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A STUDY OF THE RELATIONSHIPS BETWEEN TEACHER SUPPORT BEHAVIORS, TEACHER EFFECTIVENESS, AND STUDENT ACHIEVEMENT AMONG FIFTH-GRADE STUDENTS

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By

LORI D. ALLEN

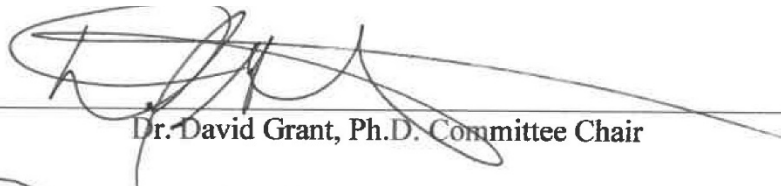
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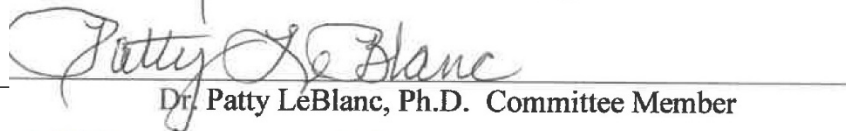
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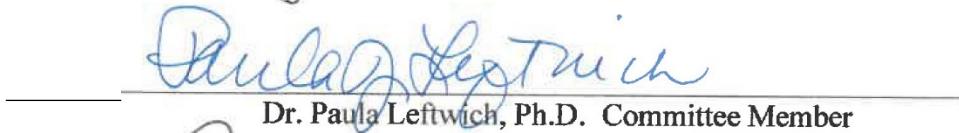
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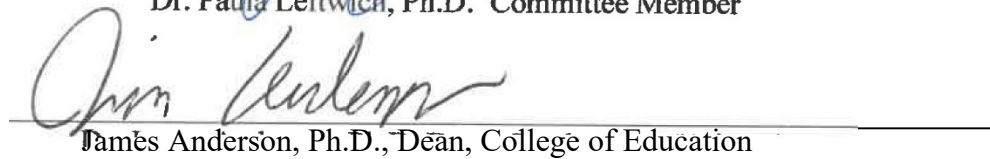
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DEDICATION

This dissertation is dedicated to my husband, John Allen, and my daughters, Sarah Elizabeth and Sadie Rose, who were always my biggest cheerleaders and longsuffering advocates during my long hours in front of the computer. I would also like to dedicate this work to my mom in heaven, who would be bursting with pride, and my dad, who has always challenged me to go beyond what I may think I can accomplish. Their love and support have always been an encouragement for me to pursue what I love and aspire to achieve whatever dream I may have. This journey was not my own. We all had a part in the completion of this task.

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Most sincerely, I am infinitely grateful for the support of my extended in-law family, friends, and coworkers who encouraged this undertaking, who stepped in to help shuffle my overloaded responsibilities, and who listened as I spoke incessantly about my work.

ABSTRACT

According to Marzano (2007), classroom teachers are the single most important factor within a school's locus of control that contributes to student learning. The purpose of this study was to explore the relationships between fifth-grade teachers' support behaviors as measured by the *Classroom Assessment Scoring System*[™] (CLASS[™]) and achievement of fifth-grade students in English language arts (ELA) and mathematics. The research design was a non-experimental, correlational exploration of archival data extracted from the Measures of Effective Teaching (MET) database. Mean CLASS[™] composite, domain, and dimension scores of 70 fifth-grade teachers were correlated to mean *z* scores of 70 fifth-grade students on summative assessments of ELA and mathematics. The results indicated that the mean CLASS[™] score on the dimension Regard for Student Perspectives within the Emotional Support domain was a significant predictor of ELA achievement. In addition, the dimension Behavior Management within the Classroom Organization domain and the dimension of Negative Interactions within the Emotional Support domain were significant predictors of mathematics achievement among fifth-grade students. Implications of the findings for teaching and learning and recommendations for further research are discussed.

Keywords: math achievement; mathematics achievement; Measures of Effective Teaching; MET; *Classroom Assessment Scoring System*[™]; CLASS[™]

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I. INTRODUCTION

Multiple variables contribute to students' success or failure in their K-12 school experiences. Adults in the school environment can control some variables such as classroom climate, management, and instruction; other variables such as home life, trauma, and aptitude are typically not within the circle of influence that a school can provide (Ladd, Birch, & Buhs, 1999). Research literature supports the presence of high quality, engaging instruction and supportive adult relationships as essential influences on the academic achievement and the social-emotional development of students. A teacher's impact on a student's ability to form healthy coping skills within social environments has been widely researched (Bailey, 2015; Flook, Repetti, & Ullman, 2005; Hamre & Pianta, 2001; Hamre & Pianta, 2005).

According to Hamre and Pianta (2001), children who experience positive social environments begin their school careers successfully and benefit from their social knowledge and experiences throughout the elementary and middle school years. To establish stable teacher-student relationships, teachers must possess the ability to self-regulate their behaviors to create a safe environment in which both adults and students can connect in authentic, meaningful ways. When teachers demonstrate positive relationships and provide a safe and connected learning environment, students display fewer low-level instances of inappropriate and disruptive behaviors (Hamre & Pianta, 2001).

Regardless of the age and stage of learners, teachers' abilities to meet the cognitive, social, emotional, and developmental needs of their students impact the depth of student growth, development, and achievement (Allen et al., 2013; Hamre & Pianta, 2001; Ladd et al., 1999; Leflot, van Lier, Verschueren, Onghena, & Colpin, 2011; Roorda, Koomen, Spilt, & Oort, 2011). A socially and emotionally competent teacher enhances students' academic achievement by developing a supportive environment, encouraging peer relationships and cooperation among students, modeling conflict resolution, building strong instruction based on student strengths and interests, and maintaining behavioral guidelines (Jennings & Greenberg, 2009).

Concerns about the impact of school disciplinary methods and their effects on student academic growth have grown in the past decade. In 2011, the U.S. Department of Education and the Department of Justice worked jointly to announce the launch of a collaborative project to support the use of school-wide discipline practices that foster safe, supportive, and productive learning environments while keeping students in school (U.S. Department of Education, 2016). According to the Office of Civil Rights, 2.8 million K-12 students nation-wide received out of school suspension in the 2012-2013 school year (U.S. Department of Education Strategic Plan for Fiscal Years 2014-2018, 2014). However, the occurrences of student violence, suspension, and low academic progress continued to grow despite the removal of disruptive and violent students from schools and classrooms (Florida Department of Education, 2016). The ways that teachers respond to student behavior have a direct impact on whether it escalates or de-escalates as well as on student achievement.

The purpose of the current study was to explore the relationships between teacher support behaviors identified by the *Classroom Assessment Scoring System*[™] (CLASS[™]) and fifth-grade

student achievement in English language arts (ELA) and mathematics using the Measures of Effective Teaching (MET) longitudinal study database.

Background

In Capel's (2012) auto-ethnography, she discussed the ways that the behavior of teachers of young children is likely to reflect rules and routines without an awareness of circumstances or consideration of a student's need for understanding. Capel described this conduct as "mindless" or less sensitive (p. 668). Detachment and poorly-timed responses to children's cues are hallmarks of these behaviors. Such mindless teaching and interactions with students prevent teachers from recognizing the importance of students' readiness and basic needs. Teachers must be sensitive and responsive to students' needs, demonstrating an understanding of student perspectives (Capel, 2012). Capel further described mindlessness as habits, fixed mindsets, or automatic processing (the ability to respond with little cognitive effort). A classroom that is primarily teacher-directed, with little support of learning through creativity and little recognition of student perceptions and interpretations, restricts the students' capacity to co-construct knowledge, stunting the growth of both students and teachers.

Marzano, Marzano, and Pickering's (2003) meta-analysis of factors that significantly influence student achievement at all grade levels included results from more than 100 separate studies (p. 3). The meta-analysis revealed that teachers' mental models of discipline, behavior management, and classroom climate had significant impacts ($p < .05$) on overall student achievement (effect size = -.869) and a mean percentile increase in achievement of 23% ($p < .05$). Further research conducted by Marzano et al. (2003) revealed that when teachers establish preconditions for learning that include rules and procedures, disciplinary

interventions, and positive teacher-student relationships, the teacher can successfully promote students' abilities to complete academic tasks with cognitive complexity and autonomy. These conditions are grounded in cognitive psychology's theory of positive mental states that students "must be in or have acquired for effective learning of content to take place" (Marzano & Toth, 2014). Marzano et al. (2003) stated, "If a teacher has a good relationship with students, then students more readily accept the rules and procedures and the disciplinary actions that follow their violations" (p. 41).

Marzano et al. (2003) also cited Adelman and Taylor's (2002) study asserting that 40 percent of school-aged children are at risk of academic failure because of problems outside of the school setting. According to Marzano et al. (2003), between 12 and 22% of all school-aged children suffer from mental, emotional, or behavioral disorders (p. 47). When teachers are competent in modeling pro-social behavior and developing supportive and encouraging relationships with students, students are more likely to accept rules, procedures, and consequences that may follow (Marzano et al., 2003).

Children identified as high-risk frequently benefit from close attachment relationships with adults (Ewing & Taylor, 2011). Ewing and Taylor further noted that favorable classroom behavior adjustments among children of all ages and diverse ethnicities increased with close teacher-child relationships. The researchers stated, "Other strategies for improving the teacher-child relationship include providing teachers with knowledge on child development and the importance of the teacher-child relationship and helping teachers to reflect on their relationships with their students" (p. 104).

A teacher's impact on a child's ability to form healthy coping skills within a social context has been widely researched (Bailey, 2015; Ewing & Taylor, 2011; Hamre & Pianta,

2001; Marzano et al., 2003; Oades-Sese & Li, 2011; Polirstok & Gottlieb, 2006). Novice teachers, especially those entering education without an education degree, often enter the classroom for the first time without extensive experience in working with large numbers of students with diverse needs or an understanding of techniques to create positive environments to meet those needs. As noted by Polirstok and Gottlieb (2006), school-age children who come from chaotic homes may not have developed behaviors that will help them become successful in school. The comments and actions that teachers say and do in the classroom influence the students directly, and, in turn, the students' responses directly influence the teachers, creating a cycle of communication that can be mutually positive or aversive.

Bailey (2015) is the author of *Conscious Discipline*[®], an emotional intelligence program used in many schools. The importance of safety and its connection to the learning process is the foundation of her program. According to Bailey (2015), when teachers meet safety and connection needs, academic and social growth can thrive. When students operate from the executive state of the brain, they can adapt and problem-solve more generally (p. 54). Teachers can facilitate an optimal state of learning by identifying and responding appropriately to the internal states of the brain, the body, and the emotions, and employing the skills necessary to help children self-regulate.

Theoretical Framework

Developmental theory and research provide substantial evidence of the role of positive social-emotional supports by adults in the daily interactions of children and adolescents as a key motivating force behind learning and development (Bronfenbrenner & Morris, 1998; Geddes, 2003; McLeod, 2013; McLeod, 2016; Vygotsky, 1978). In Chapter 2, the researcher describes Piaget's theory of cognitive development, Bandura's motivation theory, and Vygotsky's theory of

social development, Erikson's psychosocial development theory, and Maslow's hierarchy of needs to discuss the theoretical framework for this research study.

Purpose Statement

The purpose of this study was to explore the relationships between fifth-grade teachers' support behaviors as measured by the CLASS™ and achievement of fifth-grade students in English language arts (ELA) and mathematics. The study utilized existing data from the Measures of Effective Teaching, a research project funded by the Bill & Melinda Gates Foundation, to examine the relationships between teacher support behaviors and student achievement. The research design was a non-experimental, posttest only design using archival data. The independent variables in this study were composite, domain, and dimension scores of the *Classroom Assessment Scoring System*™ (CLASS™), a widely used teacher observation and evaluation tool. The dependent variables in this study were fifth-grade *z* scores on state-sponsored summative measures of fifth-grade student achievement in mathematics and reading.

Research Questions and Hypotheses

Q1: Is fifth-grade teacher effectiveness as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

Q2: Are fifth-grade teachers' support behaviors as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

H₁: The CLASS™ Composite score (total score of Emotional Support, Organizational Support, and Instructional Support domain scores) is significantly correlated to fifth-grade students' achievement in ELA as measured by standardized summative assessments.

H₂: The CLASS™ Composite score (Emotional Support, Organizational Support, and Instructional Support domain scores) is significantly correlated to fifth-grade students' achievement in mathematics as measured by standardized summative assessments.

H₃: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in ELA as measured by standardized summative assessment.

H₄: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in mathematics as measured by standardized summative mathematics assessments.

H₅: The dimension scores of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative ELA assessments.

H₆: The dimensions of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative mathematics assessment for the fifth-grade.

Method

After approval by the Internal Review Board at Southeastern University, the researcher and her mentor applied for and received permission from the University of Michigan to access the Measures of Effective Teaching database. The study's research design was a non-experimental exploration of archival data from the Measures of Effective Teaching (MET) Study database. Hypotheses 1 and 2 were tested using Pearson *R* correlations. To address hypotheses three through six, predictive multiple regressions were computed to determine relationships between

teacher support behaviors and fifth-grade student achievement in reading and mathematics. The domains and dimensions are described in-depth in the definition of terms section of this chapter.

Instrumentation

The CLASS™ is a measure of verbal and non-verbal teacher behaviors during instruction in K-12 classrooms. School administrators widely use the instrument and other educators and researchers to collect information using 20-minute observations of classroom instruction conducted several times throughout the school year. As depicted in Figure 1, the CLASS™ measures teacher and student verbal and behavioral interactions that are grouped into three domains: emotional support, classroom organization, and instructional support. Specific dimensions of teacher-student interactions are used to measure each of the three domains. Each of the items on the class is measured by a Likert scale ranging from 1 to 7, with 7 as the highest rating.

	Emotional Support	Classroom Organization	Instructional Support
Dimensions	Positive Climate	Behavior Management	Content Understanding
	Negative Climate	Productivity	Analysis and Inquiry
	Teacher Sensitivity	Instructional Learning Formats	Quality of Feedback
	Regard for Student Perspectives		Instructional Dialogue

Figure 1. CLASS™ Domains and Dimensions used to measure specific teacher-student and student-student interactions. Adapted from “Classroom Assessment Scoring System™” by R. C.

Pianta, B. K. Hamre, & S. Mintz, 2012, (p. 2).

Data Collection

The MET database provided non-identified data from CLASS™ observations of classroom teachers. The sample used for this study included all fifth-grade teachers ($n = 70$) extracted from among 1,148 teachers in the MET database and z scores for 70 fifth-grade students in the MET database with state-sponsored summative assessment scores.

The CLASS™ MET data included four video observations conducted by a team of advanced MET coders who were trained observers with high inter-rater reliability. The coders rated each of the ten CLASS™ dimensions on a 1 to 7 Likert scale, with a value of 1 or 2 signifying low scores; 3, 4, or 5 signifying midrange scores; and 6 or 7 signifying high scores. Two raters viewed videos of instruction selected by the classroom teachers in two 20-minute segments and were coded independently. A different pair of coders viewed and coded each 20-minute segment. The scores were then averaged across all raters.

For the current study, mean scores for each CLASS™ domain and dimension as well as the overall composite score were extracted for all the fifth-grade teachers ($n = 70$) in the MET database and served as the independent variables in this study. Student z scores ($n = 70$) on state-sponsored summative standardized achievement tests in ELA and mathematics were extracted; all the standardized test scores in ELA and mathematics recorded in the MET database served as the two dependent variables.

Data Analysis

The CLASS™ composite, domain, and dimension scores of the four classroom observations by MET researchers were averaged for each teacher; mean composite scores were computed for the entire group of fifth-grade teachers in the sample by this researcher. The researcher also computed mean composite z scores in both ELA and mathematics for all the

fifth-grade students in the MET database. Pearson R correlations were computed to determine whether CLASS™ composite scores were correlated to fifth-grade ELA and mathematics achievement scores. Multiple regression analyses were conducted to determine whether the mean CLASS™ domain and dimension scores of this sample of fifth-grade teachers were significantly related to and predictive of fifth-grade student achievement in ELA and mathematics.

Definition of Terms

The terms below are defined and used throughout this study.

Assimilation: the cognitive process of receiving new facts or responding to new situations into existing knowledge (Piaget, 1959).

Accommodation: the process of modifying one's existing schemas, or ideas, because of new information or new experiences (Piaget, 1959).

Equilibration: the ability to strike a balance between applying previous knowledge (assimilation) and changing behavior to account for new knowledge (Piaget, 1959).

CLASS™ Composite Scores: mean overall total scores of four classroom observations of all domain and dimension scores on the CLASS™ (Pianta et al., 2012).

CLASS™ Domains: At the broadest level, each domain measures verbal and non-verbal interactions between teachers and students and are grouped into three domains: Emotional Support, Classroom Organization, and Instructional Support (Pianta, Hamre, & Mintz, 2012).

CLASS™ Dimensions: While the domains are broad and designed to measure teacher verbal and non-verbal behaviors across all grade levels, the dimensions that comprise the domains vary to provide context-specific and developmentally sensitive metrics for each age group (Pianta et al., 2012). Definitions of each dimension for fifth-grade teachers are provided below.

CLASS™ Domain 1: Emotional Support

Positive Climate: reflects the enjoyment and emotional connection that teachers have with students, as well as the nature of peer interactions (Pianta et al., 2012).

Negative Climate: reflects the level of intensity of expressed negativity such as anger, hostility, aggression, or disrespect exhibited by teachers and students in the classroom (Pianta et al., 2012).

Teacher Sensitivity: encompasses the level of teachers' awareness and responsiveness to the academic, social-emotional, and developmental needs and levels of individual students and the entire class (Pianta et al., 2012).

Regard for Student Perspectives: focuses on the degree to which teachers meet and capitalize upon the social and developmental needs and goals of students for decision-making and autonomy, relevance, for valuing opinions and for meaningful interactions with peers (Pianta et al., 2012).

CLASS™ Domain 2: Classroom Organization

Behavior Management: encompasses the teacher's ability to use precise behavior expectations, encourage positive behaviors and monitor, prevent, and redirect misbehavior (Pianta et al., 2012).

Productivity: considers how well the classroom operates concerning routines, how well the students understand the routines, and the degree to which teachers provide activities and directions so that maximum time can be spent on learning activities (Pianta et al., 2012).

Instructional Learning Formats: focuses on the teacher's ability to engage students in and to facilitate activities so that learning opportunities are maximized (Pianta et al., 2012).

CLASS™ Domain 3: Instructional Support

Content Understanding: a teacher's ability to emphasize and use multiple approaches to help students understand both the broad framework and critical ideas in an academic discipline (Pianta et al., 2012).

Analysis and Inquiry: assesses the degree to which teachers promote higher-order thinking skills (e.g., analysis, integration of information, hypothesis testing, and metacognition) and to provide opportunities for application in novel contexts (Pianta et al., 2012).

Quality of Feedback: measures the degree to which teachers use structured, cumulative questioning and discussion to guide and prompt students' understanding of content and to encourage engagement (Pianta et al., 2012).

Instructional Dialogue: refers to the purposeful use of dialogue-structured, cumulative questioning and discussion that guide and prompt students to facilitate students' understanding and language development (Pianta et al., 2012).

Study Assumptions

In this study, certain assumptions have been held as true.

1. The CLASS™ is a valid and reliable instrument for measuring teacher-student interactions, behavior, and support (Pianta et al., 2012). This research study assumed that all the researchers who conducted the CLASS™ observations used in the MET database were trained and certified to perform the observations and evaluate teachers' classroom interactions.

2. The z scores utilized in the MET project and in this study to measure student achievement in reading and mathematics were comparable. The z scores are scaled scores with a mean of 0 and a standard deviation of 1 with a range of -4 to 4. The z score expresses how far scores are from the mean (Gay, Mills, & Airasian, 2012). Using z scores in the research study allowed for scores from different state-sponsored standardized achievement tests to be compared for all fifth-grade students in the research sample.

This study is correlational in its design. Mean CLASS™ scores for 70 fifth-grade teachers were computed to explore relationships between teacher support behaviors and mean z scores of fifth-grade students on standardized summative assessments of ELA and Mathematics. As such, no causality is assumed or implied.

Limitations

The researcher identified the limitations described below.

1. The MET data were collected from classrooms from six school districts in several states. The specific demographics of the school districts were not available in the MET database; therefore, this study may limit generalizability to other regions.
2. Since the school districts in the MET database were not known, information about the individual schools and their social/emotional programs or professional development opportunities was not known and could not be determined.
3. The analyses conducted in this study reflect mean fifth-grade teachers' CLASS™ scores and mean fifth-grade student achievement scores in reading and mathematics. In other words, Teacher A's CLASS™ scores are not directly related to his or her specific students' achievement scores.

Significance of the Study

This study has the potential to influence future instruction and development of the whole student. According to the 2016-1017 Florida discipline report for the researcher's current district during the 2015-2016 school year, less than 1 percent ($n = 7,011$) of enrolled students were placed in in-school suspension. Three percent of enrolled students in the researcher's current district received an out-of-school suspension ($n = 13,148$) (Florida Department of Education, Division of Accountability, Research & Measurement, 2017). Unfortunately, those students missed vital instruction that can affect overall achievement. The ability of teachers to manage and support students, behavior, and instruction in the classroom is vitally important to student success.

Chapter 2 is a review of the research literature on instructional practices, social-emotional support, organizational skills, and the application of instructional models. The researcher will also discuss the use of teacher observation tools and their usefulness in improving teacher practice and providing support for learning.

II. REVIEW OF LITERATURE

The purpose of this study was to explore the relationships between fifth-grade teachers' support behaviors as measured by the CLASS™ and achievement of fifth-grade students in English language arts (ELA) and mathematics. The first section of this literature review focuses on theoretical frameworks that undergird the hypothesis that teacher support behaviors influence student achievement. The second section of the review of literature focuses on teacher behaviors during instruction, teacher effectiveness in developing a supportive teacher-student relationship, and student achievement. The third section discusses the CLASS™ observation tool and research related to the use of classroom observation scores to examine teacher effectiveness in (a) providing emotional, organizational, and instructional support, and (b) informing professional learning necessary to support teacher growth in those areas.

Theoretical Underpinnings of the Study

When teaching fifth grade, this researcher had a student who had been disliked by his classmates since kindergarten. This student was tough, large for his age, often dirty, unkempt, and aggressive towards others. He was prone to outbursts and screamed, cried, cursed, and threw things. Although he was smart, his grades suffered due to the chaotic state of his thinking and behavior and problems related to frequent removals from the classroom. When this student

joined the researcher's class, his classmates worked hard to ensure empathy toward him as he struggled with daily tasks. The researcher and the students in this class built a community of sensitivity and understanding that included anyone who joined the class, whether for the day or as a permanent part of the researcher's classroom. The more often this researcher reminded the students to be patient and to remember that their classmate needed a different structure to learn, the more student empathy grew for the student, and the child's behaviors became less chaotic.

While this student's home life did not improve and he still had many struggles, his grades and behavior improved, and he had a successful year in fifth grade. This experience with a problematic student prompted the researcher to continue to study the work of researchers such as Ruby Payne (2005), Becky Bailey (2015), Eric Jensen (1995), Robert Marzano (2003), and John Hattie (2012), along with the classical theorists and their work, in order to learn more about building positive relationships with students and the impact those bonds can have on learning.

Several theories describe the role of the development of relationships with children to promote growth and learning and are pertinent to the theoretical underpinnings of this research study. Jean Piaget's research on cognitive development focused primarily on children's cognitive development that matures in a natural and unvaried sequence. Piaget (1959) regarded intellectual growth as a process of adjustment to the world through assimilation, accommodation, and equilibration. The stages of a child's development are characterized by thinking and learning capabilities that are influenced by native intellect, biological maturity, and learning experiences. Over time, Piaget's research developed into a theoretical framework for understanding cognitive development that has been researched extensively and has informed child development for decades.

Piaget's (1959) conceptual model describes four distinct and qualitatively different stages of development that are hierarchical, do not vary in sequence, and that build on the previous stages, although the ages at which the stages begin and end may vary due to inherent biology, maturation, and environmental factors and experiences. Empirical research studies of thousands of children and youth in every culture and language group that have been studied support the idea that there are, in neo-Piagetian terms, universal stages of cognitive development (Dasen, 1984). The first is the sensory-motor stage, in which infants and toddlers build critical cognitive skills such as object permanence; at this stage, babies also develop essential attachments to their parents and significant others who provide critical environmental experiences to promote language and cognitive growth. The second stage in Piaget's theory of cognitive development is the preoperational stage, beginning at approximately age two and continuing until the ages of approximately six or seven. Piaget discovered that children in the preoperational stage find it challenging to think about more than one side of any situation at once because children at this stage are primarily egocentric, meaning they are unable to see a situation from another person's point of view (McLeod, 2015).

According to Piagetian research, from the ages of approximately 6 or 7 (approximately second grade) to 11 or 12 (approximately fifth grade in the United States), children begin to think logically about events and to understand the concept of conservation of number, matter, mass, and volume, provided that the concepts refer to concrete examples that can be seen and touched. Children's thinking becomes more logical and organized; this stage is termed concrete operational. The ability to use inductive logic or reasoning from specific information to a general principle begins to form. Children can also see things from the perspective of others,

manipulate more than one variable at a time in their minds if the variables are concretely contextualized, and demonstrate empathy (McLeod, 2015).

The final stage described by Piaget is abstract reasoning, which begins to develop at approximately 11-12 years of age and continues throughout adulthood. In this stage, young people and adults can manipulate more than one variable simultaneously in their minds without concrete referents. Cause-effect reasoning is logically applied to solve problems mediated by the person's prior learning experiences. In addition, exposure to persons just slightly more advanced than the individual can promote changes in cognitive thinking due to assimilation, accommodation, and equilibration. As with all the other stages, the abstract reasoning stage builds on each of the previous stages and continuously develops over time.

Piagetian theory has important implications for classroom instruction and student achievement. In this study of fifth-grade student achievement, the learners were most likely transitioning from concrete operational thinking to abstract reasoning; theoretically, learners are beginning to see things from different perspectives, to manipulate multiple variables in order to solve problems, and to readily adjust their thinking to accommodate and assimilate diverse points of view of peers, parents, and teachers. As a result, the ability of the classroom teacher to diagnose, understand, and promote social interactions and problem-solving and adjust instruction to support the cognitive functioning of each child must undoubtedly influence the learner's academic achievement.

Lev Vygotsky's (1978) argued in his theory of social development of children that social interaction via language precedes and promotes cognitive development. He stated, "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first *between* people and then *inside* the child" (p. 57). Vygotsky's theory

emphasized social interaction with a “more knowledgeable other,” which refers to peers of similar age who have a better understanding of a task or concept or a slightly higher ability level than the learner does. Vygotsky’s research on the growth of cognitive development and its augmentation by the support of the more knowledgeable other led Vygotsky to propose a “zone of proximal development” (ZPD), which describes the cognitive ability a student needs to solve complex tasks if guided by a more knowledgeable peer of similar age with slightly more experience and ability (McLeod, 2014). The potential for cognitive development depends upon the “zone of proximal development” (ZPD) or “the distance between the actual development level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers” (p. 86).

The ZPD is governed by essential parameters that affect children’s development; if the gap between the learner’s and the more knowledgeable peer’s comprehension of a task or concept is too large, then the learner will not be able to assimilate or accommodate the peer’s explanations or guidance, and the learner’s mental structures (thinking) will not be changed. If the ZPD is relatively small between the learner and the more knowledgeable peer, the possibility of adjustments in the thinking of the learner are present. Piaget also postulated this same idea, especially among learners who were transitioning from concrete operational to abstract reasoning (Piaget, 1959).

Schools have traditionally used an instructional model in which the teacher tends to stand and deliver or “convey” information to students, also known as a transmission model of instruction or direct instruction (David, 2016). Vygotsky believed that students should play an active role in learning and should collaborate with the teacher or a more knowledgeable peer to

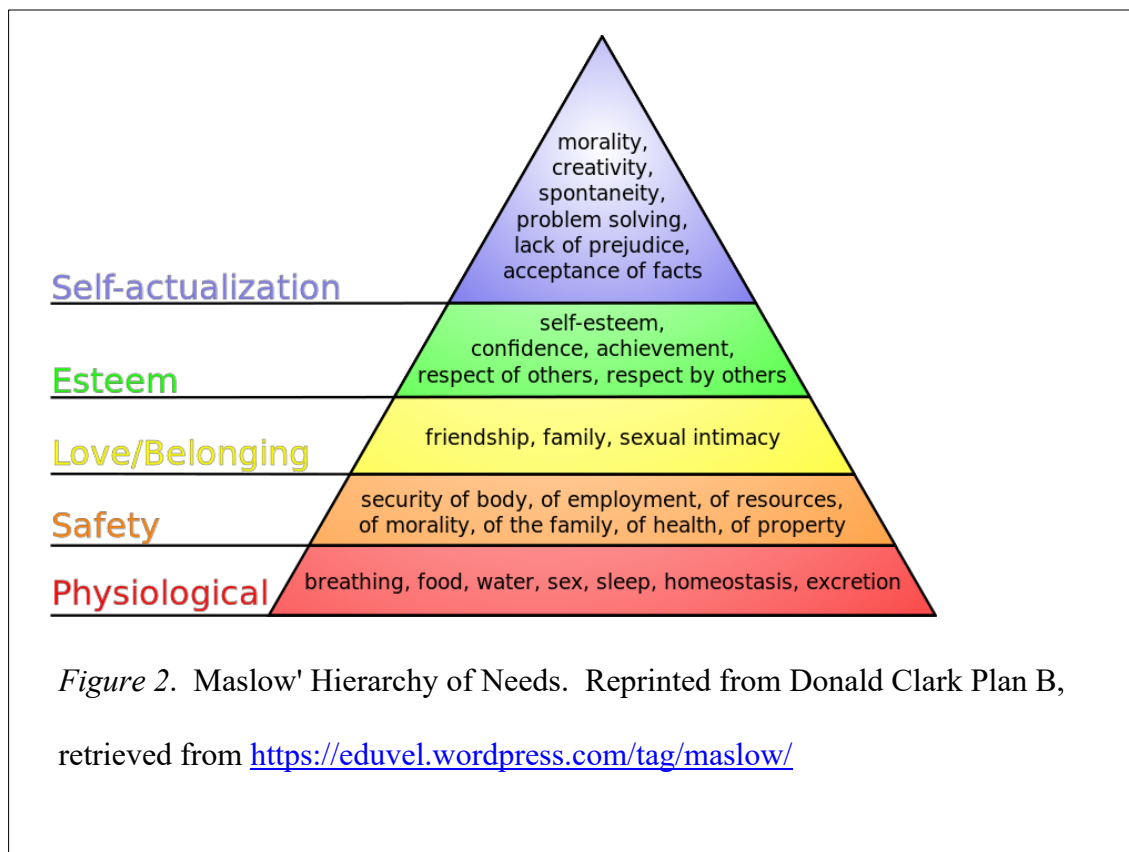
construct knowledge. He found that adult regulation or a skilled tutor could augment and accelerate the range of cognitive skill development (Vygotsky, 1978). Vygotsky's research pointed to peer collaboration in the context of social interaction as vital to learning, allowing for collaborative dialogue and cognitive growth. When a child interacts with a peer, the child begins to internalize and use the information to guide logical reasoning, thereby exceeding what would be accomplished individually. One can reasonably argue that the teacher plays a critical role in creating the environment for active learning, student collaboration, productive struggle, and cognitive growth.

While Piaget and Vygotsky focused primarily on cognitive development, Erik Erikson (1950) theorized the role of culture and society and the conflicts that take place during the social-emotional development of children and adults. McLeod (2013) summarized Erickson's belief that human personality develops in a predetermined order, building upon each previous stage. According to Erikson's psychosocial development theory, in stage 4, *Industry vs. Inferiority* (6 to 12 years of age or fourth through sixth grades in the U. S.), children ask, "Am I good at what I do?" Children compare themselves with their peers to determine their overall worthiness. Students can either develop a sense of pride and accomplishment in all the areas of importance in their lives (schoolwork, sports, social activities, and family life) or they can develop feelings of inferiority and inadequacy. If children do not learn to get along with others at this stage or have negative experiences at home or with peers, an inferiority complex may develop and continue into adolescence and adulthood, with detrimental effects on their lives.

During this stage, students' academic progress can profoundly affect their self-confidence and motivation. At this stage, students begin to discover their interests and understand that they are different from others; when students receive recognition and affirmation for doing things

correctly, they typically become hard working and industrious. Teachers and parents play critically important roles in helping children develop their sense of self, abilities, and healthy emotional development. Mindful fourth- through sixth-grade teachers can lead and influence students during this critical stage of development to ensure that students move into adolescence with confidence and proficiency.

As Maslow (1943) explained in his hierarchy of needs, the most basic human need is one of safety. In a classroom setting, students must feel safe to take risks when learning what they do not know, to have the confidence that they can learn, and to know that the teacher will be fair and predictable when engaging with students. Maslow's hierarchy of psychological needs is depicted as a pyramid in Figure 2.



The first four layers at the bottom of the pyramid describe what Maslow called “deficiency needs” or “d-needs”: esteem, friendship and love, security, and physiological needs. If these deficiency needs are not met (with the possible exception of physiological needs), Maslow’s research demonstrated that an overt manifestation of dysfunction might not be present, but that individuals would likely feel anxious and tense. Anxious and tense students are not good learners (Maslow, 2012). Maslow suggested that the four most basic levels of needs must be met before individuals strongly desire to achieve higher-level needs. Maslow further advised that learners must have concrete evidence that they are valued and respected; they also need a supportive environment that allows those with low self-esteem to strengthen socially and academically. Without strong instructional, organizational, and socio-emotional support from teachers and significant others, upper elementary students cannot reach their highest potential, which is self-actualization. Maslow describes this level of need as individuals’ motivation to realize their highest potential. To meet both the primary and higher needs of learners, highly skilled teachers are needed to create learning environments that are fair, equitable, supportive, and effective.

The work of Piaget, Vygotsky, Erikson, and Maslow provide strong theoretical underpinnings for this research study. For these reasons, this researcher hypothesized that the fifth-grade teachers’ support domain and the emotional support dimension scores of the CLASS™ would be significant predictors of fifth-grade student achievement in reading and mathematics.

Teachers and Students

The teacher’s role in fostering cognitive development and social and emotional competency is critical to raising productive, well-adjusted students. Processes that have

historically been considered pure thinking, or strictly cognitive, are now considered to be cognitive and emotional components working synergistically. Erikson (1950) and Maslow (1943) held psychoanalytical and humanistic viewpoints with strong emphases on personality and emotional development. A foundational premise of effective teaching centers on emotionally stable and supportive adults who can assist in problem-solving and in building positive relationships with and among students and who are skilled in interpreting students' feelings, motives, and actions. Scripture states, "Train up a child in the way he should go; even when he is old he will not depart from it" (Proverbs 22:6, English Standard Version). Positive and responsive relationships with adults built on trust, safety, understanding, and caring can be instrumental to fostering children's cooperation and motivation and increase in positive academic outcomes (Ladd et al., 1999).

The quality of teacher-student relationships was found to be significantly linked to students' social functioning, emotional understanding, and the development of social interaction skills (Allen, Gregory, Mikami, Lun, Hamre, & Pianta, 2013; Ladd et al., 1999); classroom behavior (Hamre & Pianta, 2001); and academic achievement (Flook et al., 2005; Roorda et al., 2011). The ability of the classroom teacher to understand and support the cognitive and social-emotional development of each child to influence his or her academic achievement is the focus of this study.

Organizational and Instructional Support Practices

The U.S. Department of Education (USDOE) delineated six goals in 2014 to guide educators and educational policy: 1) postsecondary and adult education; 2) elementary and secondary education; 3) early learning; 4) equity in educational opportunities; 5) continuous improvement of the educational system; and 6) improvement of capacity within the department

(USDOE, 2014, p. 6). Several objectives related to the role of teacher quality and effectiveness were described as critical to the achievement of the six goals (see Appendix A). Strategic Objective 2.2 emphasized improvement in teacher preparation, recruitment, retention, development, support, evaluation, recognition, and equitable distribution of effective teachers and leaders. Objective 2.3 called for an increase in the success, safety, and health of students, particularly in high-need schools, and deepened family and community engagement (USDOE, 2014, p. 9).

Recently, most interventions aimed at improving instruction and creating favorable school climates were not focused directly on cultivating relationships between teacher and students, nor infusing preventive mental health strategies, but rather focused on student achievement accountability systems (Pianta, Stuhlman, & Hamre, 2002). However, the U.S. Department of Education made school discipline reform a top priority in 2016. According to the Office for Civil Rights (USDOE, 2016), the year 2016 recorded high levels of improvement in school discipline policies and practices through the *Investing in Innovation* (i3) program: i3 was designed to initiate and support innovative methods of disciplinary action as alternatives to suspension from class or school. The importance placed on school discipline led to *School Climate Transformation* grants (USDOE, 2016) to help states and districts strengthen behavioral supports for students. The *#RethinkDiscipline* movement (USDOE, 2016) also increased awareness of the detrimental effects of exclusionary discipline and the importance of implementing appropriate behavioral interventions and supports for students, especially students with disabilities. Behavioral and social-emotional supports implied much more than classroom and school discipline and included ways that the teacher could build relationships with each student in the classroom.

Hattie's (2012) meta-analysis research was based on more than 800 meta-analyses of approximately 50,000 research articles that included approximately 240 million students. More than 150,000 effect sizes were examined to identify the interventions teachers can make that have a significant impact on student learning. Hattie asserted that in order to make learning "visible," teachers must promote student learning of at least an average gain in learning (effect size = 0.40). He further explained that most classroom interventions that are implemented with any fidelity would demonstrate an effect size of 0.20; therefore, knowing the impact and recognizing the interventions that produce more substantial gains in student achievement is vitally important to educators and policymakers. According to Hattie's meta-analysis (2012), teacher-student relationships had a large effect size (0.72).

Hattie illustrated the importance of this impact with his 'barometer of influences.' When looking at a distribution of effects, he used an average effect of 0.4 as the 'hinge-point' for identifying actions that make an impact that is visible in student learning. Hattie's large-scale study and current trends in teacher development in the areas of social-emotional supports in the classroom point to the need for educators and researchers to quantify teacher-student relationships and their impacts on student health, development, and academic success (Hamre & Pianta, 2005).

School reform literature also points to many conditions affecting student success. In their research linking teacher support to student engagement, Klem and Connell (2004) used longitudinal data sets collected by the Institute for Research and Reform in Education to validate the *Research Assessment Package for Schools* (RAPS). The RAPS tools measure components of a self-system process model by surveying elementary and secondary students, teachers, and parents.

The self-system model describes connections between self-reported experiences of the teacher, student, and parents concerning social context, their self-system processes, patterns of action, and actual outcomes of performance. In the Klem and Connell study (2004), the *Student Performance and Commitment Index* (SPCI) was used to assess student achievement and behavior. The Institute for Research and Reform in Education (IRRE) developed this tool in response to school districts' needs for compelling and scientifically credible means to track student behavior and student performance from elementary through high school.

The Klem and Connell study (2004) examined initial data from a broader data sample of students in elementary, middle, and high schools in an urban school district. The researchers compiled survey data and student records from six elementary schools and three middle schools within an urban school district. Over the course of five years, records and surveys for both students ($n = 4,276$) and teachers ($n = 3,097$) were collected. The researchers defined and used a four-point Likert scale on the teacher surveys to measure teacher support and engagement, which was comprised of two components: ongoing engagement and reaction to challenge. Ongoing engagement referred to student behaviors, emotions, and thought processes during the school day, time students spent on work, the level of student attentiveness and effort, tendency to stay on task, and inclination to initiate action when given the opportunity. Reaction to challenge described the ways students reacted to and coped with adverse school-related events (p.262). Klem and Connell found that among the elementary students ($n = 1,846$) who reported high levels of engagement, 44% were likely to do well and 23% less likely to do poorly on the SPCI performance and attendance index. In contrast, students with low levels of self-reported engagement were 30% more likely to perform poorly on the SPCI (p. 266).

Similarly, 16% of middle school students ($n = 2,430$) in this study reached optimal levels on the SPCI, and 30% reached at-risk levels on the SPCI. Middle school students who reported high levels of engagement were more than twice as likely to perform well on attendance and achievement and were 67% less likely to perform poorly on the SPCI (p. 267). Klem and Connell (2004) acknowledged that the results of this study indicated that identifying the conditions under which students experience school can improve the direction of students' academic and social functioning. While these analyses offer evidence of relationships between student engagement and academic performance, teacher reports of student engagement tended to be stronger predictors of student academic success than student reports, perhaps due to variance in the measurement tool (p. 266). The teachers reported on observed behaviors, while students reported on both behaviors and emotion (p. 267). Nevertheless, the study points to important variables that can be mediated to improve student engagement and achievement.

Durlak, Weissberg, Dymnicki, Taylor, & Schellinger (2011) conducted a meta-analysis of 213 social and emotional learning (SEL) programs used by more than 270,000 students from kindergarten through twelfth grade. The SEL programs focused on the student's development of social-emotional skills, positive attitudes toward self and others, positive social behaviors, ways to address disciplinary conduct problems and emotional distress, and improvement in academic performance. The focus of the study did not concentrate on students with adjustment difficulties, but rather on the student body population at large. The researchers used four search strategies to secure a systematic, nonbiased, representative sample of both published and unpublished studies related to SELs. The researchers gathered relevant studies through computer searches, examined reference lists of each identified study, conducted manual searches in 11 journals from 1970 to 2007, contacted researchers who shared relevant work at national prevention and community

conferences and contacted organizations that promote youth development and social-emotional learning. The study compiled evidence of the effects of Social Emotional Learning (SEL) programming on students. The meta-analysis of 213 SELs revealed some remarkable trends. According to Durlak et al. (2011), SELs had a significant, moderate relationship on K-12 students' attitudes about self, others, and school ($p \leq .05$). The most substantial effect size was observed for social-emotional skill performance, such as identifying emotions from social cues, interpersonal problem solving, conflict resolution, and decision making ($ES = 0.69$). The authors reported that SEL programs are successful at elementary, middle, and high school and in urban, suburban, and rural schools. The authors also reported that the interventions could be integrated into the day-to-day practices of the classroom (p. 417). While this study of SELs does not specifically examine social-emotional learning and its relationship to academics, the authors point to the important role of students' attitudes. A noteworthy finding of this study included results based on a small subset of all reviewed studies; students participating in SEL programs earned an 11-percentile gain in academic achievement. Participating students demonstrated enhanced SEL skills, attitudes, and positive social behaviors following interventions, and academic performance was significantly improved from pre- to post testing ($p < .05$).

Hamre & Pianta (2005) conducted a longitudinal study of five- and six-year-old children who were identified as at-risk for school failure based on demographic characteristics including maternal education and the display of multiple functional problems such as behavioral, academic, attention, and social problems as reported by their kindergarten teachers. The researchers were interested in determining whether high levels of instructional and emotional support in the classroom would moderate young children's risk of school failure. The children included in this study took part in the National Institute of Child Health and Human

Development (NICHD) Study of Early Child Care (NICHD, 2003). The parents of these children were recruited from hospitals around Little Rock, Arkansas; Irvine, California; Lawrence, Kansas; Boston, Massachusetts; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Charlottesville, Virginia; Morganton, North Carolina; Seattle, Washington; and Madison, Wisconsin (p. 954). From the original sample of 1,364 children, 910 children had complete data and were included in the study. The 910 students were strategically placed in first-grade classrooms with teachers who offered strong instructional and emotional support. Student achievement was assessed using the *Woodcock-Johnson Psycho-Educational Battery-Revised* (WJ-R) (Woodcock & Johnson, 1989); relational functioning was evaluated using the *Student-Teacher Relationship Scale* (Pianta, 2001); and classroom instructional processes were assessed using the *Classroom Observation System for First Grade*[®] (CLASS[™]) (NICHD, 2002b). The CLASS[™] was used by researchers to rate the classroom teacher on a 7-point rating scale during an approximately 3-hour morning observation. The *Preschool (PreK) CLASS*[™] dimensions included over-control, positive emotional climate, negative emotional climate, effective classroom management, literacy instruction, evaluative feedback, instructional conversation, and encouragement of child responsibility (Hamre & Pianta, 2005). The researchers then examined the kindergarten students' 1) reading scores (letter-word identification and word attack), 2) mathematics scores (applied problems), 3) cognitive assessments of long-term and short-term memory, 4) auditory processing, and 5) comprehensive knowledge. In the spring term, these scores were compared to the same scores of first-grade, at-risk students placed in less supportive classrooms. The results of the study indicated that neither instructional nor emotional support variables of the CLASS[™] were significantly related to student achievement

among these high-risk first-grade students, whether in greater supportive or lesser supportive environments.

Hamre and Pianta (2005) also defined two central categories of student risk for early school failure as *demographic* (low maternal education) and *functional* (behavioral, social, and academic). Interactions between maternal education, functional risk status, and each of the classroom support variables were entered into an Analysis of Covariance (ANCOVA) model to determine interactions between and within variables. The results of the analyses found that students whose mothers had less than a 4-year degree and who were placed in classrooms with teachers who provided moderate to high instructional support demonstrated achievement in the first grade equal to their peers whose mothers had more education. Dissimilarly, first-grade students with high demographic risk who were placed in low instructional supportive classrooms achieved significantly less than their peers ($p < .01$) who were considered low demographic risks (Hamre & Pianta, 2005, p. 960). Hamre and Pianta explained, “For children who struggled in the prior year, their risk of developing conflictual relationships with teachers in the first grade are moderated by the quality of emotional support they received within their first-grade classrooms” (p. 962). The researchers contend that a key indicator of positive school success apart from academic achievement is students’ ability to develop stable, affirmative relationships with teachers who demonstrate characteristically low levels of conflict in the classroom and who were good classroom managers (Hamre & Pianta, 2001). The researchers further hypothesized that these low-conflict students would not only have more positive school experiences, but they would also be more likely to remain at a low level of conflict in the future. Hamre & Pianta stated, “Children who are able to successfully navigate early social environments in school get

off to a better start and continue to profit from their social knowledge and experience as they progress through elementary and middle school” (2001, p. 625).

Teacher and Student Relationships

Research studies dealing with teacher-child relationships tend to reflect typical developmental changes such as the internalization of social models and the shift from adult-control to the student’s self-control of behaviors (Bowlby, 1969; Geddes, 2003; Jerome, Hamre, & Pianta, 2009; Klem & Connell, 2004). Jerome, et al. (2009) found that the quality of teacher-student relationships were related to student growth in the early academic years, and the experience and characteristics of those critical interactions carried over into preadolescence. The researchers suggest that, with this knowledge, the placement of at-risk students with knowledgeable and willing teachers who are intentional in forming close and supportive relationships with students is imperative.

An oft-cited meta-analysis conducted by Hattie (2012) identified 150 influences on early childhood, elementary, and high school student achievement across all grade levels (p. 13). The results of the meta-analysis found that classroom climate was a significant factor ($p < .01$) in promoting learning, and teacher-student relationships ranked 12th out of 150 (effect size = .72). Hattie stated, “There is a certain mindfulness by teachers in the classroom about how what is happening and what is likely to happen can affect the flow of learning for each student” (p. 77). Hattie reported that when students can evaluate the classroom climate and determine the class as safe enough to say, “I don’t know,” then there is a high level of trust (p. 77), and the students believe the teacher will listen to them. Hattie further noted that a precondition of learning is a positive and respectful classroom climate and a sense of caring and regard from the perspective

of the students. These results align with Maslow's theory of psychological development and needs.

Marzano's (2007) meta-analysis echoes Hattie's findings. Marzano found that teacher-student relationships had an effect size of -0.87; the negative direction of the effect size indicated a decreased instance of student disruptions when there was an increase in teacher-student relationships. The -0.87 effect size was also associated with a 31 percentile point decrease in student disruptions. Marzano ascertained that when the relationship between the teacher and student is good, everything else that occurs in the classroom tends to be enhanced.

Hamre and Pianta (2001) conducted a longitudinal study using a non-randomized sample of 179 of 436 kindergarten students in a small city school district. The sample included only those students who remained in the district through the eighth grade. The purpose of the study was to examine whether kindergarten teachers' perceptions of their relationships with students predicted a range of student academic outcomes in lower elementary (grades 1-4), upper elementary (grades 5 and 6), and middle school (grades 7 and 8). When children entered kindergarten in this district, they were administered a school screening that included cognitive development assessments. Extensive longitudinal academic and behavioral data were collected over time, including language arts and mathematics grades, standardized test scores, observations of student work habits, disciplinary reports, and results of teacher questionnaires. Cognitive development at kindergarten entry was measured by the vocabulary subtest of the *Stanford-Binet Intelligence Scale-Revised Fourth Edition*[®] (ISB-FE) (Thorndike, Hagen, & Sattler, 1986). In May, the kindergarten teachers completed a 38-item *Teacher-Child Rating Scale* (TCRS) (Hightower, 1986) to rate each student's classroom behaviors. The subscales included student conduct problems, learning problems, shy/anxious problems, frustration tolerance, work habits,

assertive social skills, and peer sociability. The kindergarten teachers also completed the 28-item *Student-Teacher Relationship Scale* (STRS) (Pianta, 2001) for each student to assess teachers' perceptions of their relationships with each student in the kindergarten class. The researchers examined the correlations between each kindergarten teacher's ratings of the quality of teacher-student relationships with each student and each student's academic and behavioral performance through eighth grade. Bivariate associations between kindergarten teachers' ratings of their relationship with each student and the student's behavioral and academic functioning through the eighth grade were analyzed. Hierarchical regressions were conducted on each academic and behavioral outcome measure to assess the extent to which kindergarten teacher ratings of the quality of the relationship with each student contributed uniquely (Hamre & Pianta, 2001). The researchers found that the quality of the teacher-student relationships in kindergarten was a strong and significant predictor ($p < .05$) of both behavioral outcomes and academic success in eighth grade. In addition, a significant correlation existed ($p < .01$) between kindergarten teachers' perceptions of negative relationships and the subsequent ratings of work-habit ratings of upper elementary students who were in the top third of teacher-rated behavior problems. In other words, conflict and dependency ratings by kindergarten teachers and later student disciplinary problems were strongest for those children who struggled with behavioral problems in kindergarten. The researchers also found that teacher-student conflict and teacher dependency in kindergarten were significant predictors ($p < .001$) of work-habit marks in lower elementary for the top third of kindergarten teachers' students with problem ratings in lower elementary school (p. 632). Hamre and Pianta's (2001) research revealed that children's capacity for building relationships with kindergarten teachers was highly predictive of future academic and emotional behavior, especially when children had negative relationships with

teachers. Relationships marked by conflict between teachers and students and over-dependence of students on the kindergarten teacher were significant predictors ($p < .05$) of a wide array of academic and behavioral issues (p. 634) later in the children's school years. Results of this study suggested that early teacher-student relationships were significant predictors of both behavioral and educational outcomes in early elementary school as well as moderate predictors in middle school. The quality of teacher-student relationships in kindergarten was a strong predictor of behavioral and academic student outcomes. These findings are similar to those of other researchers on the importance of social adjustment to student academic performance (Allen, et al., 2013; Pianta, 2002; Jennings & Greenberg, 2009).

Gregory and Ripski's (2008) study found that the link between teachers' relational approach to discipline and low student defiance was mediated by the students' perceptions of teacher trustworthiness. According to Gregory & Ripski, school-wide Positive Behavioral Support (PBS) and other social-emotional learning programs have been effective in lowering office referrals in elementary schools; however, the authors reported that research comparing the developmental appropriateness of PBS for young children versus adolescents was not common. The researchers conducted a study of high school students who were referred to an in-school suspension program for defiance of teacher authority. The 53 students who had received at least one defiance referral were asked to participate; 32 students and their parents agreed to participate in the study. The students were from an urban high school with a diverse student population of 2,882 students. The 32 teachers included in this study had instructional experience ranging from 1 to 40 years of teaching, with an average of 12 years (Standard Deviation = 11). An innovative selection process was needed to identify the teachers in this study: for each student that was sent out of class, the referring teacher was asked to participate; each referred student then nominated

a different teacher with whom he or she had a positive relationship. Of the 32 teachers included in the analysis, 14 were referring teachers, and 18 were nominated teachers. Both the referring and nominated teachers completed a survey on student behavior and participated in an interview that asked for a description of each teacher's typical discipline problems and ways that infractions were addressed. All the teachers also rated the behaviors of the 32 referred students on a subscale of the *Swanson, Nolan, and Pelham* measure (SNAP-IV) (Gregory & Ripski, 2008). The SNAP-IV has eight items using a four-point scale to rate items such as the frequency that the student "defied adult request" and "does things deliberately to annoy people." The SNAP-IV also includes a measure of student cooperation using items such as "works only as hard as necessary to get by" and "concentrates on doing his/her work in my class." The 32 high school students in this study who were referred for defiant behavior also completed survey items from Tyler and DeGoey's (1995) scale measuring belief in government and authority. Students rated their own defiant and cooperative behaviors in the classroom of the nominated teacher with whom the students felt there was a cooperative relationship; in addition, the students rated their defiant and cooperative behaviors in the classroom of the referring classroom teacher. The results of correlation analyses indicated that teacher and student reports of defiance were significantly correlated ($r = .46, p < .01$) as were teacher and student reports of cooperation ($r = .52, p < .01$). The researchers found that students in this sample viewed themselves as cooperative and engaged in the classes of teachers who focused on building relationships to reduce discipline problems. Student trust was significantly correlated to the relational approach and low defiant behavior ($p < .01$) among these high school students. Gregory and Ripski (2008) stated, "Teachers who consider relationships with students important for their classroom

discipline are more likely to have greater trust and cooperation from students who have a history of disciplinary infractions” (p. 349).

Roorda et al. (2011) completed a meta-analysis of positive and negative aspects of teacher-student relationships, engagement of students, and student achievement. The sample consisted of 92 articles, including primary and elementary-aged student sources ($k = 63$) and secondary-aged student sources ($k = 31$) that described 99 studies conducted from 1990 to 2011 from preschool to high school. Nearly 130,000 students ($n = 129,423$) were included in the analysis, with sample sizes ranging from 42 to 39,553. The goal of this meta-analysis was to generate specific information on teacher-student relationships (TRS) by focusing on subsets of both teacher behaviors and student outcomes. Student academic engagement and achievement were outcome variables in the study. The overall results of the meta-analysis revealed that positive TSR ratings were more important for children who were academically at risk, from low socioeconomic backgrounds, or who have learning difficulties.

In contrast to trends found previously in this literature review, TSR ratings were considered more powerful for older students than younger students, even into late adolescence (p. 520). The researchers found that while positive TSR ratings were related to lasting implications for older students, negative aspects of TSR ($r = -.32, p < .01$) were strongly related to impact on primary students (p. 510). The authors concluded that these findings might be due to developmental shifts in the two relationships; positive TSR may be more important for school adjustment of younger students, and positive affirmation may be more important for adolescents.

Although positive teacher-student relationships are vital, they alone are not sufficient to improve students’ learning behaviors and achievement. Other teacher influences such as quality of instruction, types of instructional support structures, student-student relationships, and student

autonomy also play a substantial part in promoting student learning (Flook, & Repetti, & Ullman, 2005; Hamre & Pianta, 2001). While teacher to student relationships are impactful, so are student-to-student relationships, both positive and negative. Peer acceptance in the classroom is a legitimate concern (Flook et al., 2005).

Flook et al. (2005) conducted a three-year longitudinal study of child and family development; the researchers followed the parents and fourth-grade students from one parochial school and two public schools in a large metropolitan area. Cohorts of fourth-grade students were recruited for this study for each of the three years. A total of 667 fourth-grade students were invited to participate; the final sample size was 248 students (37%). Teachers' reports of student behavior, student perceptions about themselves, and report cards were used to examine predictor, mediator, and outcome variables. A five-point Likert scale was used by the teachers to assess eight items concerning peer acceptance of their students. The six-item Academic Competence (AC) subscale of the *Self-Perception Profile for Children* (SPPC) (Harter, 1985) was used to measure the students' perceptions of their academic capabilities in fourth- and fifth-grades. In the Academic Competence subscale, the students rated which of two statements best described them. The items were scored from one to four; higher scores on the AC reflected students' positive evaluations of their academic abilities. The *Teacher Report Form* (TRF) (Achenbach, 1991) from the *Internalizing Syndrome* scale served as an indicator of the fourth and fifth-grade teachers' assessment of their students' psychological well-being. The TRF consisted of 26 items that described complaints and withdrawn, anxious, depressed, or worried feelings exhibited or expressed by the students. The students' academic performance in fourth, fifth, and sixth grades was assessed by their achievement in reading and mathematics as conveyed on their report cards. Because schools assigned grades in different ways, the report

card grades were standardized to z scores within each school and cohort to a mean of 0 and a standard deviation of 1 (p. 321). The results of the analyses indicated significant associations between fourth-, fifth- and sixth-grade peer relations and academic performance in ELA and mathematics. Less peer acceptance in the classroom was consistently associated with poorer academic performance ($p < .01$) (p. 322). Flook et al. found that a lack of peer acceptance in the fourth grade significantly predicted academic decline and poor academic performance in the sixth grade (unstandardized coefficient = $-.45$, $p < .05$). Students who were perceived by the teachers as lacking acceptance by peers demonstrated poorer academic performance than students perceived as having high peer acceptance. Further analysis revealed that academic achievement was correlated to the students' academic concept of self as reported on the SPPC (unstandardized coefficient = $-.16$, $p < .05$) (p. 324).

The Flook et al. (2005) study emphasizes the need for teachers to intervene on behalf of students who suffer from social problems and lack of peer acceptance in the classroom. Ignoring the issues of the learning environment can lead to long-term consequences for students; teachers must be prepared to manage student behaviors to create optimal learning environments skillfully. The results also relate to those of Marzano, Marzano, and Pickering (2003) who reported that when K-12 teachers lack the personal resources to manage the social and emotional contexts of their classrooms efficiently, students display lower levels of appropriate or on-task behavior and performance. Moreover, middle school students who are not self-regulated and who are disruptive experience less time-on-task, have lower than average grades and achieve less than their grade level peers on standardized reading and mathematics tests (Flook et al., 2005).

Hoffman, Huchinson, and Reiss (2005) conducted a study of more than 200 teachers in preschools through sixth-grade in four elementary schools and four early childhood centers in

Florida who signed up for *Conscious Discipline*[®] (Bailey, 2015) training. These teachers attended a one-day overview and training sessions once a month for seven months over the course of one academic year. Four different educators employed by Dr. Becky Bailey presented one new *Conscious Discipline*[®] (CD) skill each month. The workshops' focus was on the acquisition of the basic skills related to teacher self-control that would lead to actions to resolve conflicts and enhance emotional intelligence in the classroom (p. 8). Between presentations of each new skill, the teachers attending the training sessions practiced the skills in their classrooms with their students. Pre-kindergarten through sixth-grade teachers ($n = 206$) from four elementary schools and four early childhood centers with no exposure to the *Conscious Discipline*[®] workshops were initially asked to answer a survey about their school climate and their classroom management methods. The survey was adapted from the Development Studies Center (Battistich, Solomon, Watson, & Schaps, 1997). The survey employed 15 teacher-sense-of-school-community items, interspersed with an additional 30 questions specifically addressing the objectives and target outcomes of *Conscious Discipline*[®]. After eight months of training and implementation, the teachers who completed the training ($n = 117$) completed the post-survey in order to assess attitudinal changes. The pre/post survey consisted of 39 student-sense-of-school-community items, with an additional 30 questions directly addressing the objectives and targeted outcomes of *Conscious Discipline*[®]. The purpose of the survey was to determine whether the *Conscious Discipline*[®] workshops changed teachers' classroom management approaches over time. The desired outcome was to wean teachers away from reliance on tangible rewards toward their fostering of students' intrinsic motivation to conduct themselves appropriately, to acquire new learning, and to excel. The discriminant analysis of the self-reported survey results revealed significant improvements in teachers' perceptions of their knowledge and use of new classroom

management techniques ($p < .05$) and their perceptions of overall school climate ($p < .05$). The results of the discriminant analyses revealed that improvement in mutual support among teachers ($r = .306$) and improvement in student/teacher relationships ($r = .325$) were related ($p = .13$). In other words, the teachers who completed the *Conscious Discipline*[®] training felt more positive about school climate than they did prior to attending the training. Preliminary analyses revealed that the group of teachers who were not exposed to the *Conscious Discipline*[®] workshops were less aware of social relationships and the cultural precepts emphasized in training such as releasing external control, embracing conflict resolution, and implementing a more emotionally targeted reward system. Teachers who participated in the CD training also reported that their CLASS[™] evaluation scores were higher in the areas of positive discipline and positive emotional climate and that they felt better about those aspects of the school climate than the teachers who were not trained ($p = .2$). These results align with Erickson's humanistic approach to emotional development in which the adult is supportive and understanding of children's feelings, motives, and actions, and focused on problem-solving rather than punishment.

The study by Hoffman et al., (2005) provided important evidence that the more closely the teachers adhered to the tenants of *Conscious Discipline*[®], the greater the quality of interpersonal interactions within the school community. This research suggests that educators should closely examine the impact of the current use of external reward systems that rely on rewards and punishments and review alternative classroom management options that focus on building relationships.

Measuring Teacher Support

A single test score on a student assessment, independent from other measures, will not provide information for a teacher to determine whether the instruction, organization, or climate

of the classroom may need to change, nor will student assessment scores offer professional guidance to support and improve practice. Documenting teachers' effectiveness through a fair and valid approach has been a challenge for states and districts across the country as educational reforms were implemented. As discussed by multiple researchers (Allen et al., 2013; Blazer, Braslow, & Charalambos, 2015; Garrett, & Steinberg, 2015; Hafen et al., 2015), many of the newer systems of teacher evaluation currently include value-added (VAM), student learning outcomes (SLOs), student reports, and classroom observations. However, according to Garrett and Steinberg (2015), more than two-thirds of educators nationwide teach in subjects or grade levels that are not assessed by state-mandated student achievement tests. Many educational reformers suggest that the real purpose of an observation-based evaluation of teacher performance should be to provide instructional support and a means to assess teacher effectiveness. Garrett and Steinberg (2015) found that traditional measures of teacher performance such as tenure or educational attainment did not correlate with student achievement directly. The belief that teachers are more reliably evaluated when multiple measures are incorporated into teacher performance evaluations is widely accepted (Garrett & Steinberg, 2015; Kane & Staiger, 2012).

Several classroom observation instruments have been developed to assess teacher effectiveness. The *Protocol for Language Arts Teaching Observations* (PLATO) (Grossman, Loeb, Cohen, & Wyckoff, 2013) and the *Mathematical Quality of Instruction* (MQI) (Hill, Blunk, Charlambous, Lewis, Phelps, Sleep, & Ball, 2008) were developed to focus on the teaching of specific content, while the *Frameworks for Teaching* (FFT) (Danielson, 1996) and the *Classroom Assessment Scoring System*[™](CLASS[™]) (Pianta, Hamre, & Mintz, 2012) were designed to assess general teaching practices. The teaching practices typically measured include

instructional pedagogy, behavior management, classroom organization, and teacher-student interactions (Blazer, Braslow, & Charalambos, 2015). Kane and Staiger (2012, p. 2) asserted the importance of understanding that proper tools must be used correctly to be useful when observing teacher-student interactions. While observations typically play an essential role in the evaluation of teacher performance and are a system of providing meaningful feedback, if the observation tool is not used with fidelity and is implemented poorly, observations and feedback will have little benefit to the teacher or the students.

While the importance of teachers' emotional support of young students and understanding of attachment theories is evident in early education classrooms (Ladd et al., 1999), adolescents are also in need of strong social-emotional relationships with adults. Regardless of their ages, students need a supportive adult who can provide secure, understanding relationships. Allen et al. (2013) asserted that positive classroom environments are not "niceties" in a well-designed classroom in which students are successful. Instead, the researchers suggested that a positive classroom environment is a critical predictor of adolescent achievement, regardless of the subject being taught.

According to Pianta et al. (2012), developmental theory and research suggest that interactions between students and adults are the primary mechanisms of student development and learning (p. 1). The current study supports the research of Bronfenbrenner and Morris (1998) that daily interactions between children and adolescents with their peers and teachers drive learning and development.

The *Classroom Assessment Scoring System*[™] (CLASS[™]) tool was utilized to measure teacher support behaviors in the current study. Pianta, LaParo, and Hamre at the University of Virginia initially developed the CLASS[™] teacher observation tool in 2008. The CLASS[™] tool

was initially developed as a result of research conducted by the National Institute of Child Health and Human Development (NICHD) as part of a longitudinal study that began in 1991 (Hamre & Pianta, 2001). The NICHD research study followed a cohort of more than one-thousand children from infancy to age 15 to determine the elements of classroom environments and processes that were most important for the development of children from a variety of backgrounds. The CLASS™ was designed to capture aspects of effective teaching that are most closely aligned with students' positive social-emotional and academic outcomes.

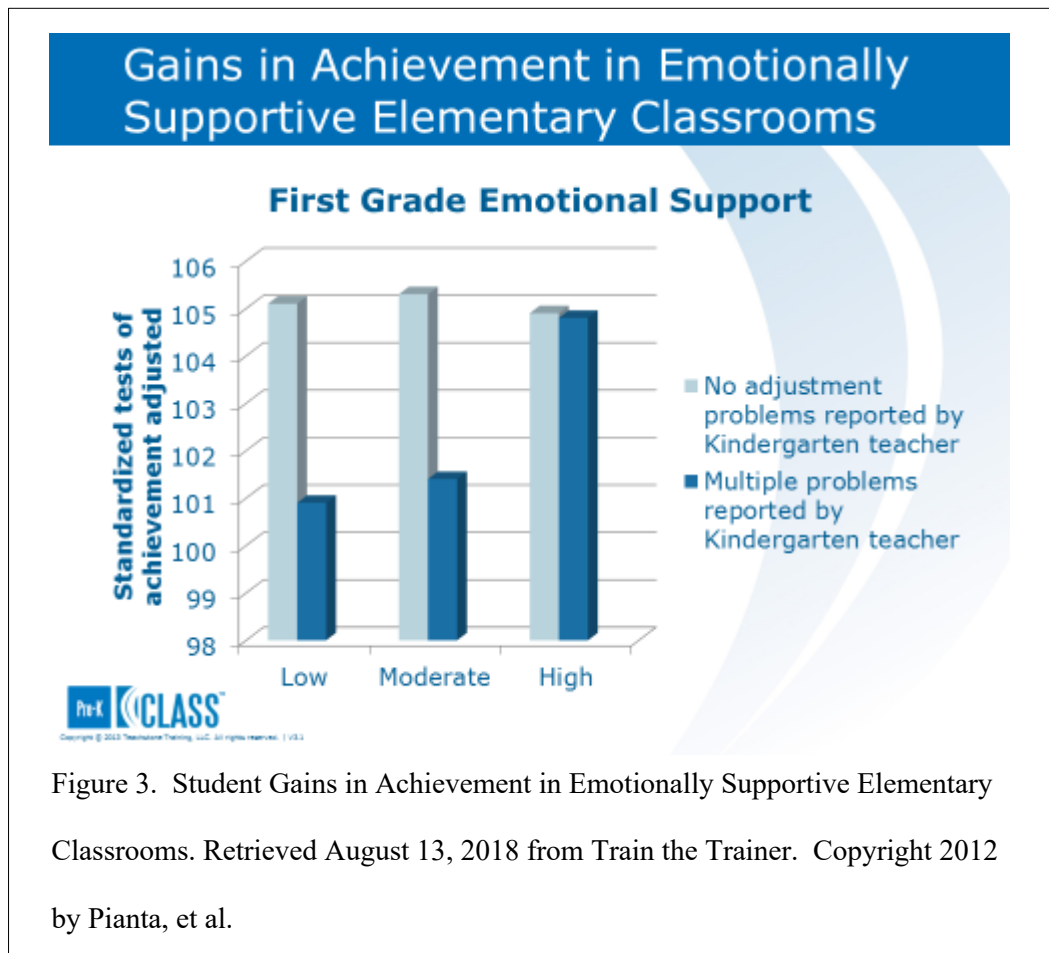
Evidence suggests that CLASS™ scores that are rated by trained, certified observers are highly reliable (Pianta et al., 2012). Reliability refers to the degree to which the tool is free from a random error associated with the process of measuring the constructs of interest. Each certified CLASS™ observer must attend a rigorous two-day training with specific training materials that provide potential observers with a clear and comprehensive understanding of the observation instrument's purpose and procedures. As part of the training, participants watch multiple videotaped segments that are consensus-coded by master CLASS™ coders. Potential raters must take a reliability exam at the end of the course in which they watch and code classroom segments and must achieve interrater reliability within 1 point of the master codes, or 87% congruency.

The CLASS™ observation tool demonstrates validity and reliability and is widely used to measure the effectiveness of teachers in early childhood through fifth-grade classrooms. Further evidence of the validity and reliability of the CLASS™ observation tool will be presented in the instrumentation section of chapter three.

CLASS™ measures the quality of teachers' social interactions and instructional intentionality with students but does not measure the presence of materials, specific curricula, or the physical environment. The CLASS™ tool has recently been further extended (CLASS-S™) to

include secondary classroom observations with specific dimensions within each domain for classroom interactions that are appropriate for the age and developmental needs of students beyond elementary grades.

According to the CLASS™ technical manual provided by Pianta et al. (2012), when elementary teachers scored high on CLASS™ observation measures, their students with adjustment problems (such as the inability to sustain attention, problems externalizing behavior, and poor performance on standardized tests) demonstrated academic growth and actually narrowed the achievement gap between children with identified risk factors and those without identified risk factors. As shown in Figure 3, Pianta et al. (2012) examined the ways that emotional support in first-grade classrooms was related to students' scores on standardized tests of achievement.



The researchers then compared the academic achievement of first-grade students who demonstrated a few problems in kindergarten to those with multiple adjustment problems. Their findings are summarized below (Pianta et al., 2012); however, significance values were not presented in the technical manual.

- When Emotional Support was low, there were significant differences between the first-grade success of students with no problems and those with numerous problems.
- When Emotional Support was moderate, students who had problems previously continued to demonstrate low achievement.
- When Emotional Support was high, students who had problems the previous year achieved at a level similar to their peers with no previous issues.
- In first-grade classrooms that provided low to moderate Emotional Support, students who demonstrated adjustment difficulties in kindergarten earned significantly lower achievement scores than those who did not have difficulties in kindergarten.
- In classrooms with high levels of Emotional Support, students who demonstrated previous adjustment difficulties achieved at a level similar to their peers who did not have such adjustment difficulties.

These findings have important implications for the current research study. This researcher hypothesized that the teachers' levels of emotional, organizational, and instructional support play vitally important roles in the achievement of fifth-grade students.

Summary

This chapter's review of theory and related research indicates that the relationships between students' behaviors, child development, the academic environment, and teacher support behaviors have important implications for students' academic success. Historically, classroom management and discipline were key areas of research; more recently, teacher-student interactions and their relationships to achievement have moved to the forefront of research studies. Students' positive emotions concerning learning and completing schoolwork are of paramount importance for both academic achievement and, ultimately, graduation (Klapp, 2016). Cooperative relationships between teachers and students often lead to students' being actively engaged in academic tasks and are essential to the functioning of an orderly classroom (Gregory & Ripski, 2008). Parents and teachers must be aware of the role that social experiences play in students' academic functioning. The unique social climate of a school provides context for students' psychological, social, and emotional adjustment and academic performance, and must not be ignored (Flook et al., 2005). The theoretical underpinnings of this literature review point to the profound connections between social, emotional, and cognitive development. The necessity for teachers to understand the child and adolescent development is critical to meet the social, emotional, and academic needs of their students. The current study adds to the body of knowledge regarding the influences on academic achievement. The method utilized in the present study is described in chapter 3, which follows.

III. METHODOLOGY

The purpose of this study was to explore the relationships between fifth-grade teachers' support behaviors as measured by the CLASS™ and achievement of fifth-grade students in English language arts (ELA) and mathematics. The study sought to examine the relationships between the composite, domain, and dimension scores of the CLASS™ and fifth-grade student achievement in ELA and mathematics. This chapter presents the research methods used to conduct this study and to address the research questions and hypotheses.

Research Questions and Hypotheses

Q1: Is fifth-grade teacher effectiveness as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

Q2: Are fifth-grade teachers' support behaviors as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

H₁: The CLASS™ Composite score (total score of Emotional Support, Organizational Support, and Instructional Support domain scores) is significantly correlated to fifth-grade students' achievement in ELA as measured by standardized summative assessments.

H₂: The CLASS™ Composite score (Emotional Support, Organizational Support, and Instructional Support domain scores), is significantly correlated to fifth-grade students' achievement in mathematics as measured by standardized summative assessments.

H₃: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in ELA as measured by standardized summative assessment.

H₄: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in mathematics as measured by standardized summative mathematics assessments.

H₅: The dimension scores of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative ELA assessments.

H₆: The dimensions of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative mathematics assessment for the fifth-grade.

Research Design

The study's research design was a non-experimental, correlational exploration of archival data extracted from the Measures of Effective Teaching (MET) database. Correlational and predictive models were conducted to determine relationships between teacher support behaviors as measured by the CLASS™ and fifth-grade student achievement in mathematics and ELA as measured by standardized summative assessments. Gay, Mills, and Airasian (2012) define multiple regression as a mathematical model for anticipating the effect of two or more variables that predict a criterion variable. This study also examined whether significant relationships existed between fifth-grade student achievement in ELA and mathematics and dimensions (indicators) of teacher social-emotional supports in the classroom. The independent variables in

this study were teacher support behaviors as measured by the CLASS™ composite, domain, and dimension scores of fifth-grade teachers. The dependent variables consisted of fifth-grade student achievement *z* scores on standardized summative assessments of ELA and mathematics.

Instrumentation

According to the technical manual for the CLASS™ (2013), a comprehensive literature review and data from large-scale classroom observation studies were analyzed and used as a basis for the development of the CLASS™ (Allen, J., Gregory, A., Mikami, Lun, Hamre, & Pianta, 2013). The three CLASS™ domains of Emotional Support, Classroom Organization, and Instructional Support were derived from the examination of constructs assessed in classroom observational instruments and used in focus groups, educational study, and extensive pilot studies to determine construct and content validity and reliability (Allen et al., 2013). Each of the three CLASS™ domains was further broken down into specific dimensions and indicators of teacher-student interactions. The CLASS™ is considered a valid and reliable instrument for evaluating teacher behaviors and instruction for teacher growth and development (Allen et al., 2013).

The typical primary use of the CLASS™ involves observation by a trained administrator, peer teacher, or researcher, and the results are used as a catalyst for discussion of strengths and weaknesses of teacher interactions with students for continuous improvement and development. CLASS™ composite, domain, and dimension scores are based solely on the verbal and nonverbal interactions between students and teachers (Pianta et al., 2012).

Teacher-student interactions are grouped into three broad domains: Emotional Support, Classroom Organization, and Instructional Support. Within these domains are 11 dimensions that are subdivided into clear, specific, and observable behaviors. To complete a classroom

observation, the observer assigns a code on a Likert scale from 1 to 7 for each dimension using detailed descriptors of low-, mid-, and high-ranges. The scores from each dimension are then summed and averaged to obtain three domain scores; domain scores are then summed to determine the overall composite score as a measure of effective teaching.

Validity of the CLASS™

A confirmatory factor analysis of the CLASS™ was conducted by Pianta et al. (2012) based on three major studies that utilized the instrument. The first of these studies was the *Secondary My Teaching Partner™ Study (S-MTP™)*. This study was an innovative professional development program using collaborative consultation processes derived from the secondary CLASS™ manual and web-based resources (Allen et al., 2013). The second major study was the *Measures of Effective Teaching Study (MET)*, which was a research partnership of academics, teachers, and education organizations dedicated to investigating better ways to identify and develop effective teaching (Bill and Melinda Gates Foundation). The third major study was the *Understanding Teaching Quality in Algebra Study (UTQ-A)*, which studied the potential of a classroom observation system as an evaluation tool to help principals and teacher leaders give actionable and meaningful feedback, specifically in algebra classrooms (Casabianca, Lockwood, & McCaffrey, 2014).

The results of the discriminant analysis by Pianta, et al. (2012) (see Table 1) revealed that a three-factor model fit the data well, and all factor loadings were .73 or higher (p. 116). In addition, Cronbach alpha statistics for each domain and dimension indicated that the CLASS™ domain had strong internal consistency (reliability).

Table 1

Confirmatory Factor Analysis Results of the CLASS™

Domain/Dimension	Secondary MTP <i>n</i> = 78	MET <i>n</i> = 1333	UTQ-A <i>n</i> = 82
Emotional Support	Factor Loading		
Positive Climate	.83	.85	.91
Teacher Sensitivity	.94	.86	.97
Regard for Student Perspectives	.79	.77	.75
Internal consistency (Cronbach's alpha)	.87	.87	.90
Classroom Organization	Factor Loading		
Negative Climate	.82	.81	.80
Behavior Management	.95	.96	.96
Productivity	.89	.85	.78
Internal consistency (alpha)	.88	.90	.86
Instructional Support	Factor Loading		
Instructional Learning	.83	.79	.93
Formats	.81	.76	.90
Content Understanding	.79	.77	.73
Analysis and Problem Solving	.91	.84	.85
Quality of Feedback			
Internal consistency (alpha)	.88	.92	.91

Note. Reprinted with permission from *Classroom Assessment Scoring System Upper Elementary*

Manual (p. 117), by Pianta et al. (2012), Charlottesville, VA. Teachstone. Copyright (2012) by

Robert C. Pianta, et al

Reliability of the CLASS™

Reliability refers to the degree to which a tool is free from a random error associated with the process of measuring the construct of interest. Pianta et al. (2012) reported that CLASS™ scores assigned by trained, certified observers were highly reliable. In the reliability studies of the CLASS™ conducted by Pianta, et al. (2012), when two different observers coded the same cycle, they consistently assigned scores within one point on the seven-point scale. Inter-rater reliability was at the moderate to high levels of agreement; in addition, observers achieved the exact, same coding approximately 30% of the time. According to Pianta, et al., trained observers consistently rated observations within 1 point 64% to 98% of the time. Table 2 displays the means and inter-rater reliability scores of observers who rated secondary teachers in the *Secondary My Teaching Partners Study*.

Table 2: Means and stability of Fall and Spring CLASS™ Raters' Scores in Secondary MTP Classrooms (n = 78)*

	Fall	Spring	Correlations between Fall and Spring
Positive climate	4.22	4.26	.49
Negative Climate	1.31	1.48	.34
Teacher Sensitivity	4.59	4.43	.48
Regard for Student Perspectives	3.40	3.49	.44
Behavior Management	5.22	5.34	.49
Productivity	5.15	5.06	.47
Instructional Learning Formats	4.27	4.18	.45
Content Understanding	3.64	3.65	.26
Analysis and Problem Solving	3.06	3.04	.26
Quality of Feedback	3.82	3.84	.47

*All correlations were significant ($p < .001$)

Note. Reprinted with permission from *Classroom Assessment Scoring System Upper Elementary Manual* (p. 118), by Pianta et al. (2012), Charlottesville, VA. Teachstone. Copyright (2012) by Robert C. Pianta, Bridget K. Hamre, and Susan Mintz.

Measures of Teacher Support

The CLASS™ was used by the MET researchers at the University of Michigan to assess emotional, organizational, and instructional support of a stratified random sample of fifth-grade volunteer teachers ($n = 70$). MET raters were trained to achieve high inter-rater reliability.

About 70 percent of the observers (raters) held a bachelor's degree or higher. The raters were

required to 1) participate in discussions about the instrument, the competencies, and performance levels; 2) view and score video examples of teaching for each competency at each performance level; 3) practice scoring videos with feedback from trainers; and 4) review techniques for minimizing rater bias. Once the raters were considered “calibrated,” they then completed, scored, and reported four CLASS™ observations of teachers using videotaped 20-minute lessons (Kane & Staiger, 2012). These data were compiled in the MET database and were subsequently used in the current study.

Measures of Student Achievement

In the current study, z scores on state-sponsored summative (end of the year) assessments as reported in the MET database were used to measure student achievement in ELA and mathematics. MET researchers converted the student achievement scores to z scores in order to compare student achievement from a diverse sample of students from different state-sponsored assessments, school districts, and states. Z scores are advantageous because they allow scores from different tests to be compared across individuals. Z scores are standard scores used to express how far a score is from the mean regarding standard deviations (Gay, et al., 2012). Z scores range from -4 to +4, with a mean of zero. A z score that is +1.00 or -1.00 is one standard deviation above/below the mean respectively.

Data Collection and Sample

After approval from the Southeastern University Internal Review Board (IRB), the researcher applied for and received permission to purchase and access the *Measures of Effective Teaching Longitudinal Database* using an online portal. The current study’s sample included all fifth-grade teachers ($n = 70$) from among the 1,148 volunteer teachers in the MET database and all 70 fifth-grade students with ELA and mathematics assessment scores. The researcher

extracted the CLASS™ composite, domain, and dimension scores for the fifth-grade teachers to serve as the independent variables. Fifth-grade student achievement *z* scores in ELA and mathematics from 2010 state-sponsored standardized summative achievement measures were extracted from the MET database by the researcher to serve as the dependent variables in the study.

Data Compilation

The CLASS™ composite and domain scores were derived from four or more different observations by MET researchers for each of the fifth-grade teachers in the study's sample ($n = 70$). Composite and domain scores of all CLASS™ observation scores of the 70 fifth-grade teachers were averaged by the researcher to obtain a single composite score and each of the three domains. The researcher also averaged CLASS™ dimension scores from the four teacher observations for each of the four dimensions within the Emotional Climate domain (Positive Climate, Negative Climate, Teacher Sensitivity, and Regard for Student Perspectives).

Average scores were also computed in the same manner on the three dimensions of the Organizational Climate domain (Behavior Management, Productivity, and Instructional Learning Format) and the five dimensions of the Instructional Support Domain (Content Understanding, Analysis/Problem Solving, Feedback Quality, Instructional Dialogue, and Student Engagement). Thus, a total mean score for each domain and each dimension was computed in addition to the composite CLASS™ score.

These averaged CLASS™ scores served as the independent variables in the study. The two dependent variables consisted of the averaged *z* scores of fifth-grade student achievement in ELA and mathematics compiled from the MET database.

Data Analysis

Demographic Analyses.

Mean, standard deviation, and range scores were computed on the CLASS™ composite, domain, and dimensions for all teachers in the sample ($n = 70$). Mean z scores and standard deviation scores were computed for all fifth-grade students in the sample ($n = 70$).

Research Hypotheses 1 and 2

To address Research Hypotheses 1 and 2, the researcher utilized Pearson R to correlate the mean CLASS™ composite score to the mean ELA and mathematics z scores of the students in the sample. The independent variable in both hypotheses was the mean fifth-grade teachers' CLASS™ composite score. The dependent variable in research hypothesis 1 was the mean z score on the standardized summative ELA assessment. In research hypothesis 2, the dependent variable was the mean z score on the standardized summative mathematics assessment. An adjusted R^2 value was computed to determine the level of association between the independent variable and the dependent variables in research hypotheses 1 and 2. The threshold for statistical significance was $p < .05$.

Research Hypotheses 3 and 4

To address Research Hypotheses 3 and 4, the independent predictor variables were the mean scores for each of the three CLASS™ domains of Emotional Support, Classroom Organization, and Instructional Support. For hypothesis 3, the dependent variable was the mean z score on the standardized summative ELA assessments. In research hypothesis 4, the dependent variable was the mean z score on the standardized summative mathematics assessments. Two multiple regressions analyses were computed to determine whether any of the three CLASS™ domain scores of Emotional Support, Organizational Support, and Instructional

Support were significant predictors of student achievement in ELA and mathematics. The adjusted R^2 values were computed to determine the predictive effect exerted by the independent variables in Research Hypotheses 3 and 4. The assumption of independence of error was assessed through the interpretation of Durbin-Watson values. Fitness of the predictive model in both research hypotheses was assessed through the interpretation of ANOVA values. The assumption of multicollinearity was assessed through the interpretation of respective Tolerance values of the independent predictors within the predictive model. Statistical significance of prediction was evaluated through slope values (t) within each model. The threshold for statistical significance of findings was set at $p < .05$.

The following equations represent the analyses for Research Hypotheses 3 and 4:

$$H3: Y^l_{(ELA)} = b_{(0)} + b_{(Emotional\ Support)} + b_{(Classroom\ Organization)} + b_{(Instructional\ Support)} + Error$$

$$H4: Y^l_{(Mathematics)} = b_{(0)} + b_{(Emotional\ Support)} + b_{(Classroom\ Organization2)} + b_{(Instructional\ Support)} + Error$$

Research Hypotheses 5 and 6

In Research Hypotheses 5 and 6, the independent predictor variables were fifth-grade teachers' mean scores on the four dimensions of the CLASS™ Emotional Support domain; the dimensions included mean scores of positive climate, negative climate, teacher sensitivity, and regard for student perspectives. In hypothesis 5, the dependent variable was the mean z score on the standardized summative ELA assessments. In Research Hypothesis 6, the dependent variable was the mean z score on the standardized summative mathematics assessments.

Two multiple regressions analyses were computed to determine whether any of the four CLASS™ dimension scores of Emotional Support were significant predictors of student achievement in ELA and mathematics. The adjusted R^2 values were computed to approximate the predictive effect exerted by the independent variables in Research Hypotheses 5 and 6. The

assumption of independence of error was assessed through the interpretation of Durbin-Watson values. Fitness of the predictive model in both research hypotheses was assessed through the interpretation of ANOVA values. The assumption of multicollinearity was assessed through the interpretation of respective Tolerance values of the independent predictors within the predictive model. Statistical significance of prediction was evaluated through slope values (t) within each model. The threshold for statistical significance of findings was set at $p < .05$.

The following equations represent the analyses for Research Hypotheses 5 and 6 using the dimensions from the Emotional Support domain.

$$H5: Y^1_{(ELA)} = b_{(0)} + b_{(Positive\ Climate)} + b_{(Negative\ Climate)} + b_{(Teacher\ Sensitivity)} + b_{(Regard\ for\ Student\ Perspectives)} + Error$$

$$H6: Y^1_{(Mathematics)} = b_{(0)} + b_{(Positive\ Climate)} + b_{(Negative\ Climate)} + b_{(Teacher\ Sensitivity)} + b_{(Regard\ for\ Student\ Perspectives)} + Error$$

Ancillary Analyses

In order to determine whether fifth-grade teachers' mean scores of Classroom Organization and Instructional Support domains of the CLASS™ were significantly related to student achievement, mean scores on the CLASS™ domains and dimensions of Classroom Organization and Instructional Support were entered into regression analyses as independent variables to predict mean z scores of fifth-grade students on standardized assessments of mathematics and ELA.

Summary

Correlation and predictive multiple regression models were utilized to address each of the research questions and hypotheses of this study. The extracted data from the MET database were collected and compiled by the researcher using the CLASS™ to measure teacher support

behaviors of fifth-grade teachers, which served as the independent variables in this study. Fifth-grade student achievement in English Language Arts and mathematics was measured by z scores on ELA and mathematics state-sponsored summative assessments, which served as the dependent variables in this study. The results of the research analyses are presented in chapter four.

IV. RESULTS

The focus of this study was to determine the associative and predictive relationships between fifth-grade teachers' support behaviors and fifth-grade students' performance on standardized, summative state-level assessments in English Language Arts (ELA) and mathematics. The dataset used for the analyses was extracted from the Measures of Effective Teaching dataset housed at the University of Michigan (Kane & Staiger, 2012). The associative and predictive independent variables were identified as fifth-grade teachers' support behaviors as measured by the CLASS™. *Z* scores of standardized summative assessments of fifth-grade students in both mathematics and ELA represented the study's dependent variables.

Preliminary Analysis

Before addressing the stated research questions and hypotheses related to the study, the researcher found the data set to be 100% intact with no missing data points. As such, imputations of missing data were not necessary for analytic purposes.

Sample

The study's sample included all fifth-grade teachers ($n = 70$) from among the 1,148 teachers in the MET database and all fifth-grade students ($n = 70$) with complete data on the ELA and mathematics standardized assessments. Race, ethnicity, and gender for both the teachers and students were not identified for the fifth-grade sample in the MET database.

Demographic Results

The researcher computed the mean CLASS™ composite and domain scores for the sample of fifth-grade teachers. The results are displayed in table 3 with corresponding 95% confidence intervals.

Table 3

Fifth-grade Teachers' CLASS™ Composite and Domain Means, Standard Deviations, and Confidence Intervals (n = 70)

	Mean	SD	Upper CI 95%
CLASS™ composite	4.72	0.38	4.81
Emotional Support	4.88	0.43	4.98
Classroom Management	5.81	0.32	4.96
Instructional Support	3.63	0.53	3.75

The reader will recall that CLASS™ scores range from 1 to 7, and 7 is the highest rating. A CLASS™ composite, domain, or dimension score of 1 or 2 is considered low-range support with few if any, relevant indicators of effectiveness. A score of 3, 4, or 5 is considered in the mid-range with the most relevant indicators present in the midrange. A score of 6 or 7 is considered high-range with most or all of the relevant indicators rated highly. On a seven-point scale, a score of 4 or higher is considered effective (Pianta et al., 2012). One can see that this sample of fifth-grade teachers as a group would be considered effective in all areas measured by the CLASS™, and highly effective in classroom management. In fact, the teachers could be considered highly effective in all areas except Instructional Support. The confidence intervals are included in the table to help explain the probability that the sample's reported mean score is

accurate within certain levels of probability or confidence. In this case, there is a 95% probability that the calculated confidence interval from repeated, future analyses and samples will encompass the true value of the population parameter.

The researcher computed the mean ELA and mathematics *z* scores for the student sample. The results are displayed in Table 4. The reader will recall that *z* scores range from -4 to $+4$, with a mean of zero.

Table 4
Means, Standard Deviations, and Confidence Intervals of z scores of Fifth-Grade Student Achievement Scores in ELA and Mathematics (n = 70)

	Mean	SD	Lower CI 95%	Upper CI 95%
ELA <i>z</i> scores	0.09	0.37	.006	.182
Mathematics <i>z</i> scores	0.13	0.38	.043	.224

The fifth-grade students' *z* scores in this sample were very close to the standardized *z* score of zero, with very small standard deviations. The results suggest that these students achieved average scores in both ELA and mathematics and small variability. The confidence intervals in this sample are quite small, indicating that the researcher can be 95% confident that the “true” score is somewhere within this range.

Results of Quantitative Analyses

To address the stated research hypotheses in the current investigation, the following results will be presented.

Research Questions

Q1: Is fifth-grade teacher effectiveness as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

Q2: Are fifth-grade teachers' support behaviors as measured by the CLASS™ associated with fifth-grade student achievement in ELA and mathematics?

Research Hypothesis 1

H₁. The CLASS™ Composite score (total score of Emotional Support, Organizational Support, and Instructional Support domain scores) is significantly correlated to fifth-grade students' achievement in ELA as measured by standardized summative assessments.

The researcher computed a Pearson R correlation to determine the relationship between the mean CLASS™ composite score for fifth-grade teachers and the mean fifth-grade student achievement *z* score in ELA. Table 5 contains a summary of results with respect to Research Hypothesis 1.

Table 5

Pearson R Correlation of Mean Fifth-grade Teachers' CLASS™ Composite Score and Fifth-grade Students' ELA Achievement

	<i>n</i>	Pearson <i>R</i>	R Squared	SE	<i>p</i>-value
ELA x CLASS™ composite score	70	0.089	-0.007	0.369	0.233

These results indicate that there was no significant relationship between the mean fifth-grade teachers' CLASS™ composite score and the mean fifth-grade students' standardized student achievement score in ELA. Therefore, the research hypothesis was not supported.

Research Hypothesis 2

H₂: The CLASS™ Composite score (Emotional Support, Organizational Support, and Instructional Support domain scores), is significantly correlated to fifth-grade students' achievement in mathematics as measured by standardized summative assessments.

The researcher computed a Pearson *R* correlation to determine the relationship between the mean CLASS™ composite score for fifth-grade teachers and the mean fifth-grade student achievement *z* score in mathematics. The results of this analysis are displayed in Table 6.

Table 6

Pearson R Correlation of Mean Fifth-grade Teachers' CLASS™ Composite Score and Fifth-grade Students' Mathematics Achievement

	n	Pearson <i>R</i>	R Squared	SE	<i>p</i>-value
Math X CLASS™ composite	70	0.158	0.025	0.374	0.095

The results indicate that there was no significant relationship between the mean fifth-grade teachers' CLASS™ composite score and the mean fifth-grade students' standardized student achievement score in mathematics. Therefore, the research hypothesis was not supported. However, the *p*-value approached significance using the more liberal interpretation of significance.

Research Hypothesis 3

H₃: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in ELA as measured by standardized summative assessment.

In order to address this hypothesis, the fifth-grade teachers' mean domain scores on the CLASS™ were entered into a step-wise linear regression model as independent variables to predict the dependent variable of fifth-grade students' mean *z* score on the standardized summative assessment of ELA. The results of the predictive analysis are presented in Table 7.

Table 7
Predicting Fifth-grade ELA Achievement from CLASS™ Domains (n = 70)

Domain	<i>B</i>	<i>SE</i>	<i>Stand β</i>	<i>R</i> ²	<i>t</i>	<i>p</i>
Intercept	-0.55	0.89				
Emotional Support	0.10	0.15	.12	.02	0.67	.51 ^a
Organizational Support	0.04	0.17	.04	.00	0.24	.81 ^a
Instructional Support	0.03	0.13	-.04	.00	0.19	.85 ^a

^a *p* > .05

In this sample, none of the CLASS™ domains were predictive of student achievement in ELA; therefore, the research hypothesis was not supported.

Research Hypothesis 4

H4: CLASS™ domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in mathematics as measured by standardized summative mathematics assessments.

In order to address this hypothesis, the fifth-grade teachers' mean domain scores were entered into a step-wise linear regression model as independent variables to predict the dependent variable of fifth-grade students' mean *z* score on the standardized summative assessment of mathematics. The results of the predictive analysis are presented in Table 8.

Table 8

Predicting Fifth-grade Students' Mathematics Achievement from CLASS™ Domains (n = 70)

Domain	β	<i>SE</i>	<i>Stand</i> β	R^2	<i>t</i>	<i>p</i>
Intercept	2.30	0.86				
Emotional Support	0.24	0.15	.28	.08	1.64	.11 ^a
Organizational Support	0.36	0.16	.30	.09	2.21	.03*
Instructional Support	-0.22	0.13	-.31	.09	-1.80	.08 ^b

^a $p > .05$ ^b $p < .10$ * $p < .05$

The results of the predictive analysis revealed that fifth-grade teachers' mean score on the CLASS™ domain of Organizational Support was a significant predictor of fifth-grade students' mean *z* score in mathematics. The mean domain scores on the other two predictors were not

significantly related to student achievement in mathematics. In light of the statistically significant predictor of Organizational Support, research hypothesis 4 was supported.

Research Hypothesis 5

H₅: The dimension scores of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative ELA assessments.

In order to address this hypothesis, the fifth-grade teachers' mean dimension scores within the Emotional Support domain of the CLASS™ were entered into a step-wise linear regression model as independent variables to predict the dependent variable of fifth-grade students' mean z score on the standardized summative assessment of ELA. The results of the predictive analysis are presented in Table 9.

Table 9
Predicting Fifth-grade Students' ELA Achievement by CLASS™ Dimensions within the Emotional Support Domain (n = 70)

Dimension	β	SE	Stand β	R^2	T	p
Intercept	0.53	0.51				
Positive Climate	-0.05	0.10	-.08	.01	-0.47	.64 ^a
Negative Climate	-0.22	0.18	-.16	.03	-1.20	.22 ^a
Teacher Sensitivity	-0.16	0.09	-.28	.08	-1.80	.08 ^b
Student Regard	0.22	0.10	.41	.17	2.40	.02*

^ap > .05 ^bp < .10 *p < .05

Within the Emotional Support Domain of the CLASS™, Regard for Student Perspectives was a statistically significant predictor of student achievement on the standardized summative

assessment in ELA. Therefore, research hypothesis 5 was supported. Using the more liberal interpretation of tests of significance ($p < .10$), the analysis revealed that the dimension of Teacher Sensitivity within the Emotional Support Domain approached significance.

Research Hypothesis 6

H₆: The dimensions of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative mathematics assessment for the fifth-grade.

In order to address this hypothesis, the fifth-grade teachers' mean dimension scores of the Emotional Support domain within the CLASS™ were entered into a step-wise linear regression model as independent variables to predict the dependent variable of fifth-grade students' mean z score on the standardized summative assessment of mathematics. The results of the predictive analysis are presented in Table 10.

Table 10

Predicting Fifth-grade Students' Mathematics Achievement by CLASS™ Dimensions within the Emotional Support Domain (n = 70)

Dimension	<i>B</i>	<i>SE</i>	<i>Stand β</i>	<i>R</i> ²	<i>t</i>	<i>p</i>
Intercept	0.44	0.52				
Positive Climate	0.03	0.10	.06	.00	0.35	.73 ^a
Negative Climate	-0.38	0.18	-.27	.07	-2.10	.04*
Teacher Sensitivity	-0.10	0.09	-.28	-.18	-1.10	.28 ^a
Regard for Student Perspectives	0.15	0.10	.23	.05	1.40	.20 ^a

^a *p* > .05 **p* < .05

The mean fifth-grade teachers' dimension score for Negative Climate within the domain of Emotional Support was a significant predictor of the fifth students' mean *z* score on the summative mathematics assessment. Therefore, research hypothesis 6 was supported.

The reader will note that the correlation coefficient is negative in direction. The Negative Climate dimension of the CLASS™ is scored in reverse; the indicators for this dimension are the frequency, quality, and intensity of teacher and student negativity. This dimension reflects the overall level of negativity among the teacher and students in the class. Therefore, a higher CLASS™ dimension score for Negative Climate reflects a higher level of negativity in the classroom. The negative relationship found in this analysis indicates that the fifth-grade teachers and students in this sample demonstrated significantly fewer incidences of negativity.

Ancillary Results

Most of the ancillary analyses conducted by the researcher uncovered non-significant relationships between mean dimension scores within the CLASS™ domains and student achievement in ELA and mathematics. However, a step-wise linear regression analysis revealed

a significant relationship between fifth-grade teachers' mean score on the Behavior Management dimension within the Classroom Organization domain and the mean student achievement standardized score in mathematics. The results of the analysis are presented in Table 11.

Table 11
Predicting Fifth-grade Mathematics Achievement by CLASS™ Dimension within the Classroom Organization Domain (n = 70)

Dimension	β	SE	Stand β	R^2	t	p
Intercept	-2.00	0.86				
Behavior Management	0.20	0.13	.32	.10	2.32	.02*
Productivity	0.04	0.15	.04	.00	0.30	.77 ^a
Instructional Learning Format	-0.01	0.09	-.02	.00	-0.14	.90 ^a

^a $p > .05$ * $p < .05$

Summary

The current investigation examined the relationships between teacher support behaviors as measured by the CLASS™ and student achievement as measured by standardized summative assessment in ELA and mathematics. There was no significant correlation between mean composite CLASS™ scores of fifth-grade teachers and mean fifth-grade students' achievement z scores in either ELA or mathematics. The only significant predictive relationship between fifth-grade teachers' mean domain scores on the CLASS™ was Organizational Support and fifth-grade students' achievement in mathematics ($p < .03$).

When the researcher examined the dimensions within the domains of the CLASS™, the only significant predictor of student achievement in ELA was Regard for Student Perspective within the Emotional Support domain ($p < .05$). The dimension of Negative Climate within the Emotional Support domain was a significant predictor of mathematics achievement ($p = .04$); the

relationship was negatively correlated. In addition, the dimension of Behavior Management within the Organizational Support domain was also a significant predictor of student achievement in mathematics ($p = .002$). The research results will be discussed in Chapter 5.

V. DISCUSSION

The purpose of this dissertation study was to explore the relationships between fifth-grade teachers' support behaviors as measured by the CLASS™ and fifth-grade student achievement in ELA and mathematics using the Measures of Effective Teaching (MET) Longitudinal Study Database. This chapter includes a summary of the study and its results, ancillary results, implications for classroom teaching, and recommendations for future research.

A number of theories describe the role of the development of relationships with children to encourage appropriate growth and learning necessary to develop well-adjusted and intelligent students. Piaget's cognitive development theories (1959), Vygotsky's social and language development theories (1978), Erikson's emotional development theories (1950), and Maslow's theoretical work (1943) on human needs all provide a solid theoretical framework for this study. Positive and trusting relationships between teachers and students are critical in nurturing cognitive development and analytical problem-solving skills.

In the present study, the researcher studied fifth-grade teachers' support behaviors as measured by the *Classroom Assessment Scoring System*™ (CLASS™) and fifth-grade student achievement in ELA and mathematics. The research sample was extracted from the Measures of Effective Teaching (MET) database to include all fifth-grade teachers ($n=70$) and all fifth-grade students ($n = 70$). The research design was a non-experimental posttest only design using archival data.

The independent variables in this study were composite, domain, and dimension scores of fifth-grade teachers' on the *Classroom Assessment Scoring System*TM(CLASSTM), a widely used teacher observation and evaluation tool. The dependent variables in this study were fifth-grade z scores on state-sponsored summative measures of fifth-grade student achievement in math and reading.

Research Questions and Hypotheses

Q1: Is fifth-grade teacher effectiveness as measured by the CLASSTM associated with fifth-grade student achievement in ELA and mathematics?

Q2: Are fifth-grade teachers' support behaviors as measured by the CLASSTM associated with fifth-grade student achievement in ELA and mathematics?

H₁: The CLASSTM Composite score (total score of Emotional Support, Organizational Support, and Instructional Support domain scores) is significantly correlated to fifth-grade students' achievement in ELA as measured by standardized summative assessments.

H₂: The CLASSTM Composite score (Emotional Support, Organizational Support, and Instructional Support domain scores), is significantly correlated to fifth-grade students' achievement in mathematics as measured by standardized summative assessments.

H₃: CLASSTM domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in ELA as measured by standardized summative assessment.

H₄: CLASSTM domain scores of effective teaching (Emotional Support, Organizational Support, and Instructional Support) are significant predictors of fifth-grade student achievement in mathematics as measured by standardized summative mathematics assessments.

H₅: The dimension scores of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative ELA assessments.

H₆: The dimensions of the CLASS™ Emotional Support domain (positive climate, negative climate, teacher sensitivity, and regard for student perspectives) are significant predictors of fifth-grade student achievement on standardized summative mathematics assessment for the fifth-grade.

Correlation and multiple regression analyses were conducted to ascertain the associative and predictive relationships between the fifth-grade teachers' CLASS™ composite, domain, and dimension scores and the fifth-grade students' achievement in English Language Arts (ELA) and mathematics. The results indicate that there were no significant relationships between the mean fifth-grade teachers' CLASS™ composite score and the mean fifth-grade students' standardized student achievement score in either ELA or mathematics. Similarly, none of the CLASS™ domains of Emotional Support, Classroom Organization, or Instructional Support were predictive of student achievement in ELA. However, the CLASS™ domain of Organizational Support was a significant predictor ($p = .03$) of fifth-grade students' mean z score in mathematics.

The mean dimension score for Negative Climate (NC) within the Emotional Support Domain was also a significant predictor of fifth-grade students' mean z score in mathematics ($p = .04$). Using a more liberal interpretation of significance, the dimension of Teacher Sensitivity within the Emotional Support Domain approached significance ($p < .10$).

Discussion of Research Results

Interestingly, many of the results of this study do not align with the researchers' hypotheses and the literature on teacher support behaviors and student achievement. The researcher and her dissertation committee believe that the non-significant results were directly related to the fact that the MET database did not allow direct, one-to-one correlation of the fifth-grade teachers' CLASS™ scores and the achievement test scores of the specific students in each teacher's classroom. For this reason, the relationships between fifth-grade teachers' CLASS™ scores and fifth-grade students' achievement scores were not sufficiently matched to accurately or directly measure associations. This substantive limitation of the study undoubtedly influenced the results. A more elegant research design would be to compute each fifth-grade teacher's CLASS™ scores to predict student achievement test scores of his or her specific students.

The possibility also exists that the CLASS™ ratings by MET researchers of video lessons were not as realistic as actual classroom observations. However, MET researchers reported significant relationships between teachers' CLASS™ scores based on video observations and student achievement in both mathematics and English Language Arts (Kane & Staiger, 2012).

Another explanation of the study's non-significant results could be attributed to the nature of correlational research. While correlational research can make valuable contributions to a body of knowledge and the literature related to a specific area of study, correlational research is limited because it does not imply causality. In this study, teachers' CLASS™ scores may not be the primary or most significant correlates or predictors of student achievement. Many variables beyond the control of the researcher and the teacher

influence student achievement, including the instruments designed to measure teacher effectiveness and student learning. Correlational research provides important information that can be used to conduct further investigations with greater controls on some of the variables that influence student achievement.

The results of the current study indicated that there were no significant relationships between the mean fifth-grade teachers' CLASS™ composite or domain scores and the mean fifth-grade students' standardized ELA or mathematics achievement scores. However, when the researcher drilled down to the individual dimensions within each of the three CLASS™ domains of Emotional Support, Organizational Support, and Instructional Support, significant relationships began to emerge.

English Language Achievement

This study provides evidence of a significant relationship between ELA achievement and the CLASS™ dimension of Regard for Student Perspective within the Emotional Support domain. Regard for student perspective (RSP) relates to the teacher's maintaining flexibility, accepting student ideas and opinions, and making meaningful connections in order for students to understand the ways that instructional material is related to life beyond the classroom. The RSP dimension also identifies ways that teachers support student autonomy, provide relaxed structures for movement, and promote peer sharing and group work (Pianta, et al., 2012). All of these teaching strategies are critical components of ELA instruction. According to Hunter (2004), a teacher can identify and validate learning in reading when a student can tell, diagram, solve, arrange, and analyze. These types of student skills require teachers to be flexible, to focus on and affirm students' ideas and thoughts, to make authentic, developmentally appropriate connections of the instruction to the students' lives, to intentionally design and nurture meaningful peer interactions, and to

support students' autonomy. These teacher support behaviors can promote an environment in which Vygotsky's zone of proximal development (1978) and Erikson's social-emotional development theories (1950) become an integral part of daily classroom norms in order to benefit the students.

Fifth-grade students generally love to talk about themselves, others, and events; teachers who emphasize deep reading and analysis of literature, critical thinking, and small- and whole-group discussion can capitalize on the inherent student needs to talk and challenge their thinking, which can ultimately make a difference in overall English Language Arts achievement. In addition, fifth-grade students are most likely transitioning from the concrete operational stage of cognitive development to the stage of abstract reasoning (Piaget, 1959). As a result, teachers have opportunities to extend the thinking and learning skills of their students through exposure to developmentally appropriate literature, extensive use of structured discussions, and affirmation and acceptance of student perspectives and ideas. Each of these examples of Regard for Student Perspective should build the foundation for the critical thinking required when students take a standardized test of English language arts.

Most standardized tests of ELA ask students to read grade-level passages and answer multiple-choice items designed to measure reading comprehension within a specific time limit. Any elementary classroom teacher can testify that the content area of English language arts includes much more than reading comprehension: vocabulary, spelling, punctuation, mechanics, grammar, literature, writing, and more are taught holistically, with a demonstration of each discrete skill relying on the understanding of the others. Most standardized reading comprehension items at the elementary level focus on students' abilities to identify the main idea and details of a reading passage, which does not measure

the totality of English language arts instruction. As a result, the possibility exists that standardized ELA assessments may not accurately or comprehensively measure ELA achievement.

In addition, higher-order thinking items are difficult to create for multiple choice testing formats. In a MET publication, Kane & Staiger (2012) reported that CLASS™ domain scores were significantly correlated to students' ELA test scores, but that the correlations were small. However, scores on open-ended, written tests of reading and language arts were significantly and moderately correlated to CLASS™ domain scores.

Math Achievement

The Negative Climate (NC) dimension of the Emotional Support domain of the CLASS™ was a highly significant predictor of fifth-grade student achievement in mathematics ($p = .012$). Because the Negative Climate dimension of the CLASS™ is scored in reverse, a low score on the dimension indicates low negativity among the teachers and students in the classroom. A higher score indicates higher frequencies of negative affect demonstrated by both teachers and students. CLASS™ raters are taught to identify and measure the frequency of negative behaviors exhibited by students and teachers, such as punitive control, lack of acceptance, sarcasm, disrespect, as well as more severe forms of negativity such as victimization, bullying, or physical punishment.

In this study, the fifth-grade teachers' mean scores on the CLASS™ revealed low levels of negative climates in their classrooms. This dimension's significant prediction of mathematics achievement in this sample does not come as a surprise given the need for organization, structure, scaffolding, and patience needed for teaching the highly precise processes required to learn mathematics, as well as the need for positive teacher to student and peer to peer interactions when solving math problems in either whole- or small-group

settings. This finding has important implications for math instruction at all grade levels and also supports the theoretical research of Vygotsky (1978), Erikson (1950), and Maslow (1943). These same factors are perhaps even more important for the trusting environment needed for the less observable and amorphous aspects of ELA teaching and learning.

Ancillary Findings

There was a highly significant predictive relationship between fifth-grade students' achievement in mathematics and the CLASS™ dimension of Behavior Management ($p = .002$) within the Classroom Organization domain in the current study. The Behavior Management (BM) dimension addresses the teachers' ability to set clear expectations, to be proactive in monitoring and anticipating student needs or problems, to direct attention to positive behaviors and effectively redirect misbehavior, and to create classroom environments with little or no evidence of student misbehavior or chaos (Pianta et al., 2012).

The need for these positive behavior management skills by teachers is readily apparent when considering not only the sequential and orderly process of learning mathematics, but also the social anxiety and stress that mathematics instruction can create in the classroom, especially among girls, whose math attitudes, aspirations, and achievement tend to shift considerably after fourth-grade.

According to Tobias (1995), the causes of math anxiety are often environmental factors created by teachers themselves. Undue emphasis on the right answer, an atmosphere of competition, and the humiliation of solving a problem in the presence of an audience can lead to avoidance behavior by the student and unwillingness to participate (Dweck, (2012); Boaler, (2002). The need for teachers to recognize and intervene with students who are having social and anxiety difficulties in the classroom is underscored by the significant predictive relationship found in the current study.

Finally, Dweck (2012) and Boaler (2002) encourage and instruct math teachers of all grade levels to praise students for effort and perseverance rather than for the performance of the correct answer. In their research studies, both Dweck (2012) and Boaler (2002) found that math achievement of students who received teacher praise for student effort and perseverance was significantly different from math achievement of students whose teachers did not praise effort or perseverance, as well as from teachers who praised intelligence or innate aptitude in mathematics. Both researchers in separate studies uncovered another important result: students whose teachers praised student effort and perseverance in mathematics demonstrated significant reductions in math anxiety when compared to control groups whose teachers did not praise effort or perseverance (Dweck, 2012; Boaler, (2002).

Discussion of Ancillary Results

Further drilling down into the study's data revealed a significant predictive relationship between fifth-grade students' achievement in mathematics and the CLASS™ dimension of Productivity ($p = .046$) within the Classroom Organization domain. The teachers' abilities characterize this dimension to execute routines and procedures, maximize learning time with few disruptions, and facilitate quick, smooth transitions from one classroom activity to the next (Pianta, et al., 2012). These abilities create a classroom environment that is structured, efficient, and safe. Both theoretically and practically, students can thrive in safe environments that promote learning.

As stated earlier, the negative climate dimension within the Emotional Support domain was a significant predictor of math achievement in this sample. Examination of the correlation tables in the current study revealed that the correlation between the overall Emotional Support domain and fifth-grade students' math scores approached significance ($p = .061$). Two dimensions of the Emotional Support domain also approached significance when correlated to

math scores: Positive Climate ($p = .057$) and Regard for Student Perspectives ($p = .084$).

Apparently, the dimensions within the Emotional Support domain exert considerable influence on fifth-grade student math achievement scores.

Possible Explanations

The significant results related to mathematics and non-significant results related to ELA are puzzling until one considers some of the elements that are unique to mathematics instruction. The researcher hypothesizes that the language of math is much more defined and restricted, especially at the elementary school level, than the comprehensive nature of English language arts. The ELA content area encompasses a much broader, more complex, and more interactive and synergistic discipline. For example, a preliminary, informal examination by the researcher of fifth-grade math vocabulary lists ($n = 10$) posted online and recommended by the National Council of Teachers of Mathematics identified an average of approximately 200 math vocabulary words typically used in math instruction. A similar review of fifth-grade ELA vocabulary lists posted online ($n = 10$) and recommended by the National Council of Teachers of English revealed an average of approximately 500 ELA vocabulary words typically used in ELA instruction. Obviously, the students' understanding and application of concepts in both math and ELA are vitally important to measurable student achievement. However, language is the building block of all of those concepts, and the language of mathematics is more circumscribed, restricted, and bound than that of ELA. This hypothesis merits further examination and research.

A second unique element of mathematics instruction at the elementary level is the typical use of manipulatives to assist learners in their comprehension of the abstract concepts inherent to mathematics. The use of manipulatives and concrete models in math instruction underscores the contributions of Piagetian theory (1959) and neo-Piagetian research. For example, in a classic

meta-analysis of 60 studies on the use of math manipulatives by Sowell (1989), she found that long-term and effective use of manipulatives in math instruction was significantly related to student achievement in math and also to the students' enjoyment of mathematics when the manipulatives were used in collaboration with teachers who were well-versed in the use of the manipulatives. Sowell's study also revealed that math instruction using images and pictures were not significantly related to student achievement in math. While Sowell's meta-analysis is dated and did not focus exclusively on fifth-grade math instruction, the results indicate that manipulatives are important tools to enhance student comprehension of abstract concepts. Hattie (2012) would probably label these results as demonstrating "visible learning." Further analysis of the research literature on the use of manipulatives in math instruction would be informative. When one considers the lack of similar concrete referents that might be used to enhance comprehension of ELA concepts, the differences between math and ELA achievement in the current study become clearer.

Kane & Staiger (2012) also reported stronger correlations between teachers' CLASS™ scores and math achievement than with ELA achievement. They hypothesized that the stronger correlations for math than ELA were related to the nature of state assessments. In the researchers' estimation, the summative assessments for measuring ELA skills are not global enough, consisting primarily of multiple-choice items measuring reading comprehension, without requiring students to write about what they are reading. When the researchers used open-ended ELA items to measure achievement, the relationships were stronger and were comparable to the relationships found in mathematics. Item type apparently influences the measurement of ELA and merits further research.

Implications for the Teaching Profession

The emphasis on highly effective teachers and teaching practices is intense in today's educational policy and practice environment. School districts are often overwhelmed with suggestions, programs, and policies designed to improve teacher practice that have a direct and measurable effect on student achievement. In some cases, the over-emphasis on teachers' evaluation is deemed to be punitive by teachers and unconnected to the realities of daily life in classrooms, especially in relation to full inclusion environments. A clear need exists to accurately and authentically measure both the hard and soft skills teachers need to create positive relationships between and among students and that have the potential to help practitioners understand ways to best measure classroom interactions and effectiveness, which was one of the primary goals of the MET study.

Empirical evidence (Allen et al., 2013; Garrett & Steinberg, 2015; Hafen, et al., 2015) supports the theoretical framework presented in this study and can be used to help practitioners determine ways to describe classroom environments that are healthy for students' social and academic development. When the teacher provides a supportive learning environment, the student may be less likely to have behavioral problems compared to peers who are less able to adapt to the social climate of the classroom (Hamre & Pianta, 2001). In most cases, students achieve more when the classroom teacher practices mindfulness in both personal and pedagogical practices (Capel, 2012). Recent research demonstrated that students with substantial behavior issues in the early school years can form positive relationships with teachers and can achieve at expected levels academically (Hamre & Pianta, 2001). However, minimal research has been conducted on strong supports by teachers in upper elementary and the possible relationships and impacts on achievement; for this reason, the current study focused on fifth-grade student achievement.

The results of this study can inform policy concerning pre-service teachers' preparation and in-service professional development programs to prepare and enhance teacher effectiveness. Consistent with evidence from the literature on teacher-student relationships (Flook et al., 2005; Gregory & Ripski, 2008; Pianta et al., 2002), the teacher's ability to process negative emotions and experiences of students was directly related to ways that the teacher behaves towards the students. Further, the results of the current study underscored the need to recognize and intervene with students who are having social difficulties in the classroom. Providing adequate training and professional development and pre-service learning to all teachers on ways to enhance and improve the quality of relationships with students should be an important consideration when developing high-quality teacher-training opportunities.

Recommendations for Future Research

The first recommendation for future research should center on the need for directly comparing each teacher's CLASS™ scores to achievement scores to each student in the teacher's classroom. In this way, the relationships are more clearly aligned and may produce different results from those in this study. Perhaps the MET database could be reconfigured to allow for these types of comparisons.

In addition to fifth-grade students, this researcher recommends that further research to replicate this same study with early elementary and secondary grade levels would be beneficial. In addition, a fruitful investigation would be to compare the mean CLASS™ composite, domain, and dimension scores from this sample to the CLASS™ national norms to determine whether there are any differences between the two groups.

The relationship between the CLASS™ dimension of Negative Climate and student achievement in mathematics merits further research. One could design an experimental study of

teachers who demonstrate high or low scores on the Negative Climate dimension on the CLASS™ and study the relationships between mathematics achievements or any other content area. Additionally, professional development designed to reduce negativity in the classroom could be examined to determine whether teachers change behaviors over time. In any case, school administrators have strong evidence that negative teacher behaviors and attitudes are significantly related to student achievement. In some cases, teachers who are critical and negative by temperament and who do not respond to professional development designed to change those behaviors may require different job assignments or dismissal. Every student deserves a highly qualified, positive teacher who is a good manager of instruction, behavior, and student performance.

Conclusions

This study uncovered two statistically significant relationships between fifth-grade teachers' CLASS™ scores and fifth-grade students' achievement in mathematics: Behavior Management and absence of Negative Climate. Regard for Student Perspectives was a significant predictor of ELA achievement. The results of this study contribute to the body of knowledge on teacher support behaviors and their measurable relationships to fifth-grade student achievement in ELA and mathematics.

This study also adds to the body of knowledge related to the relationships between teacher support behaviors and student achievement in fifth-grade classrooms. As such, the study can assist educational policymakers, school administrators, and classroom teachers to make good decisions based on evidence. Additionally, the study adds to the body of literature on teacher effectiveness, teacher support behaviors, and student achievement. Hopefully, the results of this

study will guide and inform classroom teachers, teacher educators, and professional developers as they make decisions related to the important topics addressed in this study.

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APPENDICES

Appendix A

United States Department of Education Strategic Goals and Objectives (2014 – 2108)

The following are the strategic goals and related objectives for the U.S. Department of Education for fiscal years 2014-2018 (U.S. Department of Education, n.d.):

Goal 1: Postsecondary Education, Career and Technical Education, and Adult Education.

Increase college access, affordability, quality, and completion by improving postsecondary education and lifelong learning opportunities for youths and adults.

Strategic Objective 1.3: Completion. Increase degree and certificate completion and job placement in high need and high skill areas, particularly among underrepresented and/or underprepared populations.

Goal 2: Elementary and Secondary Education.

Improve the elementary and secondary education system's ability to consistently deliver excellent instruction aligned with rigorous academic standards while providing effective support services to close achievement and opportunity gaps, and ensure all students graduate high school, college, and career ready.

Strategic Objective 2.2: Effective Teachers and Strong Leaders. Improve the preparation, recruitment, retention, development, support, evaluation, recognition, and equitable distribution of effective teachers and leaders.

Strategic Objective 2.3: School Climate and Community. Increase the success, safety, and health of students, particularly in high need schools, and deepen family and community engagement.

Goal 3: Early Learning.

Improve the health, social emotional and cognitive outcomes for all children from birth through 3rd grade, so that all children, particularly those with high needs, are on track for graduating from high school, college, and career ready.

Strategic Objective 3.2: Effective Workforce. Improve the quality and effectiveness of the early learning workforce so that early childhood educators have the knowledge, skills, and abilities necessary to improve young children's health, social, emotional, and cognitive outcomes.

Goal 5: Continuous Improvement of the U.S. Education System.

Enhance the education system's ability to continuously improve through better and more widespread use of data, research and evaluation, evidence, transparency, innovation, and technology.

Strategic Objective 5.3: Research, Evaluation, and Use of Evidence. Invest in research and evaluation that builds evidence for education improvement; communicate findings effectively; and drive the use of evidence in decision making by internal and external stakeholders.