckett) because I felt like I was reading to my dog on the grass. I would read until my mom called me because it was dark.” A connection was made that reading with
the therapy dog was like reading to a friend and the participant described a friend as “someone you play with.”

The three participants individually described their experience reading to the therapy dog in terms of an emotional bond or sentimental attachment. It is this emotional bond that Newlin (2003) indicated transfers to reading confidence and reading improvement.

Reading with Researcher

Varying levels of interest. The participants perceived their experience reading with the researcher differently than reading to the therapy dog. A contrasting opinion was expressed in that the students felt reading to the researcher was “boring” and “not much time in the middle, but toward the end, I started having more fun.” One participant commented on not liking the stories and that “some were harder to read,” however it is possible that the student confused the formal assessment sessions with the informal reading sessions that took place in the common area of the classrooms.

Although we read in the same classroom common area with and without the therapy dog, two students described their physical comfort levels when reading with the researcher. Examples included, “we were sitting outside and stuff and on the tile,” and “it was better because I didn’t have to sit on my knees.” The latter statement could have been the participant’s confusion between reading in a chair during the assessment sessions and reading on the floor with the researcher in the common area. This participant may have been more comfortable in the chair, however such comparison was not made when describing reading with the therapy dog.
Emotional attachment. An interesting finding emerged from the interviews in that the students related reading to the researcher like with reading with their mother. The responses included, “it felt like you were my mom because I was reading to you.” This student discussed the physical similarities between her mother and the researcher. Another student added, “I get to read to my mom at home and I get to read to somebody else at school,” and “she helps me like you do.” A distinction between reading with a friend and a parent was made in that “a mom is someone that takes care of you all the time and a friend is someone you play with,” “it was awesome because some nights I have reading homework and I have to read next to my mom. Like last year we used to have a fluency folder.” Additional information was shared about how this participant’s mother assisted her with managing homework responsibilities.

Effect of specific book and book selection. In contrast to discussions relating to reading to the dog when participants were asked about reading to researcher, they focused on the books or types of books read. The participants discussed how the book and book selection affected the reading sessions, including the assessment sessions. Comments included that “it was hard to concentrate and focus on the book and getting to know about the book,” “some stories were harder to read, I didn’t read them before.” This participant expanded on his comments about the text as, “Normally I select a book I didn’t read before, sometimes, those books were boring too. I didn’t always want a new book so I can learn about some more books. See how they were and some were good and some weren’t.” Specifically, this participant added, “that day that I read the one about the surgery the man had. I didn’t like that one.”
Another participant indicated that he liked the stories and they were “fun to read,” which was similar to the participant that “liked learning more stuff about reading and reading more books.”

It should be noted here that there seemed to be confusion about the assessment reading passages and the sessions in which the participants selected the book to read in the common area of the classrooms. Although I referred the students to the video a few times, the responses seemed to include both reading sessions.

**Summary of Interview Data**

The participants’ provided illustrative descriptions of their experience reading with and without the therapy dog. Responses shared highlight the positive effect of the therapy dog on reading progress among this population of students. The results from the analysis of the interviews support the potential for additional research related to the perceptions of experiences reading to a therapy dog among students identified with a learning disability.

**Summary of Results**

This chapter presented visual and descriptive results of the data analysis of Animal-Assisted Therapy on reading progress and perception of three participants identified as having a learning disability. The results demonstrated an increase in reading time as demonstrated by the participants during the treatment phases for all three participants. Statistically significant individual and group effect sizes were obtained and results from a hierarchical linear model analysis indicated significance in the participants’ total amount of time read when compared to the baseline phases. Additionally, the
participants’ responses to the follow-up questions resulted in positive feedback about their experiences reading to the dog.
The purpose of this research was to investigate the effect of Animal-Assisted Therapy on the reading progress of students identified with a learning disability and limited reading success. Initially, reading progress was defined as the participants’ comprehension rate obtained from an oral Informal Reading Inventory passage. However, the nature of the Informal Reading Inventory requires the introduction of more difficult reading passages as the student’s comprehension rate increases, potentially masking the overall effect of the intervention. Due to this factor and erratic student performance, which is a common characteristic of students with learning disabilities, obtaining consistent comprehension rates was difficult. Therefore, progress was defined as changes in total amount of time the student was engaged in reading under each condition. Additionally, the participants’ perceptions of their experience with canine Animal-Assisted Therapy were explored.

The research focused on the following two questions:

*Research Question 1*

Does canine Animal-Assisted Therapy affect reading progress among students identified as having learning disabilities?
Research Question 2

What are the perceptions of students identified as having a learning disability regarding the use of canine Animal-Assisted Therapy in relation to their reading progress?

Summary of Findings as Related to Research Questions

The dependent measure of this study was reading progress, as measured by amount of time students spent engaged in reading. Data indicated that the amount of time the participants read was significantly greater during the intervention phase than the amount of time the participants read with the researcher.

The results obtained from the visual analyses and statistically significant results of the data indicated an increase in the total amount of reading time as demonstrated by the participants during the intervention phases. On average, the participants read for 4.04 more minutes in the presence of the therapy dog. This increase in reading interest is a promising finding since a lack of interest in reading may affect elements necessary for proficient reading (Fuchs et al., 2001). Additionally, these findings support research linking the effect of literacy engagement and successful literacy activities to increased motivation and frequency of reading activities (Guthrie et al., 1996). The participants seemed to enjoy reading more, therefore practicing the skills acquired through reading instruction. Animal-Assisted Therapy could be recommended as an effective variation to homogenous grouping to maintain student interest in reading and reading instruction (Clay, 1993; Poole, 2008; Swanson, 1999).

A visual analysis of the pre and post Informal Reading Inventory assessment was conducted. Descriptive and inferential statistics were not calculated for this data due to
the limited amount of data obtained. Although the three participants’ scores on the Informal Reading Inventory increased over the duration of the study, this increase cannot be interpreted as a direct result of the research. External factors, such as classroom or individualized instruction, may have influenced the IRI assessment data. It is important to note that the three participants, who are identified as having learning disabilities, demonstrated an increase in the Informal Reading Inventory assessments over the three-month period. The data from the participants’ responses to their experience reading with the therapy dog indicated promising results. Motivation to read and positive feelings associated with the therapy dog were common themes that emerged from the responses. Additionally, the participants made emotional and sentimental connections to the therapy dog often describing their experience in terms of friendship. These results support the literature on the effects of Animal-Assisted Therapy on reading progress among students identified with learning disabilities. The therapy dogs can act as a source of unconditional love, an outlet for students' desire to express that love and a strategy to build a rapport with the student (Bossard, 1944; Levinson’s 1997). Therefore, these findings support the effects of Animal-Assisted Therapy on reading progress among students identified with a learning disability and may be a useful reading strategy for this population.

Limitations

Limitations of this study need to be addressed including research study design, amount and population of participants, and reading assessment measure. The study used an ABAB design in which the baseline and intervention phases were not staggered. Due to schedule considerations of the students, teacher and therapy dog handler, the initial start date of the phases were implemented on a predetermined date. According to Todman
and Dugard (2001), the recommended 36 sessions were implemented for this study in which a total of nine sessions per phase were initiated before continuing to the next phase. Additionally, capping the reading session length to twenty minutes may have provided a conservative result of the treatment effect as well as affecting the percentage of non-overlapping data since no session could exceed twenty minutes.

The results of this study are limited to three fourth and fifth grade students identified with having a mild learning disability and qualified to participate in this study based on the predetermined criteria established by the researcher (Appendix A). External factors, such as a peer or parent related conflict, or lack of sleep, may have had a greater impact on the overall outcome due to the small sample size of only three participants.

Internal validity may have been threatened as a result of the researcher’s multiple roles assigned throughout the study. The researcher replaced the role of the therapy dog in the baseline and withdrawal phases. Although a procedural protocol was closely maintained under both conditions (Appendix H), the participants had opportunities to interact with the researcher, outside of the treatment condition, potentially establishing a relationship independent from the research intervention. Furthermore, the researcher also administered the Informal Reading Inventory and guided the participants through the follow up comprehension questions at the conclusion of the study. The researcher may have influenced the participants responses to the questions due to the relationship that was created over the course of the study. An informal relationship may have developed as a result of the multiple roles of the researcher, affecting the participants’ behavior throughout the study.
All data sources pointed to the fact that the students were motivated and read for longer periods of time throughout the course of the study while in the presence of the therapy dog, however that motivation did not transfer to the achievement measures. The use of the Informal Reading Inventory to measure reading progress proved to be a poor measure for the participants in this study. The participants’ performance confirmed research that reading difficulties are context related, in which students will perform better in some contexts and poorly in others (Reeves, 2004; Ivey, 1999). Additionally, individual’s lack of interest in some of the IRI reading passages could have contributed to the erratic performance or even resistance to perform (Reeves, 2004).

The participants are identified with having a learning disability and did not transfer the use of Animal-Assisted Therapy to the Informal Reading Inventory assessment portion of the study resulting in erratic results. Students with learning disabilities might master skills when taught in isolation but have difficulty generalizing those strategies to other activities (Lerner, 2000). Consequently, there was no transfer of the treatment phase to the Informal Reading Inventory assessment. The IRI measures competence capability or capacity not achievement or growth, therefore it was not a true measure of the participants’ reading comprehension (Paris, 2003). For students with learning disabilities, their ability often exceeds a single instance of diagnoses and their performance reflected this dynamic. Additionally, the selection of shorter books could be what affected the time spent reading versus the motivation to continue reading the book.

**Recommendations for Future Research and Practice**

The positive findings of this study support the need for additional research of the effect of Animal-Assisted Therapy on reading progress among students identified with a
learning disability. As a result of this study, several questions emerged that could benefit future research studies. Specifically, using a performance assessment to measure reading progress for students identified with a learning disability proved to be an inadequate assessment. Therefore: a) What is the best reading measure for students with learning disabilities? b) Should the effect of Animal-Assisted Therapy for students with learning disabilities be measured through reading progress? c) Are students identified with learning disabilities more motivated to read in the presence of a therapy dog? These questions provide a basis for further research.

Video observations and interval data were kept throughout the study for treatment validity and inter-rater reliability purposes. These data were not analyzed, as they did not relate to the research questions. Future research could include this data to explore the behavior of the participants and therapy dog or time-on-task rates during the treatment sessions. Follow-up questions based on these videos could facilitate participants’ responses of their perceptions of the reading sessions in the presence and absence of the therapy dog. An analysis of this data would enhance the results of this current research study.

Limited empirical research exists on the effect of Animal-Assisted Therapy for students identified with learning disabilities. The literature included multiple observational data and qualitative studies, yet little empirical research is available on the population explored for this research study. Further research could include a replicated study including a larger population of students with learning disabilities in which to better generalize the effects of Animal-Assisted Therapy on reading progress.
Implications from this study could be used to inform teacher education and preparation programs on the reading benefits of interventions such as Animal-Assisted Therapy. Research highlighted a link between intrinsic motivation and increased literacy engagement (Guthrie et al., 1996; Melson, 2000) and this research could inform future educators to incorporate similar programs or opportunities into their classrooms.

Reading progress as measured by reading comprehension continue to be the focus for the public schools and instruction is heavily concentrated on these specific areas. The use of Animal-Assisted Therapy should be explored as an approach to increase reading motivation and progress among students with learning disabilities. The traditional use of standardized or performance based assessments do not provide a true measure of the progress of students with learning disabilities. This was evident in the use of the Informal Reading Inventory in this research study. Therefore, Animal-Assisted Therapy could provide students with learning disabilities the motivation or interest in reading necessary to affect their reading progress. The significant results of this research may generate more interest in the use of Animal-Assisted Therapy for students with learning disabilities. The results obtained from this study will enhance the existing literature on Animal-Assisted Therapy and provide new research on the effect for reading progress among students with learning disabilities.

Conclusion

In the United States, almost 6 million students receive special education services, and of these students, approximately 2.6 million are identified with a specific learning disability (U.S. Department of Education, 2009b). Historically, low reading achievement and learning disabilities have been linked to poor educational outcomes. Fuchs et al.
(2001) indicated that if students experience “persistent failure with reading skills acquisition, they will be less likely to read in and out of school.” Therefore, with the lack of interest in reading, the foundational skills, such as vocabulary growth and schematic development elements necessary for proficient reading comprehension, are also affected (Fuchs et al., 2001). When these students are not reading for enjoyment they are less motivated to read and not practicing the skills acquired through reading instruction (Lenters, 2006).

Students with learning disabilities often struggle with reading fluency and reading comprehension, as well as other components of the reading process. Innovative instructional approaches and research-based strategies have been implemented as a means to increase reading achievement among students with learning disabilities. Animal-Assisted Therapy is one approach that has been used in various capacities, but limited research exists regarding its use in the area of reading achievement with students with learning disabilities.

This study was designed to address the gap that existed in the literature regarding the use of Animal-Assisted Therapy as an effective strategy to improve reading progress and interest among the three participants of this study. Findings supported the use of Animal-Assisted Therapy as an approach to increase reading progress as measured by the total amount of time the participants elected to read during the treatment phases. During the treatment phases, the students read for an average of 4.04 more minutes in the presence of the therapy dog. Additionally, the individual results indicated a significant increase in the total amount of time read during the treatment phases.
The participants’ responses to their experience reading to the therapy dog indicated promising results as the students indicated a motivation to read and positive feelings associated with the therapy dog. Additionally, the participants made emotional and sentimental connections to the therapy dog often describing their experience in terms of friendship. These results support the literature on the effects of Animal-Assisted Therapy to provide a source of unconditional love, an outlet for students' desire to express that love and a strategy to build a rapport with the student on reading progress (Bossard, 1944; Levinson’s 1997). Therefore, the use of Animal-Assisted Therapy for students with learning disabilities is an innovative reading intervention. The results from this study support the benefits on reading progress and reading interest among the participants in this study and a need for additional related research.
References


Shanahan, T. (2008). Introduction to the report of the national early literacy panel,

*Developing Early Literacy: Report of the National Early Literacy Panel* (pp. 21-23): National Institute for Literacy.


Appendices
Appendix A: Participation Selection Form

<table>
<thead>
<tr>
<th>Student’s Name (Last, First)</th>
<th>Classroom Teacher/Grade</th>
<th>IEP-SLD (Y/N)</th>
<th>SAT/FCAT reading score</th>
<th>Verbal Skills (H,L)</th>
<th>Interest in Dogs (Y/N)</th>
<th>Native English Speaker (Y/N)</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>
## Appendix B: Reading and Assessment Matrix

### District Elementary Reading Matrix 2008-2009

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<thead>
<tr>
<th>Kindergarten</th>
<th>1st Grade</th>
<th>2nd Grade</th>
<th>3rd Grade</th>
<th>4th Grade</th>
<th>5th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Record End of Year (EOY)</td>
<td>3-4/C</td>
<td>16/I</td>
<td>28/M</td>
<td>38-40/P-R</td>
<td>50/S</td>
</tr>
<tr>
<td>Lexile (EOY)</td>
<td></td>
<td></td>
<td></td>
<td>550-700</td>
<td>650-800</td>
</tr>
<tr>
<td>SAT</td>
<td></td>
<td>Stanine 5-6</td>
<td></td>
<td>51st Percentile</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Research Approval

Application to Conduct Research
Please print or type

This form MUST be completed and signed by the Director of Research and Evaluation Services prior to collecting data and conducting research in schools.

Part I
Name: Julie Catriono Griess
Mailing Address: ____________________________
Phone: (813) _______ Fax: (813) _______

Research Affiliation: University of South Florida
Attach IRB approval for university requests.

Why are you conducting this study?
☐ Graduate Course ☐ Thesis ☒ Dissertation ☐ Research Interest (not a student)
☐ Other (specify)

If this is a student project, complete the following:

Degree Sought: Ph.D. Project Advisor: Ann Cramton-Gingras, Ph.D
Signature of Advisor: ____________________________

Are you an employee of the District School Board? Yes ☐ No ☒
If yes, what is your work location?

Signature of Principal (if the study is to be conducted in a school in the district AND the researcher IS EMPLOYED by the district).

Contact(s): This is an important aspect of your application to conduct research. These individuals are County administrative staff members responsible for content areas, schools, or locations at which the study is being carried out. These persons serve as a liaison for the project, and are selected because of their interest or expertise in the area(s) of interest. If studies are requested to be done at specific school sites, the principal(s) must be willing to serve as a contact if the application is to be approved.

Contact Signature ____________________________ Location/Department ____________________________
Contact Signature ____________________________ Location/Department ____________________________
Appendix C: Research Approval, Continued

Part III
Attach to this application:
- Research proposal that includes the purpose, statistical and design methodology, and benefit to the district.
- All research instruments
- IRB approval, if applicable
- A one-page letter or summary that can be shared with principals describing the tasks that will be required of teachers, students, or schools.

One (1) copy of the final report, thesis, dissertation, or study results with an executive summary must be submitted to the Research and Evaluation Services Department no later than one month after submission of the document to the sponsoring institution/agency.

Further, I understand and will abide by the laws related to protection of human subject rights and privacy. I will maintain confidentiality of all records, and I will destroy and eliminate any referent to school, district, or individual identity.

[Signature]
Researcher's Signature

Date

For Office Use Only

Granted: [ ]
Denied: [ ]
Date: 8/3/09

Conditions, if any:

Signature of Director of Research and Evaluation Services

Note to Researcher: When seeking approval at the school level, a copy of your approval letter MUST be shown to the school principal.

Return the completed application and required documentation to:

Director
Research and Evaluation Services Department
District School

[Signature]

Copy
Appendix D: Research Consent

Parental Permission to Participate in Research
Information for parents to consider before allowing their child to take part in this research study

IRB Study # _______________

The following information is being presented to help you/your child decide whether or not your child wants to be a part of a research study. Please read carefully. Anything you do not understand, ask the investigator.

We are asking you to allow your child to take part in a research study that is called:
A Canine Audience: The Effect of Animal-Assisted Therapy on Reading Progress and Process Among Students Identified with Learning Disabilities

The person who is in charge of this research study is Julie Omodio Griess. This person is called the Principal Investigator.

The research will be done at ___________ Elementary School. ___________ Elementary School is located in ___________ County, Florida.

Should your child take part in this study?
This form tells you about this research study. You can decide if you want your child to take part in it. This form explains:

- Why this study is being done.
- What will happen during this study and what your child will need to do.
- Whether there is any chance your child might experience potential benefits from being in the study.
- The risks of having problems because your child is in this study.

Before you decide:
- Read this form.
- Have a friend or family member read it.
- Talk about this study with the person in charge of the study or the person explaining the study. You can have someone with you when you talk about the study.
- Talk it over with someone you trust.
- Find out what the study is about.
Appendix D: Research Consent, Continued

- You may have questions this form does not answer. You do not have to guess at things you don’t understand. If you have questions, ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

It is up to you. If you choose to let your child be in the study, then you should sign this form. If you do not want your child to take part in this study, you should not sign the form.

Why is this research being done?

The purpose of this study is to find out if reading to Beckett, the dog, has an effect on reading progress and process. This study has not been previously tested and will help other educators determine how reading with dogs could affect children’s reading progress and process.

Why is your child being asked to take part?

We are asking your child to take part in this research study because he/she has had some difficulty in the area of reading and we want to learn more about how best to improve reading progress and interest.

What will happen during this study?

Your child will be asked to spend about 4 months/13 weeks in this study, September through December, concluding before winter break. The study will run for a series of 4 cycles with 9 sessions/3 weeks per cycle. More reading sessions may be necessary, depending on your child’s progress in the study. Cycle 1 will include your child reading to an adult for 3 days per week for about 3 weeks. Cycle 2 will include your child reading in the company of a dog, for 3 days per week for about 3 weeks. These cycles will then repeated. At the end of the cycles, your child will be asked two follow-up questions about her/his experience.

Your child will need to come for about 30 reading sessions. Most sessions will take about 20 minutes total.

Some reading sessions may be shorter if the child finishes reading the story sooner than the 20-minute limit. Additionally, the follow-up questions may be shorter or longer than the 20-minute limit, depending on the child’s responses.

See attached timetable.

At each visit, your child will be asked:

- For the first session (9 sessions) your child will bring a story on her/his reading level to the designated area outside of the classroom to read to the Principal Investigator, Julie Omodio Griess.
- Following the reading passage, your child will complete a reading assessment with the Principal Investigator, Julie Omodio Griess.
- For the second session (9 sessions), your child will bring a story on her/his reading level out to the designated area outside of the classroom to read with the dog, Beckett.
- Following the reading passage, your child will complete a reading assessment with the Principal Investigator, Julie Omodio Griess.

IRB Number: ________________

APPROVED

IRB Consent Rev. Date: ________________
Informed Consent Rev #: ________________
Appendix D: Research Consent, Continued

- Following all reading session, your child will be asked two follow-up questions about her/his experience reading with and without the dog.
- Each session will be videotaped. All identifying information will be removed and only the Principal Investigator, Julie Omodio Griess, will have access to the videotapes. At the conclusion of the study, all videotapes will be destroyed and thrown away.

How many other people will take part?
About 3 other children will take part in this study at USF.

What other choices do you have if you decide not to let your child to take part?
If you decide not to let your child take part in this study, that is okay. Instead of being in this research study your child can choose not to participate.

Will your child be paid for taking part in this study?
I will not pay your child for the time he/she volunteers while being in this study.

What will it cost you to let your child take part in this study?
It will not cost you anything to let your child take part in the study.
The study will pay the costs of: research materials, videotaping supplies, copies of Running Records, dog treats for the children to give to the dog following each session.

What are the potential benefits to your child if you let him / her take part in this study?
The potential benefits to your child are:
- An additional 20 minutes of oral reading time for 27 weeks
- Additional Running Record assessments analyzing reading progress and process

What are the risks if your child takes part in this study?
There are no known risks to those who take part in this study. The dog is insured and has been trained through Therapy Dogs International (TDI). Beckett has previous experience reading with children.

What will we do to keep your child’s study records private?
There are federal laws that say we must keep your child’s study records private. We will keep the records of this study private by securing all documents in a separate file located on a computer drive, password protected and only accessible by the Principal Investigator.
We will keep the records of this study confidential by removing all names and replacing names with an alphanumeric code, only identifiable by the Principal Investigator.
However, certain people may need to see your child’s study records. By law, anyone who looks at your child’s records must keep them completely confidential. The only people who will be allowed to see these records are:
Appendix D: Research Consent, Continued

- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your child's records. These include the University of South Florida Institutional Review Board (IRB) and the staff that work for the IRB. Individuals who work for USF that provide other kinds of oversight to research studies may also need to look at your child's records.

- Other individuals who may look at your child's records include: agencies of the federal, state, or local government that regulates this research. This includes the Department of Health and Human Services (DHHS) and the Office for Human Research Protections. They also need to make sure that we are protecting your child's rights and safety.

We may publish what we learn from this study. If we do, we will not let anyone know your child's name. We will not publish anything else that would let people know who your child is.

What happens if you decide not to let your child take part in this study?

You should only let your child take part in this study if both of you want to. You or child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

If you decide not to let your child take part:

- Your child will not be in trouble or lose any rights he/she would normally have.
- You child will still get the same services he/she would normally have.
- Your child can still get their regular class reading time as scheduled per day.

You can decide after signing this informed consent document that you no longer want your child to take part in this study. We will keep you informed of any new developments, which might affect your willingness to allow your child to continue to participate in the study. However, you can decide you want your child to stop taking part in the study for any reason at any time. If you decide you want your child to stop taking part in the study, tell the study staff as soon as you can.

- We will tell you how to stop safely. We will tell you if there are any dangers if your child stops suddenly.
- If you decide to stop, your child can go on getting his/her regularly schedule reading instruction.

Even if you want your child to stay in the study, there may be reasons we will need to take him/her out of it. Your child may be taken out of this study if:

- We find out it is not safe for your child to stay in the study. For example, your child’s health may get worse.
- Your child is not coming for the study visits when scheduled.
- Your child is not respecting the animal’s needs or not using care when meeting with the dog.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Julie Omodio Griess at [insert phone number].

If you have questions about your child's rights, general questions, complaints, or issues as a person taking part in this study, call the Division of Research Integrity and Compliance of the University of South Florida at (813) 974-9343.

IRB Number: [insert number]  
Page 4 of 5
Appendix D: Research Consent, Continued

If your child experiences an adverse event or unanticipated problem call Julie Omodio Griess at _________.

Consent for Child to Participate in this Research Study

It is up to you to decide whether you want your child to take part in this study. If you want your child to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to let my child take part in this study. I understand that by signing this form I am agreeing to let my child take part in research. I have received a copy of this form to take with me.

Signature of Parent of Child Taking Part in Study __________________________ Date __________

Printed Name of Parent of Child Taking Part in Study __________________________

Signature of Parent of Child Taking Part in Study __________________________ Date __________

Printed Name of Parent of Child Taking Part in Study __________________________

Signatures of both parents are required unless one parent is not reasonably available, deceased, unknown, legally incompetent, or only one parent has sole legal responsibility for the care and custody of the child. When enrolling a child participant, if only one signature is obtained, the person obtaining the consent must check on of the reasons listed below:

The signature of only one parent was obtained because:
☐ The other parent is not reasonably available. Explain: __________________________
☐ The other parent is unknown.
☐ The other parent is legally incompetent.
☐ The parent who signed has sole legal responsibility for the care and custody of the child.

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect.

Signature of Person Obtaining Informed Consent __________________________ Date __________

Printed Name of Person Obtaining Informed Consent __________________________
Assent to Participate in Research
Information for Persons under the Age of 18 Who Are Being Asked To Take Part in Research

IRB Study # ___________

Title of study: A Canine Audience: The Effect of Animal-Assisted Therapy on Reading Progress and Process

Why am I being asked to take part in this research?
You are being asked to take part in a research study about reading with and without a dog. You are being asked to take part in this research study because you like dogs and you will be working on your reading this year.
If you take part in this study, you will be one of about 4 people in this study.

Who is doing this study?
The person in charge of this study is Julie Omodio Griess of the University of South Florida. She is being guided in this research by Ann Cranston-Gingras, Ph.D.

What is the purpose of this study?
By doing this study, we hope to learn if reading to a dog helps students with reading.

Where is the study going to take place and how long will it last?
The study will be take place at [Redacted] School. You will be asked to come to the common area in the pod during the study. Each of those visits will take about 20 minutes. The total amount of time you will be asked to volunteer for this study is 3 times a week for twenty minutes each time over the next 4 months.

What will you be asked to do?
You will be asked to individually read a book already selected for you aloud to either an adult or a dog. After twenty minutes of reading or when you finish reading the book, you will be asked to individually read a different story with Ms. Griess.
When you are finished reading with Ms. Griess, you will go back to class.
In December, you will then be asked to talk about your experience reading with and without the dog.

What things might happen that are not pleasant?
To the best of our knowledge, the things you will be doing will not harm you or cause you any additional unpleasant experience.
Appendix D: Research Consent, Continued

Will something good happen if I take part in this study?
We cannot promise you that anything good will happen if you decide to take part in this study.

What other choices do I have if I do not participate?
You have the alternative to choose not to participate in this research study.

Do I have to take part in this study?
You should talk with your parents or anyone else that you trust about taking part in this study. If you do not want to take part in the study, that is your decision. You should take part in this study because you really want to volunteer.

If I don’t want to take part in this study, what will happen?
If you do not want to be in the study, nothing else will happen.

Will I receive any rewards for taking part in this study?
You will not receive any reward for taking part in this study. Your participation in this study will provide us with information to help other students with their reading.

Who will see the information about me?
We will share your information with your parents and teachers so that they can better help you.

Can I change my mind and quit?
If you decide to take part in the study you still have the right to change your mind later. No one will think badly of you if you decide to quit. Also, the people who are running this study may need for you to stop. If this happens, they will tell you why.

What if I have questions?
You can ask questions about this study at any time. You can talk with your parents or other adults that you trust about this study. You can talk with the person who is asking you to volunteer. If you think of other questions later, you can ask them.

Assent to Participate

I understand what the person running this study is asking me to do. I have thought about this and agree to take part in this study.

____________________________  ______________________
Name of person agreeing to take part in the study  Date

____________________________  ______________________
Name of person providing information to subject  Date

IRB Number: ____________________
Appendix E: Observational Log

<table>
<thead>
<tr>
<th>Time</th>
<th>Student’s Behavior</th>
<th>Dog’s Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:57</td>
<td>reading, no attention to dog, rocking back and forth</td>
<td>laying next to handler, away from student, handler petting and fixing whiskers</td>
</tr>
<tr>
<td>11:59</td>
<td>reading, no attention to dog</td>
<td>laying down asleep next to handler</td>
</tr>
<tr>
<td>12:01</td>
<td>reading quietly, no attention to dog</td>
<td>same/no change</td>
</tr>
<tr>
<td>12:03</td>
<td>same/no change</td>
<td>same/no change, handler petting dog</td>
</tr>
<tr>
<td>12:05</td>
<td>same/no change</td>
<td>same/no change</td>
</tr>
<tr>
<td>12:07</td>
<td>sitting against wall, showing picture to dog</td>
<td>sleeping next to handler</td>
</tr>
<tr>
<td>12:09</td>
<td>reading and petting dog’s belly, commented on noise coming from dog</td>
<td>Moved positions, closer to student, laying on side letting student pet her</td>
</tr>
<tr>
<td>12:11</td>
<td>reading while dog moved, laughed at dog’s sneeze</td>
<td>dog got up and walked away from area toward door, handler moved dog back to area</td>
</tr>
<tr>
<td>12:13</td>
<td>reading, resting against wall, no attention to dog</td>
<td>dog laid back down</td>
</tr>
<tr>
<td>12:15</td>
<td>“Chapter 10, I’ve read a lot. This is the last chapter” Reading, no attention to dog. END OF BOOK</td>
<td>dog laying next to student’s foot</td>
</tr>
</tbody>
</table>
INTRODUCTORY STATEMENT: Read this story to find out what Whiskers the cat did.

Soon after Whiskers sharpened his claws, he saw some blades of grass move to and fro. A human being might have said to himself, "That grass is moving against the breeze."

There must be a mouse on the ground!" But Whiskers could not talk, to himself or anyone else, and he did not take time to think things out. Instead, he crouched down and began to creep forward and pounced upon it.

Dogs and wolves bite their prey and hold it, but Whiskers did not bite. He struck the mouse with one paw and then backed away. When the mouse got up and tried to escape, Whiskers struck it again. He did this several times until the mouse was dead. Then the cat picked it up and carried it to the house. When his mistress opened the door to let him in, he laid the dead mouse at her feet.


COMPREHENSION QUESTIONS

1. What is this story about? (Whiskers catches a mouse.)
2. What caused the blades of grass to move to and fro? (a mouse)
3. What was the first thing Whiskers did when he saw the blades of grass move? (He crouched down and began to creep forward.)
4. What does the word "crouched" mean? (bent his body down close to the ground)
5. What does the word "creep" mean in the sentence "He crouched down and began to creep forward"? (to move slowly in a sneaky way)
6. What does the word "pounced" mean? (leaped on)
7. What was the first thing Whiskers did to the mouse when he caught it? (struck it with his paw)
8. Was the mouse killed when Whiskers hit it the first time? (no)
9. Where did Whiskers carry the dead mouse? (to the house)
10. Who opened the door to let Whiskers in? (his mistress)
Appendix G: SAS Code

Multilevel Modeling Code

data j2;
set j1;
y=y1; phase=phase1; time=time; person=1; output;
y=y2; phase=phase2; time=time; person=2; output;
y=y3; phase=phase3; time=time; person=3; output;
drop y1 y2 y3 phase1 phase2 phase3;

proc sort; by person time;
proc print;
proc mixed data=j2 covtest;
   class person;
   model y = phase/solution dfm=kr;
   random intercept phase/sub=person;

proc mixed data=j2 covtest;
   class person;
   model y = /solution dfm=kr;
   random intercept phase/sub=person solution;
run;
Appendix H: Procedural Protocol

Reading with Researcher

1. Researcher confirms with classroom teacher that student may be released to read
2. Student selects a book from the designated classroom library or school library at the appropriate reading level
3. Researcher walks with student to designated reading area in the middle of the four classrooms
4. Researcher tells student to begin reading the book and to read until student wants to stop or researcher will stop the student at twenty minutes.
5. Researcher tells student that assistance may be provided for difficult words
6. Student begins reading
7. At stopping point, either by student or researcher, researcher then indicates that they will now walk to the isolated teacher work area to complete the next reading session
8. Researcher starts videotaping
9. Researcher hands student pre-selected Running Record passage and gives directions to read aloud or silently and questions will be asked following the passage
10. Upon completion of both passages, researcher thanks student and sends student back to class

AAT Reading Session

1. Researcher follows protocol steps 1-3
2. Researcher tells student that they are going to read to Beckett and the handler is available to help with difficult words.
3. Researcher indicates that session will be videotaped and will be present to observe the session
4. Researcher records interval data every two minutes of reading session
5. Student self-stops or is stopped reading at twenty minutes
6. Student is invited to give Beckett a treat and water through the use of a squirt bottle
7. Researcher walks student to isolated teacher work area and continues with steps 8-10 of protocol
About the Author

Julie Omodio Griess graduated in 1994 with a B.S. degree in Elementary Education and later received a Master’s of Arts degree in Varying Exceptionalities from the University of South Florida in 1999. She earned her Ph.D. in 2010 in Curriculum and Instruction with an emphasis in Special Education from USF. Her classroom teaching experience ranges from preschool through third grade in both general and special education settings.

In addition to her classroom experience, Julie Omodio Griess was the recipient of the Cathy Lynne Richardson doctoral scholarship and elected to serve as the student representative to the Teacher Education Division of the Council for Exceptional Children. She has presented at national conferences, taught undergraduate courses and supervised student and beginning teachers. Her research interests include: teacher education, animal-assisted therapy, and research-based instructional strategies for all learning abilities.