THE EFFECTS OF A SOCIAL-EMOTIONAL LEARNING INTERVENTION ON THE SELF-REGULATION AND SCHOOL READINESS OF AT-RISK PRESCHOOL STUDENTS

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ABSTRACT

THE EFFECTS OF A SOCIAL-EMOTIONAL LEARNING INTERVENTION ON THE SELF-REGULATION AND SCHOOL READINESS OF AT-RISK PRESCHOOL STUDENTS

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Over the past several decades, there has been a dramatic increase in research surrounding factors that influence children's school readiness, or preparedness that allows children to learn in a formal educational setting. It includes possessing early academic as well as cognitive and socio-emotional skills (e.g., self-regulation, emotion knowledge) that are important for children's later development and academic success. Although the literature has suggested that instruction and practice in social-emotional learning (SEL) can improve school readiness at a universal level, it is largely unknown if these programs are effective as a targeted, modular intervention. Further, there is a need to increase transportability of evidence-based interventions into school settings. Using a group pre/post-intervention design, the current study investigated the effects of a targeted, Tier 2 evidence-based SEL curriculum on students who demonstrated behavioral concerns and low self-regulation skills. Assessments measured self-regulation, emotion knowledge, and early literacy skills in intervention and comparison participants. Results suggested that SEL instruction was related to benefits in self-regulation, situational emotion knowledge, and early literacy skills. Further, teachers qualitatively reported barriers to effective SEL intervention implementation in early childhood education settings. Implications for school psychological practice and future research are discussed.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I: INTRODUCTION

Over the past several decades, there has been a dramatic increase in research surrounding factors that influence children's school readiness (Busch & Hofer, 2012; Jordan, Snow, & Porche, 2000; Snow, 2006; Sophian, Wood, & Vong, 1995). School readiness refers to a broad state of preparedness that allows children to learn in a formal educational setting (Snow, 2006). It includes possessing early academic as well as cognitive and socio-emotional skills that are important for children's later development and academic success. Pre-literacy skills, such as alphabet knowledge, vocabulary and oral language, phonemic awareness, and listening comprehension, are documented antecedents of reading ability in elementary school (Jordan et al., 2000). Beyond basic academic skills, children also need broader underlying cognitive and social-emotional skills to continue to learn. For example, they must be able to pay attention, interact with others positively, follow a teacher's directions, remember previously taught lessons, demonstrate persistence when learning becomes difficult, and be able to control their emotions (National Institute for Early Education Research, 2006). Children who learn and practice these skills have been found to have higher levels of educational attainment, quality of life, and better interpersonal relationships (Busch & Hofer, 2012). Thus, policy makers, school administrators, and teachers, alike, are interested in learning how to promote children's early academic and social-emotional competence.

One key factor related to school readiness that has been consistently identified in the literature is self-regulation. Self-regulation, however, is a complex construct with varying definitions and theoretical models. Some researchers define self-regulation in terms of a cognitive system of regulating behavior that is characterized by top-down processes. For example, Zimmerman (2000) defines self-regulation as "self-generated thoughts, feelings, and

1

actions that are planned and cyclically adapted to the attainment of personal goals" (p.14). Thus, in this case, self-regulation refers to the higher-order cognitive processes needed to plan and organize information to reach a goal. A second group of researchers consider self-regulation in terms of the bottom-up control of thoughts, emotions, and behaviors. For example, Leong and Bodrova (2006) define self-regulation as "delaying gratification, being able to rapidly switch between different tasks, focusing attention, and controlling one's emotions" (p. 33), and Jackson, Mackenzie, & Hobfoll (2000) define it as "a systematic process of human behavior that provides individuals with the capacity to adjust their actions and goals to achieve desired results" (p.275). According to these definitions, self-regulation is conceptualized as the bottom-up suppression of proponent responses in favor of secondary responses.

A third set of researchers recognizes the role of both top-down and bottom-up processes when conceptualizing self-regulation. Thought of as distinct, yet complimentary aspects of self-regulation, top-down and bottom-up processes are considered fundamental aspects that make up the larger construct of self-regulation (Blair & Razza, 2007; Calkins & Markovitch, 2010; McClelland et al., 2015; Zhou, Chen, & Main, 2012). As such, one proposed definition is the ability to effectively control one's own behaviors and emotions using a combination of top-down (executive functions) and bottom-up skills (effortful control) (Zhou et al., 2012). According to this definition, self-regulation involves the use of higher order cognitive processes (e.g., planning) and bottom-up (e.g., inhibition, focusing attention) factors to engage in goal-directed behavior, and was used to define self-regulation in the present study.

Self-regulation has emerged as a fundamental skill set for successful development across a range of outcomes, including health and well-being (Evans, Fuller-Rowler, & Doan, 2012; Moffitt et al., 2011), school readiness (Blair & Razza, 2007; McClelland et al., 2007), and

academic achievement (Duckworth, Quinn, & Tsukayama, 2012; McClelland, Acock, Piccinin, Rhea, & Stallings, 2013). Self-regulation emerges in early childhood and has important implications for individuals' life course trajectories (Geldhof, Little, & Colombo, 2010). For example, early self-regulation is a key predictor of academic success in early childhood, adolescence, and adulthood (Breslau et al., 2009; Duckworth et al., 2012; McClelland et al., 2013), and is thought to lay the foundation for positive school and learning experiences (Raver, Jones, Li-Grining, Zhai, Bub, & Pressler, 2011; McClelland et al., 2015).

While the academic and social-emotional benefits of strong self-regulation skills have been well documented, many children enter kindergarten without the self-regulation skills necessary to succeed. In one study, 46% of kindergarten teachers reported that at least half of their students began school without adequate self-regulation skills (Rimm- Kaufman & Pianta, 2000). Children who enter formal schooling without the skills needed to pay attention, remember instructions, and demonstrate self-control have more difficulty in elementary school and throughout high school, both academically and socially (McClelland et al., 2007). Further, recent work indicates that young children from socioeconomic disadvantage (e.g., low-income, English language learner) are especially at-risk for poor self-regulation skills (Evans & Rosenbaum, 2008; Mistry, Benner, Biesanz, & Clark, 2010; Wanless, et al., 2011). Given these documented gaps in self-regulation skills, providing early identification and intervention for children at risk for poor self-regulation is critical for fostering these foundational skills prior to school entry.

One approach to promoting self-regulation skills in young children is to use high-quality, evidence-based social-emotional learning (SEL) curricula. These programs explicitly teach children to engage in pre-requisite skills for learning effectively (e.g., listening and focusing

attention), identifying their own feelings and those of others, coping with strong emotions and expressing them in socially acceptable ways, and making friends and resolving conflicts with peers (Committee for Children, 2011). Large-scale experimental studies and meta-analyses have found that universal (primary prevention) and indicated (secondary prevention) SEL programs implemented in elementary and middle schools significantly improved children's focused attention, self-control, emotion recognition, and emotion regulation (Durlak et al., 2011; Payton et al., 2008). These data indicate that SEL interventions can promote self-regulation skills and emotion knowledge in school-aged populations.

Second Step is one such SEL intervention that has been rigorously evaluated using a randomized control trial design. Second Step (Committee for Children, 2011) is a 30-lesson curriculum primarily focused on teaching students social-emotional skills. As a universal prevention program, Second Step is associated with increases in self-regulation skills, neutral or positive behaviors, emotion regulation, and emotion knowledge in elementary school students (Cooke et al., 2007; Grossman et al., 1997; McMahon & Washburn, 2003; Sullivan, Sutherland, Farrell, & Taylor, 2015). A preschool version of Second Step, Second Step Early Learning Program, is available for use with preschool-aged populations. This program is a universal, classroom-based program designed to promote emotion knowledge and self-regulation skills in three-, four- and five-year-old preschool students.

Despite the demonstrated effectiveness of elementary and middle school versions of Second Step, there are some limitations of this intervention. This intervention can be time-consuming— both in training teachers and in implementing the intervention. It can also be expensive for schools to purchase. Interventions that place high demands on teacher time and resources may be barriers to effective implementation and sustainability of SEL curricula within

schools (Elias, Zins, Graczyk, & Weissburg, 2003). Elias and colleagues (2003) note that staff turnover, poor fidelity with intervention implementation, and underestimations of intervention time and costs can prevent the use of SEL programming, despite the need for schools to focus on social- emotional growth. Thus, this study investigated the effectiveness of this intervention while additionally increasing understanding of the practical challenges of implementation in community contexts to improve intervention transportability in the future.

Significance and Rationale

Previous research on self-regulation indicates that young children can be trained to regulate their thoughts, feelings, and behaviors using school-based SEL interventions. However, researchers have not examined the effectiveness of the *Second Step Early Learning Program* on preschool students' self-regulation, emotion knowledge, and academic school readiness. Thus, although the effectiveness of *Second Step* is well established with elementary and middle school students, the use of this program with younger students needs to be evaluated. Further, research has not yet examined the effectiveness of SEL interventions on a targeted, Tier 2 sample of preschool children. SEL programs have been successfully embedded at the universal level for students, but the use of SEL programming as a targeted intervention is limited (Stoiber, 2011). This study sought to determine how a Tier 2 implementation of *Second Step Early Learning Program* affected the emotion knowledge, self-regulation, and early learning skills of at-risk students enrolled in Head Start.

Second, no published work has yet examined the effectiveness of a customized implementation of specific lessons from established social-emotional learning interventions to address the specific needs of students, and how much of the intervention students must receive to maintain effectiveness. In other fields, modular approaches to evidence-based intervention have

been shown to increase transportability to community settings. For example, the work of Chorpita and colleagues (2004) utilized a modularized approach to anxiety interventions, which increased the transportability of cognitive behavioral therapy for anxiety to practitioners for use in practice settings. Established programs generally encourage educators to deliver all lessons in sequence and follow implementation recommendations to yield optimal outcomes. However, practical barriers in everyday settings (e.g., limited time and resources) and a focus on skills that a specific child, or a particular set of children, needs to develop may contribute to low fidelity. Although developers of these interventions acknowledge the need for flexibility in delivery, the extent to which practitioners (e.g., teachers, school psychologists) can deviate from the suggested content, sequence, and dosage, among other barriers, is largely unknown. These implementation barriers and the need to target specific skills in a certain child or group of children warrant examination of the delivery of select curriculum lessons or units, as doing so is the first step to determining efficiency and effectiveness of this procedure. Therefore, this study aimed to fill a second research gap by investigating the effectiveness of implementing selected lessons from an evidence-based SEL intervention on the self- regulation of selected students identified as low in self-regulation skills.

Third, literature has documented that schools have been slow to adopt evidence-based interventions (EBIs) (Kratochwill, Albers, & Shernoff, 2004). Thus, a major challenge in the field of school psychology is increasing the accessibility and implementation of EBIs in school settings. Unfortunately, research on EBIs tends to focus little on the factors within the school context that influence the transportability of the intervention, which may be critical in closing the research to practice gap. Thus, this study additionally investigated the transportability of

evidence-based interventions into school contexts by examining teacher perceptions of the factors and conditions that influence the use of EBI in community settings.

Purpose of the Study

This study had two objectives. First, it investigated the effects of the preschool version (*Second Step Early Learning Program*; Committee for Children, 2011) of a well-established social-emotional learning (SEL) program, on the emotion knowledge, self-regulation, and early literacy of at-risk Head Start students. An experimental design with 12 randomly assigned classrooms (6 intervention classrooms, 6 control classrooms) was used to investigate the effectiveness of selected SEL program components. Teacher completed screeners and teacher and Mental Health Consultant nominations were used to determine the children who are in the bottom third of each class in self-regulation (n=5-8 children per classroom) and who would be eligible for the targeted (Tier 2) intervention. Although the findings of this study may not generalize to the typical preschool student, one strength of this design is the potential to inform the use of targeted social-emotional learning interventions with children identified as needing additional support in this area.

Second, this study investigated the transportability of a social-emotional evidence-based intervention into a school context. Teacher ratings as well as initial and exit interviews were conducted with lead classroom teachers to gain an understanding of the factors that influence teacher's use of evidence-based social-emotional interventions. This study contributed to the literature by increasing our understanding of the effectiveness of a targeted SEL intervention and identifying factors that can promote its implementation to improve outcomes for a population experiencing considerable barriers.

Research Questions

1) Do children with low self-regulation skills who receive a targeted, modified version of the *Second Step Early Learning Program* show an improvement in self-regulation, emotion knowledge, and early literacy skills compared to students, low in self-regulation skills, who do not receive the targeted intervention?

2) Do children with low self-regulation skills who receive a targeted, modified version of the *Second Step Early Learning Program* show similar self-regulation as students with adequate self-regulation skills who do not receive the targeted intervention, as rated by teachers?

3) Does dosage of *Second Step Early Learning Program*, as evidenced by attendance, relate to changes in self-regulation, emotion knowledge, and early literacy skills?

4) What are the challenges and strategies to promoting the transportability of evidence-based interventions into schools?

CHAPTER II: LITERATURE REVIEW

This literature review begins with a discussion of how self-regulation is conceptualized and develops during early childhood. Next, the review examines how self-regulation relates to academic outcomes, such as early literacy. Further, the relation between self-regulation and social-emotional learning (SEL) is discussed, as SEL curricula have been successfully used to promote self-regulation skills in young children (Durlak et al., 2011; Han & Kemmple 2006). Lastly, this review examines the previous research on promoting social-emotional health in school settings, as well as how researchers have increased transportability of evidence-based interventions. Accordingly, the review of the literature addresses the following topics: (a) conceptualization of self-regulation, (b) development of self-regulation, (c) significance of self-regulation in early childhood, (e) self-regulation and academic achievement, (f) self-regulation and demographic risk, (g) Head Start background, (h) promoting social-emotional health in schools, (i) transportability of evidence-based interventions to community settings, (j) action research approaches to intervention studies, (k) SEL programs, and (l) use of selected SEL lessons.

Conceptualization of Self-Regulation

The broad construct of self-regulation has been defined and assessed in various ways across several disciplines, and researchers have not agreed upon one definition that accurately accounts for all of the ways that self-regulation manifests across contexts and development. Often, researchers focus on specific behaviors that reflect an aspect of control, such as delaying gratification, complying with external requests, redirecting attention, inhibiting impulsive behaviors, modulating emotional reactions, or problem solving (Fonagy & Target, 2002; McClelland et al., 2015). These skills are multi-dimensional and context-specific; thus, self-

regulation can take many forms. For example, a young child adhering to a parent's request to not leave the backyard when playing, a preschool student raising his or her hand before speaking in class, or a teen opting to write a paper instead of going to the movies with friends are all illustrations of self-regulation. The common thread that ties these examples together is the skill(s) involved in controlling behavior to meet the cognitive, emotional, or social demands of a situation (Barkley, 2001).

Although researchers generally agree that self-regulation is an overarching category of skills, it has been studied using a variety of theoretical frameworks that involve top-down (executive functions) skills and bottom-up (effortful control) management of feelings and behaviors (Blair & Ursache, 2010; Calkins & Markovitch, 2010; Denham et al., 2014; McClelland et al., 2015; Zhou et al., 2012; Zins, Bloodworth, Weissberg, & Walberg, 2007). An integrated model of executive function and effortful control and a social-emotional learning framework was used to guide this study.

Integrated Model of Executive Function and Effortful Control. Executive function (EF) and effortful control (EC), conceptualized to be distinct, yet complementary aspects of self-regulation, are considered unique fundamental processes that together make up the larger construct of self-regulation (Blair & Razza, 2007; Calkins & Markovitch, 2010; Zhou et al., 2012). EF and EC are considered to be dependent on context and development and make up an integrated model of top-down and bottom-up processes (Blair & Ursache, 2011; Calkins & Markovitch, 2010; Zhou et al., 2012). EF is considered to be a cognitive, "cool" system of regulating behavior generally characterized by top-down processes. It refers to the higher-order cognitive processes that are needed to purposefully hold information in mind, mentally integrate and reorganize information, and resolve conflicting response options. It is essential for problem

solving, working memory, planning, and attentional and cognitive flexibility (Blair & Ursache, 2011; Carlson, 2005; McClelland et al., 2015). In contrast, the "hot" system of self-regulation, otherwise known as EC, is driven by the bottom-up control of thoughts, emotions, and behaviors (Zelazo & Carlson, 2012; Zhou et al., 2012). EC involves suppressing a dominant response in favor of a secondary, subdominant response, and tends to occur in highly affective or emotionally arousing situations (Rothbart & Bates, 2006). EC includes such skills as inhibitory control, delay of gratification, re-orienting attention, and emotional regulation (Eisenberg, Valiente, & Eggum, 2010).

Despite this difference, the integrated model of EF and EC suggests that EF and EC work together in complex problem-solving situations across contexts and share the common component of executive attention (Zhou et al., 2012). For example, during ages two and three years, the development of the executive attention network enables children to plan and use effortful attentional strategies to engage in goal-directed behavior related to thoughts and feelings (Calkins & Markovitch, 2010). The interdependence of these EF- and EC-related skills, in turn, supports positive social and academic functioning. In sum, the integrated model of EF and EC serves as a theoretical framework through which the research questions are examined and sets the stage for understanding the EF-EC relationship, which supports young children in learning how to learn in an early childhood educational environment.

Social-Emotional Learning Model. The social-emotional learning (SEL) model has also been used to study self-regulation in terms of school readiness and functioning. Overlap exists in the role that self-regulation plays in children's school adjustment, as described in the integrated EF-EC model. However, whereas the integrated EF-EC model conceptualizes self-regulation as neurologically based (i.e., top-down and bottom-up processes), the SEL model conceptualizes

self-regulation more diffusely as part of an intricate network of cognitive, affective, and behavioral skills required for children to thrive in the educational setting (Durlak et al., 2011).

SEL encompasses a broad set of skills that enable individuals to excel at school, at work, and in relationships (Jones & Bouffard, 2012). As defined by the Collaborative for Academic, Social, and Emotional Learning (CASEL, 2015), SEL is the process through which children learn and apply five separate, but closely related social, emotional, and cognitive competencies. The broad skills that are encompassed in SEL enable individuals to excel both in school and in relationships with parents, teachers, and peers (Jones & Bouffard, 2012). The five core competencies include: 1) self-awareness, 2) self-management, 3) social awareness, 4) relationship skills, and 5) responsible decision-making (CASEL, 2015). Self-awareness is defined as the ability to accurately recognize one's own emotions, thoughts, and values and how they influence behavior. Key skills learned in this competency include identifying emotions, accurate self-perception, recognizing strengths, self-confidence, and self-efficacy. The second competency, self-management, is the ability to successfully regulate one's emotions, thoughts, and behavior in different, sometimes stressful, situations. The skills associated with this competency include impulse control, stress management, self-discipline, self-motivation, goal-setting, and organizational skills. Third, social awareness is the ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. Key skills associated with social awareness include perspective-taking, empathy, appreciating diversity, and respect for others. The fourth competency is relationship skills, or the ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. Skills associated with this competency include communication, social engagement, relationship building, and teamwork. Lastly, the final competency of the SEL model is responsible decision-

making, which is defined as the ability to make constructive choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms. The skills included in this competency are identifying problems, analyzing situations, solving problems, evaluating, reflecting, and identifying ethical responsibility (CASEL, 2015).

   SEL Programs and Self-Regulation. In accordance with how self-regulation is conceptualized in the current study, SEL programs promote self-regulation skills through top-down and bottom-up processes.   First, SEL programs include lessons and games that allow children to practice using executive functioning skills. For example, in the *Second Step Early Learning* curriculum, Brian Builder games are active, fun games with specific rules and steps of increasing difficulty, and they are used to help children learn to control and shift their attention and use their memory, both of which involve the use of top-down executive functioning processes (Committee for Children, 2011). Second, SEL programs allow children to practice effortful control using bottom-up processes, or inhibition of a dominant response in favor of a subdominant response. In the *Second Step* curriculum, there are multiple lessons across each of the units that focus on learning what emotions are, identifying what each emotion feels like in the body and brain, and managing strong emotions (Committee for Children, 2011). In these lessons, children learn emotion management and inhibitory control, both of which are essential self-regulatory, bottom-up processes.

   Within the literature, multiple studies have found significant links between school-based SEL interventions and improvements in self-regulation in children and adolescents. Self-regulation, which encompasses the ability to effectively control one's own behaviors and emotions using a combination of top-down (executive functions) and bottom-up skills (effortful control) (Zhou et al., 2012), maps onto several foundational SEL components, primarily self-

awareness and self-management (CASEL, 2015). Recent studies have revealed that exposure to SEL programs is related to improvements in certain areas of self-regulation in preschool through high school students. These include increased levels of focus and attention (Morris et al., 2013; Nix et al., 2016; Schultz, Richardson, Barber, & Wilcox, 2011) and self-control (Morris et al., 2013). Children who have received school-based SEL instruction have also exhibited reduced levels of aggression (Nix et al., 2016; Schultz et al., 2011) and hyperactivity (Schultz et al., 2011). Other research has also identified strong relationships between exposure to SEL programming and reductions in internalizing behaviors, such as anxiety and depression (Gunter, Caldarella, Korth, & Young, 2012; Schultz et al., 2011), as well as to emotion recognition and regulation (Durlak et al., 2011; Gunter et al., 2012). Together, these findings suggest that children who receive SEL programming show improvements in their skills at regulating both behaviors and emotions.

Development of Self-Regulation

The development of self-regulation is viewed as a hierarchical process, with rudimentary skills emerging first, followed by more complex and integrated cognitive capacities (Sapienze & Masten, 2011). Various self-regulation skills emerge at different points throughout childhood, following distinct patterns of growth until they merge in adolescence (Anderson, 2002; Blair & Raver, 2012). The developmental progression of self-regulation is pertinent, as success (or failure) in mastering these skills can cascade to affect later functioning. Children must negotiate new challenges as they age, and self-regulation plays a key role in many developmental milestones across childhood, adolescence, and into adulthood (Blandon, Calkins, Grimm, Keane, & O'Brien, 2010; Masten & Coatsworth, 1998).

Self-regulation begins as a largely reflexive response to external stimuli in infancy, and transforms into intentional control of internal mental and emotional states in early childhood (Barkley, 2001; Kopp, 1989; Rothbart, Posner, & Boylan, 1990). The key developmental tasks for infants are learning to regulate their emotions and attention. Infants are limited in their ability to physically manipulate their environment or remove themselves from a stressful situation. Therefore, they must develop strategies to adapt to their surroundings. Infants learn to focus their attention either towards or away from a stimulus, with techniques such as closing their eyes or turning their head. They also gain control of their emotional reactions with self-soothing techniques, such as thumb sucking, to cope with stressful environments (Rothbart, Ziaie, & O'Boyle, 1992). Selectively attending to certain stimuli helps to minimize exposure to stressors, which might otherwise lead to an emotional outburst or temper tantrum. Emotional and attentional control improves throughout toddlerhood (Ahadi & Rothbart, 1994; Kopp, 1989; Rothbart et al., 1992), laying the foundation for effortful control of behavior in early childhood.

By the time children are toddlers, they use both emotional and attentional control to regulate their behavioral impulses (Tronick, Als, & Brazleton, 1977). Effortful control refers to the "hot" regulation of instinctive, reactive behaviors in order to achieve an alternative goal, a skill that begins to emerge around two years of age (Gerardi-Caulton, 2000). Effortful control in toddlerhood can by displayed by delayed gratification, sustained attention, inhibiting impulsive behavior, or complying with external requests (Barkley, 2001; Eisenberg, Smith, & Spinrad, 2011; Posner & Rothbart, 2000). Various situations require toddlers to exert effortful control, whether it is resisting a tempting snack (delayed gratification), playing a game of 'Simon Says' (sustained attention; behavioral inhibition), refraining from throwing a toy across the room in a fit of rage (impulse control), or cleaning up a play area (compliance with external requests).

Cross-sectional studies suggest that effortful control steadily increases from toddlerhood through the transition to adolescence (Diamond & Taylor, 1996; Ridderinkhof, van der Molen, Band, & Bashore, 1997; Rueda et al., 2004). Early mastery of these skills is vital, as young children who exhibit effortful control tend to better cope with the social and cognitive demands that accompany the transition to formal schooling (Shaw & Gross, 2008). A child who exerts effortful control by waiting his/her turn to speak in class, sharing toys, and following instructions, for example, is more likely to succeed in school.

As children transition to formal schooling and continue through elementary school, they are faced with increasingly complex tasks that call for higher-level cognitive self-regulation, or executive functioning. After gaining control of impulsive and reflexive behavior, top-down processes, such as planning and problem solving, information processing, cognitive flexibility, working memory, and goal setting, begin to develop (Anderson, 2002; Rueda, Posner, & Rothbart, 2005). Academic tasks in a classroom setting can involve processing multiple (and sometimes conflicting) rules, retaining those rules in working memory, and having the attentional flexibility to switch between rules and disregard irrelevant pieces of information. Persisting on a long, complicated task requires children to have sustained attention, without forgetting to monitor progress, strategize, and correct any errors in decision-making (Bell & Deater-Deckard, 2007; Eslinger, 1996; Kirkham, Cruess, & Diamond, 2003). Hence, multiple executive functions are involved in successful self-regulatory behavior during the transition to formal schooling and middle childhood. Cross-sectional studies indicate that executive functioning skills improve from early childhood through mid-adolescence, leveling off thereafter (Davidson et al., 2006; Luciana, Conklin, Hooper, & Yarger, 2005). These abilities parallel

maturation of the prefrontal cortex in middle childhood (e.g., Kwon, Reiss, & Menon, 2002), and are instrumental for successful executive control in adolescence.

Adolescence is a critical period for self-regulation given the sweeping biological, cognitive, and social changes at this point in development. Adolescence is also a time when repercussions from earlier deficits in self-regulation may become evident. The major marker of self-regulation in adolescence involves the integration of executive functions for 'executive control' (Anderson, Anderson, Northam, Jacobs, & Catroppa, 2001). Executive control refers to the coordination of previously acquired abilities such as working memory, inhibition, mental shifting, and information processing, which are then called upon as needed (Best, Miller, & Naglieri, 2011; Friedman et al., 2008; Miyake et al., 2000). Adolescents are faced with complex challenges that require them to process conflicting information, plan and set long-term goals, and control behavioral impulses at a time when they are prone to sensation seeking and risk-taking (Steinberg, 2007). At this age, impaired executive control can lead to poor academic performance, heightened vulnerability to peer pressure, and greater propensity to engage in risky or dangerous behavior (Chein, et al., 2011; Gardner & Steinberg, 2005).

While many of the brain regions associated with self-regulation have largely developed by adolescence, biological maturation continues throughout the second decade of life (Scherf, Sweeney, & Luna, 2006). The myelination of prefrontal cortices and loss of gray matter throughout adolescence improves interconnectivity between regions of the brain responsible for various executive functions (Huttenlocher & Dabholkar, 1997; O'Hare & Sowell, 2008). The improved interconnectivity allows for more fluid and dynamic executive control (e.g., Durston & Casey, 2006). For example, in a large cross-sectional study of children aged five to seventeen years, older participants performed better than younger participants on advanced executive

control tasks, such as greater monitoring, speed, and accuracy on a computerized planning task, suggesting that executive control consistently improves across adolescence (Best et al., 2011).

To summarize, self-regulation develops from basic, fundamental abilities such as emotional regulation and attentional control in infancy, to effortful control in early childhood, followed by higher-order cognitive executive functions like working memory, planning, and problem solving, which all coalesce in adolescence (Blair & Raver, 2012; Calkins, 2007). Changing social demands, cognitive competencies, and biological interconnectivity promote adolescents' ability to switch between executive functions, and demonstrate global executive control. This hierarchically organized framework alludes to the cascading nature of developing self-regulation, in which success in one early domain can facilitate skills in other domains (Masten & Coatsworth, 1998). Conversely, early difficulties can undermine later successful development. For example, children with problems exerting effortful control may have difficult interactions with peers and teachers when they enter school. These children might be less receptive to instruction and learning, which can subsequently interfere with cognitive executive functioning in middle childhood and executive control as a teenager. Therefore, it is important to consider the developmental progression of self-regulation as it presents at different ages, and how these early competencies affect later self-regulation and functioning.

Significance of Self-Regulation in Early Childhood

One of the goals of early childhood education is to help students in preschool meet established developmental and pre-academic standards. One such standard is the cultivation of self-regulation, such as appropriately expressing negative feelings, handling physical impulses effectively, and shifting and maintaining attention (National Association for Education of Young Children, 2015; National Center of Quality Teaching and Learning, 2015).

Self-regulation, or the ability to effectively control one's own behaviors and emotions using a combination of top-down (executive functions) and bottom-up skills (effortful control) (Zhou et al., 2012), has been widely recognized as an important contributor to school readiness and future achievement (Liew, 2012; Lewitt & Baker, 1995; Lin, Lawrence, & Gorrell, 2003). Competencies such as listening to the teacher deliver a lesson in a busy classroom, keeping hands to oneself in emotionally stimulating situations, and remaining calm in the face of frustration, enable young children to engage in and learn from increasingly structured educational environments (Liew, 2012; McClelland et al., 2015).

Data collected by the National Center for Education Statistics revealed that public kindergarten teachers (n = 1339) rated school readiness behaviors as 'essential' or 'very important' in being considered ready to begin kindergarten (Lewitt & Baker, 1995). It is particularly noteworthy that 84% of teachers recommended that children be able to express their needs, wants, and thoughts verbally. Furthermore, 76% of teachers rated enthusiasm and curiosity as essential for school readiness, while 60% considered a child's ability to follow directions and behave cooperatively to be critical skills. A separate, more recent study reported similar findings among teachers with a variety of backgrounds (e.g., age, race, and years of teaching experience) who taught in different geographical regions and types of schools (Lin et al., 2003). In contrast, few teachers from both studies considered a child's ability to use a pencil or paintbrush, recognize letters of the alphabet, or count to 20 as critically important for school readiness. Together, these results suggest that, according to teachers, the primary skills that indicate school readiness are social-emotional and self-regulation skills.

Studies additionally suggest that strong self-regulation skills in children are linked to other outcomes, such as prosocial behavior (Rothbart, Ahadi, & Hershey, 1994) and social

competence (Calkins, Gill, Johnson, & Smith, 1999). In a study of the transition to school for children with and without intellectual disabilities, McIntyre, Blacher, and Baker (2006) found that latency in touching a desired toy at 36 months had a significant, negative relationship to teacher-reported problem behavior at 60 months, regardless of intellectual ability. This suggests that children who learn how to regulate their behaviors at an early age are less likely to display problem behaviors later in their development. Further, in a school setting, children's self-regulation skills are important in the development of close and supportive relationships with teachers and peers, such that those with high self-regulation skills were more likely to report having strong friendships and positive teacher interactions than those with low self-regulation skills (Gresham, 1998). The transition to school presents new behavioral, academic, and social demands on the child. Thus, the abilities to inhibit one's behavior using top-down and bottom-up processes in favor of prosocial goals are particularly important skills in predicting school adjustment.

Teacher-reported behavior concerns have consistently centered on students' lack of effective self-regulation skills as they transition to elementary school. Data collected from a national sample of kindergarten teachers found that 35% of students were rated as not ready for kindergarten, based on teachers' behavioral expectations (Lewitt & Baker, 1995). In a more recent survey conducted by the National Center for Early Development and Learning (2015), 46% of kindergarten teachers (n = 3595) reported that at least half of their students showed difficulty in following directions at time of school entry. Taken together, these findings indicate that teacher concerns for students entering kindergarten center around their skills in regulation behaviors and emotions appropriately.

The importance of self-regulation extends far beyond early childhood. Its advantages have been shown to persist past the early elementary school years and into adulthood. For example, a three decade-long prospective cohort study (Moffitt et al., 2011) highlighted the importance of cultivating these skills during early childhood when it found that higher levels of self-regulation in preschool (ages 3 to 5 years) predicted better physical health, greater financial security, and educational attainment in adulthood. In contrast, low levels of self-regulation predicted a range of negative consequences by adulthood, including health problems, financial instability, school dropout, substance dependence, and criminal conviction. The long-term relation between self-regulation and adjustment in adulthood – along with the high degree of neuroplasticity during the preschool years (Zelazo & Carlson, 2012) – underscores the importance of helping young children develop self-regulatory abilities before they enter elementary school.

Self-Regulation and Academic Outcomes

Aside from predicting other social-emotional competencies, self-regulation also has a strong positive correlation to academic achievement. A preponderance of literature suggests that self-regulation is a key mechanism supporting academic success in early childhood, adolescence, and adulthood (Blair & Razza, 2007; Duckworth et al., 2010; McClelland et al., 2007; McClelland, Acock et al., 2013; McClelland et al., 2006; Wanless, McClelland, Acock et al., 2011; von Suchodoletz et al., 2013). The development of top-down (attention, working memory) and bottom-up (inhibitory control, delay of gratification) self-regulation skills is related to higher math and literacy achievement during preschool (Blair & Razza, 2007) and kindergarten (Cameron Ponitz et al., 2009), and lay the foundation for successful academic trajectories. For example, in a recent study, children with strong parent-rated self- regulation at age four years

had 49% greater odds of finishing college by the age of 25 (McClelland, Acock et al., 2013).

These findings indicate that self-regulation is a critical precursor for success in academic settings in that it allows children to take advantage of learning opportunities (Raver et al., 2011; McClelland, Geldhof et al., 2013). In other words, self-regulation helps children learn how to learn, rather than what to learn, and lays the foundation for academic achievement. Thus, it is critical to facilitate the development of self-regulation in early childhood to promote successful academic trajectories.

Further, a multitude of research supports the finding that early top-down self-regulation is a robust predictor of math, literacy, and vocabulary skills in elementary school children (Cameron Ponitz, McClelland, Matthews, & Morrison, 2009; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003), as well as changes in report card grades in middle school children (Duckworth et al., 2012). For example, research suggests that children who are better able to control attention have better grades and higher achievement test scores than those with poorer attention skills (Howse et al., 2003). Further, Fantuzzo and colleagues (2004) reported that children in Head Start who, according to independent observers, had better attentional control in preschool also had higher academic school readiness scores.

Similarly, bottom-up self-regulation skills have been linked to academic achievement. In a series of studies, Mischel and colleagues (1975, 1970, 1972) examined associations between preschool children's delay of gratification skills and their subsequent academic achievement. Overall, the findings of these studies suggest that preschoolers with greater skills in delaying gratification were likely to become academically successful teenagers. For example, Shoda, Mischel, and Peake (1990) found that preschoolers who waited longer to receive a self-selected reward were subsequently reported by their parents to have higher verbal and quantitative skills,

indicating a connection between bottom-up self-regulation and problem-solving and learning. Further, Opper (2003) found that young children who were better able to delay gratification were rated by teachers as more able to solve classroom problems without adult assistance, more likely to retain information, and more capable at classroom tasks. These empirical findings suggest that young children who inhibit behavior successfully are likely to have higher levels of academic achievement than children who have difficulty managing their behavior.

Children's self-regulation assessed by combining adult reports of top-down (attention control) and bottom-up (behavioral inhibition) has also been positively associated with academic achievement (Normandeau & Guay, 1998). For example, Miech and colleagues (2001) examined the association of preschooler's parent-reported attention control and behavioral inhibition and their kindergarten teachers' reports of academic achievement. They reported that children's preschool emotion self-regulation was positively associated with kindergarten academic achievement, above and beyond contributions of children's preschool cognitive abilities and family background. These empirical findings suggest that children who successfully control attention and inhibit behavior are more likely to succeed academically than their classmates with poor self-regulation skills. Together, the research highlights the importance of self-regulation for academic success, and indicates that the preschool years may be an important period for targeted intervention.

Self-Regulation and Demographic Risk

Of all children, those experiencing demographic risk, such as poverty and ethnic minority status, are at the greatest risk for negative outcomes for a range of developmental outcomes (Duncan & Magnuson, 2005; Evans & Rosenbaum, 2008; Komro, Flay, & Biglan, 2011; McClelland et al., 2000; Sektnan, McClelland, Acock, & Morrison, 2010; Mistry et al., 2010).

Decades of research underscore the negative relation between socioeconomic risk and academic outcomes (e.g., Duncan & Magnuson, 2005), and more recent work indicates similar negative effects on children's self-regulation (e.g., Raver, Blair, & Willoughby, 2013; Wanless et al., 2011). For example, in one study, children from low-income families demonstrated poorer self-regulation skills on a direct measure in the fall of the preschool year relative to their more advantaged peers (Wanless et al., 2011). Poverty can put insurmountable stress on families, and recent psychobiological models indicate that poverty-related adversity can inadvertently affect self-regulation through reductions in the quality of the home environment (Blair & Raver, 2012). Specifically, poverty-related stress can affect parents' abilities to provide stimulating home environments that encourage children to practice the skills related to strong self-regulation (e.g., paying attention, remembering rules, controlling impulses) (Hart & Risley, 1995; McClelland et al., 2000).

Previous studies suggest that strong self-regulation is a personal asset for children experiencing risk (Evans et al., 2012; McClelland & Wanless, 2012). In one recent study, self-regulation remained a significant predictor of academic outcomes over four time points regardless of risk (McClelland & Wanless, 2012), suggesting that strong self-regulation is beneficial across varying combinations of demographic characteristics. In addition, self-regulation has been documented as an underlying mechanism driving the relation between demographic risk and academic achievement. In other words, studies have shown that demographic risk factors, such as poverty, are indirectly related to children's academic outcomes through self-regulation skills (Sektnan et al., 2010; Evans & Rosenbaum, 2008). For example, in one study, family risk, as indexed by ethnic minority status, low maternal education, and maternal depressive symptoms, predicted poorer parent- and teacher-rated self-regulation when

children were 54-months-old, which, in turn, was related to poorer academic outcomes in first grade (Sektnan et al., 2010). Another study that explored self-regulation as a marker of resilience found that children who were homeless with strong levels of self-regulation demonstrated more adaptive functioning than children who were homeless who struggled with self-regulation during the transition to kindergarten (Obradovic, 2010). In sum, self-regulation seems to be especially important for children experiencing socio-economic risk, and fostering strong self-regulation for these children may be an important point of intervention, particularly before the transition to kindergarten. Therefore, the current study targeted children enrolled in Head Start, a federally-funded preschool program for families demonstrating economic need.

Head Start Background

The Head Start program was initiated in 1965 as a federally-funded early education intervention program promoting school readiness for preschool age children from disadvantaged backgrounds (National Head Start Association (NHSA), 2010). This program was a major component of the Economic Opportunity Act of 1964 (PL 88-452), which called for federal human and financial resources to be used for the purposes of fighting poverty in the United States. Based on the availability of these resources, Head Start founders were able to create a nationwide school readiness program that dealt specifically with preschool children living in poverty.

According to researchers, children in poverty have typically demonstrated marked difficulties in academic achievement, including delays in language and reading readiness (pre-literacy skills), numbers and numeracy, and reasoning abilities (Ramey & Ramey, 2004). These delays can be difficult to remediate and have long-term effects if successful intervention is not provided early enough. For instance, in a longitudinal study by Tabors, Snow, and Dickinson

(2001) that followed children from kindergarten to seventh grade, children's language skills (e.g., receptive vocabulary) and emergent literacy skills (e.g., print concepts, letter names and sounds) assessed in kindergarten were highly and significantly correlated with measures of receptive vocabulary and reading comprehension in both fourth and seventh grade. Head Start's mission focuses on intervention at the preschool level by fostering positive development of academic skills, social-emotional skills, and general health for children from low socioeconomic status backgrounds.

In order for Head Start programs to promote school readiness, federal legislation mandated that the preschool curriculum support cognitive and language development, academic readiness skills, social-emotional well-being, and physical development. The most widely used curriculum by Head Start Centers is the Creative Curriculum (Dodge, Colker, & Heroman, 2002). The curriculum incorporates four components deemed necessary for fostering positive development in all the areas emphasized by Head Start programs. The components include "knowing how children develop, creating the learning environment, knowing what content children need to learn, and understanding the teacher's role and the family's role" (p. 241). Creative Curriculum is built on a diverse set of approaches such as child-initiated learning coupled with elements of teacher-directed learning. The curriculum revolves around activities that include block play, dramatic play, toys, games, art, having a library, discovery, music, movement, cooking, computers, and outdoor activities. Major roles of the teacher and family members are to observe, encourage, ask questions, interact with, respond to, and guide the child.

In addition to learning curricula, many Head Start programs also implement school-wide social-emotional curricula with students. One such program, *Al's Pals*, has been used widely in Head Start centers around the United States. *Al's Pals* is a resilience-based early childhood

curriculum and teacher-training program that fosters the development of social, emotional, and behavioral skills in children aged 3 to 8 years (Wingspan, 2013). The *Al's Pals* curriculum consists of 46 lessons delivered twice per week that use hand puppets to teach children to express feelings appropriately, use kind words, use self-control, think flexibly, make friends, utilize positive coping skills, and understand that drugs and alcohol are not for children. Universal, Tier 1, social-emotional programming, such as *Al's Pals*, has been found effective in teaching children approaches and strategies that guide prosocial behavior and peaceful problem-solving skills (Wingspan, 2013). A complete list of *Al's Pals* lessons is provided in Table 1.

Table 1

Al's Pals Curriculum

Lesson Number and Title	Lesson Number and Title (continued)	Lesson Number and Title (continued)
1. You're a Star	16. When Someone is Mad, but Not at You	31. What's Safe for My Body
		32. What's Safe To Touch
2. Welcome Al	17. Proud	33. Keeping Ourselves Healthy
3. What's a Feeling?	18. Frustrated	34. Is It Really Medicine?
4. I Can Handle My Feelings	19. Disappointed	35. "Healthy Choices"
5. Be My Friend	20. Blending of Feelings	36. Maybe I Should Stop and Think
6. Let's Cooperate	21. Using Kind Words	37. What's the Problem?
7. Different and the Same	22. Different Things Bother Different People	38. Stop, Think, Say How You Feel
8. Different is Okay	23. Listen To Me, Please	39. Stop, Think, Brainstorm the Problem
9. Brainstorming	24. Excuse Me, Please	40. I Could Share
10. Stop and Think	25. May I Play, Too?	41. I Have an Idea

Table 1 (cont'd)

11. Happy/Sad	26. Special Me, Yeah Yeah	42. Wanna Trade?
12. How Does Mad Feel?	27. Imaginary Gifts	43. Try the Best Idea
13. Sometimes I Get Angry	28. Taking Care of Ourselves	44. Keep on Trying
14. Calm Down/Big Feelings	29. My Body is Special	45. I'm a Problem-Solver
15. I'm Scared	30. What Would You Do?	46. Putting it all Together

To monitor the outcomes of the curricula used by Head Start programs, federal legislation in 2003 mandated that Head Start programs assess children three times per year following guidelines developed by Health and Human Services (HHS). The Head Start Child Outcomes Framework (U.S. Department of Health and Human Services, 2011) delineates the essential domains to be measured, which includes language, literacy, math, science, and the creative arts. In addition to academics, the Outcomes Framework specifies other essential domains to be assessed such as social-emotional development, approaches to learning, health, and physical development. Given that the promotion of social-emotional skills is emphasized by Head Start, understanding the extent to which students are meeting academic competencies, and further, how to improve children's social-emotional skills when they are at-risk for not meeting competencies, is essential to ensure that both students and schools are meeting listed guidelines.

Promoting Social-Emotional Health in Schools

Public Mental Health Framework. While the importance of promoting children's social-emotional health is widely recognized, there is evidence that children's needs are not adequately addressed (World Health Organization, 2004). Some estimates suggest that approximately 20% of children will exhibit behaviors that negatively influence their functioning, and 5% of children will experience significant life impairments as a result of these behaviors (Massey, Armstrong,

Boroughs, Henson, & McCash, 2005). Other studies suggest that one in five children will

require mental or behavioral health services during their academic careers, but only 30% of such

children will actually receive the necessary services while they are in school (Albers, Glover, &

Kratochwill, 2007; Chafouleas, Volpe, Gresham, & Cook, 2010). Thus, the number of children

requiring mental health supports exceeds the number of children who are likely receiving

intervention, and as such, the social-emotional health of many school-aged children may be

compromised. Further, children who are equipped with fewer social skills and competencies

may be at greater risk for experiencing later negative outcomes like school failure, peer rejection,

and the development of mental health problems (Bagdi & Vacca, 2005).

Approaches to Promoting Positive Behavioral Health. Historically, the field of

psychology has taken a "wait-to-fail" approach when treating social-emotional behavior

problems. In this approach, an individual does not receive intervention or supports until there is

a severe discrepancy between the expected and actual skill level (Reynolds & Shaywitz, 2009).

However, proactive approaches to improve mental health (e.g., Cowen, 1994) provide the

foundation for prevention and promotion of social-emotional health. Cowen (1994) delineated

the importance of psychological wellness, including preventing dysfunction and promoting

psychological health. Cowen's model assumes that psychological wellness benefits from early

intervention, which serves to prevent later problems. Psychological wellness could be enhanced

through early attachments, acquiring competencies, promoting healthy settings, fostering

empowerment, and acquiring the skills necessary for navigating the difficulties of life. Thus,

instead of adopting a reactive model of service—one that focuses on the negative aspects of an

individual, waits for an individual to require services in response to a crisis, or that relies on

referrals from a "wait-to-fail" approach (Doll & Cummings, 2008)—the concepts of mental

health promotion and prevention could be adopted with a specific emphasis on focusing on health as more than just an absence of illness (Kobau et al., 2011).

The field of behavioral health prevention bases interventions on the reduction of risk factors and the enhancement of protective factors, thereby buffering against risk (Greenberg et al., 2001; World Health Organization, 2004). Prevention services are provided in a proactive manner, such as before the onset of a mental health disorder. Nastasi and Varjas (2008) suggest that the practices of mental health prevention programming within the public health model include: providing services to the population being served, making use of evidence-based practices, conducting screenings for mental health concerns, and conducting programs that improve functioning while reducing risky behavior.

Application to Schools. The present study applied the behavioral health prevention model to an educational setting by identifying children who would benefit from increased social-emotional instruction and providing evidence-based intervention services proactively. Doll and Cummings (2008) and Merrell and Gueldner (2010) provide a framework for applying the concepts of a public mental health framework to a school-based three-tiered prevention model. The three-tiered model is typically portrayed as a triangle with three levels, providing a continuum of services at each level (Figure 1).

Figure 1

Three-Tiered Model of Intervention

Tier 3 — Fewest students. Most intensive. Short & long term interventions

Tier 2 — Strategic interventions: behavioral/academic. Targets specific students. As needed; fluid

Tier 1 — All students. Best first teaching in core curriculum. Differentation & scaffolding. Classroom norms & behavior interventions
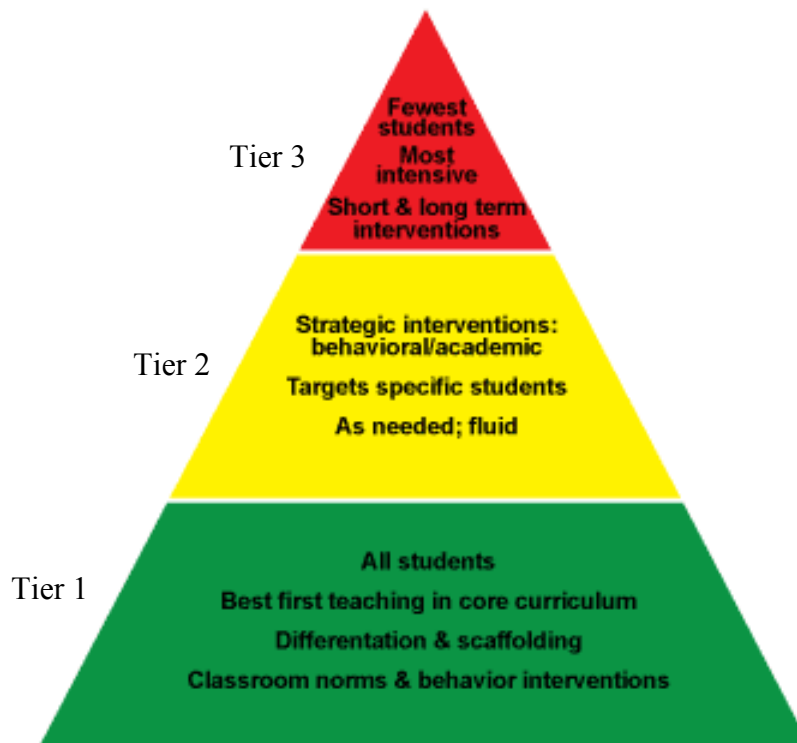
The bottom level is the primary or "universal" level of support, serving approximately 80% of the school's population. At the universal level, efforts for mental health prevention are geared toward serving all students within the school (Mills et al., 2006). Doll and Cummings (2008) note that efforts at the universal level include evidence-based curricula, social problem solving strategies, and school-wide bullying prevention plans. Despite the primary prevention efforts, there may be students who do not respond. Secondary or "targeted" supports are provided to students who require additional services and who may be at-risk for developing emotional, behavioral, or mental health problems. The targeted, Tier 2 level of support is geared toward a smaller percentage of a school, approximately 15% (Merrell & Gueldner, 2010). Finally, the top of the triangle, Tier 3, depicts the tertiary or "indicated" level of support. This

reflects the proportion of the population, approximately 5% of students, who do not respond to the first two levels of support. These are the students that have significant needs requiring individualized intervention supports. Merrell and Gueldner (2010) note that students at this level have historically consumed most of the school's resources, as they often require significant accommodations or supports, reflecting the "wait-to-fail" approach. The present study will target the Tier 2 level of students requiring additional social-emotional learning support. Thus, these students are not responding as expected to the Tier 1, general social-emotional learning curriculum and may be at-risk for developing emotional or behavioral problems in school. In an attempt to prevent these problems from developing, these students will receive additional evidence-based social-emotional learning supports.

Promoting Evidence-Based Intervention in Schools. While many behavioral intervention programs exist, research supports the use of evidence-based mental health services in schools as a means of behavioral and mental health prevention. Kettlewell (2004) summarized the principal arguments in support of evidence-based interventions (EBIs) as the following: "(a) evidence-based treatments give guidance to better serve people who are seeking care; (b) using the scientific approach to evaluate treatment is the best way to advance knowledge in order to provide the best mental health services in the future; (c) it is necessary to use limited mental health resources wisely; (d) there are treatments that work that many practitioners do not use; and (e) the best alternative is to use science as the standard for practice" (p.191). However, there are various criticisms of EBI present in the literature. One theme that emerges from the various criticisms is the need to move from efficacy studies to effectiveness studies (Southam-Gerow, 2004; Weisz, Chu, & Polo, 2004; Westen, Novotny, & Thompson-Brenner, 2005). The delivery of EBIs in school- or clinic-based settings is more complex and

confounded by other factors than those in controlled laboratory studies. Therefore, dissemination of EBIs in communities will not necessarily follow a process similar to the one in lab-based settings, and may require alterations to the EBI in order for it to meet the needs of the setting. The present disconnect between laboratory studies and implementation of invention in applied settings illustrates a need for researchers to further study the transportability of EBIs, and whether or not modular approaches can still achieve positive results. Further, research is needed that explores the practical challenges in implementing evidence-based interventions given setting constraints and available resources.

Transportability of Evidence Based Interventions to Community Settings

The transportability of EBIs into school settings is an important aspect of providing mental health services in schools. Transportability refers to the ease with which an EBI can be moved from the research setting in which it was developed and tested to non-research settings (Schoenwald & Hoagwood, 2001). Researchers have noted that a necessary direction for school-based mental health is to determine how to adapt these treatments to facilitate their use in school settings without affecting their efficacy (Graczyk, Domitrovich, & Zins, 2003; Hoagwood et al., 2001). This includes examining the feasibility of implementation, use of selected units, and the dosage required to maintain intervention effectiveness. Currently, there is a research to practice gap, whereby researchers create idealized EBIs that may not be feasibly implemented in school settings and therefore, have limited transportability (Auster, Feeney-Kettler, & Kratochwill, 2005). Unfortunately, research on EBIs tends to focus little on the factors within the school context that influence the transportability of the intervention, which may be critical in closing the research to practice gap. Furthermore, the gap is typically seen as a problem on the part of the practitioners when researchers and trainers should share the responsibility of narrowing the gap

(Kratochwill & Shernoff, 2004). This study addressed this gap by working in collaboration with local agencies and practitioners to evaluate the transportability of EBIs in practice settings.

Preschools. Although there is not an abundance of literature that focuses on the transportability of EBIs to preschools, studies have identified several factors that may be unique to the preschool setting. A study by Shernoff and Kratochwill (2007) identified contextual variables that negatively influenced transportability of a classroom-based social-emotional intervention to private preschool classrooms. The most significant barriers were time to complete training, untrained co-teachers, and lack of training/administrator support. This suggests that reduced training time and increased ongoing support at an institutional level may help to facilitate the introduction of EBIs in preschools. While Shernoff and Kratochwill (2007) addressed some barriers of introducing EBIs into preschools, they did not obtain data on the practical challenges of implementing an EBI and how researchers can work with schools to overcome these barriers. For example, in the present study, conversations with Head Start consultants revealed that practical barriers, such as space or personnel to deliver interventions and inconsistent student attendance, are additional concerns that may be unique to this setting. Thus, the current study expanded prior research by identifying the practical challenges of introducing and implementing EBIs in Head Start preschools.

Action Research Approaches to Intervention Studies

To promote the use of EBIs in schools, researchers have suggested using an action research perspective when working with school partnerships. In an educational setting, action research involves a process in which researchers and participants operate as full collaborators in creating action projects that are designed to meet specific needs of the participants (Ditrano & Silverstein, 2006). Thus, researchers using an action research perspective incorporate the needs

and the culture of the partnership in implementation of EBIs, and because of this, upend the power dynamics between outside experts and local community insiders. As a result, action research offers the potential for more authentic and valid findings, and was adopted for the current research, in collaboration with the community partner, Head Start.

In ongoing discussions, collaborators within Head Start emphasized the need for additional social-emotional instruction, but insufficient resources to address these needs. While the agency did have pre-existing access to (unused) social-emotional learning curricula that would meet their needs (i.e., *Second Step Early Learning Program*), stakeholders reported having insufficient resources in terms of available personnel to complete Tier 2 and Tier 3 interventions, lack of space to conduct pull-out interventions, inconsistent student attendance, and lack of knowledge about how to introduce and implement EBIs. Further, stakeholders wanted research assistance in implementing pre-existing programs, such as *Second Step*, as opposed to introducing a new curriculum. Thus, the researcher worked with stakeholders within Head Start to develop a project that addressed their needs, while still being aligned with researcher interest and expertise. Because the agency had purchased, but not used the *Second Step Early Learning Program*, they expressed interest in finding ways to implement this program across several schools. However, due to insufficient resources in terms of interventionists and intervention space, stakeholders decided that as a first step in expanding the delivery of socio-emotional interventions, the researcher would deliver the lessons (instead of teachers or Mental Health Consultants) in the classrooms. Due to the current constraints of this setting, the best and only way to introduce a Tier 2 intervention was for an outside expert to deliver the curriculum. As such, researchers delivered the intervention in this study as a way to understand the outcomes

35

of the intervention, as well as to increase teacher and Mental Health Consultant familiarity with Tier 2 interventions and how they can be practically implemented in the classroom.

Social-Emotional Learning (SEL) Programs

Definition of SEL. One method found to enhance the self-regulation of young children is SEL programming (Durlak et al., 2011; Zins et al., 2007). As previously defined, SEL refers to the ability to identify and handle feelings effectively, solve problems, make responsible decisions, develop caring and concern for others, and form positive relationships (Zins et al., 2007). Aiming to adjust thoughts, feelings, and behaviors, SEL involves the manner by which an individual learns and uses the information and competencies to accomplish prosocial and behavioral goals (CASEL, 2015). Thus, a child considered to be socially and emotionally competent is able to self-soothe when upset or excited, divert attention away from a frustrating or distressing situation, make and keep friends, offer help, express empathy, and engage in effective peer conflict resolution.

Essential Elements of SEL. SEL programs aim to foster children's primary social and emotional skills (self-management, self-awareness, social awareness, relationship skills, and responsible decision making) and enhance the perspectives children take about themselves and others (CASEL, 2013). Many SEL programs integrate essential elements, known as the SAFE technique, to help children work toward the previously stated goals (Hamre & Pianta, 2007). Specifically, the use of SAFE is critical in skill acquisition and reinforcement of desired behavior (Payton et al., 2008; Weare & Nind, 2011). The SAFE method entails application of a planned sequence of activities to support gradual skill development, use of sufficient time to focus on SEL skill development, and ample opportunities to practice, role play, and apply targeted SEL skills to real-life events. Students who received SEL instruction using the SAFE technique

outperformed their counterparts who received SEL instruction without the SAFE technique in SEL skills, attitudes towards themselves and others, positive social behavior, conduct problems, emotional distress, and academic performance (Payton et al., 2008). Other SEL instructional methods include modeling and coaching children to recognize personal emotions and those of others, as well as prompting and dialoguing (CASEL, 2015).

 Significance of SEL in Early Childhood. Over the past decade, empirical studies have revealed positive links between SEL programs and children's emotional, behavioral, social, and academic outcomes in preschool and lower elementary school students. For example, Payton and colleagues (2008) reviewed 317 studies on the effectiveness of universal, indicated, and afterschool SEL programs for children in kindergarten through eighth grade, and results demonstrated significant improvements in children's views about themselves, their peers, and their school; social-emotional competence; social behaviors; conduct; and academic performance. These benefits were found across SEL programming during and after school; diverse ages and backgrounds; grade levels; and rural, urban, and suburban settings (Payton et al., 2008). Furthermore, follow-up data indicated that the effects of SEL interventions on child functioning were sustained over time after the completion of the intervention. A subsequent meta-analysis of 213 school-based SEL programs provided additional evidence for the benefits of SEL programs (Durlak et al., 2011).

 Intervention Dosage. One aspect of SEL intervention delivery that is linked to student outcomes is intervention dosage, or the number of components or lessons the student was present for (Mokrue, Elias, & Bry, 2005). Previous studies of SEL interventions have found that students who were considered to have high or medium intervention dosage displayed significantly better outcomes than peers considered to have low intervention dosage (Aber et al.,

1988; Rosenblatt, 2008). This suggests that students who learn more components of the intervention display better outcomes than those who receive a low dosage of the intervention. In the current study, the partnering agency disclosed that frequent student absences are a concern when considering introduction of Tier 2 interventions, as they do not know if the intervention will be effective if students are not present for all lessons. Further, research standards about the minimum intervention dosage needed to see expected outcomes do not exist, which is an additional barrier for understanding the transportability of EBIs to school settings. Thus, in the current study, the researcher attempted to understand how intervention dosage related to student outcomes.

      Second Step Early Learning Program. A number of studies support the use of school-based SEL programming with young children during preschool through early elementary school. These studies have revealed positive relationships and sustained effects of a variety of SEL interventions on multiple child outcomes. One promising SEL intervention for four- and five-year-old preschool children is *Second Step Early Learning Program* (Committee for Children, 2011). A downward extension of the widely researched *Second Step* program (Thomas & Gravert, 2011), *Second Step Early Learning Program* aims to build young children's school readiness by cultivating social-emotional competence and self-regulation. To meet this goal, the program includes lessons that teach self-regulation skills necessary for learning and getting along with others. Other lessons teach skills like the management of positive and negative emotions and empathy, which encompasses identifying feelings, offering help, and providing comfort to a peer (Committee for Children, 2011). Brain Builder activities, or games embedded within the *Second Step Early Learning Program* curriculum intended to reinforce skills that children learn

during the week, are typically integrated across lessons and have been shown to improve children's attention, working memory, and inhibitory control (Tominey & McClelland, 2010).

Currently, there is no published research that has evaluated *Second Step Early Learning Program* efficacy or effectiveness. The original *Second Step* program, however, has received satisfactory to high ratings for research quality and effectiveness. Based on a review of implementation materials, training and support resources, and quality assurance procedures, *Second Step* earned a rating of 3.8 out of 4.0 for effectiveness from the National Registry of Evidence-Based Programs and Practices (NREPP) (Department of Health and Human Services [DHHS], Substance Abuse and Mental Health Administration [SAMHSA], 2006). Furthermore, *Second Step* earned at least a 2.4 rating out of 4.0 for its overall research quality, based on six indicators (reliability and validity of measures, intervention fidelity, missing data and attrition, potential confounding variables, and appropriateness of analysis) in 2006 (NREPP, DHHS, SAMHSA, 2006). A number of studies have found that *Second Step* increased social competence, improved emotion regulation, reduced verbal and physical aggression, and decreased problem behaviors among elementary school-aged children (ages 6 through 12 years) (e.g., Frey et al., 2005; Grossman et al., 1997). Most recently, teacher-reported data revealed positive effects of *Second Step* for reducing problem behaviors (conduct problems, hyperactivity, and peer problems) and enhancing a variety of competencies (prosocial skills, social and emotional skills, skills for learning, emotion management, and problem solving) in kindergarten through second-grade students whose schools implemented the program (Low, Cook, Smolkowski, & Buntan-Ricklefs, 2015). Because the *Second Step Early Learning Program* utilizes many of the same strategies and materials as the original program, these positive findings make it a promising choice for preschool-aged children that merits further research.

Use of Selected Second Step Lessons

For this study, selected units from the *Second Step Early Learning Program* will be implemented with students from Head Start classrooms, even though the program was not originally designed as a modular intervention. The use of selected units was based on practical, theoretical, and empirical considerations. First, the researcher was interested in studying the effectiveness and transportability of the *Second Step Early Learning Program* using an action research approach. As such, the researcher strongly considered the needs of the partnering organization, Head Start, when designing the study. In conversations with the researcher, Head Start consultants expressed two key criteria for the intervention; first, that the intervention focus was on improving the self-regulation skills of students, and second, the intervention was delivered in fewer than 10 weeks, due to resource restraints of the participating schools. Because of the limited time frame, the first three units of the *Second Step Early Learning Program* (i.e., Skills for Learning, Empathy, and Emotion Management) were chosen for implementation, as these could be delivered in fewer than 10 weeks and allowed students to learn and practice a wide range of self-regulation skills, including focusing attention, following directions, and managing strong feelings.

Second, no study to date has investigated the use of selected intervention units and how this influences student outcomes. Prendergast (2011) noted that while evidence-based practice is the gold standard in intervention implementation, it is often not feasible in many situations because efficacy studies for interventions are often conducted in highly controlled clinical settings with a homogenous sample, well-trained staff, and adequate funding, and this often does not translate to typical community-based settings. In addition, interventions are evaluated as a single package, and it remains unclear which of the components are the "active" ingredients that

are related to behavior change (Prendergast, 2011). Although dismantling an intervention may be considered a violation of fidelity, there is also a need to understand which of the components of the intervention contribute to behavioral change in students, as use of selected lessons is more feasible and practical in community- and school-based settings. This study attempted to contribute to the research in this area by investigating the effectiveness of the use of selected units of the *Second Step Early Learning Program* and its effect on student outcomes.

Research Questions and Hypotheses

This study aimed to accomplish three goals: a) examine the effects of a preschool version of a well-established social-emotional learning (SEL) program (*Second Step Early Learning Program*; Committee for Children, 2011) on the self-regulation, emotion knowledge, and early literacy skills of at-risk Head Start students, (b) examine the dosage effects of the use of selected units from the *Second Step Early Learning Program* (Committee for Children, 2011), and (c) investigate the factors related to transportability of evidence-based interventions to school settings.

Research Question 1. Do children with low self-regulation skills who receive a targeted, modified version of the Second Step Early Learning Program show an improvement in self-regulation, emotion knowledge, and early literacy skills compared to students low in self-regulation skills who do not receive the targeted intervention?

It was hypothesized that the children who are low in self-regulation skills and receive selected units of the *Second Step Early Learning Program* will show a greater improvement in self-regulation, emotion knowledge, and early literacy skills compared to students who are low in self-regulation skills and do not receive the intervention.

41

Research Question 2. Do children with low self-regulation skills who receive a targeted, modified version of the Second Step Early Learning Program show similar self-regulation as students with adequate self-regulation skills who do not receive the targeted intervention, as rated by teachers?

At post-intervention, the children who are low in self-regulation skills and receive selected units of the *Second Step Early Learning Program* will display self-regulation skills at a comparable level to same-class peers with adequate self-regulation skills who do not receive the intervention.

Research Question 3. Does dosage of Second Step Early Learning Program, as evidenced by attendance, relate to changes in self-regulation, emotion knowledge, and early literacy skills?

Children who have high attendance will have better self-regulation, emotion knowledge, and early literacy skills than low attending children.

Research Question 4. What are the challenges and strategies to promoting the transportability of evidence-based interventions into schools?

This question is exploratory, but teachers were expected to identify challenges related to the priority on academic curriculum, and limited time, staff, and resources available for Tier 2 intervention.

CHAPTER III: METHOD

Setting

The study took place in six Head Start preschools that served children aged three through five years in separate classrooms. Each Head Start preschool was part of a larger Head Start program that encompassed four state counties. The Head Start program began providing preschool services in 1965. Currently, it provides school year and full year programming options and serves a total of 1,761 children. Each Head Start classroom maintains a teacher-student ratio of 1 teacher for every 10 students specific to this age range (i.e., up to 20 three-, four-, and five-year old children under the supervision of two full-time teachers). In order to be eligible for Head Start enrollment, the child must be between the ages of three and five years old before September 1 of the current school year. Further, the family must meet federal poverty guidelines to qualify for Head Start services (e.g., the income for a family with three family members may not exceed $20,090).

Participants in this study were recruited from twelve classrooms that serve three-, four-, and five-year old children. Each classroom adopted the *Al's Pals* (Wingspan, 2013) social-emotional curriculum for class-wide delivery. However, according to teacher and Mental Health Consultant reports, some students required additional instruction and practice applying social-emotional skills appropriately. In line with the school-based three-tiered prevention model described by Doll and Cummings (2008) and the needs of the setting, the researcher taught selected *Second Step Early Learning Program* lessons as a targeted, Tier 2 intervention that supplements the universal level of intervention. Table 2 provides the particular skills of interest, operational definitions, and the associated *Al's Pals* and *Second Step Early Learning* lessons that are aimed at teaching those skills

Table 2

Skills and Associated Al's Pals and Second Step Early Learning Program Lessons

Variable	Operational Definition	Associated Al's Pals Lesson (Number and Description)	Associated Second Step Lessons (Units 1-3) (Number and Description)
Emotion Knowledge	Recognizing expression of emotions	3 (What's a Feeling); 11 (Happy/Sad); 12 (How Does Mad Feel?); 13 (Sometimes I Get Angry); 17 (Proud); 18 (Frustrated)	7 (Identifying Feelings Happy/Sad); 8 (Identifying Feelings Surprised/Scared); 9 (Identifying Anger); 13 (Worried)
	Labeling expressions of emotions	11 (Happy/Sad); 12 (How Does Mad Feel?); 15 (I'm Scared); 17 (Proud); 18 (Frustrated); 19 (Disappointed)	7 (Identifying Feelings Happy/Sad); 8 (Identifying Feelings Surprised/Scared); 9 (Identifying Anger); 10 (Same or Different Feelings); 13 (Worried); 14 (Strong Feelings/Frustrated); 15 (Naming Feelings)
	Understanding the causes and consequences of emotions	13 (Sometimes I Get Angry); 15 (I'm Scared); 16 (When Someone is Mad, but Not at You); 18 (Frustrated); 19 (Disappointed); 20 (Blending of Feelings)	7 (Identifying Feelings Happy/Sad); 8 (Identifying Feelings Surprised/Scared); 9 (Identifying Anger); 10 (Same or Different Feelings); 11 (Accidents); 13 (Worried); 14 (Strong Feelings/Frustrated
Self-Regulation	Suppressing a dominant response in favor of a secondary, subdominant response	9 (Brainstorming); 10 (Stop and Think); 14 (Calm Down/Big Feelings); 36 (Maybe I Should Stop and Think); 37 (What's the Problem); 38 (Stop, Think, Say How You Feel); 39 (Stop, Think, Brainstorm the Problem)	16 (Managing Disappointment); 17 (Managing Anger); 18 (Managing Waiting)
	Selecting and attending to relevant information, despite presence of distracters		2 (Listening); 3 (Focusing Attention); 4 (Self-Talk); 5 (Following Directions); 6 (Asking for What You Need or Want)

Five to eight children across six Head Start classrooms (39 children total) received the *Second Step Early Learning* curriculum in addition to the class-wide *Al's Pals* curriculum that was delivered by their classroom teacher. Further, five to eight children across an additional six classrooms (39 children total) served as the comparison group, and did not receive the *Second Step Early Learning* curriculum. All 78 participants, selected from all children across the twelve classrooms (*N*= 214 students), took part in pre- and post-intervention assessments.

Recruitment and Participant Selection

Students. Participants ranged in age from three to five years old and were selected from all of the students (N = 214) in the 12 participating classrooms. These students received a full day of preschool programming, attending school from 8:30am to 3:30pm. Students had the same classroom teacher each day, and attended school four days per week on a school-year schedule (September through June). Students who could not understand materials delivered in English were excluded from this study. One item on the demographic questionnaire was used to disqualify students: parent response (yes or no) indicating whether or not their child will have difficulty completing activities in English. Two students were found to be ineligible for the study. Eligible children who displayed behavior and self-regulation difficulties were identified based on teacher and Mental Health Consultant behavior ratings. From this group, a selected sample who met criteria were invited to participate in the study.

An a priori power analysis determined that a sample size of N=96 was required for multilevel modeling to be used with an estimated effect size of 0.15. A priori power analysis using *G*Power* (version 3.1.9.3) for one-way ANCOVA with 95% power and an effect size of 0.25 indicated that a minimum sample of 54 was needed. Due to the nested nature of the data, the researcher attempted to recruit 96 students to appropriately conduct multilevel modeling

45

procedures. However, when this became unlikely due to the restrictions set by the setting, the researcher aimed to recruit a minimum sample size of 54 students.

Recruitment Procedure. Two primary recruitment strategies were used to ensure sufficient participation. First, to encourage parental consent, the researcher and classroom teachers had face-to-face or phone conversations with parents to discuss the study and potential benefits of participation. According to conversations with Mental Health Consultants and classroom teacher supervisors, they viewed this study and the additional SEL programming (i.e., *Second Step Early Learning*) as valuable to the school and children by providing a better understanding of: (a) the effectiveness of additional social-emotional intervention for individual students who are behind their peers in self-regulation skills, (b) student growth in self-regulation and emotion knowledge before and after the intervention, which can inform future instruction, and (c) if changes in self-regulation relate to the child's academic and social-emotional school readiness.

Second, recruitment involved teacher involvement. Specifically, teachers, in collaboration with the researcher, sent home consent packets, addressed to parents or primary caregivers, with each eligible child to invite them to participate in the study. Each consent packet included a letter that provided information about the *Second Step Early Learning Program*, a parent consent form for study participation, and a demographic questionnaire.

Target Student Selection Procedure. To select participants who needed additional support in self-regulation, a multi-step process was used. Following consent (Appendix A) and a parent-completed background survey (Appendix B), students were selected for the study using teacher rating scale data and teacher and Mental Health Consultant nominations. A teacher-completed Devereux Early Childhood Assessment for Preschool, Second Edition (DECA-P2;

LeBuffe & Naglieri, 2013) was one measure used to select students for the intervention and comparison groups. Prior to the start of the intervention, the lead teacher from each classroom completed one de-identified DECA-P2 form for each student in her class. Students with a self-regulation subscale T-score of 40 or less (Area of Need), or a behavioral concern T-score of 60 or higher (Area of Need), were considered for the study. In addition to DECA-P2 data, lead teachers and Mental Health Consultants each nominated up to eight children per classroom who might benefit from the *Second Step Early Learning Program*. Students who met any two criteria (DECA-P2 self-regulation T-score of less than 40, DECA-P2 behavioral concerns T-score of higher than 60, teacher nomination, Mental Health Consultant nomination) were eligible to participate in the study. Table 3 lists the number of students who were selected for the study by each criteria pair, as well as DECA-P2 pre-intervention mean scores for each group. Classrooms were randomly assigned to receive the *Second Step Early Learning* curriculum immediately (six classrooms of selected children), or be placed in the comparison condition (six classrooms of selected children).

Table 3

Selection Criteria Pairings

Criteria Pair	Number of Students	Mean DECA-P2 Self-Regulation T-Score	Mean DECA-P2 Behavioral Concerns T-Score
DECA-P2 Self-Regulation < 40 and DECA-P2 Behavioral Concerns > 60	42	35.21	64.89
DECA-P2 Self-Regulation < 40 and Teacher Nomination	7	36.14	52.29
DECA-P2 Self-Regulation < 40 and MHC Nomination	0	N/A	N/A
DECA-P2 Behavioral Concerns > 60 and Teacher Nomination	4	46.75	60.52
DECA-P2 Behavioral Concerns > 60 and MHC Nomination	6	43.67	61.00
Teacher Nomination and MHC Nomination	19	45.90	50.90
Total Participants	78	42.30	55.81

Students were recruited for participation in two waves from the classes of six teachers. To ensure that the intervention and comparison groups received comparable instruction, each teacher had one class in the intervention group and one class in the comparison group. For example, during the first wave of data collection (i.e., 2017-2018 school year) a group of students from the teacher's class would receive the *Second Step Early Learning* intervention, but during the second wave of data collection (i.e., 2018-2019 school year) the students from her class would be selected for the comparison group. This structure ensured that students from comparison and intervention groups received identical Tier 1 intervention, and that each teacher had students that received Tier 2 support.

Participants

Target Students. Following this process, 78 target students, who gave their assent and whose parents gave consent, were selected for the intervention (n=39) and comparison (n=39) groups and intensive data collection. All students attended preschool full time. Their ages ranged from three to five years (*M*=4.18 years; *SD*=0.66) and the majority were male (66.7%). Thirty-four (43.6%) of the students were Black, 21 (26.9%) were White, 15 (19.2%) were multiracial, 7 (9.0%) were Hispanic, and 1 (1.3%) was Asian. The majority of students (n=46; 59.0%) were in their first year of Head Start. Thirteen students (16.7%) were in their second year and 1 student (1.3) was in his/her third year of Head Start.

Class-Wide Participants. De-identified DECA-P2 data of 214 students, including target students, was used to evaluate self-regulation skills and teacher behavioral concerns of all students, pre- and post-intervention. Of the 214 students, 100% attended preschool full time. Their ages ranged from three to five years (*M*=4.22 years; *SD*=0.62) and the majority were male (56.3%).

Lead Teachers. With consent (Appendix A), all six lead teachers were asked to complete a brief, semi-structured initial interview, exit interview, and complete an intervention transportability survey post-intervention. The initial interview (Appendix C) inquired about their thoughts on the importance of SEL curricula, the current use of SEL programs in their classroom, and their expectations about potential *Second Step* outcomes. The exit interview (Appendix D) asked questions about the feasibility of implementing *Second Step* in their classroom, the ease of use of *Second Step* strategies, their perceptions on the challenges of implementing new curriculum in the classroom, and the likelihood of using *Second Step* in the future. Lead teachers received $150 for participation in this study across the two waves of data collection ($100 when participating in the intervention condition, $50 when participating in the comparison condition).

Intervention

This study examined the effect of a social-emotional curriculum, *Second Step Early Learning Program* (Committee for Children, 2011), on children's self-regulation skills, emotion knowledge, and early literacy skills. *Second Step Early Learning Program* (Committee for Children, 2011) is a universal, classroom-based program that consists of five units designed to promote social-emotional competence and self-regulation skills in three-, four-, and five-year-old preschool students. Designed to be delivered two to three times per week for 29 weeks, *Second Step* consists of 29 weekly scripted lessons and a Teaching Materials Notebook for teachers. Engaging visual and interactive content – which includes color photo Weekly Theme Cards, a CD of songs, colorful classroom posters, Listening Rules Cards, Feelings Cards, and boy and girl puppets for use during the mini-lessons – facilitates delivery of all lessons across units. A summary of the content of each unit is presented in Table 4.

Table 4

Second Step Early Learning Program Lessons

Unit 1: Skills for Learning	Unit 2: Empathy	Unit 3: Emotion Management	Unit 4: Friendship Skills and Problem Solving	Unit 5: Transitioning to Kindergarten
1. Welcoming 2. Listening 3. Focusing Attention 4. Self-Talk 5. Following Directions 6. Asking for What You Need or Want	7. Identifying Feelings (happy, sad) 8. Identifying Feelings (surprised, scared) 9. Identifying Anger 10. Same or Different Feelings 11. Accidents 12. Caring and Helping	13. We Feel Feelings in Our Bodies (worried) 14. Strong Feelings (frustrated) 15. Naming Feelings 16. Managing Disappointment 17. Managing Anger 18. Managing Waiting	19. Fair Ways to Play 20. Having Fun with Friends 21. Inviting to Play 22. Joining in with Play 23. Saying the Problem 24. Thinking of Solutions 25. Speaking Up Assertively	26. Fair Ways to Play 27. Learning in Kindergarten 28. Riding the Kindergarten Bus 29. Making New Friends in Kindergarten

The researcher and two trained research assistants delivered 30-minute lessons twice per week across nine weeks (i.e., two lessons per week). Although the Second Step Early Learning Program was not originally designed as a modular program, only lessons from Unit 1, Unit 2, and Unit 3 were included, as the lessons from these units met the needs of the setting (i.e., intervention focused on self-regulation skill development, delivered in fewer than 10 weeks). Students in the intervention group received instruction and opportunities to practice prerequisite skills that enhance learning, emotion identification, and emotion management and self-regulation skills.

Beyond the scripted lessons, there were also suggested teaching strategies designed to reinforce skills, manage behavior, help children pay attention, encourage classroom participation,

and integrate learning the specific skills throughout the day. For example, each unit provided

ideas to link themes to other curriculum goals in literacy, math, science, and social studies so that

the theme language and teaching strategies can be used in other activities. Teaching strategies

included in the teacher manual to reinforce the themes include: 1) having children *think ahead* by

asking them to think about times in the classroom when they could use the skill being taught, 2)

ongoing *reinforcement* of skills by providing feedback to children who use the skills and

modeling/coaching their use as situations naturally arise during the day, and 3) *thinking back* to

when the children used the skills and *praising* them for what they demonstrated. To promote the

integration of the *Second Step Early Learning* curriculum throughout the day, assistant teachers

were invited and encouraged to observe *Second Step* implementation and assist with behavior

management. Through this, the assistant teachers learned the strategies and themes taught in

Second Step lessons and were encouraged to continue using the suggested language with children

receiving the intervention when the researcher is not present.

  Treatment Integrity. To assess treatment integrity, a research assistant observed at least

20% of the *Second Step* lessons using the fidelity checklist (Appendix F). Throughout both

waves of data collection, 89% procedural fidelity was maintained.

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Measures

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  In addition to examining the outcomes of the *Second Step Early Learning Program*, this

study examined the importance of intervention dosage to student outcomes, and the barriers that

exist in transporting evidence-based interventions into school settings. Table 4 provides the

operational definition of each variable, the measures used, and the individuals responsible for

collecting the data. A description of each measurement method is provided after presentation of

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51

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Table 5. All data was collected once before and once after the implementation of the *Second Step Early Learning* program.

Table 5

Summary of Measures

Variable	Operational Definition	Rating Scales (completed by teachers)	Behavioral Task (administered by researchers)
Emotion Knowledge	Recognizing expression of emotions, labeling expressions of emotions, and understanding the causes and consequences of emotions		*Affective Knowledge Task (AKT)* α=.82 Administration Time: 10 minutes
Self-Regulation	Acting out verbal directions unnaturally (e.g., opposite or non-typical response) according to instructions	*DECA-P2 – self-regulation and behavioral concerns subscales* α=.86	Bottom-Up: *Head-Toes-Knees-Shoulders (HTKS) Task* α=.93 Administration Time: 5 minutes
Self-Regulation	Selecting and attending to relevant information, despite presence of distracters	*DECA-P2 – self-regulation and behavioral concerns subscales* α=.86	Top-Down: *Statue* α=.82 Administration Time: 5 minutes
Early Academic Skills: Early Literacy	Skills in alphabet knowledge, vocabulary and oral language, phonemic awareness, and listening comprehension		*Preschool Early Literacy Indicators (PELI)* α=.75 Administration Time: 10 minutes
Teacher Acceptability	Teacher views on intervention appropriateness, goals, format, outcomes, and likelihood of future use	Behavior Intervention Rating Scale (BIRS) α=.97	

Social-Emotional Competence: Emotion Knowledge. Emotion knowledge, or accurate emotion labeling and understanding of typical responses to emotional situations (Miller et al., 2006), was measured using the **Affective Knowledge Test (AKT; Denham, 1986; Denham, Zoller, & Couchoud, 1994),** an assessment of a child's ability to accurately label and interpret emotions. The skills assessed by this measure include verbal and nonverbal emotion recognition as well as identification of emotion given contextual information. To assess emotion labeling and recognition with the AKT, schematic representations of happy, sad, angry, and scared expressions were presented to the child. The developer-provided faces were replaced with emoji version faces of the same emotions, as the emotions displayed by emoji faces were more familiar and identifiable to the participants than the hand-drawn provided faces. The child verbally identified each face as it was presented in random order. The experimenter then presented the faces in a new, random order and asked the child to point to each of the emotions as the experimenter provided a verbal label. Skills on both tasks were scored on a 3-point scale: a "2" was awarded if the child provided the correct label; a "1" was awarded if the child selected the correct valence of the emotion; and a "0" was awarded if the child provided an answer that was incorrect. Expressive and receptive scores were combined to create emotion recognition aggregate. High scores on this portion of the AKT indicated the child had the capacity to recognize and label basic emotions. Given the nature of the task, a child could not score "1" during the happy task because there is only one type of positive valence.

The second section of the AKT assessed children's ability to identify emotions in situations. With the aid of the schematic faces used in the recognition and labeling task, the experimenter engaged in a teaching phase in which a verbal label and a physical demonstration of happy, sad, angry, and scared were provided. Several short vignettes were then read and acted

54

out with the aid of puppets. At the end of each vignette, the experimenter asked the child how the puppet feels and allowed the child to select one of the schematic faces in order to "give the puppet a new face."

Vignettes were characterized as either stereotypical or non-stereotypical. Stereotypical events were ones in which the character's emotions would be expected of most individuals in that situation. For example, if the puppet was receiving an ice cream cone, the experimenter enacted the scenario by having the puppet say, "Yum, Yum" with happy vocal affect, and then reinforced the emotion with a happy facial expression. The correct response would be 'happy.' Non-stereotypical vignettes were ones in which the story character experiences an emotion that would vary across children. An example of a non-stereotypical event is the puppet being happy at the prospect of being served beans for dinner. Teachers were asked in advance what the child's least favorite food is (e.g., beans). In a non-stereotypical situation, the puppet's response is different than that of how the child would normally react.

Scoring for the vignettes was the same as the emotion labeling and emotion recognition tasks, with scores ranging between 0 and 2 for each vignette. High scores on the stereotypical identification suggested that the child has sound knowledge of which emotions are typically elicited by particular events. High scores on the non-stereotypical emotion identification component suggested that children have the ability to use contextual information or cues outside of their own emotions to make deductions about which emotion was expressed. Higher scores indicated greater emotion knowledge, an important facet of emotion understanding. Scores were combined to form a situations aggregate score. Total mean scores for the affective labeling portion of the AKT had moderate internal consistencies (α = .62 and .70 for expressive and

receptive labeling, respectively). Internal consistencies were good for the stereotypical (α =.74) and non-stereotypical (α =.80) portions of the AKT.

Social-Emotional Competence: Self-Regulation. Self-regulation was measured using two behavioral tasks: 1) a measurement of bottom-up control, the HTKS task, and 2) a measure of top-down control, Statue. Additionally, a survey measure, the DECA-P2 was used to gain teacher perceptions of children's self-regulation.

      Head-Toes-Knees-Shoulders (HTKS). HTKS was used to assess bottom-up self-regulation (Ponitz et al., 2011). HTKS is a structured observation designed to assess primarily inhibitory control, in addition to two other aspects of executive function (attentional focusing and working memory). HTKS required children to carry out a series of actions over 30 trials in an unexpected way following their response to two oral commands (e.g., "touch your head" and "touch your toes"). During the first 10 trials, children were asked to perform the opposite of what they would typically do in response to the two types of oral commands (e.g., required to touch toes when instructed to touch head). The second 10 trials added two additional rules that still required children to perform the opposite of their natural response ("touch your shoulders" and "touch your knees"). The third set of 10 trials required children to respond to four new oral commands that correspond to four body parts. For example, the correct response to "touch your toes" was for the child to touch his or her shoulders. Likewise, "touch your knees" required the child to touch his or her head. A child scored 2 points for every correct response and 0 points for each incorrect response. A self-corrected response (i.e., child corrected an initial error, which led to a correct response) earned 1 point. Scores ranged from 0 to 60 points, with higher scores indicating a greater level of behavioral regulation.

Research has shown that HTKS is a reliable and valid measure of self-regulation (McClelland & Cameron, 2012; Ponitz et al., 2009; McClelland, Cameron, Connor, et al., 2007). The original developers (Ponitz et al., 2009) demonstrated construct validity of HTT, the precursor of HTKS, by showing that age group consistently correlated with task improvements in similar sample sizes of preschool children ages 36 through 66 months ($F(8, 1320) = 29.55$, $p<0.01$). Kindergarten children who scored higher on the HTKS at the beginning of the year were also found to earn higher parent ratings on the attentional focusing ($r = 0.25$, $p<0.01$) and inhibitory control ($r = 0.20$, $p<0.01$) scales of Putnam and Rothbart's (2006) CBQ-SF (Ponitz et al., 2009). HTKS also exhibited strong predictive validity, with moderate to strong effect sizes found for the task predicting math ($d = 0.56$), literacy ($d = 0.27$), and vocabulary ($d = 0.16$) achievement levels at the end of the kindergarten year (Ponitz et al., 2009). Ponitz and colleagues (2008) established strong internal consistency ($\alpha = 0.87$ to 0.92) of HTT for eight behavior regulation items. Additionally, the researchers reported a 66% scoring consistency (overall) and a 75% scoring consistency for self-corrects for HTKS by twelve examines across two sites (Ponitz et al., 2009). Strong inter-rater reliability (0.98) in the assessment of first-grade students using HTKS was found in another study (Skibbe, Phillips, Day, Brophy-Herb, & Connor 2012). In addition, the test-retest reliability was found to be high over a three-month timeframe ($\alpha = 0.93$) (McClelland & Cameron, 2012). In the current study, the mean inter-observer agreement (IOA) of this task was 92%.

Statue. Statue, a subtest of the NEPSY-II (Korkman, Kirk, & Kemp, 2007), assessed focused attention and motor persistence by asking the child to close his or her eyes, remain in a specified body position, and refrain moving, speaking, or laughing for 75 seconds while the examiner performed potential distractions (e.g., loudly coughing, dropping a pencil). Although

57

the task (i.e., remaining in a fixed position with eyes closed) does not correspond directly to academic tasks, the act of remaining focused on the task at hand while ignoring external distracters is a behavior that is regularly expected of students in an academic setting. Because of this, the Statue is an appropriate measure of top-down self-regulation for preschool-aged children.

To score the Statue task, the assessor made observations every five seconds to track errors, defined as body movements, eye opening, or vocalizations. Raw scores ranged from 0-30; for each five-second interval, a score of 2 indicated there were no errors, a score of 1 indicated one error, and a score of 0 indicated two or more errors in the interval. Scores were then converted to a T-score according to the NEPSY-II Manual, which accounted for student age. T-scores ranged from 1-19, with higher scores indicting better self-regulation. The NEPSY-II manual (Korkman et al., 2007) provided evidence of the reliability and validity of the Statue task. The Statue demonstrates strong internal consistency for four-year-old ($\alpha= .82$) and five-year-old ($\alpha= .88$) children. Further, test-retest reliability was also found to be strong ($\alpha= .82$). The Statue task demonstrated moderate correlations with a number of *Bracken Basic Concept Scale-Third Edition: Receptive* subtests, including Direction/Position (r=.40), Self-/Social Awareness (r=.40), and Texture/Material (r=.39) (Korkman, et al., 2007).

Devereux Early Childhood Assessment for Preschool, Second Edition (DECA-P2). The DECA-P2 (LeBuffe & Naglieri, 2013) is a 38-item behavior rating scale used to identify the level at which a child displays specific protective factors and behaviors relevant to optimal social and emotional functioning. Social-emotional competencies are examined through the 27-item Total Protective Factors (TPF) scale, which is further divided into three subscales: Initiative, Self-Regulation, and Attachment/Relationships, and the 11-item Behavioral Concerns subscale.

Of particular importance to this study were the Self-Regulation and Behavioral Concerns subscales, as these were used to select students for study participation. The Self-Regulation subscale assesses the child's ability to express feelings and effectively manage his or her behavior. A sample item includes "controls his/her anger." The Behavioral Concerns subscale screens for behavioral concerns in children ages 3 through 5 years. Sample items include "have a short attention span (difficulty concentrating)" and "become upset or cry easily." Teachers reported the frequency (never, rarely, occasionally, frequently, and very frequently) with which the target child has behaved during the previous 4 weeks.

On the DECA-P2, the teacher's rating yielded T-scores, percentile ranks, and descriptions of skill level for each child. The sum of assigned points per subscale were used to determine the T-scores (ranges from 28 to 72) and percentile ranks (ranges from 1 to 99) specific to the Self-Regulation subscale (total raw score ranges from 0 to 36) based on the DECA-P2 Manual. On the Self-Regulation subscale, T-scores of 60 or above represent a Strength, scores between 41 and 59 represent Typical functioning, and scores of 40 or below represent an Area of Need. On the Behavioral Concerns scale, scores of 59 and below are considered Typical and scores of 60 or above are considered an Area of Need.

Research compiled by Devereux Center for Resilient Children (DCRC; 2012) provided evidence that the DECA-P2 has strong technical adequacy. Overall, the DECA-P2 is considered to be a reliable instrument. With regard to internal consistency, reported Total Protective Factor (TPF) coefficients for teacher raters ($\alpha = .95$) exceed the suggested desirable standard of the .90 composite value recommended by Bracken (1987) (DCRC, 2012, p. 53). Similar Cronbach's alphas that met minimum standards were also found among teacher raters ($\alpha = .86$) on the Behavioral Concerns subscale. A separate investigation, which asked teachers to rate the same

children on two separate occasions, provided evidence for high test-retest reliability (primary subscales: TPF coefficient = .95; Behavior Concerns scale: TPF coefficient = .80) (DCRC, 2012).

Data also support the validity of DECA-P2. Three types of validity provide evidence: (1) content validity, (2) criterion validity, and (3) construct validity. Based on a literature review on social and emotional competence and resilience in young children, feedback from focus groups made up of early childcare and education professionals, and a review by a National Advisory Committee, content validity of DECA-P2 is regarded as high. Research that collected scores on two samples of children (diagnosed with emotional or behavioral disturbance (EBD) matched with typically developing comparison group) documented large and significant differences between the mean scores of these groups (EBD Mean ± SD = 42.1 ± 9.1, comparison Mean ± SD = 47.4 ± 9.2, p < .01). Furthermore, d-ratios ranged from 0.58 to 1.09, which indicates large differences between the means of these groups. An evaluation of the appropriateness of the DECA-P2 for use with minority children reported similar scores earned by Black, White, and Hispanic children. Similar mean scores and standard deviations, along with d-ratios below .2 (indication of small differences), support the appropriateness of the DECA-P2 for White, Black, and Hispanic children.

Early Academic Skills: Early Literacy. Children's early literacy skills were assessed using the **Preschool Early Literacy Indicators (PELI; Aguayo, Abbott, & Kaminski, 2014).** The PELI is a preschool literacy assessment for three to five year olds that measures alphabet knowledge, vocabulary and oral language, phonemic awareness, and listening comprehension. It includes a set of standardized subtests within a storybook format, and measures literacy and language growth across the school year. In the Alphabet Knowledge subtest, children were asked to

identify as many letters as possible on a page that included a random array of all 26 letters of the alphabet. The Vocabulary and Oral Language subtest had two expressive language tasks: Picture Naming and Tell About. For the Picture Naming task, the child was shown a picture of a scene and asked to name ten pictures. During Tell About, the child was asked to tell everything he or she can about five of the pictures. Comprehension on the PELI was assessed through two tasks. In the first task, Comprehension Questions, the assessor read a short story and paused during and after the reading to ask simple literal, prediction, and inference questions. Following the story, the child participated in a Shared Retell task during which the assessor retold the story leaving out words and the child filled in the blanks. Lastly, Phonological Awareness was assessed through a game during which the child was shown a picture of a scene. The child was shown a series of ten pictures of objects and asked to identify the first part of the first sound of a word for each picture. The PELI composite score provided an overall estimate of early literacy performance. Scores ranged from 0 to 309 with higher scores indicating better early literacy skills. The total administration time for all subtests was 10-15 minutes.

Because this was a new measure, there had not been extensive research on the reliability and validity of the PELI. The reliability and validity had been investigated in a study of 6079 students across 28 states representing all census regions of the United States, including children with disabilities and English Language Learners (Aguayo et al., 2014). Results of this study indicated that inter-rater reliability of the PELI ranged from .90-.98. Additionally, criterion-related validity with the Peabody Picture Vocabulary Test, Fourth Edition ranged from .70-.80 (Aguayo et al., 2014).

Challenges and Strategies for Transportability. Teacher's perceptions of the transportability of the Second Step Curriculum were assessed using the ***Behavior Intervention Rating Scale***

(**BIRS**). A 24-item rating scale, the *BIRS* (Von Brock & Elliot, 1987) was used to gather information regarding perceptions of treatment acceptability. Each teacher in the intervention group answered each item on a 6-point Likert scale to indicate the degree to which she agrees or disagrees (1 = strong disagree, 6 = strongly agree). Factor analysis of the *BIRS* yielded Acceptability, Effectiveness, and Time of Effectiveness factors (Elliot & Von Brock Treuting, 1991). All three factors were found to have high internal consistency. Acceptability, which consisted of 15 items, yielded an alpha of 0.97 and was found to account for 63% of the total variance. A sample acceptability item includes "I would be willing to use this in the classroom setting." Effectiveness, which was made up of 7 items, yielded an alpha of 0.92 and was found to account for 6% of the total variance. A sample effectiveness item includes "The child's behavior will remain at an improved level even after the intervention is discontinued." Time of Effectiveness, which contained 2 items regarding how quickly the intervention could lead to behavior improvement, yielded an alpha of 0.87 and was found to account for 4.3% of the variance. A sample time of effectiveness item includes "The intervention would quickly improve the child's behavior."

Teacher's perceptions were also assessed using an **initial and exit interview**. The initial interview inquired about their thoughts on the importance of SEL curricula, the current use of SEL programs in their classroom, and their expectations about potential *Second Step* outcomes. The exit interview asked questions about the feasibility of implementing *Second Step Early Learning* in their classroom, the ease of use of *Second Step Early Learning* strategies, their opinions on *Second Step Early Learning* materials, their perceptions of the challenges of implementing new curriculum in the classroom, and the likelihood of using *Second Step Early Learning* in the future. Each interview took approximately 15 minutes to complete.

Research Design

This research had an experimental group design with repeated measures consisting of an intervention group and a comparison group. The teachers, who had one intervention and one comparison classroom, completed de-identified pre- and post-intervention DECA-P2 behavior rating scales for all of their students. Additionally, during the pre-intervention stage, lead teachers and Mental Health Consultants provided nominations for *Second Step* participation. The results of the pre-intervention rating scales, along with the nominations, were used to select the five to eight target children from each of the twelve classrooms. Following consent, each of the selected children from intervention and comparison groups participated in the four tasks that measured each variable of interest. Additionally, an initial interview was conducted with each of the six lead teachers. Pre-intervention data collection was followed by small-group implementation of *Second Step Early Learning*. Small-group *Second Step* implementation involved instruction of three 6-lesson units in a push-in group format, meaning the researcher and assistants conducted the intervention in each classroom with behavior management support from assistant teachers. Following the implementation of the intervention, all rating scales and tasks were completed with all intervention and comparison children, in addition to teacher intervention transportability rating scale data collection and lead teacher exit interviews.

Procedures and Data Collection

The current study followed a sequence of three phases: (1) *Second Step* pre-intervention, (2) *Second Step* instruction, (3) *Second Step* post-intervention, which occurred once in the 2017-2018 school year and once again in the 2018-2019 school year. The first round of data collection, which included three intervention and three comparison classrooms, occurred from

March 2018 through June 2018. The second round of data collection, which included three

intervention and three comparison classrooms, occurred from October 2018-December 2018.

Second Step Pre-Intervention. The six lead teachers of the participating classrooms each

independently completed a de-identified *Devereux Early Childhood Assessment for Preschool,*

Second Edition (*DECA-P2*; LeBuffe & Naglieri, 2013) for each child in her classroom, and

mental health consultants and teachers nominated students for the intervention. Students were

selected for the study participation using the target student selection procedure previously

described. The researcher sent consent forms to the families of 93 students; 15 families did not

return the forms. As a result, 78 children participated in this study. The lead teacher then

completed the semi-structured entrance interview with the researcher.

Four behavioral tasks were administered individually by trained researchers to all

intervention and comparison children in a quiet room, separate from other children. Task

administration occurred during the same time of day in which intervention implementation took

place. The tasks included (a) HTKS (bottom-up self-regulation), (b) AKT (emotion knowledge),

(c) PELI (early literacy skills), and (d) Statue (top-down self-regulation). These tasks together

took approximately 30 minutes and were administered in one session.

Second Step Instruction. *Second Step Early Learning Program* (Committee for Children,

2011), a social-emotional learning curriculum designed for preschool children, served as the SEL

intervention. The researcher (during the first round of data collection) and two trained research

assistants (during the second round of data collection) provided *Second Step* instruction to a

small group of children identified as having low self-regulation skills for up to 30 minutes, twice

per week. Intervention implementation occurred during class-wide small group time. All

children in the intervention group were expected to sit in a chair at the table during instruction

and stand in a line during interactive, activity-based lessons. The classroom assistant teachers provided behavior management as needed. Even though assistant teachers did not deliver the lessons, their presence during *Second Step* instruction allowed them to learn the content and language used in the program. This enabled them to continue to use *Second Step* strategies with intervention participants throughout the day when researchers were not present.   This was also designed to gain entry and acceptability of a Tier 2 SEL intervention into Head Start classrooms. To limit exposure to the intervention to the target children, the intervention was delivered in a location in the classroom that was away from other small group tables to prevent non-target students from hearing and viewing the lessons.

Three units of *Second Step Early Learning* were implemented: (a) Skills for Learning, (b) Empathy, and (c) Emotion Management. Each unit consisted of 6 lessons with one instructional day per lesson, resulting in a total of 18 instructional days. *Second Step Early Learning* sessions included a scripted mini-lesson and guided practice of skills. Each six-lesson *Second Step Early Learning* unit taught students up to six concrete skills. During each lesson, the researcher presented the skill during a 5- to 10-minute instruction period, which incorporated music, puppets, and storytelling. Then, students had opportunities to practice these skills in the form of a game or another activity (e.g., Brain Builder games). All lessons and practice activities took place at a small group table in the children's classroom during small group instruction.

During practice activities, each child was provided an opportunity to rehearse the given skill as outlined in the scripted lesson. If a child performed the requested behavior, the researcher provided verbal praise. If a child performed the behavior incorrectly, the researcher provided specific corrective feedback and a peer who performed it correctly was asked to

demonstrate the behavior. The researcher invited the child to perform this behavior once more before he or she received verbal praise and the next child was asked to respond.

Second Step Post-Intervention. When *Second Step Early Learning* instruction was complete, the lead teacher from each of the six participating classrooms independently completed a de-identified *Devereux Early Childhood Assessment for Preschool, Second Edition* (*DECA-P2*; LeBuffe & Naglieri, 2013) for each child in her classroom. In addition, teachers completed the exit interview with the researcher and the Behavior Intervention Rating Scale (BIRS) independently.

All intervention and comparison children were individually administered four behavioral tasks in a separate room. Task administration occurred during the same time of day in which intervention implementation took place. The tasks included (a) HTKS (bottom-up self-regulation), (b) AKT (emotion knowledge; situations), (c) PELI (early literacy skills), and (d) Statue (top-down self-regulation). These tasks together took approximately 30 minutes to complete and were administered in one session.

Procedural Fidelity

During the study, the primary researchers implemented all of the *Second Step* lessons in all classrooms. To assess implementation accuracy, a research assistant observed 22% of the *Second Step* lessons (or 4 of 18 days of *Second Step* instruction) using the intervention fidelity checklist.

The researcher followed a fidelity checklist, which included essential components required for successful delivery of the lessons. The checklist contained items that were divided into separate parts, including preparedness of the researcher for whole- class instruction, components of the *Second Step* lessons, and the presence of each part of the practice activities.

The *Second Step* fidelity checklist contained 13 items, although the number of items assessed depended on the content of the lesson taught that day. A research assistant used each intervention checklist to indicate whether or not the section of the lesson or practice activity was present, carried out correctly, or followed the prescribed outlined lesson components. A "-" indicated that the component was absent, delivered incorrectly, or deviated greatly from the outline. A "+" indicated that it was present and was implemented accurately. Maintenance of at least 90% procedural fidelity was achieved throughout *Second Step* implementation.

Inter-Observer Agreement

Inter-observer agreement (IOA) was calculated to establish the quality of measurement procedures and ensure data collection objectivity for all behavioral outcome measures (i.e., HTKS, Statue, AKT, PELI; Gast and Ledford, 2014). One 2-hour training session occurred before data collection to ensure at least 80% IOA across the researcher and research assistants (Kratochwill et al., 2013). The three individuals who conducted behavioral observations practiced coding and scoring at least 6 practice videos of each task. Operational definitions were clarified and disagreements were discussed and reconciled during these sessions to address coding variations.

During data collection, two trained individuals (i.e., primary researcher and research assistant) collected IOA data in 20% of *Second Step* pre-intervention sessions and 22% of *Second Step* post-intervention sessions by (Kratochwill et al., 2013). Separate observations and ratings were independently recorded by each observer on personal data sheets for each behavior task. Following each observation, each individual's recording sheet was collected and compared across behaviors. If both observers recorded the occurrence or absence of a target behavior, it

67

was scored as an agreement. If one observer did not mark an occurrence, while the other observer recorded it as having occurred, then it was considered to be a disagreement. IOA estimates never reached below 80% during data collection.

CHAPTER IV: RESULTS

This chapter presents results of the preliminary analyses, descriptive statistics, and the multilevel analyses and analyses of covariance (ANCOVA). When appropriate, multilevel modeling was used to explore research questions 1-3 hierarchically. There was statistical justification for using multilevel modeling on Question 1 only for self-regulation as measured by HTKS (i.e., significant differences were found between classrooms). ANCOVA models were instead used to answer these questions when multilevel modeling was not indicated. The final research question was explored using a qualitative analysis of trends and descriptive statistical analysis. These results aimed to provide an enhanced understanding of the effectiveness of social-emotional interventions in classrooms, and factors influencing intervention transportability.

Preliminary Analyses

Assumptions of multilevel modeling and ANCOVA were investigated prior to analyses for RQ1, RQ2, and RQ3.

Normality. The assumption of normality was tested for all dependent variables by examining histograms, normal probability (quantile-quantile) plots, skewness values, and Shapiro-Wilk statistics. Preliminary analyses were conducted for all primary dependent variables: HTKS, AKT Emotion Recognition, AKT Situations, PELI Composite, Statue, and DECA-P2 Self-Regulation by classroom type (i.e. intervention and comparison). A review of the Shapiro-Wilk test for normality, along with skewness and kurtosis statistics revealed that the assumption of normality was not met for the AKT Emotion Recognition variable. Results are summarized in Table 6.

69

Table 6

Summary of Normality Data

Dependent Variable	Shapiro-Wilk	Skewness	Kurtosis
HTKS (residuals)			
Intervention	S-W=0.959, df=39, p=.18	-0.037	-0.761
Comparison	S-W=0.924, df=39, p<.06	0.437	1.501
Statue			
Intervention	S-W=0.943, df=39, p=.151	0.193	-1.000
Comparison	S-W=0.927, df=39, p=.055	-0.015	-1.030
AKT Emotion Recognition			
Intervention	S-W=0.822, df=39, p<.001*	-0.662	-0.387
Comparison	S-W=0.783, df=39, p<.001*	-1.360	1.083
AKT Situations			
Intervention	S-W=0.953, df=39, p=.110	0.023	-0.147
Comparison	S-W=0.970, df=39, p=.364	0.088	-0.387
PELI Composite			
Intervention	S-W=0.963, df=39, p=.230	0.146	-1.055
Comparison	S-W=0.980, df=39, p=.708	-0.414	0.149
DECA-P2 Self-Regulation			
Intervention	S-W=0.971, df=99, p=.057	0.453	0.222

*= significant result (p<.05)

Four types of transformations (log 10, square root, square, and inverse) were conducted for the

AKT Emotion Recognition variable as an attempt to correct for its non-normal distribution.

However, no transformation adequately addressed normality. As such, a more conservative *p*

value (.01 rather than .05) was used to establish significance for AKT Emotion Regulation

variable.

      Homogeneity of Variance. Homogeneity of variance was tested with Levene's Test of

Equality of Error Variances. All variables met this assumption, and results are summarized in

Table 7.

Table 7

Homogeneity of Variance

Dependent Variable	Levene's Test of Equality of Error Variances
HTKS	F (1,75) = .09, *p*=.77
Statue	F (1,75) = 3.04, *p*=.10
AKT Emotion Recognition	F (1,75) = .76, *p*=.39
AKT Situations	F (1,75) = .86, *p*=.36

Table 7 (cont'd)

PELI	F (1,75) = .03, *p*=.88
DECA-P2 Self-Regulation	F (1,97) = .73, *p*=.40

Linearity. Scatterplots were used to test the assumption of linearity. Scatterplots comparing each dependent variable to its covariate (pre-intervention score) showed a relatively straight diagonal line (as opposed to non-linear or U-shaped). Thus, each variable met the assumption that the relationship between the dependent variable and the covariates was linear.

Homogeneity of Regression Slopes. This assumption was tested by checking for non-significant interactions between the covariate and the treatment. Results of these tests are presented in Table 8, which demonstrates that all interactions were non-significant and the homogeneity of regression slopes assumption was met for all variables.

Table 8

Homogeneity of Regression Slopes

Dependent Variable	Covariate*Treatment Interaction Result
HTKS	F (1,73) = .00, *p*=.99
Statue	F (1,73) = .28, *p*=.60
AKT Emotion Recognition	F (1,73) = 3.80, *p*=.07
AKT Situations	F (1,73) = 0.02, *p*=.89
PELI	F (1,73) = .11, *p*=.74
DECA-P2 Self-Regulation	F (1,95) = 3.48, *p*=.09

Descriptive Statistics

Demographic data for the sample is presented in Table 9. A summary of descriptive statistics for all outcome variables for pre-intervention and post-intervention scores is presented in Table 10. Descriptive statistics for outcome variables are presented by classroom in Table 11, and by time of data collection (spring versus fall) in Table 12.

Table 9

Demographic Data

	Gender		Mean Age	Race				
	Male	**Female**		**Black**	**White**	**Multi-Racial**	**Hispanic**	**Asian/PI**
Total Sample	55.8 %	43.7%	50.52 months	43.0%	26.6%	20.3%	3.9%	1.3%
Intervention Group	74.4%	25.6%	51.36 months	43.65	30.8%	17.9%	5.1%	2.6%
Comparison Group	59.0 %	41.0%	48.91 months	43.6%	25.1%	20.5%	10.8%	0%
Data Collection Time 1 (Spring)	55.8%	44.2%	52.83 months	42.1%	18.4%	23.7%	13.2%	2.6%
Data Collection Time 2 (Fall)	56.4 %	43.6%	49.31 months	43.9%	34.1%	17.1%	4.9%	0%

Demographic data indicated that the majority of the total sample was male (55.8%) and participants had a mean age of 50.52 months. Students in the sample identified as Black (43.0%), White (26.6%) or Multi-Racial (20.3%). There were 15.4% more males in the intervention group compared to the comparison group, but the percentage of males for both groups was higher than the total sample, indicating teachers rated males as having poorer self-regulation skills than females, overall. Students in the intervention group were slightly older than students in the comparison group, and the racial makeup of each of the groups was comparable. There was no student attrition for the intervention and comparison groups. As expected, students who participated in spring data collection were slightly older than those who participated in fall data collection. Both groups had similar numbers of males and females. The spring data collection group had more students who identified as Multi-Racial and Hispanic, while the fall data collection group had more students who identified as White.

Table 10

Descriptive Statistics for Outcome Variables

Measure	*N*		*M*		*SD*		**Minimum**		**Maximum**	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post

Table 10 (cont'd)

DECA-P2 Self Regulation T-Score										
Non-Target Students	136	127	55.03	55.85	8.73	9.35	33	31	70	81
Intervention Students	39	39	41.28	44.79	6.99	6.25	11	34	55	62
Comparison Students	39	39	43.31	48.51	6.35	7.34	28	38	57	70
DECA-P2 Behavior Concerns T-Score										
Non-Target Students	136	127	43.53	46.33	9.39	9.95	18	29	71	72
Intervention Students	39	39	56.03	57.50	7.78	7.21	39	42	69	72
Comparison Students	39	39	55.59	54.23	8.05	9.25	36	30	68	66
HTKS										
Intervention Students	39	39	11.79	18.45	13.27	16.25	0	0	44	48
Comparison Students	39	39	4.82	5.95	9.21	10.39	0	0	32	40
Statue Scaled Score										
Intervention Students	39	39	6.77	8.16	3.66	2.82	1	3	13	13
Comparison Students	39	39	8.00	8.67	2.86	2.86	3	4	13	14
AKT Emotion Recognition										
Intervention Students	39	39	9.10	10.82	2.23	1.25	2	8	12	12
Comparison Students	39	39	8.49	10.00	3.17	2.53	0	3	12	12
AKT Situations										
Intervention Students	39	39	11.87	14.39	2.93	2.32	5	8	18	18
Comparison Students	39	39	12.31	13.21	1.99	3.30	6	3	16	18
PELI Composite Score										
Intervention Students	39	39	142.28	176.82	53.29	53.17	34	87	254	282
Comparison Students	39	39	129.69	135.54	50.54	51.14	8	2	217	231

At pre- and post-intervention, both intervention and comparison students had DECA-P2 Self Regulation T-Scores slightly above the clinical cut-off score of 40, indicating that the mean rating for these students was in the typical range. However, scores for both groups were less than those for all students, indicating teacher concern in this area relative to other classmates. Similarly, intervention and comparison students had an average Behavior Concerns T-Score below the clinical cut-off of 60 at pre- and post-intervention. Scores on the Behavior Concerns scale for these two groups were higher compared to all classmates, indicating elevated teacher behavior concerns for these students. Intervention students showed, on average, much better bottom-up self-regulation (i.e., HTKS) skills than comparison students at the pre-intervention

time point. However, comparison students showed better top-down self-regulation (i.e. Statue) at pre-intervention, but these differences decreased at post-intervention. Students in the intervention group started with slightly better emotion recognition skills; students in the comparison group started with slightly better situational emotion understanding skills. Lastly, students receiving the intervention demonstrated better early literacy skills at pre-intervention, and also had greater gains in early literacy skills at post-intervention. The statistical significance of these mean differences will be explored further throughout this chapter.

Table 11

Descriptive Statistics for Behavioral Task Outcome Variables by Classroom

	N		M		SD		Minimum		Maximum	
Measure	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
HTKS										
Classroom 1	6	6	5.50	8.50	8.24	10.95	0	0	21	30
Classroom 2	6	6	9.17	13.17	13.89	17.39	0	0	32	40
Classroom 3	7	7	15.43	30.86	8.04	13.23	0	13	26	45
Classroom 4	6	6	7.50	5.17	11.62	9.43	0	0	23	24
Classroom 5	6	6	7.67	7.83	12.14	12.24	0	0	27	26
Classroom 6	6	6	18.83	26.67	16.96	13.74	0	7	41	42
Classroom 7	6	6	2.33	6.80	3.67	7.69	0	0	8	16
Classroom 8	8	8	24.25	31.50	14.41	12.07	7	14	44	48
Classroom 9	7	7	2.33	3.30	1.92	1.25	0	0	7	4
Classroom 10	5	5	2.20	1.80	1.48	3.03	0	0	4	7
Classroom 11	7	7	2.86	4.29	4.98	5.35	0	0	13	12
Classroom 12	8	8	1.25	2.37	0.70	4.07	0	0	4	12
Statue Scaled Score										
Classroom 1	6	6	7.83	9.83	1.72	3.67	6	4	11	14
Classroom 2	6	6	6.83	9.50	2.71	2.35	3	6	11	13
Classroom 3	7	7	8.29	10.57	3.25	2.57	2	7	12	13
Classroom 4	6	6	9.50	9.17	3.51	1.94	4	7	13	12
Classroom 5	6	6	7.67	9.00	3.39	3.46	4	5	13	12
Classroom 6	6	6	7.67	8.83	4.67	3.25	3	6	12	13
Classroom 7	6	6	2.83	7.00	2.64	1.73	1	6	8	10
Classroom 8	8	8	7.50	8.25	3.34	2.12	3	6	12	11
Classroom 9	7	7	7.86	6.14	3.02	1.57	3	4	11	8
Classroom 10	5	5	8.60	8.40	3.51	2.88	5	6	13	12
Classroom 11	7	7	5.71	5.71	2.14	2.56	2	3	9	9
Classroom 12	8	8	8.25	8.75	2.96	3.01	4	4	12	12
AKT Emotion Recognition										

Table 11 (cont'd)

Classroom 1	6	6	6.83	7.33	4.83	3.44	0	3	12	12
Classroom 2	6	6	9.50	10.17	2.07	2.23	7	7	12	12
Classroom 3	7	7	9.57	10.29	1.62	1.25	6	9	11	12
Classroom 4	6	6	9.67	10.33	1.51	2.34	8	6	12	12
Classroom 5	6	6	8.33	11.00	2.34	1.10	4	10	10	12
Classroom 6	6	6	8.67	10.67	2.94	1.75	4	8	11	12
Classroom 7	6	6	7.33	10.60	3.27	1.67	2	8	10	12
Classroom 8	8	8	10.00	11.13	1.31	0.64	8	10	11	12
Classroom 9	7	7	7.57	9.57	4.69	2.99	0	4	12	12
Classroom 10	5	5	9.80	11.60	1.92	0.55	7	11	12	12
Classroom 11	7	7	9.00	10.71	1.83	1.38	6	9	11	12
Classroom 12	8	8	9.00	11.25	2.20	1.16	5	9	12	12
AKT Situations										
Classroom 1	6	6	11.17	11.67	2.79	5.71	6	3	14	17
Classroom 2	6	6	12.83	14.67	1.72	3.33	11	8	16	17
Classroom 3	7	7	11.86	13.29	2.54	1.98	8	11	15	17
Classroom 4	6	6	13.67	14.33	1.63	2.94	12	10	16	18
Classroom 5	6	6	12.67	14.17	2.50	2.64	9	11	16	17
Classroom 6	6	6	12.67	15.50	1.97	1.87	10	12	15	17
Classroom 7	6	6	8.67	11.80	3.20	2.49	5	8	14	12
Classroom 8	8	8	13.63	16.00	2.92	1.07	10	15	18	18
Classroom 9	7	7	11.57	12.86	1.62	2.41	9	11	13	18
Classroom 10	5	5	11.40	14.40	2.70	1.82	8	12	14	16
Classroom 11	7	7	12.29	14.57	2.43	2.64	9	11	17	18
Classroom 12	8	8	12.13	12.00	1.25	2.07	10	9	14	15
PELI Composite Score										
Classroom 1	6	6	111.50	113.33	56.44	65.00	27	28	185	189
Classroom 2	6	6	157.83	155.50	38.74	43.01	102	87	194	199
Classroom 3	7	7	155.71	173.00	43.95	47.88	93	116	205	229
Classroom 4	6	6	154.67	159.33	47.94	51.53	92	83	217	217
Classroom 5	6	6	154.50	151.17	57.85	49.67	82	99	215	231
Classroom 6	6	6	173.67	210.17	42.73	37.41	125	146	254	262
Classroom 7	6	6	64.33	127.80	29.25	25.96	34	92	105	157
Classroom 8	8	8	186.12	225.37	30.41	41.35	148	163	230	282
Classroom 9	7	7	88.29	111.86	46.95	60.34	8	2	138	176
Classroom 10	5	5	126.40	152.20	34.44	44.11	77	87	174	204
Classroom 11	7	7	130.00	149.14	41.57	50.62	80	101	205	246
Classroom 12	8	8	121.13	128.38	28.04	31.60	82	83	156	165

Mean classroom score differences were unremarkable in all variables, with the exception of HTKS, which demonstrated wide variability between class mean scores. Notably, students in

Classroom 8 consistently performed better, on average, than students in other classrooms across

variables. The average age for students in this class was 56.4 months, which was greater than the

other classrooms (range = 46.6 months to 53.2 months), and could have contributed to this

difference. Further, within classroom standard deviations were high for classrooms 6 and 8

across variables, suggesting the data is dispersed over a wider range of values for these two

classrooms. In contrast, standard deviations were low for classroom 12 across variables,

indicating low spread in outcome scores for students in this classroom. Overall, the standard

deviations imply that there existed potentially large variability in student scores within certain

classrooms. Classroom mean score differences were investigated using multi-level modeling for

all outcome variables, and will be discussed in further detail in the following section.

Table 12

Descriptive Statistics for Outcome Variables by Data Collection Time

Measure	*N*		*M*		*SD*		Minimum		Maximum	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DECA-P2 Self Regulation T-Score										
Spring Data Collection (T1)	113	108	52.49	54.53	11.15	10.00	28	34	70	70
Fall Data Collection (T2)	101	96	48.04	49.98	8.25	8.62	11	31	70	81
DECA-P2 Behavior Concerns T-Score										
Spring Data Collection (T1)	113	108	45.86	46.91	11.52	10.94	18	29	69	72
Fall Data Collection (T2)	101	96	50.41	53.31	9.03	8.76	33	29	71	72
HTKS										
Spring Data Collection (T1)	37	37	9.95	15.86	11.86	15.61	0	0	41	45
Fall Data Collection (T2)	41	41	6.83	8.83	11.84	13.61	0	0	44	48
Statue Scaled Score										
Spring Data Collection (T1)	37	37	7.19	9.25	3.67	2.72	1	4	13	14

Table 12 (cont'd)

Fall Data Collection (T2)	41	41	7.56	7.68	3.01	2.79	2	3	13	12
AKT Emotion Recognition										
Spring Data Collection (T1)	37	37	8.62	9.89	2.93	2.36	0	3	12	12
Fall Data Collection (T2)	41	41	8.95	10.85	2.59	1.59	0	4	12	12
AKT Situations										
Spring Data Collection (T1)	37	37	11.81	13.58	2.74	3.38	5	3	16	18
Fall Data Collection (T2)	41	41	12.34	13.98	2.27	2.44	8	9	18	18
PELI Composite Score										
Spring Data Collection (T1)	37	37	136.81	157.78	55.38	53.87	27	28	254	262
Fall Data Collection (T2)	41	41	135.24	154.27	49.40	58.09	8	2	230	282

Mean data collection time score differences were unremarkable in all variables, with the exception of HTKS, which demonstrated variability between spring and fall data collection. Mean score differences were investigated using multi-level modeling for all outcome variables and will be discussed in further detail in the following section.

Research Question 1

Multilevel regression models were first attempted to address research question 1: Do children with low self-regulation skills who receive a targeted, modified version of the *Second Step Early Learning Program* show an improvement in self-regulation, emotion knowledge, and early literacy skills compared to students low in self-regulation skills who do not receive the targeted intervention? This approach was indicated due to the nested nature of the data, such that students (Level 1) are nested within classrooms and data collection time points (Level 2). Of specific interest was the relation between classroom type (intervention vs. comparison; Level 2 predictor variable) and student post-intervention outcomes. Model testing began with the

unconditional null model. Five separate null models were used to determine whether the Level 2

units (classrooms) differed on the five outcome variables (HTKS, AKT Emotion Recognition,

AKT Situations, PELI, Statue). The multilevel equation for each model was:

Model 1, Level 1: $Y_{ij} = \beta_{0j} + r_{ij}$

Model 1, Level 2: $\beta_{0j} = \gamma_{00} + u_{ij}$

where Y_{ij} is the outcome score for student i in classroom j post-intervention. In Level 1 of

Model 1, β_{0j} is the average post-intervention outcome score in classroom j (intercept), and r_{ij}

quantifies the difference between classroom j's average outcome score and student i's outcome

score (i.e., Level 1 residual). In Level 2 of Model 1, γ_{00} is the grand mean, or the average

outcome score across all classrooms. u_{ij} is the difference between classroom j's average outcome

score and the grand mean (i.e., Level 2 residuals).

The purpose of the null models, which did not include predictors, was to determine

whether there were differences at the group level on the outcome variables. In other words, this

model confirmed the need for multilevel modeling, as it was used to test whether variability in

the outcome variable, by Level 2 group (classrooms), was significantly different from zero using

the Wald chi-square test. Results for the HTKS post-intervention outcome variable were

statistically significant, indicating that for this variable, there was variance in HTKS by the Level

2 classroom groupings, and thus statistical justification for running multilevel model analysis

$[\chi^2(11) = 1.18, p=.04]$. Results for AKT Emotion Recognition $[\chi^2(11) = 0.61, p=.24]$, AKT

Situations $[\chi^2(11) = 0.96, p=.29]$, PELI $[\chi^2(11) = 928.92, p=.09]$, and Statue $[\chi^2(11) = 1.12,$

$p=.24]$ were all non-significant, indicating that for these four outcome variables, there was not

significant variance by the Level 2 classroom groupings. Thus, there was not statistical

justification for running multilevel model analyses for these four outcome variables and ANCOVA models were used to investigate group differences for these outcome variables.

Bottom-Up Self-Regulation: HTKS. As an additional step for the HTKS, the outcome variable that had a significant multivariate null model, the intraclass correlation coefficient (ICC) was calculated. The ICC represented how much variance in the outcome was accounted for by the clustering/Level 2 predictors. Thus, the ICC was used to determine the proportion of variance in HTKS post-intervention scores that can be explained at both the student level (Level 1) and classroom level (Level 2). The ICC was calculated using the σ^2 (variance of Level 1 residual variance) and τ_{00} (variance of Level 2 residual) terms derived through the null model analysis. This value represented the percentage of total variance in the HTKS post-intervention scores that can be accounted for by differences at the classroom level. The remaining percentage not accounted for represented the percentage of variance in HTKS attributable to differences at the individual level. The ICC was defined as:

$$ICC = \frac{\tau_{00}}{\tau_{00} + \sigma^2}$$

where σ^2 is the estimated residual variance (the variance of the values; within classrooms) and τ_{00} is the estimated variance of the random components (intercept variance; between classrooms). The ICC value of the null model was 0.524, which suggests that 52.4% of the variance in HTKS post-intervention scores was accounted for by differences at the classroom level, and 47.6% at the student level. Because variance existed at both levels of the data, predictor variables were individually added at each level for the remaining models.

The second model included the Level 2 predictor of classroom type (intervention and comparison). Coefficients were estimated and significance values were used to determine the

relation between the Level 2 predictor variables and HTKS post-intervention scores. The

multilevel equation for this model was as follows:

Model 2, Level 1: $Y_{ij}=\beta_{0j} + r_{ij}$

Model 2, Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}$ (Classroom_Type) $+u_{0j}$

where Y_{ij}, β_{0j}, r_{ij}, and u_{0j} are defined as described prior. γ_{00} is the grand mean (average HTKS

post-intervention score across all classrooms), and γ_{01} is the estimated average effect of

classroom type across classrooms.

The resulting estimate for the effects of classroom type was examined to determine

whether there was a relation between the predictor and the outcome. The Wald chi-square

relating classroom type and HTKS post-intervention score was statistically significant [$\chi^2(10) =$

1.90, p=.05]. Therefore, classroom type (i.e., intervention or comparison) was related to HTKS

post-intervention score, as anticipated. For a measure of the effect size of this predictor, the

deviance of the null model (Model 1) and the deviance of the current model (Model 2) were

compared. To calculate a measure of effect size, the variance (r^2) explained by the Level 2

predictors in HTKS post-intervention scores (outcome) was computed using the following

equation:

$$r^2= \frac{\tau^2_{null} - \tau^2_{means}}{\tau^2_{null}}$$

where τ^2_{null} was the τ value obtained in the previous null model and τ^2_{means} was the τ value

obtained through the present model. The resulting value indicated that classroom type (Level 2

predictor) explains 20.6% of the variance in HTKS post-intervention scores (r^2=0.206).

The third model included the Level 1 predictor of HTKS pre-intervention score (variable

name: HTKS_Pre). Specifically, this model was used to determine the relation between HTKS

pre-intervention and post-intervention scores (outcome). By selecting both error terms, the analyses include estimates of both the between- and within-group error. Specifically, u_{0j} starts with the assumption that HTKS post-intervention scores vary from classroom to classroom and u_{1j} starts with the assumption that strength of the relationship between HTKS pre- and post-intervention scores varies from classroom to classroom. The multilevel equation for this model was:

Model 3, Level 1: $Y_{ij} = \beta_{0j} + \beta_{1j}*HTKS\_Pre + r_{ij}$

Model 3, Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$

$\beta_{1j} = \gamma_{10} + u_{1j}$

where Y_{ij}, β_{0j}, r_{ij}, and u_{0j} are defined as described prior. β_{1j} quantified the relation between HTKS post-intervention scores in class j as a function of those HTKS pre-intervention scores (slope). γ_{00} is the estimated mean HTKS post-intervention score when classrooms interact with students who demonstrate an average pre-intervention score. γ_{10} is the estimated average effect of HTKS pre-intervention scores across classrooms, and u_{1j} is the random component of the effect of HTKS pre-intervention (i.e., quantifies how the effect of student pre-intervention scores for classroom j differs from the average).

The resulting estimate for the average effect of HTKS pre-intervention across classrooms was looked at specifically to determine whether the effect of this variable was significantly different than zero. The Wald chi-square relating HTKS pre-intervention and HTKS post-intervention scores was not statistically significant [$\chi^2(5) = 0.64$, $p=.53$]. Therefore, there was not a significant relationship between HTKS pre-intervention scores and post-intervention scores.

The final model tested for interactions between the predictor variables. Thus, it included Level 2 predictors from Model 2 and Level 1 predictors from Model 3. Coefficients were estimated, and, as before, significance values were used to determine whether there were any interaction effects on HTKS post-intervention scores in the model. The multilevel equations for this model was as follows:

Model 4, Level 1: $Y_{ij} = \beta_{0j} + \beta_{1j} * HTKS\_Pre + r_{ij}$

Model 4, Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}$ (Classroom_Type) $+ u_{0j}$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

The full model as a whole, which included the predictors of HTKS pre-intervention score and intervention versus comparison group, was significantly better than one in which only the intercepts were included, $\chi^2(6) = 74.90$, $p < .001$. Thus, the predictors together improved the model beyond that produced by considering variability in HTKS pre-intervention scores and classroom types alone. This relationship was also examined by comparing the deviance of the null model (Model 1) to the deviance of this model (Model 4). By comparing the σ^2 value between Model 4 and Model 1, a variance accounted for measure was derived and interpreted. To calculate a measure of effect size (r^2) explained by all of the predictors in HTKS post-intervention scores (outcome) was computed using the same method as previously described. The resulting value indicated that this model explains 58% of the variance in HTKS post-intervention scores ($r^2 = 0.580$).

Top-Down Self-Regulation: Statue. A one-way between-groups analysis of covariance (ANCOVA) was conducted to compare the effectiveness of select units of the *Second Step Early Learning* intervention on students' top-down self-regulation skills. The independent variable was group membership (intervention or comparison), and the dependent variable was

participants' post-intervention scores on the Statue test. Participants' scores on the pre-intervention administration of the Statue test were used as the covariate in this analysis.

After adjusting for pre-intervention scores, there was no significant difference between the intervention and comparison groups on post-intervention scores on the Statue test, $F(1,74) = 0.03$, $p=.96$. These results were unexpected, as it was originally predicted that students who received the intervention would demonstrate better top-down self-regulation than students who did not receive the intervention.

Emotion Knowledge: AKT Emotion Recognition. A one-way between-groups ANCOVA was conducted to compare the effectiveness of select units of the *Second Step Early Learning* intervention on students' emotion recognition. The independent variable was group membership (intervention or comparison), and the dependent variable consisted of scores on the AKT Emotion Recognition test administered to all participants after the intervention was completed. Participants' scores on the pre-intervention administration of the AKT Emotion Recognition test were used as the covariate in this analysis.

After adjusting for pre-intervention scores, there was no significant difference between the intervention and comparison groups on post-intervention scores on the AKT Emotion Recognition test, $F(1,74) = 1.48$, $p=.23$, which was contrary to the hypothesis.

Emotion Knowledge: AKT Situations. A one-way between-groups ANCOVA was conducted to compare the effectiveness of select units of the *Second Step Early Learning* intervention on students' responses to and understanding of emotional situations. The independent variable was group membership (intervention or comparison), and the dependent variable consisted of scores on the AKT Situations test administered to all participants after the

intervention was completed. Participants' scores on the pre-intervention administration of the AKT Situations test were used as the covariate in this analysis.

After adjusting for pre-intervention scores, there was a significant difference between the intervention and comparison groups on post-intervention scores on the AKT Situations test, F $(1,74) = 3.93$, $p=.05$. As predicted, students in the intervention group performed better at this task than students in the comparison group. Effect size was calculated using the partial eta squared. This model explains 5% of the variance in AKT Situations post-intervention scores.

Early Literacy Skills: PELI. A one-way between-groups analysis of covariance was conducted to compare the effectiveness of select units of the *Second Step Early Learning* intervention on students' early literacy. The independent variable was group membership (intervention or comparison), and the dependent variable consisted of composite scores on the PELI test administered to all participants after the intervention was completed. Participants' scores on the pre-intervention administration of the PELI were used as the covariate in this analysis.

After adjusting for pre-intervention scores, there was a significant difference between the intervention and comparison groups on post-intervention scores on the PELI, F $(1,74) = 23.54$, $p<.001$. As predicted, students in the intervention group performed better at this task post-intervention than students in the comparison group. Effect size was calculated using the partial eta squared. This model explains 24.1% of the variance in PELI post-intervention scores.

Research Question 2

Multilevel regression modeling was attempted to answer research question 2, which investigated whether children with low self-regulation skills who received a targeted, modified version of the *Second Step Early Learning Program* showed similar self-regulation as students

with adequate self-regulation skills who did not receive the targeted intervention, as rated by teachers. This approach was attempted due to the nested nature of the data, such that students (Level 1) were nested within classrooms (Level 2). Of specific interest was the relation between students who received the intervention versus their classmates that did not (Level 1 predictor variable) and student post-intervention DECA-P2 Self-Regulation outcomes. Model testing began with the unconditional null model. The multilevel equation for each model was:

Model 1, Level 1: $Y_{ij} = \beta_{0j} + r_{ij}$

Model 1, Level 2: $\beta_{0j} = \gamma_{00} + u_{ij}$

where Y_{ij} is the outcome score for student i in classroom j post-intervention. In Level 1 of Model 1, β_{0j} is the average post-intervention outcome score in classroom j (intercept), and r_{ij} quantifies the difference between classroom j's average outcome score and student i's outcome score (i.e., Level 1 residual). In Level 2 of Model 1, γ_{00} is the grand mean, or the average DECA-P2 Self-Regulation score across all classrooms. u_{ij} is the difference between classroom j's average DECA-P2 Self-Regulation score and the grand mean (i.e., Level 2 residuals).

The purpose of the null models, which did not include predictors, was to determine whether there were differences at the classroom level on the outcome variable. In other words, this model determined the need for multilevel modeling, as it was used to test whether variability in the outcome variable, by Level 2 group (classrooms), was significantly different from zero using the Wald chi-square test. Results for post-intervention DECA-P2 Self-Regulation scores were not statistically significant, indicating that there was not significant variance in DECA-P2 post-intervention scores by the Level 2 classroom groupings, and thus there was not statistical justification for running multilevel model analysis [$\chi^2(3) = 1.83$, $p=.70$]. As such, ANCOVA was used for this analysis.

85

A t-test was initially performed to analyze pre-intervention differences in teacher-rated self-regulation between those selected for the intervention and those who were not selected. Students who did not receive the intervention (M=53.39; SD=8.06) had significantly higher self-regulation scores than those who received the intervention (M=41.28; SD=6.99; t(103) = 7.81, p<.001). A one-way between-groups ANCOVA was conducted to compare the effectiveness of select units of the *Second Step Early Learning* intervention on teacher-rated self-regulation. The independent variable was intervention condition (received intervention vs. did not receive intervention), and the dependent variable consisted of post-intervention, teacher-rated scores on the DECA-P2 Self-Regulation subscale. Teacher ratings on the pre-intervention administration of the DECA-P2 Self-Regulation subscale were used as the covariate in this analysis.

After adjusting for pre-intervention scores, there was no significant difference between students who received the intervention ($M = 44.79$, $SD = 6.25$) and their classmates who did not receive the intervention ($M = 53.38$, $SD = 9.60$) on post-intervention DECA-P2 Self-Regulation ratings, F (1,96) = 0.86, p=.36. As predicted, students who received the intervention did not show differences in teacher-rated self-regulation scores post-intervention, suggesting that intervention students had similar levels of teacher-rated self-regulation as comparison students.

Research Question 3

Multilevel regression models were attempted to address research question 3: Does dosage of *Second Step Early Learning Program*, as evidenced by attendance, relate to changes in self-regulation, emotion knowledge, and early literacy skills? This approach was attempted due to the nested nature of the data, such that students (Level 1) were nested within classrooms (Level 2). Of specific interest was the relation between attendance (high vs. low; Level 1 predictor variable) and student post-intervention outcomes. High attendance was classified by attending at

least 75% of lessons, and ranged from 14 to 18 sessions, (M=15.88 sessions (88.22%);

SD=1.48), low attendance was classified by attending fewer than 75% of sessions, and ranged

from 3 to 13 sessions (M=10.43 sessions (57.94%); SD=2.93). The frequency distribution for

low attendance was negatively skewed, such that most students in this group attended at least 10

sessions (Skewness = -1.59; Kurtosis = 2.19). The frequency distribution for high attendance

showed an even distribution across the number of sessions attended (Skewness = 0.22; Kurtosis

= -1.46). Means and standard deviations for all outcome variables are summarized in Table 13.

Table 13

Summary of Means and SD for High and Low Attending Intervention Students

Measure	*M*	*SD*
HTKS		
High Attendance	19.40	17.02
Low Attendance	16.62	15.15
Statue Scaled Score		
High Attendance	8.04	3.00
Low Attendance	8.38	2.70
AKT Emotion Recognition		
High Attendance	10.84	1.14
Low Attendance	10.77	1.48
AKT Situations		
High Attendance	14.84	2.29
Low Attendance	13.54	2.22
PELI Composite Score		
High Attendance	184.36	53.62
Low Attendance	162.31	51.20

Model testing began with the unconditional null model. Five separate null models were

used to determine whether the Level 2 units (classrooms) differed on the five outcome variables

(HTKS, AKT Emotion Recognition, AKT Situations, PELI, Statue). The multilevel equation for

each model was:

Model 1, Level 1: $Y_{ij} = \beta_{0j} + r_{ij}$

Model 1, Level 2: $\beta_{0j} = \gamma_{00} + u_{ij}$

where Y_{ij} is the outcome score for student i in classroom j post-intervention. In Level 1 of Model 1, β_{0j} is the average post-intervention outcome score in classroom j (intercept), and r_{ij} quantifies the difference between classroom j's average outcome score and student i's outcome score (i.e., Level 1 residual). In Level 2 of Model 1, γ_{00} is the grand mean, or the average outcome score across all classrooms. u_{ij} is the difference between classroom j's average outcome score and the grand mean (i.e., Level 2 residuals).

The purpose of the null models, which did not include predictors, was to determine whether there were differences at the group level on the outcome variables. In other words, this model determined the need for multilevel modeling, as it was used to test whether variability in the outcome variable, by Level 2 group (classrooms), was significantly different from zero using the Wald chi-square test. Results for all five outcome variables were not significant: HTKS [$\chi^2(5) = 1.44$, $p=.15$], AKT Emotion Recognition [$\chi^2(5) = 0.60$, $p=.24$], AKT Situations [$\chi^2(5) = 1.11$, $p=.27$], PELI [$\chi^2(5) = 912.09$, $p=.21$], and Statue [$\chi^2(5) = 1.79$, $p=.30$]. This indicates that for all five outcome variables, there was not significant variance by the Level 2 classroom groupings. Thus, there was not statistical justification for running multilevel model analyses for this analysis. Alternatively, ANCOVA models were used to investigate group differences.

Bottom-Up Self-Regulation: HTKS. A one-way between-groups analysis of covariance was conducted to compare intervention dosage on students' bottom-up self-regulation. The independent variable was attendance (high or low), and the dependent variable consisted of post-intervention scores on the HTKS test. Participants' scores on the pre-intervention administration of the HTKS test were used as the covariate in this analysis. After adjusting for pre-intervention scores, there was no significant difference between the high ($M = 19.40$, $SD = 17.02$) and low attendance ($M = 16.62$, $SD = 15.15$) groups on post-intervention scores on the HTKS test, F

(1,35) = 0.002, p=.97. This is unexpected, as it was anticipated that students who attended more sessions would demonstrate significantly better bottom-up self-regulation skills than those who attended fewer sessions.

Top-Down Self-Regulation: Statue. A one-way between-groups analysis of covariance was conducted to compare intervention dosage on students' top-down self-regulation. The independent variable was attendance (high or low) and the dependent variable was scores on the Statue test administered to all participants after the intervention was completed. Participants' scores on the pre-intervention administration of the Statue test were used as the covariate in this analysis. After adjusting for pre-intervention scores, there was no significant difference between the high (M = 8.04, SD = 3.00) and low attendance (M = 8.38, SD = 2.70) groups on post-intervention scores on the Statue test, F (1,35) = 3.06, p=.09. Unexpectedly, students who attended more sessions demonstrated similar top-down self-regulation skills as those who attended fewer sessions.

Emotion Knowledge: AKT Emotion Recognition. A one-way between-groups ANCOVA was conducted to compare intervention dosage on students' emotion recognition. The independent variable was attendance (high or low) and the dependent variable consisted of scores on the AKT Emotion Recognition test administered to all participants after the intervention was completed. Participants' scores on the pre-intervention administration of the AKT Emotion Recognition test were used as the covariate in this analysis. After adjusting for pre-intervention scores, there was no significant difference between the high (M = 10.84, SD = 1.14) and low attendance (M = 10.77, SD = 1.48) groups on post-intervention scores on the AKT Emotion Recognition test, F (1,35) = 0.02, p=.90. This is unexpected, as it was anticipated that

students who attended more sessions would demonstrate significantly better emotion recognition skills than those who attended fewer sessions.

Emotion Knowledge: AKT Situations. A one-way between-groups analysis of covariance was conducted to compare intervention dosage on students' responses to emotional situations. The independent variable was attendance (high or low) and the dependent variable was post-intervention scores on the AKT Situations test. Participants' scores on the pre-intervention administration of the AKT Situations test were used as the covariate in this analysis. After adjusting for pre-intervention scores, the difference between high (M = 14.84, SD = 2.29) and low attendance (M = 13.54, SD = 2.22) groups approached significance on post-intervention scores on the AKT Situations test, F (1,35) = 3.48, p=.07. Students with high attendance tended to perform better than students with low attendance, as predicted.

Early Literacy Skills: PELI. A one-way between-groups analysis of covariance was conducted to compare intervention dosage on students' early literacy skills. The independent variable was attendance (high or low) and the dependent variable was scores on the PELI test administered to all participants after the intervention was completed. Participants' scores on the pre-intervention administration of the PELI test were used as the covariate in this analysis. After adjusting for pre-intervention scores, there was no significant difference between the high (M = 184.36, SD = 53.62) and low attendance (M = 162.31, SD = 51.20) groups on post-intervention scores on the PELI test, F (1,35) = 0.02, p=.90. Unexpectedly, students who attended more sessions demonstrated similar early literacy skills as those who attended fewer sessions.

Research Question 4

This research question was concerned with teacher's perceptions of SEL and the selective implementation of *Second Step Early Learning* in their classroom: What are the challenges and

strategies to promoting the transportability of evidence-based interventions into schools?

Review of the data obtained from the Behavior Intervention Rating Scale (BIRS), entrance interviews, and exit interviews revealed that teachers reported both positive and negative perceptions on the implementation of Tier 2 social-emotional curricula in their classrooms.

Most important skills for students entering kindergarten. All six teachers listed self-regulation and social emotional skills as key factors for school readiness. For example, one teacher noted, "self regulation is the key to everything. Students can't focus, be successful, problem solve, or rationalize without it" (Teacher 2, Entrance Interview). Similarly, another teacher reported, "social emotional skills are number one. Without [self-regulation] students have trouble sitting still and focusing, and then struggle academically. Social emotional skills are the most important thing for students this age" (Teacher 6, Entrance Interview). The view that social emotional skills and self-regulation are essential skills for student success in school was expressed/shared by all teachers. They viewed these skills as allowing students to better solve problems, learn, and remain focused in school. Another teacher emphasized the importance of these skills when she noted:

> "SEL is the number one focus in my classroom. I probably spend half of my focus on social-emotional; definitely more than academic skills. While those are important too, [students] can't be successful until they can focus and work together. A lot of my kids have rough male figures in their lives and they resort to anger quickly. I try to spend time processing emotions with them and teaching other ways to express themselves" (Teacher 1, Entrance Interview).

In sum, all teachers agreed that self-regulation and social-emotional skills are the most important skills for children entering kindergarten, and many (n=4) emphasized the use of SEL

curricula in their teaching. These statements revealed that these teachers value teaching social emotional skills to young students, and, see additional programming as a welcome and helpful curriculum addition for high-risk students.

Views of *Second Step Early Learning* Curriculum. Following implementation, teachers expressed positive views of the *Second Step Early Learning* intervention. Overall, survey results indicated that the teachers held a strong liking of *Second Step Early Learning*. The BIRS **Acceptability** mean score ranged from a 5.20 to 5.93 on a 6-point Likert scale for the six educators, suggesting strong acceptability of this intervention. Teachers described the intervention as "appropriate for a variety of children", "consistent with those used in the classroom setting", and "reasonable for the behavior problem described".

The BIRS **Effectiveness** mean score ranged from 4.86 to 5.29, which suggested that the teachers' general view of the intervention's effectiveness was positive. Teachers reported seeing the child's behavior remain at an improved level after the intervention discontinued, and that other behaviors related to the problem behavior were also likely to be improved by the intervention. The BIRS **Time** mean scores ranged from 5.00 to 5.50, suggesting that teachers thought this intervention would quickly improve the child's behavior and would produce a lasting improvement in behavior. In interviews, most teachers (n=5) reported that they would want a full version of *Second Step Early Learning* implemented at a targeted level to students in their class, as they thought that the addition of lessons targeting friendship skills would also be beneficial for students lacking self-regulation skills.

Challenges of SEL Curriculum. Even though teachers emphasized the importance of social-emotional skills for current and future student success, and had positive views of the *Second Step Early Learning* curriculum, they also revealed several challenges to supporting

student social-emotional skill development. One theme noted by several of the teachers (n=5)

was that the curriculum materials for additional social-emotional curricula, besides Al's Pals,

were not readily available to them. For example, Teacher 1 and Teacher 2 noted that access to

full curricula is limited. Teacher 1 noted:

> T1: The agency picks the curricula and we use the ones provided. Funding for other
> things is hard, from an agency perspective.
> R: What curricula do you know you have access to?
> T1: Um, I think just Al's Pals. That's all I use and know about, at least.
> R: This *Second Step* kit is actually from the agency too, so there might be other curricula
> available for you to use.
> T1: Oh really? I wasn't taught that they have that! So more communication would be
> nice, too. (Exit Interview)

Similarly, Teacher 2 noted agency-related challenges. She reported, "Access to materials

can be hard. I know that they can cost a lot of money, and we get what the agency gives us."

Teachers consistently noted that access to resources is a barrier to implementing Tier 2 social-

emotional curricula in their classrooms. A few (n=3) were not aware of the resources (e.g.,

Second Step Early Learning curriculum kits) that are available to them, and some (n=2) were

additionally concerned about the cost of the materials, especially if each individual classroom

requires a kit. Due to these factors, teachers thought that agency restrictions prevented them

from implementing Tier 2 social emotional support in their classrooms.

Another noted barrier to Tier 2 social-emotional intervention was the lack of training and

in-class support necessary to complete this type of intervention. The majority of teachers (n=4)

expressed that in order for small group intervention to be possible, additional, trained support

staff would be necessary. Teacher 3 noted:

> T3: For this to truly be possible, we would need people in the classroom.
> R: What do you mean by that?
> T3: We would need people to help with behavior management, additional people who
> could be there to handle kids that act out or become inappropriate.
> R: Ideally, who would those people be?

T3: Oh, they could be more assistant teachers, maybe mental health consultants? (Exit Interview)

Teacher 3 reported that with current resources, running a Tier 2 social emotional group would not be possible, as there is not enough trained staff present to manage students. She suggested that hiring additional assistant teachers or including mental health consultants in the intervention would help to mitigate this problem.

Teacher 5 also reported that extra staff would be required for a Tier 2 SEL group.

T5: Small group structure was great, but I would need extra staff for that to happen.
R: Why?
T5: Well, I think that if it is done by someone who is not me, then the kids might open up more or hear things differently. It always helps hearing things multiple times or in different ways, so, um, having someone else there to give the lessons could … could help them to hear it in a different way and maybe it will stick better.
R: Who do you think would best deliver the lessons?
T5: I think like a para-pro or extra staff, someone the kids don't know.
R: Because the kids might be more receptive to someone they don't know, or that person might, um, say it in a different way than you do?
T5: Exactly. (Exit Interview)

Teacher 5 noted that, while a small group format was a benefit, for this structure to continue, additional staff who are new to the children might be the best implementers of the intervention, as the students might be more apt to listening to this person. Further, she noted this person might deliver the material in a way that would be more memorable to the students. A third teacher, Teacher 4, suggested another staff-related concern to the implementation of a Tier 2 SEL curriculum. She noted "I would love for my assistant teachers to be trained. I'm working on having [assistant teacher] trained in *Al's Pals* so she can conduct lessons and be more familiar with the curriculum. None of us are trained in *Second Step* … I'm not too familiar with it … so, uh, I guess training would be necessary in order for this to continue" (Exit interview). Overall, the majority of teachers agree that staff training in *Second Step Early Learning*, and support from additional staff members, would be crucial to implementation of the program. Teachers

expressed that with their current responsibilities and time constraints, they would not be the best

implementers of a Tier 2 intervention. However, if additional staff members were hired, or

current support staff were trained, Tier 2 SEL intervention would be possible.

CHAPTER V: DISCUSSION

The purpose of the present study was to investigate the effects of a targeted social-emotional learning curriculum on the self-regulation, emotion knowledge, and early literacy skills of at-risk preschoolers. This chapter presents the results of the current study with reference to the existing literature. It specifically contains the following: interpretation of the results associated with each research question, limitations and future directions, and implications for educational practice.

Research Question 1

Multiple studies and meta-analyses have shown that school-based SEL interventions predict improvements in students' behaviors and feelings (e.g., less aggression and improved emotion identification) across grade levels (Durlak et al., 2011; Frey et al., 2005; Low et al., 2015). Based on this empirical evidence, it was anticipated that preschool students' self-regulation skills, emotion identification, and early literacy skills would improve upon receiving SEL instruction from *Second Step Early Learning Program*. Results from the current study provide limited support for previous findings.

Self-Regulation. In line with the hypothesis, the modified version of *Second Step Early Learning Program* had a significant effect on bottom-up self-regulation (HTKS Task). Results indicated that bottom-up self-regulation scores were higher when students were in the intervention group, and there was a medium effect size for this relationship ($r^2 = 0.58$). This further suggests that SEL curricula can promote bottom-up self-regulation skills in preschool students. It is possible that SEL programming cultivated students' bottom-up self-regulation by teaching and reinforcing bottom-up self-regulation skills, such as inhibitory control, in a wide variety of relatable contexts. In particular, *Second Step Early Learning* lessons incorporated

inhibitory control across units to applicable, everyday situations, such as following directions, waiting one's turn, and managing waiting (Jones et al., 2017). Further, Brain Builder activities (i.e., Wiggle and Stop, Follow the Arrow) that were practiced during each lesson fostered inhibitory control skills through practiced suppression of dominant behavioral responses. Integrating EC skills across multiple units and lessons may have allowed participants more practice opportunities across different situations across time, which has been found to improve young children's EC skills (Diamond & Lee, 2011). The improvement in bottom-up self-regulation scores supports previous findings specific to this skill area (Raver et al., 2011; Tominey & McClelland, 2011).

Although significant findings emerged in relation to bottom-up self-regulation, student differences in top-down self-regulation (Statue task) were not found. This was surprising, as it contradicts previous findings in the literature. For example, SEL programs have been found to relate to improvements in bottom-up self-regulation in preschool through high school students. These include increased levels of focus and attention (Morris et al., 2013; Nix et al., 2016; Schultz, et al., 2011) and self-control (Morris et al., 2013). Children who have received school-based SEL instruction have also exhibited reduced levels of aggression (Nix et al., 2016; Schultz et al., 2011) and hyperactivity (Schultz et al., 2011). Because previous studies have noted student improvements in bottom-up self-regulation following SEL intervention, future studies clarifying this link, and the mechanisms for change in improvement in bottom-up self-regulation, are warranted.

In relation to theory, results of the current study suggest that bottom-up self-regulation, top-down self-regulation, and SEL may be more distally connected than expected, according to the integrated model of EF-EC. Student performance on behavior tasks revealed quantitative

differences in EF-EC skills across groups. For instance, while students who received the SEL intervention improved in bottom-up self-regulation (e.g., inhibitory control), they unexpectedly did not significantly improve in top-down self-regulation (e.g., focused attention). While outcome differences may reflect measurement issues (e.g., content validity), they may also indicate that the integrated system of EF-EC is less directly linked than originally thought.

These results suggest at least three possible explanations for the effect of *Second Step Early Learning* on the top-down and bottom-up self-regulation of at-risk preschool students. First, findings indicate that SEL skills and top-down self-regulation may involve processes that target different areas of functioning that involve self-regulation. Results from the current study are consistent with findings from an investigation that identified SEL skills and top-down self-regulation (e.g., focused attention) as independent contributors to social competence in children ages four through fourteen; it suggested no relationship between these areas (McKown, Gumbiner, Russo, & Lipton, 2009).

Second, the association between SEL and the integrated model of EF-EC might not be as strong as originally assumed. The *Second Step Early Learning Program* targeted the five skills central to social-emotional learning: 1) self-awareness, 2) self-management, 3) social awareness, 4) relationship skills, and 5) responsible decision-making (CASEL, 2015). Thus, effortful control, included as an aspect of self-management, was a targeted skill of *Second Step*, but executive functioning was not (Committee for Children, 2011). As a result, there were more opportunities for practice and growth in bottom-up self-regulation skills. These findings may explain why improvements in top-down self-regulation were not observed in the current study. This also provides evidence for selective targeting of effortful control skills, but not executive functioning skills, by *Second Step*. While SEL curricula address some aspects of self-regulation,

there remains a gap in the intervention in targeting self-regulation more comprehensively, including executive functioning. Future research that combines an executive functioning intervention with SEL programming is needed to determine whether both top-down as well as bottom-up processes of self-regulation can be fostered.

Third, the variability of self-regulation outcomes in response to an SEL intervention may reflect developmental timing. The preschool years are a period of dramatic neurodevelopment, specifically in relation to self-regulation skills. Developmental psychologists note that effortful control begins to emerge around two years of age, and steadily increases from toddlerhood through the transition to adolescence (Diamond & Taylor, 1996; Ridderinkhof, van der Molen, Band, & Bashore, 1997; Rueda et al., 2004). Top-down self-regulation, on the other hand, typically begins to develop in elementary school, as increasingly complex tasks require higher-level cognitive self-regulation (Anderson, 2002; Rueda, Posner, & Rothbart, 2005). Thus, the SEL intervention might have fostered skills that were developmentally appropriate in preschool-aged children (i.e., bottom-up self-regulation), but did not promote skills that come later in the course of children's development (i.e., top-down self-regulation).

Emotion Knowledge. Surprisingly, students who received the SEL intervention did not show improved emotion understanding. This finding was unexpected, given the abundance of previous literature that has linked SEL programming to improved emotion understanding in preschool students (Denham et al., 2014; Durlak et al., 2011; Payton et al., 2008). One reason for the discrepancy between the findings in the currently study and the previous literature is that the measure used did not fully capture the emotion understanding skills that the students were taught in the *Second Step Early Learning* lessons. In the first three units of the Second Step curriculum, students learn how to identify various emotions in themselves. In Unit 3, students

learned how to manage emotions and control strong negative feelings, such as worry, frustration, disappointment, and anger. Identifying these feelings in others, however, was not a focus of the intervention. Because of this, it could be that the emotion understanding skills taught in the *Second Step Early Learning* curriculum did not translate to identifying emotions in *others* and *in context*, which is what was expected of them on the AKT. Studies that investigate changes in knowledge of emotions within the individual, as well as those that provide explicit instruction in identifying emotions in others, are important next steps for future research.

Second, even though there was not a significant difference in post-intervention emotion understanding scores in intervention and comparison students, both groups of students demonstrated improvements in emotion understanding and situation knowledge over time. Perhaps because emotion understanding is also a focus of the Tier 1 Al's Pals curriculum (about half of all of the Al's Pals lesson focus on emotion understanding), students had sufficient instruction in this area to demonstrate improvement over time, and additional Tier 2 instruction in this area was not necessary. Understanding the appropriate dosage of intervention to improve student outcomes is a necessary direction for future research.

Intervention students did, however, demonstrate improved understanding of emotional situations compared to comparison peers. This result was expected, as it replicated findings from previous literature; for example, in a comprehensive meta-analysis of SEL outcomes, Durlak and colleagues (2011) found significant improvement in students' emotional competence, including students' understanding of emotions in complex situations. The current study lends support to the effectiveness of SEL curricula at improving students' situational emotion knowledge, and, expands upon the literature by suggesting that SEL curricula can be effectively implemented in a Tier 2, small group format.

Early Literacy Skills. As expected, students who received the SEL intervention demonstrated greater improvement in early literacy skills than their peers who were low in self-regulation who did not receive the intervention. This finding mirrors and expands on the findings of previous studies. Notably, Payton and colleagues (2008) reviewed 317 studies on the effectiveness of universal, indicated, and afterschool SEL programs for children in kindergarten through eighth grade. Results demonstrated significant improvements in children's conduct and academic performance, including literacy skills, following SEL instruction. These benefits were found across SEL programming during and after school; diverse ages and backgrounds; grade levels; and rural, urban, and suburban settings (Payton et al., 2008).

While SEL programs have been linked to improved academic outcomes, the mechanism behind this change is largely unknown. One proposed mechanism for improved early academic skills is increased self-regulation (Raver et al., 2011). For example, the development of bottom-up (inhibitory control, delay of gratification) self-regulation skills is related to higher math and literacy achievement during preschool (Blair & Razza, 2007) and kindergarten (Cameron Ponitz et al., 2009). Thus, self-regulation may be a critical precursor for success in academic settings in that it allows children to take advantage of learning opportunities (Raver et al., 2011; McClelland, Geldhof et al., 2013). In the current study, because the SEL intervention was related to improved bottom-up self-regulation, it is possible that improvements in self-regulation also contributed to improvements in early literacy skills. In other words, self-regulation helped children learn how to learn, rather than what to learn, and laid the foundation for academic achievement in the classroom.

Modular Approaches to SEL Curricula. Taken together, these results support the use of modular approaches to SEL curricula in school settings. In other fields, modular approaches

to evidence-based intervention have been shown to be effective in community settings. For example, the work of Chorpita and colleagues (2004) utilized a modularized approach to anxiety interventions, which led to a significant decrease in patient anxiety and increased the transportability of cognitive behavioral therapy for anxiety to practitioners for use in practice settings. The current study provided SEL instruction based on identified need; three out of five units were delivered to students. Selected units included Skills for Learning, Empathy, and Emotion Management, which together targeted the identified student skill deficits of emotion knowledge and self-regulation. Students who received the intervention demonstrated improved bottom-up self-regulation, emotional situation understanding, and early literacy skills compared to students who did not receive the intervention. These results provide support to the use of modular SEL interventions in early childhood education settings, and suggest that the delivery of specific units that target identified skill deficits can lead to improved student outcomes.

Research Question 2

This study investigated the effectiveness of a targeted, modular Tier 2 social-emotional learning intervention on students' early education outcomes, including teacher perception of student's self-regulation skills. The results of this study indicated that, at post-intervention, teachers did not perceive intervention students to be significantly lower in self-regulation than their peers, even though a difference was observed at pre-intervention. This indicated that students were able to catch up to their peers in self-regulation, according to teacher ratings, supporting the effectiveness of Tier 2 social-emotional learning interventions in a school setting. These results additionally provide support to the use of modular SEL interventions in educational settings, as teachers reported student change in response to select units of the *Second Step Early Learning Program.* Of note, however, teachers were not blind to student participation and group

102

status, which could have influenced pre- or post-intervention ratings. The implications of this potential bias are discussed in detail in the limitations section.

Previous studies have also found Tier 2 interventions to be effective in promoting student behavioral change. A study by Stage and colleagues (2012) investigated the change in the percentage of at-risk status students from the fall to spring assessment period, following the *Check and Connect* intervention. Results showed that from the fall to the spring assessment period, there was a significant reduction in the overall number of students who were rated by their teachers as at-risk on externalizing problem behavior from 50% to 39%, suggesting that Tier 2 interventions can successfully change students' at-risk status (Stage et al., 2012). However, this study applied individual behavior support interventions, which can be costly and time-consuming for schools to implement. The current study, on the other hand, shows that group-based strategies can be implemented effectively and in a time-sensitive manner to promote student change on behavior at the Tier 2 level.

Further, studies have shown Tier 2 behavioral interventions to be effective in Head Start populations. In a study by Stanton-Chapman, Walker, Voorhees, and Snell (2016), students who received a targeted Tier 2 intervention demonstrated statistically significant decreases in average standard scores for externalizing and total problem behavior on the Child Behavior Checklist (Cohen, 1988). This study also found that children's social skills, as measured by teacher ratings significantly increased from the pre- to post-assessment, leading to a medium effect size. Similarly, studies have found increases in interactive play behavior (Stanton-Chapman, Walker, Jamison, & Smith, 2014), increases in children's social competence (Feil et al., 2009), and decreases in disruptive externalizing behavior (Muscott, Pomerleau, & Szczesiul, 2009) following implementation of a Tier 2 behavioral intervention. While these studies did not

directly compare Tier 2 students to Tier 1 students, the results suggest that targeted interventions can improve preschool student behavioral outcomes. An important direction for future research is to investigate how Tier 2 students perform compared to Tier 1 students' post-intervention, as there remains a need in understanding the degree to which students "catch up" to their peers.

<div align="center">**Research Question 3**</div>

The current study additionally investigated whether dosage, measured by attendance, of *Second Step Early Learning* lessons related to the degree to which preschool students demonstrated self-regulation, emotion knowledge, and early literacy skills. It was expected that students who attended at least 75% of SEL lessons would show a greater level of improvement in these skills than their peers who attend fewer than 75% of lessons. This hypothesis was based on previous early childhood educational studies that have found dosage effects. For instance, a study that investigated the number of days that two- and three-year-old low-birth-weight children attended a center-based childcare program found a larger, sustained effect on vocabulary skills on children with the highest levels of participation (Hill, Brooks-Gunn, & Waldfogel, 2003). Multiple studies have also found that young children (particularly those from at-risk populations) who consistently attended full-time early childhood education programs had a greater likelihood of demonstrating better social-emotional skills and higher cognitive, literacy, and math achievement scores than those who attended half-day programs (e.g., Reynolds et al., 2014; Lee et al., 2006). Overall, these findings suggest that individuals across age groups who participate in more intervention sessions are more likely to outperform their counterparts on social, behavioral, and academic outcomes.

Contrary to previous findings, the current study did not find dosage effects for the assessed outcomes. For bottom-up self-regulation, top-down self-regulation, emotion

<div align="center">104</div>

recognition, emotional situation recognition, and early literacy skills, students who attended more sessions did not demonstrate significantly better skills than their peers who attended fewer sessions. This finding is unexpected, given that greater dosage (e.g., number of sessions attended) to diverse interventions has been found to relate to a variety of improved outcomes in the pre-existing literature, as previously discussed (e.g., Reynolds et al., 2014; Lee et al., 2006).

While the results of the present study were unexpected, they may provide evidence that students do not need a large dosage of intervention to demonstrate improvements. Overall, students who received the intervention demonstrated better bottom-up self-regulation, emotional situation recognition, and early literacy skills post-intervention than their peers who did not receive the intervention. However, differences did not emerge among these variables when comparing high versus low attending students. Thus, regardless of attending a low number of sessions (approximately 10 sessions in the current study) or a high number of sessions (approximately 16 sessions in the current study), students demonstrated similar improvements in all of the assessed outcomes. This provides support that any amount of intervention, even if students only attend about half of the provided sessions, can be beneficial for students experiencing risk.

While the results might suggest that a small dosage of intervention can still be beneficial for at-risk students, it is important to note that all but three students attended at least 10 sessions, and the low attendance group was negatively skewed, indicating the data was clustered around the chosen cut-off of 13 sessions. Even though the mean number of sessions for the high attendance (*M*=15.88 sessions (88.22%); *SD*=1.48) and low attendance (*M*=10.43 sessions (57.94%); *SD*=2.93) groups were significantly different, this clustering could have minimized the dosage effects. Thus, it is possible that the chosen cut-offs might not have translated into

meaningful differences in dosage. Additionally, this study did not investigate student outcomes by specific lesson. As such, it is unknown if there are specific lessons, or a certain combination of lessons, that might relate to improved outcomes. Because of this, the results from this study suggest that students attending both a high (i.e., approximately 16) and low (i.e., approximately 10) number of sessions can demonstrate improved outcomes, but the lessons that might most contribute to improvements are unknown.

Further, measuring dosage in terms of session attendance has limitations. For example, being physically present for the session is an imprecise measure of dosage and does not indicate the amount of content that the student learned or, even whether a student was attentive during the lesson. Thus, while student attendance does measure dosage offered, it does not measure dosage received and taken in. To address this limitation, future research can focus on measuring a more targeted form of dosage, such as measuring student time on-task during each intervention session. This would provide a greater and more specific understanding of how received dosage relates to student outcomes.

Research Question 4

This exploratory question investigated teachers' perceptions on social-emotional learning and the existing barriers to evidence-based intervention implementation in preschools. Through interview and rating scale data, teachers ranked SEL skills as being of high importance for school readiness and success. They unanimously listed self-regulation as essential to student problem-solving, learning, and focus. Further, teachers emphasized the large role that SEL plays in their teaching, with some teachers reporting SEL skills encompassing half of their teaching time. These results mirror the findings of Buchanan, Guelder, Tran, and Merrell (2009). Interviews from this study indicated that teachers strongly believed that SEL was important for

students to succeed in school (i.e., student academic outcomes) and life (i.e., relationship skills). Further, teachers emphasized the importance of emotion knowledge, emotional control, impulse control, and the acknowledgement of differences between emotions and actions for students entering kindergarten to learn and be successful in school (Poulou, 2005). Thus, teachers have identified in the current and previous research the importance of social-emotional learning for early learners, indicating that this should be an area of focus in the pre-kindergarten curriculum.

Barriers. Although teachers ranked SEL skills as being of high importance for school readiness and success, they noted several areas of difficulty in implementing evidence-based SEL interventions in their classrooms. Previous research has identified the most significant barriers to EBI implementation in preschools were time to complete training, untrained co-teachers, and lack of training/administrator support (Shernoff & Kratochwill, 2007). These trends were replicated in the current study. Teachers identified access to materials and teacher training/in-class support as the top barriers to implementation. Specifically, teachers noted concerns about access to new curricula, and the need to use curricula that are provided by the agency. Further, teachers expressed concerns about costs and availability of monetary resources for new curricula, as they perceived funds to be limited. Several teachers recognized that the high cost of SEL curricula and the lack of current resources would likely prevent the addition of new curricula in their classrooms.

The second major barrier to Tier 2 implementation was lack of training in new curricula and in-class support to effectively run Tier 2 interventions. The majority of teachers expressed that in order for small group intervention to be possible, additional, trained support staff would be necessary. For example, teachers would need training in the new intervention, and then additional staff would be needed to either deliver the intervention, or, watch the rest of the class

107

while the teacher conducted the intervention with a small group. However, teachers noted that because they already deliver the Tier 1 intervention, a separate person available to deliver the Tier 2 intervention would be more beneficial for students while also protecting the teachers' time. Teachers noted that these resources are not currently available, which would make it very hard to effectively run a Tier 2, small group intervention. Teachers suggested additional staff members that would be beneficial include mental health consultants, assistant teachers, or para-professionals. Overall, the majority of teachers agree that staff training in SEL, as well additional staff support, would be crucial to implementation of a Tier 2 intervention in a Head Start setting.

The barriers identified by teachers in this study suggest that the resources available for teachers are lacking. Teachers not only identified monetary resources as a barrier to EBI implementation, but also a lack of support staff. This potentially has larger implications for understanding teachers' perceived demands and expectations. In a setting with limited resources, teachers may be expected to take on additional roles, such as being an interventionist. However, researchers have identified several factors that can contribute to teacher burnout, or emotional exhaustion, depersonalization, and feelings of low accomplishment stemmed from a loss of idealism and enthusiasm for work (Leiter, Bakker, & Maslach, 2014). These factors include the feeling of being overwhelmed by workload, classroom management/discipline problems, lack of support from colleagues or administration, and few opportunities to be leaders (Marzano & Heflebower, 2012). Teachers who have reported feeling unsupported and/or that there are unrealistic demands placed on them have higher rates of burnout (Kipps-Vaughan, 2013).

Understanding the contributing factors to teacher burnout is important, as teachers have been experiencing burnout at an increasing rate. One study found that 91% of schoolteachers

suffered from job-related stress in the past two years, and 91% of those teachers reported excessive workload as the major source of stress, which is a 13% increase from the last six years (Stanley, 2014). Relatedly, more than 41% of teachers leave the profession within five years of starting, and teacher attrition has risen significantly over the last two decades (Ingersoll, Merrill, and Stuckey, 2014). Understanding teachers' work-related demands, expectations, and stress is a necessary step in EBI implementation. Teachers, who are at-risk for burnout and attrition, require additional support not only to meet the demands currently placed on them, but also to be able to implement Tier 2 intervention effectively.

Use of a modular intervention approach can help to address these barriers. While the current study has shown that modular approaches can be effective in early education settings when implemented with fidelity, it may further suggest that modular approaches have added value in schools because they have increased feasibility, sustainability, and practical applications. For instance, modular approaches allow stakeholders to tailor interventions to meet their specific needs, reducing the amount of time spent on teaching extraneous lessons or skills. Therefore, interventionists deliver only the lessons that pertain to the specific area of need, reducing the time and resources necessary to complete a full intervention, and also reducing the demands placed on the interventionist. This kind of customized intervention was highlighted in the current study, where a modular approach was required to address the concerns of the community partnership (e.g., time constraints, targeted intervention focus) and increase buy-in. This is consistent with previous research that suggests that practitioners report a range of difficulties that prevent them from implementing manualized, evidence-based practices in the school setting, as full programs are generally not feasible due to time and resource constraints (George et al., 2013). The results of this study suggest that modular approaches can address

109

these barriers by reducing training, resource, and organizational demands while increasing practitioners' sense of autonomy in making empirically informed clinical judgments (Chorpita et al., 2005) and precisely target areas of need. An important direction for future research is to build on the current study to further explore refinements in the modular approach to identify the critical content and features that are essential for effectiveness while addressing the key barriers to EBI implementation.

Limitations

The current study specifically examined the social-emotional and learning effects of a targeted SEL intervention. Other contributions of this investigation to the evidence base include its exploration of the use of a modular intervention approach to target self-regulation skills; its use of pre-post group design to investigate intervention effects; its use of behavior tasks and teacher rating scales to investigate student progress; evaluation of intervention dosage on outcomes; and its evaluation of treatment acceptability and transportability in school settings. While the study contributed to the literature in many ways, several limitations existed.

First, teachers were not blind to which students were in the control and experimental groups. As such, teacher ratings may reflect this knowledge and be biased. For example, teachers knew which students received the intervention, which could have influenced their post-intervention ratings. Additionally, researchers were not blind to group status, and might have behaved in a way that contributed to bias in pre- and post- intervention assessment scores. Further, although surveys asked the teacher to complete the forms based on behaviors demonstrated over a set period of time (e.g., past 4 weeks for *DECA-P2*), perhaps each child was rated based on the most recent or most salient behavior displayed. In addition, it is known that raters generally hold different standards and ideas about typical and extraordinary behavior

across settings and over time (Renk & Phares, 2004), in part, due to the fact that each individual observes and uniquely processes events and behaviors (Dobbs & Arnold, 2009). This idea extends to teacher raters. For example, within the school setting, it is likely that the teacher held higher expectations of her students' behavior as the school year progressed, even if the child's behavior remained the same over time. This increased expectation could have led to similar or lower teacher ratings at post-intervention. Furthermore, ratings could have been influenced by the mood and mental health of the teacher rater (Pas & Bradshaw, 2014; Webster-Stratton & Hammond, 1988). Thus, teacher knowledge of intervention students, paired with expectations and individual factors, could have biased the results.

Second, practical barriers in a community setting impeded delivery as intended by the intervention developers, which may have affected intervention outcomes. Implementation barriers included scheduling conflicts and limited resources, which resulted in inconsistent assistance throughout implementation (e.g., lack of consistent assistant teacher support and space availability for pre/post data collection). Further, due to limited setting resources, the intervention took place in each classroom, leaving a potential for contamination with students who did not receive the intervention, and possible distraction for students during intervention implementation. Other, non-target students could have reasonably overheard intervention delivery and unintentionally learned the content. Further, there was also a potential for contamination in using the intervention ideas and language beyond the targeted group within intervention classrooms, as assistant teachers might reasonably have used the *Second Step Early Learning* strategies with all students, instead of just with those receiving the intervention.

Third, this study had a limited sample size, which influenced the analyses that could be used. Twelve classrooms consisting of five to eight children were recruited for the present study,

which was not enough of a sample size to meet minimally sufficient power to run a multilevel model analysis for all variables. Due to the nested nature of the data, multilevel modeling would have been a more appropriate analysis. Further, the conclusions that could be drawn from the ANCOVA analyses are limited, including an unknown understanding of how much of the variance can be attributed to different factors (such as pretest scores, classroom, and intervention effects).

This limited sample size was also present in the number of participants providing qualitative data. Although the data yielded an interesting consensus by many of the teachers, a larger number of participants would likely have yielded a more complete and potentially diverse picture of teachers' views on social-emotional learning and barriers to implementing evidence-based interventions. This information would be helpful in gaining a more complete understanding of the research-to-practice intervention gap and how to effectively narrow it.

Fourth, parents were not engaged in reinforcing social-emotional learning practices at home in this investigation. A strong research base suggests that home-school collaboration relates to positive educational student outcomes, such that it has become widely encouraged (e.g., National Association of School Psychologists, 2012). School-family partnerships have also been found to benefit children's social-emotional competence (Durlak et al., 2010). Thus, it is likely that home-school collaboration would also enhance children's self-regulation and emotion knowledge skill development.

Future Research

In relation to the findings and limitations, researchers may wish to address a number of issues in future evaluations of interventions that target self-regulation in young children. First, research on the long-term effects of early (i.e., preschool) social-emotional learning should be

investigated. The current study did not examine data longitudinally, however, understanding how early intervention influences outcomes over time, especially for children in high-risk populations, can provide evidence to the need for these interventions in an early childhood educational setting. In the future, obtaining students' data throughout their education (i.e., through high school or college graduation) would help to fill this knowledge gap.

Second, research is needed to understand the essential components and mechanisms of change in SEL curricula. Currently, it is not known which specific intervention units or lessons contribute to change. This study found that the *Second Step Early Learning Program* as a whole was not needed to see positive change in student outcomes. Instead, selected units related to the presenting problems (i.e., self-regulation, emotion knowledge, emotion regulation) were delivered to students, and the assessed outcomes showed significant changes in students who received the intervention. Future research is needed to further understand the effectiveness of modular interventions, for example, by investigating the specific modules that most contribute to improvements in student outcomes. Future research can additionally investigate the essential components or lessons of the intervention that relate to student outcomes to gain a better understanding of aspects of the intervention that contribute to change.

Third, researchers should consider expanding on the current study by examining intervention effectiveness by dosage to the intervention. Although pre-existing literature suggests that frequency of attendance directly relates to improvement in a variety of skills across diverse populations, these findings were not replicated in the current study. Therefore, an examination of this particular topic in interventions that target self-regulation skills may be beneficial. Further, there is currently little understanding of the amount of intervention (e.g., number of intervention sessions attended) needed to elicit student change. Although this

question was beyond the scope of the current study, future research should examine intervention dosage by session as it relates to student outcomes.

Fourth, more research is needed to examine the relationship between the integrated hot and cold self-regulatory processes and social-emotional competence during early childhood in a large sample of preschool students. Results from this study indicate that EC-EF and school readiness are only distantly linked, perhaps during early childhood. Development is likely an important variable to investigate in relation to these processes, as those that are common to EC and EF are emerging and have not fully integrated during early childhood (Garon et al., 2008; Jones et al., 2003). Therefore, a more intensive investigation into the EC-EF relationship during early childhood could help to provide more data about this relationship and strengthen theoretical understanding.

Fifth, there remains a need for comprehensive research on teachers' perceptions of SEL curricula and the existing barriers for implementing curricula in their classrooms. Qualitative data collected in the present study provided evidence that mirrored previous studies, indicating barriers to EBI intervention include teacher training, support, and access to resources. In response, studies that aim to address and overcome these barriers is a necessary direction for research to reduce the research-to-practice gap that currently exists in implementing educational interventions.

Sixth, future studies should formally involve parents in the intervention, such that home-school collaboration is established in promoting school readiness. Overwhelming evidence suggests that parent involvement can improve children's social-emotional competence (e.g., NASP, 2012; Durlak et al., 2011). Based on this literature, it is likely that home-school partnership would also enhance children's self-regulation, emotion knowledge, and early literacy

skills because instruction and reinforcement would occur in two different settings. Doing so may help children generalize their skills across contexts and situations.

Implications for Practice

The current study's findings are relevant for the delivery of school psychological services for children across grade levels, but particularly for those in early childhood educational settings. Research on the short- and long-term implications of self-regulation suggests that this set of skills improves young children's school readiness (e.g., Blair, 2002) and predicts their educational, mental, and physical health through adulthood (Moffitt et al., 2011). In light of the evidence, school psychologists are ethically obligated to promote children's skills in their effective management of thoughts, feelings, and behaviors through "[advocacy] for school policies and practices that are in the best interest of children" (Standard IV.1.2; NASP, 2010).

The present study supports the effectiveness of a modified, targeted SEL curriculum in promoting school readiness for at-risk preschool students. Students who participated in the intervention displayed improved bottom-up self-regulation, emotional situation recognition, and early literacy skills compared to non-intervention peers, regardless of dosage. Intervention students also caught up to Tier 1 students in teacher-rated self-regulation at post-intervention. These results indicate a need for continued Tier 2 social-emotional learning support in early education settings, particularly for students who are considered to be at-risk for negative outcomes. Preventative services that make use of evidence-based practices in a proactive manner have been found to improve functioning while reducing risky behavior (Natasi & Varias, 2008). Thus, educational programs should prioritize preventative intervention in social-emotional learning in early education settings, particularly given the connection between SEL curricula and improved student social-emotional and academic outcomes.

115

This study also highlights the need for increased teacher training, funding, and support to narrow the research to practice gap for evidence-based interventions. Teachers consistently identified lack of training and knowledge of intervention, for themselves and assistant teachers, as a barrier to implementation. One place this where change can be initiated is in teacher preparation programs. Teacher preparation programs that include social-emotional learning and intervention courses can inform teachers about how to teach social-emotional skills and intervene with students who are lacking these skills. This also supports the recommendation of Marlow and Inman (2001) that colleges of education include social-emotional learning in their missions and courses.

Lastly, given the need for social-emotional competence in schools (Durlak et al., 2011), it is essential that there is an increase in applied research on social-emotional learning and curriculum in educational settings. Ecological validity can only be achieved if research takes place within the school environment. Financial concerns, scheduling, and staffing limitations must be considered, along with student attendance, parent concerns and administrator approval; there is little utility to an effective intervention that cannot be implemented due to budget, time, student, or staffing constraints.

Conclusion

The current study investigated the effectiveness of a modified, targeted Tier 2 social-emotional learning intervention in at-risk Head Start students using a group design. The findings indicated that students who received the intervention showed greater improvements in bottom-up self-regulation, emotion identification of situations, and early literacy skills than their low self-regulation peers who did not receive the intervention. Further, students who received the intervention did not significantly differ on teacher-rated self-regulation compared to their peers

116

with typical self-regulation skills. Lastly, intervention dosage, as measured by attendance, did not yield significant outcomes. Teachers prioritized SEL for early learners as the one of the most essential skills for academic success, but noted barriers to implementation, including available materials, training and in-class support during lessons, and student sustained attention. Future research that considers the complexities of school-based implementation of evidence-based intervention should replicate and expand on the current study.

APPENDICES

Consent Forms

Research Participation Information and Parental Consent Form
Early Learning Enrichment Study
Michigan State University

Dear Parent/Guardian,

My name is Kiley Hierl and I am a doctoral student in the School Psychology Program. I am working with your child's school, Capital Area Community Services (CACS) Head Start, to strengthen school readiness skills. We will be using lessons from the ***Second Step Early Learning Program*** that are designed to improve problem-solving and self-management skills in the classroom. Your school is offering these lessons twice per week to select students. In addition to teaching, I will be collecting data as part of the evaluation of the program. I am asking your permission for your child to participate in the Early Learning Program and research study.

Your participation would involve completing a 1-page background questionnaire that takes about 5 minutes.

We are also asking for your permission to assess your child's self-management, social-emotional skills, and early reading skills, now and at the end of the school year. The activities that your child will be asked to complete are similar to games and puzzles, and others involve reading short stories together. These activities should take about 30 minutes to complete. Additionally, we are asking permission for teachers to share their ratings of your child's social-emotional competence and behavior, such as self-control and initiative, and their nominations of children for the Early Learning Program.

A limited number of children will be selected to participate in the Second Step Early Learning Program. The purpose of the program is to promote school readiness by teaching how to pay attention, manage feelings, and solve problems. Twelve preschool students from your child's school will be chosen to take part in the program based on nominations from Mental Health Consultants and teachers. You may also choose to nominate your child for consideration to participate in this program. There is no cost to participate. Students who are not selected to participate in this program will still participate in data collection and receive the classroom-based Al's Pals program.

This study has several potential benefits. This research can promote social-emotional and problem solving skills important for early success in school. These findings may help students to be better prepared for elementary school by providing them with skills to recognize and manage their behaviors and feelings, as well as to get along with others. Learning these skills may also help to improve their readiness to learn academically, for example in reading and math. While

these improvements have been found in previous research, we cannot guarantee that your child will see these results.

There is minimal risk in participating in the study. All children participating in data collection will miss 30 minutes of class time, twice, to complete the game-like activities. While most children enjoy these activities, some might have less interest and find them difficult.

Participants' identities will be kept confidential. All identifying information will be removed. Each student and teacher will be assigned an ID code. Data will be stored in locked files on password protected computers. Your confidentiality will be protected to the maximum extent allowable by law. The results of the study will not contain any identifying information. General results will be available to you upon request.

Your participation in this study is entirely voluntary. This means that you are free to choose whether or not you want to participate in the study, and you are free to withdraw your participation at any time without consequence. You may also refuse to answer certain questions without consequence. If you choose not to participate, this will not affect your child's school experience in any way.

PLEASE SIGN THE CONSENT FORM, SEAL IT IN THE ATTACHED ENVOLOPE, AND RETURN IT TO YOUR CHILD'S TEACHER.

If you are willing to participate, please sign and return this consent form to your child's teacher, who will return it to the researchers. Please keep a copy for your records.

If you have any questions or concerns about participating in this study, or if questions arise later, please feel free to contact me: Kiley Hierl (Michigan State University; CEPSE, hierlkil@msu.edu) or my supervisor: Dr. Evelyn Oka (Michigan State University; CEPSE, 620 Farm Lane; East Lansing, MI, 48824; 517-432-9615; evoka@msu.edu).

If you have any questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this research study, you may contact, anonymously if you wish, Michigan State University Human Research Protection Program at 517-355-2180, FAX 517-432-4503, or email irb@msu.edu, or regular mail at: 202 Olds Hall, MSU, East Lansing, MI 48824.

If I may be of further assistance, please do not hesitate to contact Dr. Oka or me.

Sincerely,

Kiley Hierl, M.A.
Doctoral Candidate, School Psychology
Department of Counseling, Educational Psychology, and Special Education
Michigan State University

You indicate your voluntary agreement to participate in this study by signing below.

_____   _____

Parent/Guardian Name (Please Print)   Relationship to Child

_____   _____

Parent/Guardian **Signature**   Date

_____

Phone Number (for contact, if needed)

_____   _____

Child's Name   Child's Birth Date

Would you like for your child to be considered for enrollment in the 9-week Early Learning Program?

Please circle one:

Yes   No

PLEASE SIGN, SEAL, AND RETURN THIS COPY TO YOUR CLASSROOOM TEACHER.

Dear [Name of Lead Teacher],

My name is Kiley Hierl and I am a doctoral student in the School Psychology Program. I am working with the Mental Health Consultants at Capital Area Community Services (CACS) Head Start, to teach children skills to manage behavior and feelings in the classroom. This year, your preschool classroom will be implementing the ***Second Step Early Learning Program*** to teach children self-management and social skills and give them practice in responding to challenging tasks and interpersonal situations. I will be delivering the lessons and evaluating the program, and will work with you to set up a schedule. Data will be collected from students in both your morning and afternoon classes, but only one class will receive the *Second Step Early Learning Program*. Selected students will receive instruction twice per week and practice activities designed to teach strategies to manage behavior and feelings. I am inviting you to participate in research that studies whether these lessons help to promote school readiness, and to hear your thoughts on implementing social-emotional learning interventions in preschool classrooms.

Your participation would involve: 1) completing a rating scale for each child in your morning and afternoon class (*DECA-P2*) at the beginning and end of the *Second Step* intervention, 2) nominating 6-8 students per class who could benefit from the *Second Step Early Learning Program*, and 3) completing a brief interview with the researcher before and after the *Second Step Early Learning Program*. In appreciation of your time and effort, you will be provided with a $50 gift card at the beginning of *Second Step* and a $100 gift card at the end of the 9-week program.

This study has several potential benefits. This research can help young children develop socio-emotional skills shown to support early success in school. It can also help to increase the use of research-based programs by understanding the challenges and benefits involved in implementation. You may benefit from this study by the findings that would be available to you should you choose to deliver the *Second Step Early Learning Program* in the future. These findings can also be used to identify students in need of additional support and keep track of skills development over time. There is minimal risk in participating in the study and primarily involves spending time completing the rating forms and interviews to evaluate the effectiveness and acceptability of this program.

Participants' identities will be kept confidential. All identifying information will be removed. Each student and teacher will be assigned an ID code. Data will be stored in locked files on password protected computers. Your confidentiality will be protected to the maximum extent allowable by law. The results of the study will not contain any identifying information. General results will be available to you upon request.

Your participation in this study is entirely voluntary. This means that you are free to choose whether or not you want to participate in the study, and you are free to withdraw your

participation at any time without consequence. You may also refuse to answer certain questions without consequence.

PLEASE SIGN AND RETURN IN THE ENVELOPE PROVIDED.

If you are willing to participate, please sign and we will pick it up from you. Please keep a copy for your records.

If you have any questions or concerns about participating in this study, or if questions arise later, please feel free to contact me: Kiley Hierl (Michigan State University; CEPSE, hierlkil@msu.edu), or my advisor: Dr. Evelyn Oka (Michigan State University; CEPSE, 620 Farm Lane; East Lansing, MI, 48824; 517-432-9615; evoka@msu.edu).

If you have any questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this research study, you may contact, anonymously if you wish, Michigan State University Human Research Protection Program at 517-355-2180, FAX 517-432-4503, or email irb@msu.edu, or regular mail at: 202 Olds Hall, MSU, East Lansing, MI 48824.

If I may be of further assistance, please do not hesitate to contact Dr. Oka or me.

Sincerely,

Kiley Hierl, M.A.
Doctoral Candidate, School Psychology
Department of Counseling, Educational Psychology, and Special Education
Michigan State University

Informed Consent Form

You indicate your voluntary agreement to participate in this study by signing below.

_____   _____
Teacher Signature   Date

PLEASE PRINT

_____   _____
Teacher Name   Title

PLEASE SIGN AND SEAL IN THE PROVIDED ENVELOPE. THE PROJECT STAFF WILL
PICK UP THE FORMS.

Kiley Hierl, M.A. ~ Michigan State University ~ email: hierlkil@msu.edu

Dear [Name of Assistant Teacher],

This year, your preschool classroom at CACS Head Start is using the ***Second Step Early Learning Program*** to teach children self-management and social skills and give them practice in responding to challenging tasks and interpersonal situations. I will be delivering the lessons and evaluating the program in collaboration with you. During Second Step implementation, you would sit in on the lessons and assist with behavior management. Selected students will instruction twice per week and practice activities designed to teach strategies to manage behavior and feelings. I am inviting you to participate in research that studies whether these lessons help to promote school readiness.

Your participation would involve completing a brief interview at the end of the study about *Second Step*. In appreciation of your time and effort, you will be provided with a $10 gift card at the end of the study.

This study has several potential benefits. This research can help young children develop socio-emotional skills shown to support early success in school. It can also help to increase the use of research-based programs by understanding the challenges and benefits involved in implementation. You may benefit from this study by the findings that would be available to you should you choose to deliver *Second Step Early Learning Program* in the future. These findings can also be used to identify students in need of additional support and keep track of skills development over the school year. There is minimal risk in participating in the study and primarily involves spending time participating in brief interviews on acceptability of these programs.

Participants' identities will be kept confidential. All identifying information will be removed. Each student and teacher will be assigned an ID code. Data will be stored in locked files on password protected computers. Your confidentiality will be protected to the maximum extent allowable by law. The results of the study will not contain any identifying information. General results will be available to you upon request.

Your participation in this study is entirely voluntary. This means that you are free to choose whether or not you want to participate in the study, and you are free to withdraw your participation at any time without consequence. You may also refuse to answer certain questions without consequence.

PLEASE SIGN AND RETURN IN THE ENVELOPE PROVIDED.

If you are willing to participate, please sign and we will pick it up from you. Please keep a copy for your records.

If you have any questions or concerns about participating in this study, or if questions arise later, please feel free to contact me: Kiley Hierl (Michigan State University; CEPSE, hierlkil@msu.edu) or my advisor: Dr. Evelyn Oka (Michigan State University; CEPSE, 620 Farm Lane; East Lansing, MI, 48824; 517-432-9615; evoka@msu.edu).

If you have any questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this research study, you may contact, anonymously if you wish, Michigan State University Human Research Protection Program at 517-355-2180, FAX 517-432-4503, or email irb@msu.edu, or regular mail at: 202 Olds Hall, MSU, East Lansing, MI 48824.

If I may be of further assistance, please do not hesitate to contact Dr. Oka or me.

Sincerely,

Kiley Hierl, M.A.
Doctoral Candidate, School Psychology
Department of Counseling, Educational Psychology, and Special Education
Michigan State University

Informed Consent Form

You indicate your voluntary agreement to participate in this study by signing below.

_____   _____
Teacher Signature   Date

PLEASE PRINT

_____   _____
Teacher Name   Title

PLEASE SIGN AND SEAL IN THE PROVIDED ENVELOPE. THE PROJECT STAFF WILL PICK UP THE FORMS.

Kiley Hierl, M.A. ~ Michigan State University ~ email: hierlkil@msu.edu

Child Assent Verbal Script

Hi. My name is _____. I go to school. I'm trying to learn about how kids learn and play with their friends.

We are going to do many different activities today. We'll do some reading together, some puzzles and play some games. By doing these activities, you will help me understand about how kids your age learn. Your mom/dad says it's okay for you to do this. We can take a break at any time. Do you have any questions for me now? If you have a question later that you don't think of now, you can ask *[me/your teacher/parents]*. Would you like to start?

NOTES TO RESEARCHER: The child should answer "Yes" or "No." Only a definite "Yes" may be taken as assent to participate.

Name of Child: _____ **Parental Permission on File:** ☐ Yes ☐ No
(If "No," do not proceed with assent or research procedures.)

Child's Verbal Response to Voluntary Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

Parent Background Survey

This form is to be completed by the parent or primary caregiver of the child. We want to learn more about you and your child. Please answer the following questions as honestly as possible. All information will be kept confidential.

Person completing the survey:_____

Relationship to child:_____

Child's Name:_____   Child's Gender: ☐ Female ☐ Male

Head Start School:_____   Child's Birth Date: ___/___/___

Child's Age:_____   First Year in Head Start:_____

Person in the home that spends the most time taking care of your child:_____

Does your child have difficulty communicating or understanding speech? ☐ Yes ☐ No

The materials will be presented in English. Will your child have difficulty completing activities in English? ☐ Yes ☐ No

Does your child currently receive special education services? ☐ Yes ☐ No

If yes, under which category does your child qualify for services? _____

What activities does your child like to do? (e.g., drawing, sports, reading)_____

Is there anything that we should be aware of when working with your child?

_____

What is your race and/or ethnic origin? (check all that apply)

☐ American Indian or Alaskan Native

☐ Asian or Pacific Islander

☐ Black, not of Hispanic origin

☐ Hispanic

☐ White, not of Hispanic origin

☐ Other (please specify:_____)

APPENDIX C

Lead Teacher Initial Interview

THEME 1: Thoughts on/Importance of SEL

- What are the most important skills when entering kindergarten? What helps students to be successful?
- I am aware that your school uses SEL programs, such as Al's Pals. How important is SEL for students in preschool?
- What are some of your concerns for your students?

THEME 2: Current Use of SEL in Classroom

- What is your view of SEL programs?
- Do SEL curricula teach the skills you want your students to know?
- How do you implement SEL in your classroom?
- What does a typical Al's Pals lesson look like?
- What do you think Al's Pals teaches students? What changes as a result of Al's Pals?
- How much time per week do you spend teaching SEL lessons?
- Do you wish there was more or less time available for SEL programming?

THEME 3: Expectations for Additional SEL Instruction

- Do you think additional SEL instruction will be helpful for children with low self-regulation skills?
- How do you see Second Step being helpful/not helpful?
- What outcomes/student changes do you expect to see at the end of 9 weeks?

APPENDIX D

Lead Teacher Exit Interview

THEME 1: Feasibility/Ease of Use of Second Step

- What do you think about Second Step:
    - Format
    - Content
    - Materials
    - Lessons
    - Songs
    - Activities
    - Goals
- Was the time taken to implement Second Step feasible?
- Would you recommend Second Step to others?

THEME 2: Perceptions/Challenges of Implementing New SEL Curricula

- What are some of the challenges in implementing a new curriculum in your classroom?
- What can be done to minimize these challenges?
- Would you want a full version of Second Step implemented in your classroom (as opposed to a modified version)?

THEME 3: Students Outcomes and Future Use

- Overall, was the addition of Second Step helpful for your students?
- Did the curriculum meet your goals for promoting children's social and emotional development?
- Would you be interested in using Second Step in the future?
    - How likely 1-7?
- What are barriers to you using additional SEL programming in the future?
- How might this be sustained without MSU staff?

APPENDIX E

Second Step Procedural Fidelity Checklist

Implementer: _____ Observer: _____

Date: _____ Time Start/End: _____

SS Lesson: _____

Total Items: _____	**Key:**
Total Items Marked: _____	+ (Happened)
Ratio: _____	- (Did Not Happen)
	N/A (Not Applicable)

Second Step Implementation: Before Lesson

#	Procedure	Check
1	Lesson materials are set up (e.g., puppets / cue cards out of the box, posters hung on wall, CD in CD player and on the specific track) within 12 inches of implementer	
2	Lesson materials are out of reach of students	
3	Objects and materials that compete for students' attention on the rug removed	
4	Scripted lesson card is placed by the implementer on the rug (corner)	
5	Students are asked to sit in a circle on the rug	
6	Lesson will begin once students sit quietly with crossed legs and eyes on implementer	

Second Step Implementation: During Lesson

#	Procedure	Check
7a	Puppet Script: • Bring out boy and/or girl puppet • ☐ (If specified) Bring out additional materials	
7b	Story & Discussion: • Show students photo	

7c	Skill – Practice Activity: • Practice as directed in manual Activity: _____	

PUPPET SCRIPT

8	• Read scripted text accurately (puppet/s are worn on hand at this time)	
	• Students are prompted to respond to at least 1 directive or question	
	• Students are called on to respond to the question asked	
	• Review rules and rephrase students' responses (if specified in lesson)	
	• Repeat rules and model actions (if specified in lesson)	

STORY AND DISCUSSION [excludes Unit 2: Week 7 (Identifying Feelings)]

9	(If specified in lesson) Students are prompted to respond to at least 1 directive or question (read scripted text accurately) • "What do you see? AND • "What is happening?" AND • "How does the [name of child in photo] feel in the picture?"	
	• Story elements are pointed out (read scripted text accurately)	
	• Students are prompted to respond to at least 1 directive or question (read scripted text accurately)	
	• Students are called on to respond to the question asked	
	• Provide reminders for students to use listening rules as needed	
	• Repeat asking question and calling on students to respond	

SKILL – PRACTICE ACTIVITY (Introduction)

10a	IF FIRST TIME GAME IS PLAYED	IF GAME HAS BEEN PLAYED BEFORE	
	• Introduce game (read scripted text accurately)	• Remind students to follow the rules required to play game	
	• Say each rule (if specified in lesson)	• Have students make hand gesture (e.g., "Make an attent-o-scope with your hands" as it is modeled)	
	• Model what to say and/or do	• Students are prompted to engage in game	

133

	• Students are prompted to copy what to say and/or do	• Notice and reinforce skill and/or behavior	
	• Notice and reinforce skill and/or behavior: 1. State what the student did (read scripted text accurately if script is included) 2. Say the rule and ask students to do the action 3. Do the action and ask students to say the rule	• Repeat the prompt, notice, and reinforce at least 3 times with different cards, objects, scenarios, or actions	
	• Repeat the prompt, notice, and reinforce at least 3 times with different cards, objects, scenarios, or actions		
SKILL – PRACTICE ACTIVITY (Student Feedback During Game)			
	If student performs task **correctly** on attempt #1: 1. Give him/her a high five with verbal acknowledgement that the behavior was performed		

10b	If student performs the task **incorrectly** on additional attempts:
	
	1. Provide corrective feedback
	2. Ask a peer who has performed it correctly to demonstrate the behavior correctly (done 3 times maximum)
	3. Invite the student to perform the behavior/complete the task 1 more time
	    o *If performed correctly*, give the student a high five with verbal acknowledgement that the behavior was performed
	    o *If performed incorrectly*, give the student a high five with verbal encouragement ("Nice try, [name of student]! You [describe briefly what was done correctly]. Practicing more tomorrow can help you get better."]		

Notes/Comments:

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