THE EFFECTS OF

BEHAVIOR SPECIFIC PRAISE ON MATH FLUENCY

AND ON TASK BEHAVIOR OF STUDENTS

By

ERYN M. MCMASTER

Bachelor of Arts in Psychology
University of Tulsa
Tulsa, Oklahoma
2012

Master of Science in Educational Psychology
(Option: School Psychometrics)
Oklahoma State University
Stillwater, Oklahoma
2015

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May, 2019

THE EFFECTS OF

BEHAVIOR SPECIFIC PRAISE ON MATH FLUENCY

AND ON TASK BEHAVIOR OF STUDENTS

Dissertation Approved:

Dr. Brian C. Poncy, Dissertation Adviser

Dr. Gary Duhon

Dr. Sara E. Rich

Dr. Mwarumba Mwavita

ACKNOWLEDGEMENTS

Countless hours and many sleepless nights went into this dissertation. But it would not have been possible without the amazing support from so many incredible individuals. I could not have done this without the help from fellow graduate students in the School Psychology program. So many students dedicated their time to help complete observations, score math probes, and prepare materials with me. A special thank you to Janna Sanders and Danielle Campbell for helping things run smoothly when I could not be present.

Thank you to my adviser, Dr. Brian C. Poncy, for your guidance not only with this dissertation, but throughout graduate school. I appreciate your feedback and encouragement throughout this laborious process. I would also like to thank my committee members, Dr. Gary Duhon, Dr. Sara Rich, and Dr. Mwarumba Mwavita for your guidance and assistance throughout this project. I would also like to thank my amazing cohort for their unwavering support over the last 5 years. I could not have done any of this without your encouraging words and frequent reminders to relax. Finally, thank you to my friends and family for always being there. Your words of encouragement meant more than you will know. You reminded me that the things that are worth having, take time and hard work. I could not have done this without your support and faith in me.

Name: ERYN M. MCMASTER

Date of Degree: MAY, 2019

Title of Study: THE EFFECTS OF BEHAVIOR-SPECIFIC PRAISE STATEMENTS ON MATH FLUENCY AND ON-TASK BEHAVIOR OF STUDENTS

Major Field: SCHOOL PSYCHOLOGY

Abstract: One mission of schools is to assist children in developing cognitive skills, in order to become well-functioning, productive contributors to their community and society as a whole (Abbott, O'Donnell, Hawkins, Hill, Kosterman, & Catalano, 1998). While providing students with academic instruction, it is important to consider the variance in student performance. One variable that can account for such variance is classroom management and opportunities for learning (Abbott et al., 1998). Classroom management is a major contributing factor to successful student learning, as well as active engagement in the classroom. In addition, research indicates that there is a link between effective classroom management strategies and positive outcomes, including an increase in on-task behavior and academic engagement (Leflot et al., 2010; Reinke, Lewis-Palmer, & Merrell, 2008). The use of verbal praise in the classroom allows for more instructional time, increased student intrinsic motivation, facilitates students' feelings of competence (Sutherland et al., 2000), and increased appropriate behaviors in students who witness other students being praised for appropriate behaviors (Kern & Clemens, 2007). The present study examined the use of behavior-specific praise (BSP) statements on math fluency and on-task behavior of students. The study sought to determine if BSP would increase math fluency, as well as the on-task behavior of students. Forty fourth-grade students participated in the study and were randomly assigned to the treatment group (received behavior-specific praise statements) or the control group (no praise statements). Results of the study indicated that significant differences were found within-subjects over time, indicating that explicit timing is an effective math fluency intervention. Additionally, results indicated that students performing in the frustrational range (< 20 Digits Correct per Minute), benefit more from BSP, than those performing above the frustrational level. However, there were no significant differences found for the between-subjects variables of group and time. Limitations and future implications for research are discussed.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

One mission of schools is to assist children in developing cognitive skills, in order to become well-functioning, productive contributors to their community and society as a whole (Abbott, O'Donnell, Hawkins, Hill, Kosterman, & Catalano, 1998). While schools address a multitude of skills, the acquisition of academic skills is exceptionally important for increasing academic performance in students. Although academic performance is at the forefront of education systems, there are risks associated with low academic performance. Short-term risks of low academic performance include increased behavior problems (Algozzine, Wang, & Violette, 2011), retention (Bali, Anagnostopoulos, & Roberts, 2005), and placement in restrictive learning environments (Gottlieb, Gottlieb, & Trongone, 1991). In addition, long-term risks include an increased risk of substance abuse, teenage pregnancy, violence, delinquency, and school dropout (Abbott et al., 1998). With many known risks of low academic performance, it is important that schools provide students with exceptional instruction, support, and opportunities to succeed. While providing students with academic instruction, it is important to consider the variance in student performance. One variable that can account for such variance is

classroom management and opportunities for learning (Abbott et al., 1998).

Classroom Management

Classroom management is a critical area for teachers to receive substantial training and support (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). Classroom management is often defined as "how teachers maintain order in a classroom" (Malone & Tietjens, 2000), or as "a set of procedures that, if followed, should help the teacher maintain order in the classroom and involve both antecedent and consequent procedures that can be combined to provide a comprehensive approach to classroom management" (Little & Akin-Little, 2008). In a study conducted by Stichter, Lewis, Whittaker, Richter, Johnson, and Trussell (2006), results indicate that teachers who used ineffective classroom management strategies, consistently saw student disturbances in the classroom, with an increase in verbal interruptions. While these may seem like minor disruptions, they add up to more than mere annoyances.

Comparably, Vaitaro, Brendgen, Larose, and Tremblay (2005) found in a recent study, that hyperactivity and inattention in Kindergarten children, was predictive of aggression in high school students, as well as dropout and delinquency. Furthermore, Clunies-Ross, Little, and Kienhuis (2008) found that children who exhibit behavior problems are at greater risk for developing serious health problems, as well as conduct disorders, in adolescence. Fergusson, Horwood, and Ridder (2005) found, during a longitudinal study, that conduct problems between the ages of seven and nine years, are associated with various domains, after confounding variables. These domains include economic disadvantage, family conflict, child abuse, ethnicity, and gender were controlled for: crime (including violent offenses and imprisonment), mental health (including major depression/anxiety disorders,

antisocial personality disorder, and suicide risk), substance abuse (including nicotine and illegal drug use and/or dependence), and sexual relationships (including 10+ sexual partners, teen pregnancy, and domestic violence). As evidence by these research findings, it would be reasonable to assume that children with untreated behavior problems are at an increased risk for developing conduct disorders or other serious disorders in adolescences, and eventually leading to a higher rate of high school drop-out. Due to the substantial amount of risks associated with behavior problems, it is critical that measures be taken to address and minimize problem behaviors in children.

To assist in the reduction of behavior problems in students, systems-level interventions can be implemented within a school. School-Wide Positive Behavioral Interventions and Supports have been used to effectively decrease the number of office referrals (Luiselli, Putnam, Handler, & Feinberg, 2005). Although School-Wide Positive Behavioral Interventions and Supports are widely accepted and used, Stronge, Ward, Tucker, & Hindeman (2008) presume that for an intervention to be effective within a school, there must first be a change in the teacher's behavior. For teachers and other school personnel to respond effectively to behavior problems or difficulties, they must receive adequate training to improve their professional functioning (Leflot, van Lier, Onghena, & Colpin, 2010).

While the benefits of effective classroom management are clear, the negative consequences of ineffective classroom management strategies should also be addressed. Negative consequences of ineffective classroom management are not limited only to students, but to teachers as well. Clunies-Ross and colleagues (2005), found that two of the biggest contributors to teacher burnout are, student misbehavior and workload. In addition, Hastings and Bham (2005) found a diverse amount of student classroom behaviors that

contribute to teacher burnout. These behaviors include, disrespect and lack of attention within the classroom. Research indicates that teacher stress impacts teacher performance, as well as physical and emotional well-being, which in turn leads to the use of ineffective classroom management strategies (Clunies-Ross et al., 2008).

The Effect of Classroom Management on On-Task Behavior

The vast majority of teachers currently implement classroom management using a consequent method, rather than antecedent (Clunies-Ross et al. 2005; Little & Akin-Little, 2008). Consequent methods are used after the child has displayed undesirable behavior, and the teacher is trying to remediate the behavior. Examples of this include correcting the child, removing privileges, or reprimanding the child after the fact. Research indicates that teachers who use consequent methods are more likely to respond to inappropriate behavior rather than appropriate behaviors (Clunies-Ross et al., 2008). In contrast, antecedent methods allow for more instruction time to be spent on academics rather than focusing on disciplinary actions for undesirable behaviors (Little & Akin-Little, 2008). While antecedent methods of classroom management reduces the amount of instructional time spent on discipline, it has also been proven to reduce inappropriate classroom behaviors, as well as increasing student attention and engagement (Clunies-Ross et al., 2008).

The Effect of On-Task Behavior on Student Learning

Classrooms with more structure, promote the use of appropriate behavior, both socially and academically (Simonsen et al, 2008). As discussed previously, classroom management is a major contributing factor to successful student learning, as well as active engagement in the classroom. In addition, research indicates that there is a link between effective classroom management strategies and positive outcomes, including an increase in

on-task behavior and academic engagement (Leflot et al., 2010; Reinke, Lewis-Palmer, & Merrell, 2008). Codding and Smyth (2008), suggest that the more time a student spends actively engaged in learning, the higher their rates of academic performance will be. Students who spend more time engaged in academic activities are more likely to read at higher grade levels, write better, and are stronger performers on standardized tests (Bohn, Roehrig, & Pressley, 2004).

While the benefits of using effective classroom management strategies are clear, there are negative consequences when ineffective classroom management strategies are being implemented within the classroom. American Psychological Association (APA; 1993) indicates that aggression and disruptive behavior in early childhood lead to low academic performance and inadequate social skills to form peer relationships. In the absence of effective classroom management, there is an increase in unstructured classroom time which allows for more disruptive behavior to occur (Little & Akin-Little, 2008). When a teacher stops instruction to address disruptive behavior, it reduces the amount of instructional time, which effects academic performance for the class as a whole (Clunies-Ross et al., 2008; Freiberg, Huzinec, & Templeton, 2009). To reduce the amount of disruptive behavior, and increase the amount of time spent focusing on academic activities, the teacher should ensure that no less than seventy percent of classroom time be spent on academics. This will ensure that minimal time is being spent focusing on disciplinary actions for disruptive behaviors (Little & Akin-Little, 2008).

Instructional Hierarchy

The Instructional Hierarchy (IH) has been widely used to guide the use and implementation of empirically-supported academic interventions (Haring & Eaton, 1978).

Within this hierarchy, there are four stages of skill learning or development: (1) Acquisition, (2) Fluency Building, (3) Generalization, and (4) Adaptation. Skill acquisition often occurs by watching the teacher model the skill, receiving assistance with prompting, and by receiving performance feedback (Martens & Witt, 2004; Wolery, Bailey, & Suagi, 1988). Fluency of a skill is often built by repeated drill and practice of skill, within a strict amount of time, while receiving reinforcement (Martens & Witt, 2004; Daly, Lentz, & Boyer, 1996). Generalization is the ability to apply a learned behavior across various times and settings. Generalization training includes applying the learned skills in different situations and environments (Ardoin & Daly, 2007; Martens & Witt, 2004). Lastly, adaptation is the ability to modify or alter a learned skill to be used in different situations. Adaptation is often considered to be the most complex stage of the IH (Haring & Eatons, 1978; Martens & Witt, 2004). The Instructional Hierarchy is used to identify the appropriate instructional level for students, which can be used to assist in the selection of appropriate academic interventions, to aid in student performance (Ardoin & Daly, 2007).

Importance of Fluency

A crucial part of skill mastery is becoming fluent in a skill. Fluency is defined as a "fluid combination of accuracy plus speed that characterizes competent performance" (Binder, 1996). Fluency is often considered a prerequisite skill to generalization and adaptation. When fluency is applied to academics, such as mathematics, students who lack fluency in foundational or basic skills, are more likely to have difficulty on higher levels of math (Alferink, 2007). High levels of math require generalization and adaptation of those basic math skills. Increasing the rate of fluency is important because those who are fluent in a skill are able to complete math tasks and assignments faster. Fluency requires students to

practice skills until they are automatic, which requires less cognitive effort or time (Poncy, Skinner & Jaspers, 2007).

Explicit Timing

There have been several evidence-based interventions identified for remediating mathematic skills. Two eminent interventions are Cover Copy Compare (CCC) and Explicit Timing (ET). Cover Copy Compare is an intervention that requires the students to self-manage their learning through completing efficient learning trials (Skinner, McLaughlin, & Logan, 1997). CCC requires students to repeatedly (1) look at the model problem (e.g., computation model), (2) cover the model, (3) rewrite the given problem, in the absence of the model, and (4) compare their answer with the model problem (Skinner et al., 1997). CCC has extensive research that confirms it effectively increases accuracy and fluency (Skinner, Turco, Beatty, & Rasavage, 1989). Although CCC is an effective intervention, it has been shown to be less time efficient than interventions such as ET (Poncy et al., 2007). This is likely due to the use of complete learning trials, which limits the response rates.

CHAPTER II

REVIEW OF LITERATURE

Student Learning

One mission of schools is to assist children in developing cognitive skills, in order to become well-functioning, productive contributors to their community and society as a whole (Abbott, O'Donnell, Hawkins, Hill, Kosterman, & Catalano, 1998). While schools address a multitude of skills, the acquisition of academic skills is exceptionally important for increasing academic performance in students. Although academic performance is at the forefront of education systems, there are risks associated with low academic performance. Short-term risks of low academic performance include increased behavior problems (Algozzine, Wang, & Violette, 2011), retention (Bali, Anagnostopoulos, & Roberts, 2005), and placement in restrictive learning environments (Gottlieb, Gottlieb, & Trongone, 1991). In addition, long-term risks include an increased risk of substance abuse, teenage pregnancy, violence, delinquency, and school dropout (Abbott et al., 1998). With many known risks of low academic performance, it is important that schools provide students with exceptional instruction, support, and opportunities to succeed. While providing students with academic instruction, it is important to consider the

variance in student performance. One variable that can account for such variance is classroom management and opportunities for learning (Abbott et al., 1998).

Classroom Management

Definition and Components of Effective Classroom Management. Classroom management has been defined as "the ability of the teacher to lead the class…toward achieving the socio-emotional welfare and learning of the students" (Tal, 2010), as well being "a set of procedures that, if followed, should help the teacher maintain order in the classroom and involve both antecedent and consequent procedures that can be combined to provide a comprehensive approach to classroom management," (Akin-Little, 2008). Although, teachers often view classroom management as various techniques that can be used to control various problems in the classroom, or "fix" problem behavior (Tal, 2010). However, research suggests that there is more to classroom management than some would be believe. In addition to Little and Akin-Little (2003), Stichter and colleagues (2009) define classroom management as "those general environmental and instructional variables that promote consistent classroom-wide procedures of setup, structure, expectations, and feedback".

Classroom management can be divided into three components: time allotted for instruction, using instruction to promote academic engagement as well as academic engagement, and using antecedent behavior management strategies (Sugai & Horner, 2002). In order for classroom management to be effective, there are many variables that need to be considered, including the use of classroom rules and expectations (Hart, 2010; Kern & Clemens, 2007; Little & Akin-Little, 2008), established procedures for chronic misbehavior, and a classroom environment that promotes learning (Hart, 2010),

reinforcement of appropriate behavior, responding to inappropriate behavior, positive relationships and interactions between staff and students (Simonsen et al., 2008). Taking these elements into account, the first step should be to establish a set of classroom rules. Kern and Clemens (2007) suggest that establishing rules is the first priority because it clarifies to the students what behaviors are expected of them. Previous research suggests that the consistent use of classroom rules has been linked to improved student behavior in the classroom as well as school-wide (Kern & Clemens, 2007). To establish clear classroom rules, the following guidelines should be followed: (1) The number of classroom rules should be limited to five, (2) Students should help the teacher devise the classroom rules, (3) Rules should be simple, brief, and stated positively, (4) Rules should be displayed in an easily visible place in the classroom, (5) Rules should be specific, (6) Rules should describe and focus on behaviors that are observable and measurable, (7) Teachers should teacher and model the rules for the class, (8) Rules should be connected to consequences (Kern & Clemens, 2007; Little & Akin-Little, 2008). For classroom rules to be most effective in reducing inappropriate behavior, they should be used in addition to a classroom behavior management plan. This plan should include reinforcement, such as verbal praise, tangibles, or privileges, along with consequences (Kern & Clemens, 2007; Little & Akin-Little, 2008; Simonsen et al., 2008).

Use of Time Allotted for Instruction. The likelihood of disruptive behaviors increases with the amount of unstructured classroom time (Little & Akin-Little, 2008), while occupying instructional time; which impacts students' academic performance (Clunies-Ross et al., 2008; Freiberg et al., 2009). When teachers have to manage students' inappropriate behaviors, it takes away from the amount of time the teacher

should spend on teaching, as well as the amount of time students should be learning (Matheson & Shiver, 2005). Little and Akin-Little (2008) suggest that academic activities should account for at least seventy percent of classroom time, which can effectively reduce the amount of time teachers spend tending to disruptive behaviors.

One area of difficulty within the classroom is transitions from one activity to another. Research suggests that up to 25 percent of non-learning activities can be accounted for by transitions (Codding & Smyth, 2008). There are various methods that can effectively reduce the amount of time spent on transitions, including the use of visual schedules, providing reminders of upcoming changes, and providing information about upcoming events in terms of content and duration (Kern & Clements, 2007). In addition to transitions contributing to lost instructional time, gaining the attention of the students and getting started on instruction, contribute as well.

Academic Engagement and Student Learning. The relationship between academic engagement and student learning has been thoroughly documented through research, specifically examining academic engagement as a predictor for student learning (Matheson & Shiver, 2005). In fact, Bohn and colleagues (2004) suggest that students who spend more time engaged in academic activities, read at higher levels, write better, and perform better on standardized tests.

Off-task or disruptive behavior often leads to fewer educational opportunities for students (Austin & Agar, 2005). When children are frequently exhibiting off-task or disruptive behaviors, they are decreasing the amount of learning time for other students in the classroom (Clunies-Ross et al., 2008). When children are being disruptive, the teacher often has to stop instruction and address the student's inappropriate behaviors. This shifts

the teacher's focus away from instruction and the other students in the classroom. Resulting in more time being spent on discipline and less on instruction (Clunies-Ross et al., 2008). Therefore, off-task or disruptive behaviors in the classroom can have a negative effect on the amount of learning that takes place, well-being of the teacher, and the classroom environment in general (Clunies-Ross et al., 2008). Matheson and Shriver (2005) indicate that there is a positive correlation between effective classroom management and academic engagement.

Although most educators recognize the relationship between academic engagement and student learning, students are spending up to half their instructional time engaged in non-academic activities such as classroom procedures, transitions, and discipline (Codding & Smyth, 2008). Based on direct observations, the average percentage of academic engagement in general education classrooms ranges from 75 to 85 percent (Sutherland et al., 2000).

Compliance with teacher instruction is essential for increasing academic engagement and responding (Matheson & Shiver, 2005). In order for students to be engaged and respond to academic tasks, they must comply with teacher instructions. Therefore, if students do not comply with teacher instruction, the level of academic engagement is likely to be low. Teachers can use various methods or strategies to increase academic engagement such as effective classroom management procedures. Bohn and colleagues (2004) found that students whose teachers focused on classroom rules and procedures for the first few days of school, were more engaged and had higher rates of achievement. Further research suggests that establishing good classroom

management in the beginning of the school year leads to more order in classrooms and higher achievement in the middle of the school year (Bohn et al., 2004).

Short-Term Risks Associated with Poor Classroom Management. There are several risks associated with the use of ineffective classroom management, including negative effects on student learning. In a recent study by Stichter and colleagues (2006), teachers who use ineffective classroom management strategies experience more disruptive behaviors and verbal interruptions in the classroom. On average, six percent of students displaying disruptive behaviors, require interventions. While the risks are high for the student displaying the inappropriate behavior, but they increase the risk for other students by interfering with other students' learning (Clunies-Ross et al., 2008). The cumulative effects of disruptive behaviors can be extremely harmful; retention (Bali, Anagnostopoulos, & Roberts, 2005) and placement in more restrictive educational environments (Gottlieb, Gottlieb, & Trongone, 1991) are two examples of these cumulative effects.

Long-Term Risks Associated with Poor Classroom Management. The use of ineffective classroom management strategies not only has short-term risks for students, but also long-term risks. The use of ineffective classroom management strategies has been shown to have a negative impact on students' academic performance, behavior, and social functioning (Reinke et al., 2008). Teacher burnout is one long-term risk for the use of ineffective classroom management strategies. Teachers who lack effective classroom management strategies experience more stress and have higher rates of burnout. According to Hastings and Bham (2003), various aspects of student classroom behavior (e.g., disrespect, lack of attentiveness) are predictors of various aspects of teacher burnout

(e.g., emotional exhaustion, depersonalizing students, and lack of feelings of personal accomplishments). Teacher stress leads to poor teacher performance, decreased physical and emotional well-being, and the teacher's overall attitude towards the school is more negative (Clunies-Ross et al., 2008). There is a positive correlation between teacher stress and teacher complaints. These complaints often address disruptive behaviors such as inattention, overactivity, and noncompliance (Little & Akin-Little, 2008). Reinke and colleagues (2008) define disruptive behavior as "any statements or actions by an individual student of group of students that disrupt or interfere with ongoing classroom activities for the teacher (e.g., talks out during instruction, any behavior reprimanded by the teacher, questions, or comments unrelated to the task) and/or one or more peers (e.g., hitting or poking a peer, fighting, making noises, or actions that clearly distract classroom peers."

Not only are student problem behaviors impacting the level of stress teachers experience, but they also increase the student's risk for developing serious disorders in adolescence, such as conduct disorder (Clunies-Ross et al., 2008). In a study conducted by Ingersoll (2001), schools with fewer student discipline problems experienced a significantly lower rate of teacher turnover. Little and Akin-Little (2008) recommend training teachers on the use of effective classroom management strategies, to decrease the occurrence of teacher turnover. This training would be most effective if done at the undergraduate or graduate level, before teachers begin working in their own classrooms (Little & Akin-Little, 2008).

Behavioral Methods

Behavioral methods are often used to increase appropriate behaviors of students in the classroom. Behavioral methods use reinforcement to increase desired behaviors and decrease inappropriate behaviors. Behavioral methods focus on changing the environment so that antecedents, which frequently precede inappropriate behaviors, are no longer present (Hart, 2010). Within the disciplines of education and human behavior, the link between the behavior of individuals and their immediate environment has been examined (Kern & Clemens, 2007). In relation to this link, many students exhibit appropriate behaviors contingent on the naturally occurring reinforcers, including positive teacher praise, good grades, or completing academic tasks. While these reinforcers may be reinforcing for some students, they may not be salient enough to elicit appropriate or desirably behaviors in all students (Little & Akin-Little, 2008). Research indicates that for interventions to be effective and have a lasting effect, the environmental events that trigger inappropriate behaviors must be altered. Using this idea in practice requires changing the events immediately preceding the inappropriate or undesirable academic or social behaviors (Kern & Clemens, 2007).

Antecedent vs. Consequent Methods of Behavior Management

The vast majority of teachers currently implement classroom management using a consequent method, rather than antecedent (Clunies-Ross et al., 2005; Little & Akin-Little, 2008). However, research suggests that the most effective use of classroom management is using an antecedent method, rather than the common consequent methods (Clunies-Ross et al., 2008). Consequent methods are used after the child has displayed undesirable behavior, and the teacher is trying to remediate the behavior. Examples of

this include correcting the child, removing privileges, or reprimanding the child after the fact. Research indicates that teachers who use consequent methods are more likely to respond to inappropriate behavior rather than appropriate behaviors (Clunies-Ross et al., 2008). While many teachers use consequent methods to decrease inappropriate behaviors, research suggests that it may in fact be reinforcing the inappropriate behavior (Leflot et al., 2010; Little & Akin-Little, 2008) and discouraging the desired behaviors (Beaman & Wheldall, 2000). Wehby, Tally, and Falk (2004) suggest that this is due to students learning to exhibit inappropriate behaviors in order to escape academic tasks or to gain the teacher's attention. Antecedent methods are used more as prevention and are usually more positive in nature. Antecedent methods allow for more instruction time to be spent on academics rather than focusing on disciplinary actions for undesirable behaviors (Little & Akin-Little, 2008). While antecedent methods of classroom management reduce the amount of instructional time spent on discipline, it has also been proven to reduce inappropriate classroom behaviors, as well as increasing student attention and engagement (Clunies-Ross et al., 2008).

In a study conducted by Johnson and colleagues (1996), three classroom management interventions' effectiveness were examined while being implemented with seventh-grade students. The interventions used were (1) the use of weekly syllabus and academic assessments for individual students, (2) self-monitoring, and (3) the use of five classroom rules. Results indicate that all three interventions were linked to an increase in appropriate behavior and a decrease in inappropriate or disruptive behaviors (Kern & Clemens, 2007).

There are many benefits associated with the use of antecedent methods. Antecedent methods decrease the likelihood that inappropriate behaviors will occur by eliminating or altering the events that precede the behaviors. In order to create an environment that facilitates learning, it is essential to decrease the likelihood of the behaviors occurring. In addition, eliminating or changing the events that precede the inappropriate behaviors, will lead to an immediate decrease in the number of undesirable or inappropriate behaviors. Another benefit of using antecedent methods is that it improves the instructional environment. This is due to the fact that the events that precede appropriate behaviors are increased, which leads to increased levels of student work completion and academic achievement (Kern & Clemens, 2007; Reinke et al., 2008). Using antecedent methods at the classwide level establishes positive, organized, predictable, and motivating classroom environments (Kern & Clemens, 2007). Despite all of the findings that support the use of effective classroom management strategies, many teachers still use ineffective methods of classroom management (Infantino & Little, 2005). Kern and colleagues (2007) indicate that general education teachers are not likely to use praise with their students, especially those who exhibit inappropriate behaviors.

As a matter of fact, Bohn and colleagues (2004) suggest that the difference between effective and ineffective teachers, is that more effective teachers tend to use antecedent methods such as behavior specific praise. Not surprising, then, that disciplinary events rarely occur in the classrooms of teachers who use effective methods (Bohn et al., 2004), which indicates the preventative nature of antecedent methods. Hence, why consequent methods of classroom management are not effective methods for managing student behaviors (Clunies-Ross et al., 2008). As expected, with the use of

consequent methods, there is a decrease in the level of on-task behaviors (Leflot et al., 2010).

Teacher Use of Verbal Praise

Verbal praise is one specific antecedent method that can be easily incorporated into the classroom and has proven benefits such as increasing appropriate behaviors (Kern & Clemens, 2007), increasing the overall engagement of students (Sutherland et al., 2000), as well as decreasing inappropriate behaviors (Leflot et al., 2010). Verbal praise is defined as "any verbal statement or gesture that indicates teacher approval of a desired student behavior… beyond confirmations of correct academic responses" (Reinke et al., 2008). The use of verbal praise in the classroom allows for more instructional time, increased student intrinsic motivation, facilitates students' feelings of competence (Sutherland et al., 2000), and increased appropriate behaviors in students who witness other students being praised for appropriate behaviors (Kern & Clemens, 2007). The difference between a high-achieving classroom and a low-achieving classroom was examined in a study by Wharton-McDonald and colleagues (1998). They examined classrooms in terms of the amount of teacher praise provided to students. As indicated by the results, students in high-achieving classrooms received more praise for effort and attention for their assignments, in addition to praise for correct responses. However, students in low-achieving classrooms rarely received praise, which was typically provided for writing neatly or staying quiet during instruction (Wharton-McDonald et al., 1998).

Teachers in high-achieving classrooms typically used effective classroom management methods to prevent or positively redirect inappropriate student behaviors, and

consistently identified expectations and consequences associated with inappropriate behaviors. Another characteristic of teachers in high-achieving classrooms was time management; time management included controlling transition time, minimizing interruptions by other adults, and increasing the amount of time spent on academic activities. As expected, teachers in low-achieving classrooms experienced difficulties with carrying out morning routines and beginning instruction (Wharton-McDonald et al., 1998).

Behavior-Specific Praise Statements

While there is evidence of praise being effective in classrooms. The use of behavior specific praise is most effective due to the specific behavior, of the student, being identified, verbally expressed to the student, and reinforced (Kern & Clemens, 2007). A behavior-specific praise (BSP) statement directed towards an individual student, can also serve as a prompt for appropriate behavior to other students, as well as an alert that teacher attention is accessible if appropriate behavior is observed (Kern & Clemens, 2007). Research indicates that as teachers increase their use of BSP statements, students' on-task behaviors increase. While on-task behaviors decreased when the teacher discontinued the use of BSP statements. Regardless, BSP statements serve as only a small portion of praise students receive (Sutherland et al., 2000).

Interval Recording

Interval recording is commonly used in behavioral research (Kelly, 1977). Sutherland and colleagues (2000) used a momentary time-sampling observation in a study looking at the observed behavior of students. This study used one-minute intervals to calculate on-task behavior of students. The classroom was divided into four sections.

The observer would observe a quadrant for one minute and then move to the next quadrant. This was repeated for a total of 15-minutes. During the observation, the students' behaviors were coded as either on-task or off-task. The students' behavior was considered as on-task if all students in that quadrant were on-task for the duration of the whole interval. If at least one student in the quadrant was off-task during the interval, the observer would code the behavior as off-task. Once baseline was collected, the observer recorded the number of behavior-specific praise statements that were observed during baseline. Following baseline, the observer provided examples BSP and its effects on student on-task behavior. For the intervention phase, a goal of six BSP statements was set. This goal was determined by the number of statements provided during the baseline. Before each observation, the teachers were reminded of this goal and feedback was provided following the observation (Sutherland et al., 2000). Sutherland and colleagues (2000) reported that there was a correlation between the number of BSP statements provided and on-task behavior of students. In addition, as the number of BSP statements increased, the rate of on-task behavior decreased.

Interobserver Reliability

Validity and reliability are a major component of behavioral research. Behavioral observations are a major component of the current study; therefore, validity and reliability should be addressed. Several threats to validity have been identified by Volpe and colleagues (2005). These threats include: inadequately defined behaviors, low interobserver reliability, subject reactivity to the observer, target behaviors that are situation-specific, inappropriate code selection, and observer bias. Additionally, observer

drift can be prevented by frequently checking inter-observer reliability (Volpe, DiPerna, Hintze, & Shapiro, 2005).

Reinke and colleagues (2008) addressed multiple methods that can be used to prevent these threats to validity. By providing written definitions and examples of behaviors, this helps all observers remain consistent in their identification of behaviors. Another method is to allow observers the opportunity to practice coding a taped classroom, and then practice in the actual classroom. Interobserver agreement (IOA) should be at or above 85 percent (Reinke, Lewis-Palmer, & Merrell, 2008). Reinke and colleagues (2008) conducted observations for two weeks, prior to data collection, to ensure observer reliability. This time also allowed for the students and teachers to become familiar and comfortable with an observer present. For the two weeks, if an observer fell below 85 percent, they had a lead observer present during the intervention phase, until their IOA was consistently above 85 percent (Reinke et al., 2008).

Instructional Hierarchy

The Instructional Hierarchy (IH) has been widely used to guide the use and implementation of empirically-supported academic interventions (Haring & Eaton, 1978). Within this hierarchy, there are four stages of skill learning or development: (1) Acquisition, (2) Fluency Building, (3) Generalization, and (4) Adaptation. Skill acquisition often occurs by watching the teacher model the skill, receiving assistance with prompting, and by receiving performance feedback (Martens & Witt, 2004; Wolery, Bailey, & Suagi, 1988). Fluency of a skill is often built by repeated drill and practice of skill, within a strict amount of time, while receiving reinforcement (Martens & Witt, 2004; Daly, Lentz, & Boyer, 1996). Generalization is the ability to apply a learned

behavior across various times and settings. Generalization training includes applying the learned skills in different situations and environments (Ardoin & Daly, 2007; Martens & Witt, 2004). Lastly, adaptation is the ability to modify or alter a learned skill to be used in different situations. Adaptation is often considered to be the most complex stage of the IH (Haring & Eatons, 1978; Martens & Witt, 2004).

The Instructional Hierarchy is used to identify the appropriate instructional level for students, which can be used to assist in the selection of appropriate academic interventions, to aid in student performance (Ardoin & Daly, 2007). For example, if a student is performing poorly on math fluency, a basic skill assessment may indicate that the student can accurately perform addition procedures, but not quickly. Therefore, a math intervention, targeting fluency should be developed to improve the student's proficiency of performing basic math skills. Fluency is built through interventions using drill and practice (i.e., repeated exposure to the stimulus) (Ardoin & Daly, 2007). Haring and Eaton's (1978) model suggests that practitioners can match a student's response topographies to evidence-based interventions to remediate the target behavior (Daly et al., 1996; Daly, Witt, Martens, & Dool, 1997). This suggests that selecting an appropriate intervention that contains critical components, targeting a particular skill, is an essential step in remediating skills in students struggling.

Building Accuracy. The first stage of the Instructional Hierarchy (IH) is acquisition, which Haring and Eaton (1978) define as "the period between the first appearance of the desired behavior and the reasonably accurate performance of that behavior". When referring to skill acquisition in the context of behavior, it can be conceptualized as operant conditioning using a three-term contingency learning trial that

includes an antecedent (i.e., occurring before the behavior), response (i.e., target behavior), and a consequence (i.e., following the behavior) (Albers & Greer, 1991). Accuracy is the quality of a corresponding response within this three-term contingency, therefore, it is best measured as a percent of correct attempts and percent of errors (Shahan & Chase, 2002).

Research suggests that the use of explicit instruction (i.e., three-term contingency learning trials) is the most effective strategy for increasing accuracy (Skinner, 1998). For example, direct instruction produces greater outcomes than other methods of instruction (Gersten, Woodward, Darch, & Craig, 1986). There are many components that attribute to effective instruction for accurate responding. These include demonstration, modeling, prompting, and errorless learning (Carnine, Jones, & Dixon, 1994; Daly, Witt, Martens, & Dool, 1997; Hendrickson & Gable, 1981).

Building Fluency. In order for a student to become fluent in a skill, they must first be able to perform the skill accurately without assistance (Haring & Eaton, 1978). Fluency, also referred to as automaticity, is defined as "the ability to perform a target skill at a rapid and proficient rate" (Daly, Lentz, & Boyer, 1996). Fluency is measured as a rate (i.e., frequency of behavior per unit of time) because fluent responding is dependent upon time. Fluency of a skill is an important prerequisite for developing generalization and adaptation of a skill (Haring & Eaton, 1978; Skinner, 1998). Individuals who are fluent in a skill, are able to complete tasks at a faster rate. As a result, the student is able to acquire (Albers & Greer, 1991) and retain (Ivarie, 1986) greater amounts of information in less time. It also increases academic endurance (Martens & Witt, 2004) and rates of reinforcement (Skinner, 1998). According to Hernstein's

Matching Law (1961), being fluent in an academic skill decreases the response effort needed to complete a task, which in turn, increases academic engagement (McDowell, 1988). Consequently, completing more tasks in less time is reinforcing to the learner (Martens et al., 1992; Skinner, Fletcher, & Henington, 1996). There are numerous benefits of fluent responding, including the increase in learning efficiency, which requires less time from educators to revisit topics, and allocates more time for instruction of new skills (Skinner, 1998). The National Mathematics Advisory Panel (NMAP) acknowledges the importance of research focused on how children learn, benefits of conceptual understanding, automatic recall of facts, and procedural fluency (NMAP, 2008). The NMAP (2008) encourages the use of evidence-based intervention and instruction for math. Some empirically-validated interventions used to increase mathematic skills include explicit timing (ET), cover copy compare (CCC), and taped problems (TP). These interventions incorporate drill and practice, immediate feedback, and reinforcement (NMAP, 2008).

Evidence-Based Interventions for Mathematics

Cover copy compare (CCC) and explicit timing (ET) are two evidence-based interventions used to increase academic fluency, specifically in mathematics (Daly et al., 1996). In addition, fluency can be increased by providing contingent reinforcement for increased rates of academic output (Chadwich & Day, 1971). CCC is an evidence-based intervention used to increase accuracy and fluency of student responding on basic math skills (Skinner, Turco, Beatty, & Rasavage, 1989). With CCC, students receive immediate feedback concerning performance on the present math facts (Skinner, McLaughlin, & Logan, 1997).

While CCC is an effective math intervention, ET is preferred due to its time efficient topographies. Van Houton and Thompson (1976), compared baseline conditions (i.e., no timing contingency) to an ET condition. During the ET condition, students were explicitly timed and told they had one minute to complete as many math problems as possible. This study used an ABAB single-subject design, increasing students' rates of problem completion from 6.8 correct problems per minute (1st baseline) to 10.5 correct problems per minute (1st treatment). The study then returned to baseline, where students' responding decreased to 5.5 correct problems per minute (2nd baseline), but then increased to 11.5 correct problems per minute (2nd treatment). Further research indicates that ET is effective in increasing response rates within session, as well as increasing digits correct per minute (DCPM) over time (Evans-Hampton et al., 2002; Rhymer et al., 1999; Rhymer et al., 1998).

CHAPTER III

METHODOLOGY

The purpose of the current study was to determine if intervening on classroom management by increasing the use of behavior-specific praise statements, will result in an increase in student learning, as well as on-task behavior of students. Student learning was measured by the students' average math fluency scores on a class-wide math intervention.

Participants and Setting

The participants of this study were students from two fourth-grade general education classrooms from one elementary school in the Southern Plains region of the United States. Participants included all of the students in the two fourth-grade classrooms selected. Informed consent (Appendix D & E) was obtained from the principals, teachers, and parents, and assent (Appendix F) from the participants, prior to data collection. This study was conducted in the fourth-grade classrooms at the school using explicit timing mathematics interventions worksheet packets.

Materials

Math Probes. Materials for this study consisted of paper and pencil, and explicit timing mathematic intervention packets. The intervention packet materials (probe worksheets) for the studies were constructed in Microsoft Excel and were randomized

by graduate faculty (e.g., "Facts on Fire" explicit timing probes). These probes were initially created as part of an ongoing school-wide Tier-1 mathematic intervention. As part of this intervention, each participant received a folder with a packet during each intervention session. The packets contained basic math computation fluency probes at participants' frustrational skill levels. To determine the students' frustrational skill levels, baseline data were collected using the scope and sequence of skills outlined by the "Facts on Fire" explicit timing interventions. A skill is considered to be at the students' frustrational level when their scores are < 20 Digits Correct Per Minute (DCPM), per probe. Those students performing above frustrational on all skills, were given division probes, as it was the highest skill being used for the explicit timing intervention. In their folders, participants had four probes each day. Each probe was scored daily so that a math fluency score could be determined. Each probe was labeled with the date and the participants corresponding identification number.

Behavioral Observation Form. For this study, the classroom was set up with six tables that seated 3-4 students per table. The observer used a momentary time-sampling procedure to record the on-task behavior of students. The observer used 10-second time sampling intervals. For each interval, the observer recorded the behavior for one table. At the end of the interval, the observer moved to the next table to begin the next interval. In order for the observer to code the behavior as on-task, all students at the given table must remain on-task for the entire interval. If one or more students were off-task during the interval, the observer would code the interval as off-task. A behavioral observation form

(Appendix C) and training on the form, were provided to the observer, prior to the observation. The form was broken up into 10-second intervals, for 5 minutes. Every third day, data were collected on the dependent variable, which consisted of one- additional minute prior to the intervention phase. After each interval, the observer recorded whether the students were on or off-task, and then moved to the next interval. At the end of the observation, the observer calculated the number of on-task intervals. To obtain the percent on-task, the observer divided the number of on-task intervals by the total number of intervals, which was 30, and then multiplied by 100.

Intervention Recording Forms. Additionally, a form was used to record the use of behavior-specific praise statements, provided by the teacher (Intervention Recording Form; IRF). The IRF was used to ensure consistency of praise statements, from the teacher. Sutherland and colleagues (2003) found that a decrease in the number of disruptive behaviors will increase the percentage of on-task intervals, as well as an increase in correct responses observed, when an average of 3.5 instructional prompts per minute were provided. In addition, a praise-to-correction ratio of 3:1 or 4:1 is said to be most effective when provided contingent upon the student behavior (Stichter et al., 2009). Therefore, the IRF was used to ensure that an average of three behavior-specific praise statements were provided per minute. The teacher was instructed to refrain from providing any student-directed statements that did not meet the criteria for a behavior-specific praise statements.

Audio Recording. An audio recording was used to prompt the students during intervention, providing a script with instructions and timing for each probe. After passing out the intervention folders each day, the observer would press play on the recording, which played over the smartboard. A script was read by the interventionist, to ensure consistency in instruction delivery across days and classrooms (Appendix A).

Video Recording. Video recording was collected each day during the intervention. IRB approval and principal, teacher, and parent consent were obtained prior to video recording. Video recording was used in order for IOA, on-task behavior, and intervention integrity to be calculated. These were calculated by the interventionist, following each day of intervention, to reduce observer drift and consistency across observers.

I**nterobserver and Interscorer Reliability.** In order to avoid threats to validity, observers were expected to reach 85 percent agreement with the lead interventionist. Interobserver reliability was calculated for 32% of the intervention days to ensure that a minimum of 85 percent agreement was obtained.

Design and Procedure

Independent Variable. The independent variable in this study is the use of behavior-specific praise statements. Specifically, the intervention consisted of increasing the use of behavior-specific praise (BSP) statements above baseline rates.

Behavior-specific praise statements. For this study, a behavior-specific praise statement was defined as any statement that provides praise, identifies the student

receiving the praise, and identifies the behavior for which the student is being praised (Hart, 2010). Examples of behavior-specific praise statements that meet these criteria include, "Mark, great job sitting quietly in your seat," "Adam, I really like how you're getting out your math materials," and "Thank you for going to your seat, Taylor." Non-examples include "Alison is ready," "This table is doing a great job," and "Awesome job, Ashley!" Frequency counts of behavior-specific praise statements were taken during the baseline and treatment phases. This number was divided by the duration of the intervention (in minutes) to yield an average rate of behavior-specific praise statements per minute. BSP statements were provided at a rate of 3 statements per minute.

Dependent Variable. There are two dependent variables for the current study which included math fluency and on-task behavior of students.

Growth Rate of Student Math Fluency. Math fluency was measured by the number of digits correct per minute (DCPM). DCPM are the number of digits the student correctly answered during the one-minute explicit timing intervention. Skinner and colleagues (1989) established guidelines for calculating DCPM. A digit is recorded as correct if it is placed in the correct column of the answer. For example, a response of "13" for 11 + 2, would be recorded as two digits correct because both digits in "13" were correctly placed in the proper place value. However, if a student had the same problem of 11 + 2, but responded with "22", zero digits correct would be recorded because both values were incorrect. The current study's intervention sessions were 5 minutes in length.

Therefore, to calculate DCPM, the number of digits correct were divided by five, in order to obtain the correct number of digits correct per minute.

Each student received their own math folder with two math probes for every day of the current week. Each morning, the folders were passed out to the students and an instructional script was played on the smartboard, in the classroom. The students were given five minutes to complete as many problems as possible. The math task for each student was determined by their frustrational level during the baseline phase. During scoring, the number of digits correct were totaled and then divided by five to yield a score of digits correct per minute (DCPM).

Increase in On-Task Behaviors of Students. The second dependent variable for this study was the on-task behavior of students. For this study, the classroom was set up with six tables that seated 3-4 students per table. The observer used a momentary time-sampling procedure to record the on-task behavior of students. The observer used 10-second time sampling intervals. For each interval, the observer recorded the behavior for one table. At the end of the interval, the observer moved to the next table to begin the next interval. In order for the observer to code the behavior as on-task, all students at the given table must remain on-task for the entire interval. If one or more students were off-task during the interval, the observer would code the interval as off-task. At the end of the observation, the observer calculated the number of on-task intervals. To obtain the percent on-task, the observer divided the number of on-task intervals by the total number of intervals during the observation, which was 30, and then multiplied by 100.

Interventionist Training

Graduate research assistants enrolled in the author's doctorate program were trained to score math probes, in order to calculate interrater and interobserver reliability. The classroom teacher was trained in order to ensure understanding of behavior-specific praise statements.

Data Collection

Data were collected over 25 days. The classroom teacher provided BSP statements during the explicit timing intervention for 13 of the 25 days. Due to unforeseen circumstances, the classroom teacher was not available to continue with the research study. Therefore, the primary researcher provided the BSP statements for the remainder of the study. While the individual providing BSP changed during the study, all procedures remained the same. During data collection, examiners were assigned classrooms and given materials. The data collection process began with the examiner mounting the video recording device in the corner of the classroom, to ensure that all students were visible. The examiner then passed out the folders to the participants. Next the examiner pressed 'record' on the video recording device. The examiner then started the voice recording on the smartboard, which read the instructions and timed the intervention for 5-minutes.

Every third day, data were collected prior to the intervention, to measure the dependent variables. In order to measure the dependent variables without the behavior-specific praise intervention, the students were given one additional math probe, on their

frustrational level. The students had one-minute to complete as many problems as possible. During this time, BSP was not provided.

Procedural Integrity and Interscorer Agreement

An independent observer collected procedural integrity (PI) data for 32% of the intervention sessions. A checklist detailing the steps of the intervention was developed, and the observer checked off each intervention step as they were completed, during the intervention. PI was calculated by dividing number of steps completed by number of steps possible. PI for intervention sessions was 100%.

All intervention sessions were video recorded, and an independent scorer rescored the intervention sessions to calculate the on-task behavior. Independent scorer also scored 32% of daily intervention probes in order to calculate interscorer agreement (IA) was calculated by dividing number of disagreements between researcher and the independent scorer, by the number of agreements. IA for daily interventions was 90%.

In order to avoid threats to validity, observers were required to be 85 percent in agreement with the lead observer. Inter-observer and interagreement were measured periodically to ensure that 85 percent agreement is maintained.

Experimental Design and Data Analysis

The primary dependent variable was the on-task behavior of students, and the secondary dependent variable was math fluency. The independent variable was the use of

behavior-specific praise statements. A 2 x 3 stratified-random design was used to ensure that each group was as equal as possible. All participants were given a pre-test to determine their frustrational skill level. Based on these results, the participants were randomly assigned to a group, ensuring that the groups remained equally weighted in skill difficulty. Two, one-way repeated measures ANOVAs were utilized to examine differences across conditions of DCPM, in addition to the on-task behavior of students, during Pre-, Mid-, and Post-Intervention.

CHAPTER IV

RESULTS

The research questions the current study sought to answer were, "Will providing behavior-specific praise statements increase students' math fluency scores?" and "Will providing behavior-specific praise statements increase students' on-task behavior?" Demographic information was obtained for the participating fourth grade students and is included in Table 4.1.

Table 4.1

Demographics of Fourth-Grade Students

	N	%
Gender		
Male	22	55
Female	18	45
Total	40	100
Ethnicity		
Hispanic/Latino	4	10
American Indian	5	12.5
Black or African American	2	5
White	29	72.5
Total	40	100
Educational Services		
IEP	10	25
No Services	30	75
Total	40	100

Data from the current study were analyzed using two, one-way repeated-measures analysis of variance (ANOVA) for the dependent variables: math fluency and on-task behavior, separately. A one-way repeated measures ANOVA is appropriate when trying to determine whether there are statistically significant differences between three or more levels of a within-subjects factor. For this study, the levels are defined by pre-, mid-, and post-intervention assessment data. Daily intervention data were collected and assessment of the dependent variables were collected every third day of intervention, resulting in a total of 8 data points. For the analysis, pre-test data were used, and the 4th dependent variable assessment was used for the mid-intervention assessment data. Additionally, for the post-intervention data point, the final dependent variable assessment data were used.

A one-way repeated measures ANOVA was conducted to determine whether there were statistically significant differences between groups for math fluency over the course of a 5-week behavior-specific praise intervention. There was one outlier, as assessed by a boxplot. Statistical analysis was run with and without the outlier, but the results remained the same. Therefore, the outlier was included in the data analysis. Additionally, normality was assessed using Shapiro-Wilk test ($p > .05$), and concluded that the data were not normally distributed. The strongly, positively skewed data were transformed using a log transformation and the statistical analysis were run and compared to the original data. However, when compared to the original data, the transformed data did not differ significantly. Therefore, the original data were used for the statistical analysis and the violation of normality was accepted. The assumption of sphericity was violated, as assessed by Mauchly's test of sphericity, χ^2 (2) = 7.321, p = .026. Therefore, a Greenhouse-Geisser correction was applied ($\varepsilon = 0.838$). Overall, results indicate

significant effects for within-subjects growth over time, F (1.675, 58.640) = 28.932, p < .001, partial η^2 = .453.

Results indicate that there was an increase in math fluency, pre-intervention (M = 16.768, SD = 8.28391) to mid-intervention (M = 22.675, SD = 14.30513). A statistically significant mean increase of 5.907 DCPM, 95% CI [2.542, 9.272], p < .001. There was an increase in math fluency mid-intervention (M = 22.675, SD = 14.30513) to post-intervention (M = 28.751, SD = 17.27650). A statistically significant mean increase of 6.076 DCPM, 95% CI [2.437, 9.716), p = .001. Lastly, there was an increase in math fluency pre-intervention (M = 16.768, SD = 8.28391) to post-intervention (M = 28.751, SD = 17.27650). A statistically significant mean increase of 11.984 DCPM, 95% CI [7.239, 16.728], p < .001. These results indicate that explicit timing is an effective intervention for producing positive growth in mathematics fluency, which is consistent with previous research (Van Houten & Thompson, 1976; see Table 4.2 below). There was no significant interaction between time and group F (1.675, 58.640) = .706, p = .474, partial η^2 = .020. See Table 4.3 for marginal means and standard errors of time and see Table 4.4 for marginal means and standard errors of group. Figure 1 below displays a DCPM growth plot by group for math fluency over time.

Table 4.2

One-Way Repeated Measures ANOVA: Math Fluency

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Within-Subjects Effects					
Time	2639.531	1.675	*1575.438*	28.932	.000***
Time*Group	64.432	1.675	*38.457*	.706	.474
Error(Time)	3193.135	58.640	*54.453*		
Between-Subjects Effects					
Group	669.867	1	*669.867*	1.408	.243
Error	16655.106	35	*475.860*		

*Note. ***p<.001*

Table 4.3

Estimated Marginal Means and Standard Errors for Time: Math Fluency

Time	Mean	Standard Error
Pre-Intervention	16.768	1.363
Mid-Intervention	22.675	2.326
Post-Intervention	28.751	2.856

Table 4.4

Estimated Marginal Means and Standard Errors for Groups: Math Fluency

Groups	Mean	Standard Error
Treatment	25.196	3.055
Control	20.267	2.816

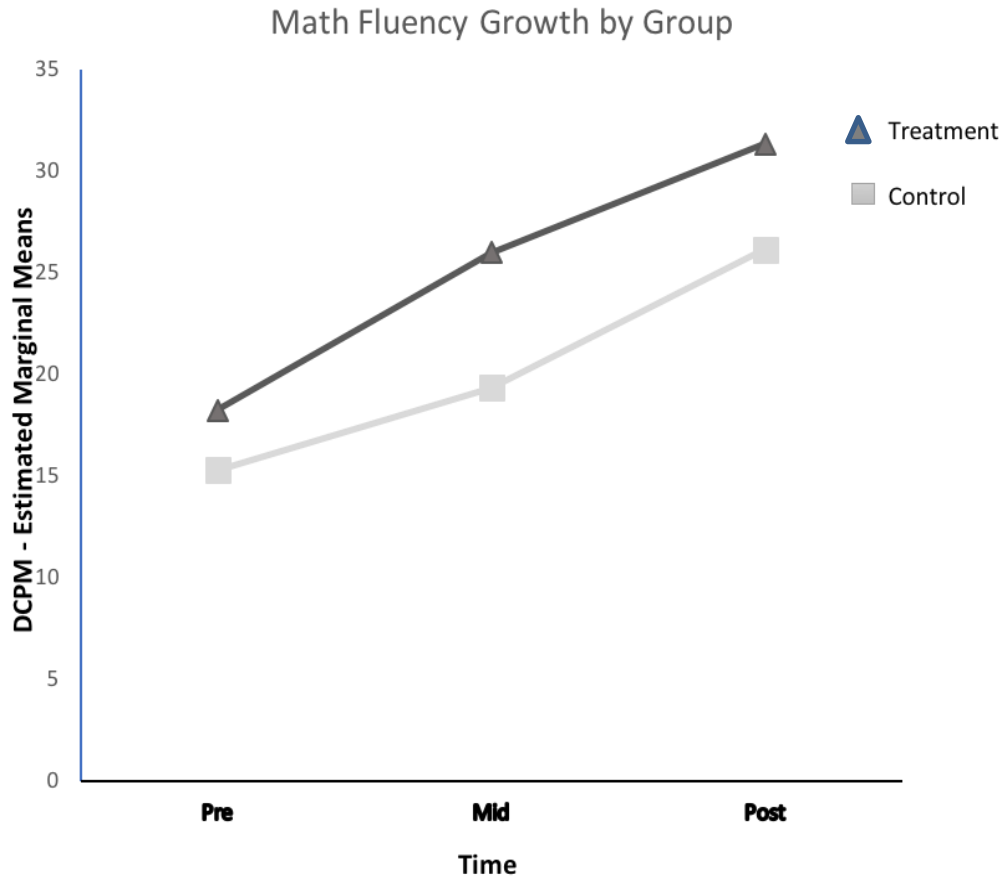

Figure 1 DCPM Growth Plot by Group for Math Fluency over Time

A one-way repeated measures ANOVA was conducted to determine whether there were statistically significant differences between groups for on-task behavior over the course of a 5-week behavior-specific praise intervention. Results indicate that there was an

increase in on-task behavior, pre-intervention (*M* = 92.0818, *SD* = 8.43062) to mid-intervention (*M* =100.00, *SD* = .0000). A non-significant mean increase of 7.9182%. There was a decrease in on-task behavior mid-intervention (*M* = 100.00, *SD* = .0000) to post-intervention (*M* = 92.0818, *SD* = 8.43062). A non-significant mean decrease of 7.9182% DCPM. Lastly, there was no change in on-task behavior pre-intervention (*M* = 92.0818, *SD* = 8.43062) to post-intervention (*M* = 92.0818, *SD* = 8.43062). The results indicate that for this sample, on-task behavior was not affected by the behavior-specific praise intervention. See Table 4.5 for marginal means and standard errors of time and see Table 4.6 for marginal means and standard errors of group. Figure 2 below displays an Percent On-Task growth plot by group for On-Task Behavior over time.

Table 4.5

Estimated Marginal Means and Standard Errors for Time: On-Task Behavior

Time	Mean	Standard Error
Pre-Intervention	91.665	.000
Mid-Intervention	100.00	.000
Post-Intervention	91.665	.000

Table 4.6

Estimated Marginal Means and Standard Errors for Groups: On-Task Behavior

Groups	*Mean*	*Standard Error*
Treatment	*100.000*	*.000*
Control	*88.887*	*.000*

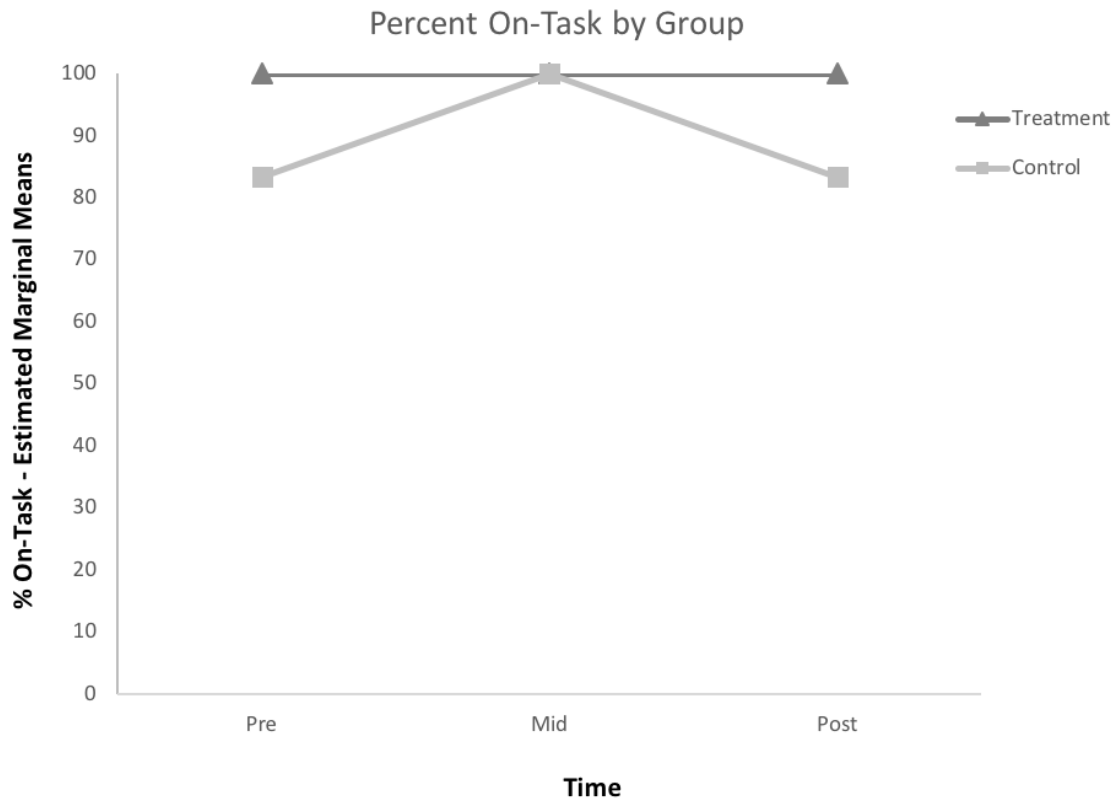

Figure 2 DCPM Growth Plot by Group for On-Task Behavior over Time

Results indicated that there was a statistically significant difference in math fluency over time, but there were non-significant differences between groups over time for math fluency or on-task behavior of students. Therefore, the data were re-analyzed to look at only students performing in the frustrational range on math fluency, during the pre-intervention assessment. The results for the re-analyzed data are discussed in the following section.

CHAPTER V

DISCSUSSION

The primary purpose of the current study was to determine if providing behavior-specific praise statements would affect math fluency and on-task behavior of students. This study used a behavior-specific praise intervention, along with an evidence-based mathematics fluency intervention (explicit timing). The author hypothesized that significant treatment effects would be observed with the implementation of behavior-specific praise statements. Results indicated that there were statistically significant differences in math fluency over time. This indicates that explicit timing is an effective math fluency intervention. This is consistent with previous research indicating that explicit timing is effective in increasing response rates within session, as well as increasing digits correct per minute (DCPM) over time (Evans-Hampton et al., 2002; Rhymer et al., 1999; Rhymer et al., 1998). However, additional results of the study demonstrated no significant main effects for group and time, for both math fluency and on-task behavior. With these results, the effectiveness of behavior-specific praise statements on math fluency and on-task behavior of students, could not be established. Therefore, the author fails to reject the null hypothesis. These results could be attributed to the use of a convenience sample and using the classes that were chosen by the school,

rather than using classes based on their baseline levels of behavior. The students used in this study had a baseline level above 80% for on-task behavior, leaving minimal room for growth. Therefore, this effected the potential for behavior-specific praise statements to be an effective intervention for on-task behavior.

Follow-up statistical analysis were performed, limiting the sample to students performing in the frustrational range, during the pre-intervention assessment. The frustrational range was defined as < 20 DCPM. The original data included some students performing above the frustrational level, due to reaching the highest skill provided for the math fluency intervention. These students were assigned division probes for the intervention. Therefore, the re-analyzed data only included those students performing in the frustrational range.

A one-way repeated measures ANOVA was conducted to determine whether there were statistically significant differences between groups, for students performing in the frustrational range, for math fluency over the course of a 5-week behavior-specific praise intervention. There were no outliers, as assessed by a boxplot. Additionally, normality was assessed using Shapiro-Wilk test ($p > .05$), and concluded that the data were not normally distributed. The strongly, positively skewed data were transformed using a log transformation and the statistical analysis were run and compared to the original data. However, when compared to the original data, the transformed data did not differ significantly. Therefore, the original data were used for the statistical analysis and the violation of normality was accepted. The assumption of sphericity was violated, as assessed by Mauchly's test of sphericity, χ^2 (2) = .586, p = .002. Therefore, a Greenhouse-Geisser correction was applied ($\varepsilon = 0.707$). Overall, results indicated

significant effects for within-subjects growth over time, F (1.414, 35.354) = 6.933, p = .007, partial η^2 = .217. Results also indicated that the interaction between time and group was approaching significant, F (1.414, 35.354) = 3.410, p = .059, partial η^2 = .120.

Results indicated that there was an increase in math fluency, pre-intervention (M = 13.1111, SD = 3.45669) to mid-intervention (M = 14.6963, SD = 5.21134). A non-significant mean increase of 1.528 DCPM, 95% CI [-0.944, 4.000], p = .376. There was an increase in math fluency mid-intervention (M = 14.6963, SD = 5.21134) to post-intervention (M = 19.1630, SD = 10.00016). A non-significant mean increase of 4.105 DCPM, 95% CI [- 0.226, 8.436), p = .068. Lastly, there was an increase in math fluency pre-intervention (M =13.1111, SD = 3.45669) to post-intervention (M = 19.1630, SD = 10.00016). A statistically significant mean increase of 5.633 DCPM, 95% CI [0.786, 10.480], p = .019. These results indicate that explicit timing is an effective intervention for producing positive growth in mathematics fluency, which is consistent with previous research (Van Houten & Thompson, 1976; see Table 5.1 below). Additionally, results for an interaction between time and group were marginally significant F (1.414, 35.354) = 3.410, p = .059, partial η^2 = .120. See Table 5.2 for marginal means and standard errors of time and see Table 5.3 for marginal means and standard errors of group. Figure 3 below displays a DCPM growth plot by group for math fluency over time.

Table 5.1

One-Way Repeated Measures ANOVA: Math Fluency (Frustrational)

Source	Sum of Squares	df	Mean Square	F	Sig.
Within-Subjects Effects					
Time	452.634	1.414	320.071	6.933	.007
Time*Group	222.619	1.414	157.421	3.410	.059
Error(Time)	1632.195	35.354	46.167		
Between-Subjects Effects					
Group	.191	1	.191	.003	.959
Error	1761.854	25	70.474		

*Note. ***p<.001*

Table 5.2

Estimated Marginal Means and Standard Errors for Time: Math (Frustrational Level)

Time	Mean	Standard Error
Pre-Intervention	13.275	.616
Mid-Intervention	14.803	1.011
Post-Intervention	18.908	1.921

Table 5.3

Estimated Marginal Means and Standard Errors for Groups: Math (Frustrational Level)

Groups	Mean	Standard Error
Control	15.711	1.399
Treatment	15.613	1.251

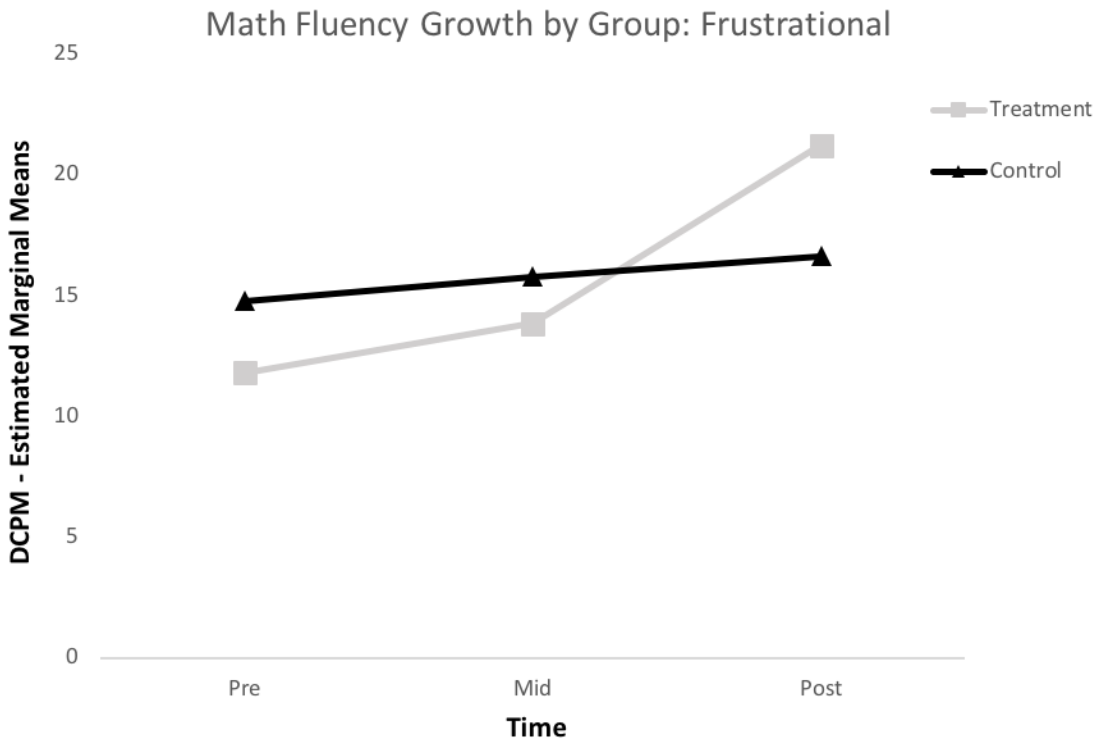

Figure 3 DCPM Growth Plot by Group for Math Fluency over Time

Results from the follow-up analysis using only students in the frustrational range, indicated that there was a marginally significant difference in groups for math fluency over time. These results suggest that BSP is more effective for students when they are

performing at a lower skill level. Students performing at the frustrational level, are more likely to benefit from their teacher using BSP than if they were performing at a higher performance level.

Limitations

A major limitation to the current study was the use of a convenience sample, which did not provide adequate students displaying low baseline behavior, for the study. This hindered the ability to show significant growth in both math fluency and on-task behavior. Students in the current study were not chosen based on their baseline skills, but rather were assigned based on availability.

An additional limitation was the limited population utilized for this study. All students were enrolled in the fourth grade, in a single school located in north central Oklahoma. As a result, generalizability may not occur in various grades or locations. Lastly, internal validity of the study was weakened with a change of interventionist for the treatment group. After 13 days of intervention, the interventionist changed from the classroom teacher to the main researcher. This change may have affected student motivation and active engagement.

Implications and Future Direction

As noted, the sample used for the current study were fourth-grade classrooms in the same school. These classes were not performing at low enough baseline levels of on-task behavior, to produce significant growth results. Therefore, future researchers should set baseline criteria for participants at < 80% on-task behavior. By having students with lower on-task behavior at baseline, it may allow for more growth to occur for on-task behavior and math fluency. Based on results presented above, students performing in the

frustrational range benefit from behavior-specific praise statements. Future researchers should seek to increase the sample size to include various grades and geographical locations.

Additionally, explicit timing was proven to be an effective intervention for mathematics fluency, which is consistent with previous research. Explicit timing is effective in increasing response rates within session, as well as increasing digits correct per minute (DCPM) over time (Evans-Hampton et al., 2002; Rhymer et al., 1999; Rhymer et al., 1998). This is evidenced by the current study's results of significant increase in DCPM over time.

REFERENCES

Abbott, R. D., O'Donnell, J., Hawkins, J. D., Hill, K. G., Kosterman, R., & Catalano, R. F. (1998). Changing teaching practices to promote achievement and bonding to school. *Journal of Orthopsychiatry*, 68, 542-552.

Albers, A. E., & Greer, R. D. (1991). Is the three-term contingency trial a predictor of effective instruction? Journal of Behavioral Education, 1(3), 337-354. doi: 10.1007/BF00947188

Alferink, L. A. (2007). Educational Practices, Superstitious Behavior and Mythed Opportunities. Scientific Review Of Mental Health Practice, 5(2), 21-30.

Algozzine, B., Wang, C., & Violette, A. S. (2011). Reexamining the relationship between academic achievement and social behavior. *Journal of Positive Behavior Interventions, 13*, 3-16.

American Psychological Association. (1993). *Commission on youth and violence*. Washington, D.C.: American Psychological Association.

Ardoin, S. P., & Daly, E. (2007). Introduction to the special series: close encounters of the instructional kind—how the instructional hierarchy is shaping instructional research 30 years later. *Journal Of Behavioral Education*, *16*(1), 1-6.

Austin, J. L., & Agar, G. (2005). Helping young children follow their teachers' directions: The utility of high probability command sequences in pre-K and kindergarten classrooms. Education and Treatment of Children, 28, 222-236.

Bali, V. A., Anagnostopoulos, D., & Roberts, R. (2005). Toward a political explanation of grade retention. *Educational Evaluation and Policy Analysis, 27*, 133-155.

Beaman, R., & Wheldall, K. (2000). Teachers' use of approval and disapproval in the Classroom. *Educational Psychology, 20*, 431-446.

Binder, C. (1996). Behavioral fluency: Evolution of a new paradigm. *The Behavior Analyst, 19*(2), 163-197.

Bohn, C. M., Roehrig, A. D., & Pressley, M. (2004). The first days of school in the Classrooms of two more effective and four less effective primary-grades teachers. The Elementary School Journal, 4, 269-287.

Chadwick, B. A., & Day, R. C. (1971). Systematic reinforcement: Academic performance of underachieving students. *Journal of Applied Behavior Analysis, 4*(4), 311-319. doi: 10.1901/jaba.1971.4-311

Clunies-Ross, P., Little, E., & Kienhuis, M. (2008). Self-reported and actual use of proactive and reactive classroom management strategies and their relationship with teacher stress and student behaviour. *Educational Psychology*, 28, 693-710.

Codding, R. S., & Smyth, C. A. (2008). Using performance feedback to decrease classroom transition time and examine collateral effects on academic engagement. *Journal of Educational and Psychological Consultation, 18*, 325-345.

Daly, E., Lentz, F. R., & Boyer, J. (1996). The instructional hierarchy: A conceptual model for understanding the effective components of reading interventions. *School Psychology Quarterly*, *11*(4), 369-386.

Daly, E., Witt, J. C., Martens, B. K., & Dool, E. J. (1997). A model for conducting a functional analysis of academic performance problems. *School Psychology Review*, *26*(4), 554-574.

Evans-Hampton, T. N., Skinner, C. H., Henington, C., Sims, S., & McDaniel, C. E. (2002). An investigation of situational bias: Conspicuous and covert timing during curriculum-based measurement of mathematics across African American and Caucasian students. *School Psychology Review, 31*(4), 529-539.

Fergusson, D. M., Horwood, L. J., & Ridder, E. M. (2005). Show me the child at seven: The consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry, 46*, 837- 849.

Freiberg, H. J., Huzinec, C. A., & Templeton, S. M. (2009). Classroom management—a pathway to student achievement: A study of fourteen inner-city elementary schools. *The Elementary School Journal*, 110, 63-80.

Gersten, R., Woodward, J., & Darch, C. (1986). Direct instruction: A research-based approach to curriculum design and teaching. *Exceptional Children*.

Gottlieb, J., Gottlieb, B. W., & Trongone, S. (1991). Parent and teacher referrals for a psychoeducational evaluation. *Journal of Special Education*, 25, 155-167.

Haring, N., & Eaton, M. (1978). Systematic instructional procedures: An instructional hierarchy. *The fourth R: Research in the classroom*, 23-40.

Hart, R. (2010). Classroom behaviour management: Educational psychologists' views on effective practice. *Emotional and Behavioural Difficulties, 15*, 353-371.

Hastings, R. P. & Bham, M. S. (2003). The relationship between student behavior patterns and teacher burnout. *School Psychology International*, *24*, 115-127.

Hendrickson, J. M., & Gable, R. A. (1981). The Use of Modeling Tactics to Promote Academic Skill Development of Exceptional Learners. *Journal of Special Education Technology, 4(*3), 20-29.

Herrnstein, R. J. (1961). Relative and absolute strength of response as a function of frequency of reinforcement. *Journal of the experimental analysis of behavior, 4(*3), 267.

Houten, R. V., & Thompson, C. (1976). The effects of explicit timing on math performance. *Journal of Applied Behavior Analysis, 9(2)*, 227-230. doi: 10.1901/jaba.1976.9-227

Infantino, J., & Little, E. (2005). Students' perceptions of classroom behavior problems and the effectiveness of different disciplinary methods. Educational Psychology, 25, 491-508.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*, 499-534.

Ivarie, J. J. (1986). Effects of proficiency rates on later performance of a recall and writing behavior. Remedial and Special Education, 7(5), 25-30.

Kelly, M. (1977). A review of the observational data-collection and reliability procedures reported in the Journal of Applied Behavior Analysis. Journal of Applied Behavior Analysis, 10, 97-101.

Kern, L. & Clements, N. H. (2007). Antecedent strategies to promote appropriate classroom behavior. *Psychology in the Schools*, *44*, 65-75.

Leflot, G., van Lier, P. A. C., Onghena, P., & Colpin, H. (2010). The role of teacher behavior management in the development of disruptive behaviors: An intervention study with the good behavior game. *Journal of Abnormal Child Psychology, 38*, 869-882.

Luiselli, J. K., Putnam, R. F., Handler, M. W., & Feinberg, A. B. (2005). Whole- school positive behavior support: Effects on student discipline problems and academic performance. *Educational Psychology*, *25*, 183-198.

Little, S., & Akin-Little, A. (2008). Psychology's contributions to classroom management. *Psychology in the Schools, 45*(3), 227-234.

Malone, B. G., & Tietjens, C. L. (2000). Re-examination of classroom rules: The need for clarity and specified behavior. *Special Services in the Schools, 16*, 159-170.

Martens, B. K., Lochner, D. G., & Kelly, S. Q. (1992). The effects of variable-interval reinforcement on academic engagement: a demonstration of matching theory. *Journal of Applied Behavior Analysis, 25(1)*, 143.

Martens, B. K., & Witt, J. C. (2004). Competence, persistence, and success: The positive psychology of behavioral skill instruction. *Psychology in the Schools, 41(1),* 19- 30.

Matheson, A. S., & Shriver, M. D. (2005). Training teachers to give effective commands: Effects on student compliance and academic behaviors. *School Psychology Review, 34,* 202-219.

McDowell, J. (1988). Matching theory in natural human environments. *The Behavior Analyst, 11(2),* 95.

National Mathematics Advisory Panel. (2008). Foundations for success: The final report of the National Mathematics Advisory Panel. Washington, DC.

Poncy, B. C., Skinner, C. H., & Jaspers, K. E. (2007). Evaluating and Comparing Interventions Designed to Enhance Math Fact Accuracy and Fluency: Cover, Copy, and Compare Versus Taped Problems. *Journal of Behavioral Education, 16(1*), 27-37. doi:10.1007/s10864-006-9025-7

Reinke, W. M., Lewis-Palmer, T., & Merrell, K. (2008). The classroom check-up: A classwide teacher consultation model for increasing praise and decreasing disruptive behavior. *School Psychology Review, 37,* 315-332.

Rhymer, K. N., Henington, C., Skinner, C. H., & Looby, E. J. (1999). The effects of explicit timing on mathematics performance in second-grade Caucasian and African American students. *School Psychology Quarterly, 14(4),* 397-407. doi: 10.1037/h0089016

Rhymer, K. N., Skinner, C. H., Henington, C., D'Reaux, R. A., & Sims, S. (1998). Effects of explicit timing on mathematics problem completion rates in African-American third-grade elementary students. *Journal of Applied Behavior Analysis, 31(4),* 673-677. doi: 10.1901/jaba.1998.31-673

Shahan, T. A., & Chase, P. N. (2002). Novelty, stimulus control, and operant variability. *The Behavior Analyst, 25(2)*, 175.

Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence- based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children, 31*, 351-380.

Skinner,C.H. (1998). Preventing academic Skills deficits. In T.S. Watson & F. Gresham (Eds.), Handbook therapy: Ecological considerations in assessment, treatment, and evaluation (pp. 61-83). New York: Plenum.

Skinner, C. H., McLaughlin, T. F., & Logan, P. (1997). Cover, copy, and compare: A self-managed academic intervention effective across skills, students, and settings. *Journal of Behavioral Education, 7(3)*, 295-306.

Skinner, C. H., Turco, T. L., Beatty, K. L., & Rasavage, C. (1989). Cover, copy, and compare: A method for increasing multiplication performance. *School Psychology Review, 18(3),* 412-420.

Stichter, J., Lewis, T., Whittaker, T., Richter, M., Johnson, N., & Trussell, R. (2009). Assessing Teacher Use of Opportunities to Respond and Effective Classroom Management Strategies. *Journal of Positive Behavior Interventions, 11*(2), 68- 81.

Stronge, J. H., Ward, T. J., Tucker, P. D., & Hindeman, J. L. (2007). What is the relationship between teacher quality and student achievement? An exploratory study. *Journal of Personnel Evaluation in Education, 20*, 165-184.

Sugai, G., & Horner, R. H. (2002). Introduction to the special series on positive behavior support in schools. *Journal of Emotional and Behavioral Disorders, 10,* 130-135.

Sutherland, K. S., Wehby, J. H., & Copeland, S. R. (2000). Effect of varying rates of behavior-specific praise on the on-task behavior of students with EBD. *Journal of Emotional and Behavioral Disorders, 8*, 2-8.

Tal, C. (2010). Case studies to deepen understanding and enhance classroom management skills in preschool teacher training. *Early Childhood Education Journal, 38*, 143-152.

Van Houten, R. & Thompson, C. (1976). The effects of explicit timing on math performance. *Journal of Applied Behavior Analysis*, 9(2), 227-230.

Vitaro, F., Brendgren, M., Larose, S., & Trembley, R. E. (2005). Kindergarten disruptive behaviors, protective factors, and educational achievement by early adulthood. *Journal of Educational Psychology, 97*, 617-629.

Volpe, R. J., DiPerna, J. C., Hintze, J. M., & Shapiro, E. S. (2005). Observing students in classroom settings: A review of seven coding schemes. School Psychology Review, 34, 454-474.

Wehby, J. H., Tally, B. B., & Falk, K. B. (2004). Identifying the relation between the function of student problem behavior and teacher instructional behavior. *Assessment for Effective Intervention, 30*, 41-51.

Wharton-McDonald, R., Pressley, M., & Hampston, J. M. (1998). Literacy instruction in nine first-grade classrooms: Teacher characteristics

Wolery, M., Bailey, D. B., & Sugai, G. M. (1988). Effective teaching: Principles and procedures of applied behavior analysis with exceptional students: Allyn and Bacon Boston.

APPENDIX A

Explicit Timing Script (Provided via Audio Recording)

1. Interventionist will pass out folders to student, and will instruct them to take out their ET packets and write their first and last name and date on the back.

2. The interventionist will start the audio recording which will say "**The packet in front of you has math computation problems for you to complete. When I say begin, start working the problems as best as you can. Begin with the first row and work across the page. Do not skip problems! But also, do not guess. If you do not know the answer after you try it, you can put an X through it and move on. You will have 1 minute to do as many problems as you can before I tell you to stop. When I say stop, I would like everyone to put their pencils down and put your packets back in your folder. Is everyone ready? …. Begin."**

3. The audio package will include a built-in timer for 5 minutes of intervention

4. At the end of 5 minutes the audio recording will say. **"stop, put your pencils down."** The interventionist will make sure that all students have stopped working and are not working ahead.

Name:_____ Week 1 Monday #1

Addition: 2x2, No regrouping

87 + 10	23 + 76	58 + 41	41 + 10	55 + 13	79 + 20	86 + 13	35 + 22	18 + 70
58 + 41	79 + 10	84 + 11	21 + 32	34 + 55	33 + 14	25 + 24	36 + 11	52 + 45
98 + 1	44 + 21	17 + 10	24 + 51	53 + 11	82 + 11	72 + 24	26 + 50	58 + 41
86 + 10	14 + 33	84 + 14	99 + 0	43 + 35	14 + 63	33 + 63	35 + 30	37 + 10
79 + 20	33 + 32	75 + 21	66 + 22	63 + 26	83 + 14	85 + 14	35 + 50	42 + 27
66 + 31	76 + 23	25 + 30	28 + 51	59 + 30	63 + 12	26 + 12	84 + 13	93 + 6
31 + 10	55 + 20	44 + 35	47 + 21	77 + 12	76 + 10	66 + 20	44 + 15	79 + 10
66 + 33	65 + 23	45 + 32	19 + 20	14 + 45	23 + 40	69 + 10	17 + 21	55 + 30
78 + 20	51 + 46	42 + 50	94 + 3	34 + 11	16 + 53	62 + 32	35 + 42	39 + 10
84 + 14	95 + 4	65 + 20	17 + 10	22 + 30	85 + 11	86 + 13	78 + 10	86 + 13

Name:_____ Week 1 Monday #1

Addition: 2x2 Sums with Regrouping

54 + 07	77 + 08	45 + 45	87 + 04	14 + 07	73 + 18	72 + 18	64 + 28
78 + 12	51 + 39	34 + 38	48 + 19	39 + 54	47 + 27	43 + 37	55 + 26
17 + 19	31 + 29	54 + 28	25 + 18	56 + 18	34 + 37	78 + 09	17 + 03
27 + 64	77 + 05	41 + 49	43 + 18	14 + 77	75 + 08	71 + 09	51 + 19
72 + 18	57 + 19	89 + 04	31 + 49	79 + 05	19 + 35	45 + 07	66 + 19
18 + 43	65 + 09	52 + 09	54 + 37	26 + 15	38 + 06	78 + 07	21 + 29
25 + 69	84 + 08	27 + 24	22 + 39	38 + 22	58 + 17	13 + 18	76 + 07
61 + 19	46 + 06	11 + 19	16 + 24	73 + 09	66 + 26	37 + 45	26 + 48

Name:_____ Week 1 Monday #1

2X2 Subtraction without Regrouping

95 - 12	56 - 44	88 - 04	58 - 34	82 - 21	49 - 11	56 - 10
25 - 02	46 - 30	79 - 28	83 - 51	87 - 65	23 - 00	72 - 11
86 - 52	82 - 11	77 - 52	82 - 01	41 - 10	28 - 00	12 - 00
88 - 46	65 - 54	32 - 00	98 - 64	39 - 01	98 - 23	75 - 34
22 - 00	54 - 41	21 - 00	34 - 10	92 - 30	74 - 53	66 - 05
41 - 20	16 - 02	53 - 02	25 - 10	42 - 00	79 - 43	18 - 00
71 - 60	62 - 51	15 - 01	74 - 10	13 - 02	77 - 34	23 - 11
18 - 03	78 - 04	26 - 02	54 - 41	26 - 11	82 - 71	95 - 52
76 - 62	19 - 05	88 - 25	68 - 14	76 - 64	34 - 02	64 - 43

Name:_____ Week 1 Monday #1

2X2 Subtraction with Regrouping

84 - 76	75 - 47	60 - 03	70 - 37	41 - 04	32 - 13	50 - 03
84 - 36	72 - 48	42 - 38	40 - 03	35 - 28	36 - 09	41 - 33
52 - 29	96 - 77	30 - 06	72 - 29	90 - 76	95 - 87	73 - 48
36 - 09	87 - 59	91 - 07	93 - 29	70 - 08	42 - 13	66 - 09
72 - 53	80 - 55	94 - 35	42 - 37	70 - 03	31 - 24	43 - 19
70 - 23	35 - 08	40 - 26	63 - 54	95 - 06	50 - 28	87 - 59
62 - 14	47 - 39	81 - 73	31 - 14	80 - 28	60 - 36	82 - 63
33 - 04	35 - 27	54 - 28	60 - 36	82 - 14	81 - 43	71 - 04
91 - 86	80 - 34	45 - 29	90 - 29	82 - 14	80 - 49	55 - 26

APPENDIX C (Behavioral Observation Form)

INTERVENTION RECORDING FORM

Teacher: _____ Date:_____

Number of students:_____ Time:_____

Interventionist:_____ Reliability:_____

Directions: Using the key as a guide, provide behavior-specific praise statements throughout the intervention. Provide a tally mark for each BSP statement that is provided during each interval. Record the total number in the box below.

Provide BSPS

	:00	:10	:20	:30	:40	:50
0:	1	2	3	4	5	6
1:	7	8	9	10	11	12
2:	13	14	15	16	17	18
4:	19	20	21	22	23	24
5:	25	26	27	28	29	30

APPENDIX D

Informed Consent Form; Principal/Teacher

OKLAHOMA STATE UNIVERSITY

PROJECT TITLE: Evaluating the Effects of Behavior-Specific Praise Statements on Math Fluency and On-Task Behavior of Students

INVESTIGATORS: Eryn McMaster, M.S. Graduate Student, Oklahoma State University and Brian C. Poncy, Ph.D., Associate Professor at Oklahoma State University.

PURPOSE: The purpose of this research study is to evaluate the effects of providing effective classroom management by increasing the use of effective commands and behavior-specific praise statements, on math fluency.

PROCEDURES: This research study will be administered in your student's school. Participation in this research will involve completion of basic math skills including addition and subtraction. The students will practice basic math skills daily for about 5 minutes. This will take place over five weeks.

AUDIO/VIDEO RECORDING & TRANSCRIPTION: This study involves the audio and video recording your student and other students in the classroom. Neither your students name nor any identifying information will be associated with the audio or video recording or the transcript. Only the research team will be able to listen (view) to the recordings. The tapes will be transcribed by the researcher and erased once the transcriptions are checked for accuracy. Video recordings and transcripts are important for the researcher to accurately measure the student's on-task behavior throughout the intervention. Students will not be made aware of the reasoning for video recording. This is to eliminate any effects on the students' behavior, and could interfere with the treatment variables.

RISKS OF PARTICIPATION: There are no known risks associated with this project, which are greater than those ordinarily encountered in daily life.

BENEFITS OF PARTICIPATION: The students will be given evidence-based interventions that have been shown to increase fluency in basic math skills. The information gained from this study may assist in the process of gaining a foundation for further mathematic skills.

CONFIDENTIALITY: The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you or your child. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records. Data will be destroyed five years after the study has been completed.

COMPENSATION: No monetary compensation is offered for participation in the study. The benefits provided by the study are explained above.

CONTACTS: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Eryn McMaster, M.S. (eryn.mcmaster@okstate.edu) or Brian Poncy, Ph.D., (brian.poncy@okstate.edu) Dept. of Education Oklahoma State University, Stillwater, OK 74078. If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

PARTICIPANT RIGHTS:

Participation in this study is voluntary and you may choose to withdraw from the assessment at any time. No risks from withdrawal or termination are anticipated.

CONSENT DOCUMENTATION:

I give my permission for faculty and/or students from Oklahoma State University to assess in my school/classroom, for the purposes of this research. I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me

Signature of Principal	School Site	Date

Signature of Teacher	Date

I certify that I have personally explained this document before requesting that the principal/teacher(s) sign it.

Signature of Researcher	Date

APPENDIX E

PARENT/GUARDIAN PERMISSION FORM

OKLAHOMA STATE UNIVERSITY

PROJECT TITLE: Evaluating the Effects of Behavior-Specific Praise Statements on Math Fluency and On-Task Behavior of Students

INVESTIGATORS: Eryn McMaster, M.S. Graduate Student, Oklahoma State University and Brian C. Poncy, Ph.D., Associate Professor at Oklahoma State University.

PURPOSE: The purpose of this research study is to evaluate the effects of providing effective classroom management by increasing the use of behavior-specific praise statements, on math fluency.

PROCEDURES: Your student's class has been chosen to participate in this research study. Participation in this research will involve completion of basic math skills including addition and subtraction. The students will practice basic math skills daily for about 5 minutes. This will take place over five weeks. During this study, audio and video recording will be used to record the students' behaviors while completing math problems.

AUDIO/VIDEO RECORDING & TRANSCRIPTION: This study involves the audio and video recording of your student and other students in the classroom. Neither your student's name nor any identifying information will be associated with the audio or video recording or the transcript. Only the research team will be able to listen (view) to the recordings. The tapes will be transcribed by the researcher and erased once the transcriptions are checked for accuracy. Video recordings and transcripts are important for the researcher to accurately measure the student's on-task behavior throughout the intervention. Students will not be made aware of the reasoning for video recording. This is to eliminate any effects on the students' behavior, and could interfere with the treatment variables.

RISKS OF PARTICIPATION: There are no known risks associated with this project, which are greater than those ordinarily encountered in daily life.

BENEFITS OF PARTICIPATION: The students will be given evidence-based interventions that have been shown to increase fluency in basic math skills. The information gained from this study may assist in the process of gaining a foundation for further mathematic skills.

CONFIDENTIALITY: The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you or your child. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records. Video and audio recording will be destroyed immediately following active data collection. Data collected on the students' math fluency, will be destroyed five years after the study has been completed.

COMPENSATION: No monetary compensation is offered for participation in the study. The benefits provided by the study are explained above.

CONTACTS: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Eryn McMaster, M.S. (eryn.mcmaster@okstate.edu) or Brian Poncy, Ph.D., (brian.poncy@okstate.edu) Dept. of Education Oklahoma State University, Stillwater, OK 74078. If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

PARTICIPANT RIGHTS:

I understand that my child's participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my permission at any time.

CONSENT DOCUMENTATION:

I have been fully informed about the procedures listed here. I am aware of what my child and I will be asked to do and of the benefits of my participation. I also understand the following statements:

I have read and fully understand this permission form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my child.

_____ (insert child's name here) to participate in this study.

_____ _____

Signature of Parent/Legal Guardian Date

_____ _____

Signature of Researcher Date

APPENDIX F (Student Assent Form)

PARTICIPANT INFORMATION
OKLAHOMA STATE UNIVERSTIY
Student Script

Hello,

Your class has been selected to participate in a study. You will be working on some math problems for the next few weeks. We are interested in learning about how children learn at your age. In order to understand this, we would like you fill out some forms. Your parent/guardian is aware of this project and you will be allowed to participate if they sign a permission slip for you.

Your answers will be kept protected and will not be posted with your name. The only way anyone would know how you answered is if we were worried about you, and then we would call your parent/guardian. If you have any questions about the form or what we are doing, please ask us. Thank you for your help.

_____ _____

Signature of Student Date

_____ _____

Signature of Researcher Date

APPENDIX G

Script for Recruiting Principals and Teachers:

Proposal Title: Effects of Behavior-Specific Praise Statements on Math Fluency and On-Task Behavior on Students

"I would like to request your permission to collect data for my dissertation at your school and in your classroom(s). I appreciate you spending this time with me and would like to briefly discuss the purpose and methods of the proposed study with you."

The purpose and the research problem in the proposed study:

The purpose of this study is to determine if intervening on classroom management by increasing the use of behavior-specific praise statements, will result in an increase in student learning and on-task behavior. Student learning will be measured by the students' average math fluency scores on a class-wide math intervention.

Methodology:

The participants in the current study will include 4th grade elementary school students.

After parental permission is secured, researchers will conduct a pre-test (basic math computation including addition and subtraction). Then students will practice basic math skills daily for 5 minutes. This will take place over five weeks.

During the interventions, I will be video recording the students to measure their on-task behavior. Students will not be told why I am recording them, as this could affect the treatment outcomes. There will be no identifying information associated with the recordings, and it will be kept confidential.

"Do you give permission for me and my team of one to two other graduate students to collect the data described at your school and in your classroom(s)? Thank you again for your time."

APPENDIX H

Intervention Integrity Checklist: Control Group

Date: _____ Observer: _____

Teacher: _____ _____ %

____ 1. Researcher set-up tablet in the corner of the room, where all students were visible

____ 2. Researcher passed out all folders to students and kept the folders for the students that were absent

____ 3. Researcher pressed record on the tablet before the intervention instructions began playing over the SmartBoard

____ 4. Instructions were played on the SmartBoard

____ 5. Researcher stood out of sight or quietly to the side

____ 6. Teacher remained seated and silent at their desk

____ 7. After the timer went off, researcher collected all folders

_____% of steps complete

Intervention Integrity Checklist: Treatment Group

Date: _____ Observer: _____

Teacher: _____ _____ %

____ 1. Researcher set-up tablet in the corner of the room, where all students were visible

____ 2. Researcher passed out all folders to students and kept the folders for the students that were absent

____ 3. Researcher pressed record on the tablet before the intervention instructions began playing over the SmartBoard

____ 4. Instructions were played on the SmartBoard

____ 5. Researcher/Teacher continuously walked around providing BSP during the intervention

____ 6. After the timer went off, researcher collected all folders

_____% of steps complete

APPENDIX I

STILLWATER BOARD OF EDUCATION	GVA-E

RESEARCH STUDY REQUEST
STILLWATER PUBLIC SCHOOLS

I hereby request permission to conduct a research study in the Stillwater Public Schools district during the period September 2017 to October 2017.

The topic is Evaluating the Effects of Behavior-Specific Praise Statements on Math Fluency and On-Task Behavior of Students.

Date Submitted May 26, 2017 Daytime Phone Number (918) 810-7947

Reason for Request:

____ Class Requirement ____ Master's Thesis _X_ Doctoral Dissertation ____ Other

If this request is granted, I agree to abide by the Stillwater Board of Education policy and administrative procedures.

Eryn McMaster
Typed Name of Researcher

Signature of Researcher(s)

Oklahoma State University
Institution of Higher Education

SAHEP
Sponsoring College or Department

Brian Poncy, PhD
Typed Name of Faculty Member

Signature of Faculty Member

Submit approval letter from the IRB
(Must have IRB approval to proceed.)

ENDORSEMENT:

This request was: Approved ✓ Disapproved ____ Date: 8-28-17

Cathy Walker
Assistant Superintendent or Designee

Adoption Date: August 11, 2009	*Revision Date(s): 6/9/15*	*Page 1 of 3*

RESEARCH STUDY REQUEST (Cont.)

PROPOSAL FOR RESEARCH
STILLWATER PUBLIC SCHOOLS

Purpose and Description of Study: The purpose of the current study is to determine if intervening on classroom management by increasing the use of effective commands and behavior-specific praise statements, will result in an increase in student learning. Student learning will be measured by the students' average math fluency scores on a class-wide math intervention.

Number and Description of Students Required: Approximately sixty 4th grade students across two general education classrooms will participate in this study. All children in both classrooms will be used as participants, dependent upon parental consent.

Time Required of Each Student: The study will run for 5 weeks, and will consist of 5 days of intervention per week. Each day of intervention will include 5 minutes of intervention and 10 minutes for passing out and collecting the materials- Totaling 375 hours for the full study

Time Required of Classroom Teacher: The study will run for 6 weeks, and will consist of 5 days of intervention per week. Each day will be 5 minutes of intervention and 10 minutes used for passing out and collecting materials - Totaling 450 hours for the full study.

Information Needed from School Records: General demographics such ethnicity and gender, as well as percentage of students receiving free or reduced lunch. This information will be used if the current study is published in a research journal. This provides information about the population used for the study.

Include copies of any data-gathering instruments and permission forms:

See Attached

Equipment and Materials to be Used. The researcher will provide all equipment and materials needed. The researcher will provide folders, math probes for the intervention, and audio recordings for providing directions during the intervention. The primarily researcher will also provide any recording devices that will be used during this study.

Facilities Needed: Data collection for this research study, will take place in the two general education classrooms.

Major Investigator: Eryn McMaster, M.S.

Research Assistant: 2-3 graduate research assistants enrolled in the major investigator's doctoral program will be used to help with scoring math probes and conducting integrity checks throughout the intervention.

RESEARCH STUDY REQUEST (Cont.)

Starting Date: September 2017

Finishing Date: October 2017

Preferred Days and Times for Collecting Data: Monday - Friday (5 weeks)
8:15 -8:30 am

Special Conditions and Restrictions: Audio and video recording will be utilized during the 5 minute observation period. Individual assessments of on-task behavior will be conducted by reviewing the video recordings of the observation periods for each student.

Use of the Results: The results will be used and analyzed for the researcher's doctoral dissertation. The results will be used to answer the researcher's research questions regarding classroom management's effects on math fluency.

If the research includes data-gathering instruments or interview protocols, these must be submitted with the proposal, along with the parent permission form. Please include the IRB application used by the IRB to determine their approval of the research.

VITA

Eryn M. McMaster

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECTS OF BEHAVIOR SPECIFIC PRAISE ON MATH FLUENCY AND ON TASK BEHAVIOR OF STUDENTS

Major Field: School Psychology

Biographical:

Education:
Completed the requirements for the Doctor of Philosophy in School Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2019.

Completed the requirements for the Master of Science in Educational Psychology at Oklahoma State University, Stillwater, Oklahoma in December, 2015.

Completed the requirements for the Bachelor of Arts in Psychology at The University of Tulsa, Tulsa, Oklahoma in December, 2012

Experience:
OTISS Support Coach for the Oklahoma Tiered Intervention System of Support grant.

Completed 1,200+ Practicum Hours in School, Clinical, and Outpatient Settings through Oklahoma State University

Graduate Teaching Assistant at Oklahoma State University in the School of Applied Health and Educational Psychology in the College of Education. August 2014 – December 2016

Academic Facilitator at Oklahoma State University in the Academic Enhancement Center for Student Athletes. August 2015 – May 2018.