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The Relationship between Social-Emotional Development, Academic Achievement and Parenting Practices in Young Children who Attend Head Start

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Abstract

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During the preschool years, children develop social-emotional skills – such as cooperation and self-regulation – which predict later academic achievement. Research shows that parents play an important role in the development of these skills. However, it remains unclear how specific parenting practices may facilitate the relationship between social-emotional development and academic success. Often, children who grow up in low-income families are at risk for a variety of cognitive and emotional problems. Head Start is a federal program offered to low-income families that provides services, including early childhood education programs, to help offset these risks. Using Bronfenbrenner's bioecological theory, the purpose of this dissertation was to explore the relationship among these three factors -- social-emotional skills, academic achievement, and parenting practices -- in an effort to better understand child development. There were three primary aims of this dissertation: (1) to demonstrate the inter-relatedness of several social-emotional skills for children who attended Head Start at age three; (2) understand the relationship between social-emotional skills during preschool and academic achievement at the end of kindergarten; and (3) understand how parent characteristics can influence the relationship between social-emotional skills in preschool and academic achievement by the end of kindergarten. Using a large, nationally representative data set from the Head Start program, several specific research questions were addressed through secondary data analysis. Findings from backwards regressions and moderation analysis indicate that there was a relationship

between social-emotional skills at age three and academic achievement at age five, and that these relationships were sometimes moderated by parenting approaches.

Keywords: Social-emotional development; academic achievement; Head Start; parenting practices

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Table of Contents

List of Tables

List of Figures

The Relationship between Social-Emotional Development, Academic Achievement and Parenting Practices in Young Children who Attend Head Start

Research has shown that early childhood education and experiences are building blocks for later academic success. For example, in a recent meta-analysis, Camilli, Vargas, Ryan, and Barnett (2010) found that children who attend preschool showed improved social and cognitive development as compared with children who did not attend preschool. Preschool typically provides a unique and structured opportunity for a child to engage with peers and non-familiar adults. Additionally, research has demonstrated that the development of cognitive skills in early childhood, such as language and critical thinking, can be limited by various risk factors, such as poverty, minority status, and English language learning (e.g., Rhoades, Greenberg, Lanza, & Blair, 2011). These risk factors also may have a relationship with the development of social-emotional skills in early childhood, such as self-regulation (e.g., Mendez, Fantuzzo, & Cicchetti, 2002). A child's socioeconomic status -- growing up in a low-income household -- can negatively influence the development of both cognitive and social-emotional skills, especially in early childhood.

Early childhood educators debate the goals of early childhood education in general: should children in preschool programs focus on developing soft skills, such as self regulation and cooperation, or focus on hard skills, like literacy and traditional academic skills? Raver (2002) argued that a strong emphasis on literacy skills in early childhood education may limit the focus on social-emotional skills, and ultimately have a negative impact on academic achievement later in school. Alternatively, it could be suggested that the development of social-emotional skills and cognitive skills are interrelated during the preschool years, as opposed to parallel developmental trajectories. The research to date does support the idea that there may be a critical

period for the development of social-emotional skills during the preschool years of childhood (e.g., Denham et al., 2012; Garner & Spears, 2000; Mendez, Fantuzzo, & Cicchetti, 2002), and that early childhood education provides unique opportunities during which children can develop their social-emotional skills.

While teachers and early childhood education programs can help children develop specific social-emotional skills, it is also important to consider the role of parents in the process. Specific types of parenting practices may support the development of social-emotional skills in how they actually parent (e.g., Sheridan, Knoche, Edwards, Bovaird, & Kupzyk, 2010). Risks factors associated with socioeconomic status also may be related to parenting (e.g., Santiago, Wadsworth, & Stump, 2011). However, due to the limited research in this area, it is unclear what role parents play in the relationship between social-emotional development and academic achievement in pre-school aged children who grow up in low-income households. In the following sections, a theoretical perspective is presented to guide the literature review, research questions and data analysis.

Theoretical Perspective

According to the developmental theorist Urie Bronfenbrenner, children do not develop in isolation. Therefore it is important to consider environmental and contextual factors in studying individual development. Bronfenbrenner's bioecological theory of development emphasizes the important interactions between a child and his or her environment (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2006). In his theory, Bronfenbrenner is most commonly known for identifying four specific systems that influence development. The "microsystem" represents the most basic level of analysis: the individual in his or her most immediate environment (e.g., parents, the home, teachers, and school). The "mesosystem" is the system in which different microsystems may interact (e.g., the parent-teacher interactions). The "exosystem" captures the larger, less immediate environments that still have an impact on the individual (e.g., socioeconomic status, parental education level). The "macrosystem" represents the more global environment (e.g., cultural norms, political systems). These different systems provide a context within which psychologists can understand human development.

However, the bioecological theory is not limited to these contextual systems. Bronfenbrenner identifies four additional features of human behavior that are important to study: process, person, context and time (Bronfenbrenner & Morris, 2006). The first feature of the bioecological model is *process,* or interactions, between individuals, and is considered a 'primary mechanism for human development' (p. 795). These processes – often termed proximal processes – depend on active individuals, are reciprocal in nature, and should be consistent but become more complex over time (p. 797, 798). For example, a proximal process that could be found in the microsystem is the activity of developing friendships. This process focuses on the individual engaging with its immediate environment (a primary feature of the microsystem),

depends on active individuals (e.g., the individual interaction with others), is consistent, and becomes more complex over time (e.g., friendships moving from similar interests to support networks). It should be noted that proximal processes can occur in any system, and proximal processes are not limited to dyadic interactions (pp. 798, 814).

A second important feature of the bioecological model is the *person*. The person is understood in two ways: first as an influential feature of proximal processes, and second as a 'developmental outcome' (p. 798). There are three, empirical characteristics of a person (p. 795-796). Disposition characteristics are features of a person that begin proximal processes. Resource characteristics are the skills, knowledge, and ability that shape proximal processes. Demand characteristics support or discourage how a proximal process operates. To continue the friendship example previously presented, a dispositional characteristic is the human characteristic of being social; resource characteristics will depend on the age and experiences of the individual (e.g., a young child may have friendships based on proximity, where as an older child may have friendships based on similar interests and skill level); and, a demand characteristic could be how willing the individual is to develop and attend to friendships. These characteristics of both individuals, engaging in proximal processes, should be studied to best capture the reciprocal nature of the relationship.

The third feature of the bioecological model is context, which highlights Bronfenbrenner's first presentation of the bioecological theory in 1979 with four systems: micro-, meso-, exo-, and macro-system as presented earlier. These systems provide a structure to understand the proximal processes and the person. To continue with the example of friendships, the macrosystem emphasizes the role of society and cultural norms; for example reciprocity may be a cultural norm of friendships. In contrast, an example of the macrosystem is the ways in

which people may engage with each other, which can be dictated by political agendas. For example, government-controlled internet access limits how social media may support the development and continuation of friendships when compared to non-censored communities. The empirical study of these four systems led to Bronfenbrenner's identifies the fourth dimension: time.

Often described as the chronosystem, time is affects the micro-, meso-, and macrosystems (Bronfenbrenner & Morris, 2006; p. 796). Time in each system is categorized from smaller to larger units according to the system. Often, the microsystem highlights the continuity or discontinuity of proximal processes. The mesosystem emphasizes how these processes change over days, weeks, months or even years. And the macrosystem captures the changes in norms and standards over time. Time in the bioecological model provides the medium through which change – and ultimately development – can be studied.

It should be noted that Bronfenbrenner's theory here is termed 'bioecological,' despite little focus on the study of biological processes. In 2006, while highlighting his collaboration with Ceci (e.g., Bronfenbrenner & Ceci, 1993, 1994), Bronfenbrenner notes that the term 'bio' is an effort to recognize that individuals have biological processes, and that there are biological and evolutionary limits on human development. However, since these biological processes were not with his area of expertise, not his expertise, Bronfenbrenner left it to the biologists and geneticists to add to this body of knowledge on human development.

Using the bioecological theory as a basis, it is presumed that social-emotional development in early childhood is supported by individual, person-oriented features (e.g., cognitive processes such as language capacity, perspective-taking skills, executive functioning); is supported by proximal processes such social interactions with parents, teachers and peers; can

be shaped by various contexts, such growing up in a low-income household, as described in the meso and macrosystems; and, can change and develop over time.

In the next section there will be a review of recent (within the past 15 years) research on social-emotional development in early childhood. The purpose of this literature review is to (1) define features of social-emotional development, (2) highlight the empirical literature that demonstrates empirically based, normative social-emotional development, (3) demonstrates how social-emotional development is related to academic achievement in early childhood, and (4) identifies the role parents play in a child's social-emotional development during early childhood.

Growing up in a low-income household is very different: having financial access to basic necessities like food, shelter, and transportation become priority. Therefore, low-income households provide a unique environment, or context, to examine development. As such, the literature discussed in the following chapters generally is limited to samples of preschool-aged children identified as growing up in low-income homes living in the United States.

In the United States, low-income families have the opportunity to send their preschool-aged children to a program called Head Start. Head Start is a national publicly funded early childhood education program that supports the development of the whole child (United States Department of Health and Human Services, 2014). To highlight the role of the macrosystem in this dissertation, a review of the Head Start program also is provided in the following literature review. Specific empirical and theoretical gaps in the literature on early childhood education are discussed. A rationale, purpose, and specific research questions for this dissertation then is presented.

An Overview of Social-Emotional Development in Early Childhood

Social-emotional development can be broadly defined as the changes in childhood and adolescence that support self-regulation, successful relationships, and an understanding of self (see Jones & Bouffard, 2012 for a review). Synonyms used for social-emotional development include social competence or emotional competence. Researchers have operationalized social-emotional development primarily as a skill to understand, attend to, and react to emotional knowledge in social situations (e.g., Eisenberg, Smith, Sadovsky, & Spinrad, 2004; Smith-Donald, Raver, Hayes, & Richardson, 2007). In early childhood (e.g., children under the age of 5), children learn and develop skills that support the ability to successfully navigate social situations (Skibbe, Connor, Morrison, & Jewkes, 2011). The ability to develop lasting friendships is often a characteristic of children who are developing positive social-emotional skills (Blair, 2002).

Preschool is known to be a time when young children first experience social situations with peers and authority figures other than their immediate family. There are a variety of early childhood education programs that emphasize and focus on different aspects of child development and education. One such program is Head Start. The Head Start program was founded in late 1960's because of the realization that the economic gap created an educational gap: children who experienced poverty had significant delays compared to higher socio-economic peers (Aber & Phillips, 2007, p. 5). The program was designed under the direction of several prominent psychologists, including Urie Bronfenbrenner, and uses the bioecological approach to emphasize a whole-child approach to development (Phillips & Styfco, 2007, p.14). It is a national program available to poor families and provides a plethora of free services, including early childhood education.

The Head Start early childhood education program focuses on 11 different domains of development, knowledge, and skills: physical development and health, social and emotional development, approaches to learning, language development, literacy knowledge and skills, mathematics knowledge and skills, science knowledge and skills, creative arts expression, logic and reasoning, social studies knowledge and skills, and English language development. For social-emotional development, there are five defining dimensions: self concept, self control, cooperation, social relationships, and knowledge of families and communities (U.S. Department of Health and Human Services, 2013).

The focus of this literature review will be to define social-emotional skills – not knowledge – in early childhood. The social-emotional skills of particular focus are self control, cooperation, and social relationships. It is proposed that the other two defining concepts – self-concept, and knowledge of families and communities – are knowledge based, not skill based. Additionally, measurements of self-concept are limited, and often have not been empirically validated or standardized. It could be suggested that knowledge of self (self concept) and knowledge of families is based on factual concepts. Children may understand these factual concepts through skills like cooperation, self control, and social relationships. However, this issue is beyond the scope of this dissertation. Therefore, the focus will be on the measurable skills of social-emotional development as defined by the Head Start model: self control, cooperation, and social relationships.

Self Control

One aspect of childhood is growth in independence. For example, the Center on the Social and Emotional Foundations for Early Learning (n.d.) has an electronic resource for parents on how to encourage and support children to become more independent as they grow up,

and rely less on parental direction. An indicator of independence is self control. The Head Start model defines self control as a skill where children are able to (1) express themselves adequately, (2) understand the concept of consequences, and (3) understand and follow rules (U.S. Department of Health and Human Services, 2013). Emotions often are used in early childhood to express oneself. Children may rely upon emotions to communicate effectively when their language skills are underdeveloped. Thus, the ability to intentionally attend to emotions can be crucial to successfully navigating social situations. Additionally, understanding rules and consequences help children navigate intentional behaviors and thoughts. It is important to review how self control has been defined in the research literature, and how it has been operationalized.

Definitions. Psychological researchers often use the term 'self control' synonymously with 'self-regulation' or 'inhibition'. This approach can be confusing when each construct may or may not be measured with the same measurements, which can make a review of the empirical literature on self control challenging. Although self-regulation and inhibition are separate constructs, the following sections will highlight the similarities and differences between these two constructs.

Self-regulation. Self-regulation is considered a skill that develops throughout childhood. Kopp (2002, p. 11) identifies three specific self-regulatory processes: physiological, emotional and self-regulation. Physiological regulation includes the ability to control bio-physiological systems such as temperature and hunger; emotion-regulation is the process by which the intensity of emotions is regulated; and, self-regulation is "a balancing of self-defined needs with respect to societal/cultural values and norms" (p. 11). Self-regulatory processes are used in infancy and childhood for a successful transition into adulthood. A growing child must change

from depending on others to regulate their internal bio-physiological states, and become independent in identifying their needs and wants.

Similarly, Blair (2003) defines self-regulation as "controlled, cognitive monitoring of the actions and steps required to obtain a goal, or to bring about a desired response from the environment" (p. 1). Both Blair and Kopp emphasize goal directed or rule-oriented decision making. For example, young children will recognize that they are hungry, and find effective strategies to address their hunger: a baby will cry, or a young child will use language skills to communicate. As a child grows up, their needs and wants – their goals – can become more complex depending on the social setting.

To highlight this issue of terminology and conceptual definitions, a special section of a 2004 issue of *Child Development* invited commentaries on a lead article by Cole, Martin and Dennis (2004) focused on *emotion-regulation* as a scientific construct. Emotion-regulation can be viewed as a subcategory of self-regulation, in as much as it is a specific form of self-regulatory skills (another subcategory of self-regulation could be cognitive self-regulation). According to Cole and colleagues, emotion-regulation "refers to changes associated with activated emotions… [and] can denote two types of regulatory phenomena: emotion as regulating and emotion as regulated" (p. 320). In response to Cole et al, Eisenberg and Spinrad (2004) noted that the definition presented by Cole and colleagues was too broad, and required a more specific focus on the role of emotion in regulation, as opposed to regulating emotions. That is to say, Eisenberg and Spinrad argued that measuring emotions also should be considered as part of the process of self-regulation and not merely as an outcome of it. Clearly, self-regulation is a very broad term that theoretically needs more attention. A similar construct discussed and

measured in the literature is inhibition. Inhibition is sometimes used synonymously with self-regulation, and often focuses specifically on cognitive or behavioral processes.

Inhibition. Inhibition can be understood as a sub category of self-regulation. Inhibition may refer to the effortful and intentional ability to cognitively, emotionally and behaviorally attend to specific stimuli (Eisenberg & Spinrad, 2004, p 337). To clarify, when a child is given a rule, he or she must consciously adhere to that rule by preventing themselves from behaving or thinking in a way that is contradictory to the rule.

When inhibition is operationalized as a rule-abiding skill, there often are distinctions among behavioral inhibition, cognitive inhibition and emotional inhibition. For example, a definition of inhibition comes from research conducted by Rhoades and colleagues. Inhibition can be defined as the "cognitive-related ability to inhibit a strong dominant response in favor of a subdominant one" (Rhoades, Greenberg, Domitrovich, 2009, p. 310). Here inhibition is strongly related to cognitive skills of self-regulation, with no mention of behavioral, physiological, or emotional self-regulation. However, inhibition can be used in any of these domains. For example, the Marshmallow task (Mischel, Shoda, & Rodriguez, 1989) requires a young child to behaviorally inhibit eating a marshmallow for a predetermined time frame, with the goal of a second marshmallow as a reward.

Sometimes inhibition is not presented as a subcategory of self-regulation. Blair (2002) posits that inhibitory skills are a part of a larger construct known as 'executive functioning' where goals and working memory bi-directionally influence inhibitory processes. Similarly, Luria focused on how individuals may behave or think when they have two or more rules – or goals – to follow (Luria, 1961, 1966, 1973). Other researchers have focused on how different

goals may influence behaviors and long-term outcomes (e.g., delay of gratification, Mischel & Mischel, 1983).

Alternatively, research on inhibition and self control as related to emotions is categorically organized into positive and negative attributes (e.g., Garner & Spears, 2000). For example, aggressive behavior and anger could be categorized as a negative attribute as it is an undesirable behavior. On the other hand, pro-social behavior or successful peer relationships could be categorized as a positive attribute. The regulation of the emotions in specific contexts with explicit goals as exemplified here can complicate a research paradigm but also add depth into various outcomes.

The conceptual overlap between self-regulation and inhibition can make it difficult to know specifically what is being measured in the empirical literature. Despite this difficulty, an effort is made here to summarize these terms. *Self-regulation* is a term that loosely focuses on an individual's ability to regulate thought, behavior, and emotion. Sometimes this regulation depends on physiological, cognitive, emotional and behavioral processes. Regulation is goal driven, much like inhibition. *Inhibition* is an individual's ability to follow specific rules (or adhere to a goal) that may be contradictory to an initial response to a stimulus. An individual response to a stimulus may be behavioral, cognitive, or emotional. The response may bi-directionally depend on higher order cognitive skills such as working memory and language (e.g., executive functioning). Inhibition is a crucial skill for children when learning to understand what are appropriate and inappropriate behaviors, thoughts, and emotions. The study of self control encompasses all of the features of self-regulation and inhibition, and will be used here as a holistic term for self-regulation and inhibition.

Self control. Self control is a primary facet of the social emotional domain for Head Start programs. Self control is when children (1) express themselves adequately, (2) are able to understand the concept of consequences which determines how they intentionally think and behave, and (3) are able to follow rules (U.S. Department of Health and Human Services, 2013). Using these parameters, self control encompasses the skill of understanding rules and consequences (inhibition), and maintaining an awareness of one's needs and wants in the context of social norms (self-regulation). As noted previously, sometimes these skills fall into the conceptual understanding of executive functioning, which is primarily a cognitive skill (Blair, 2003). However, in an effort to consistently use the Head Start frame work, self control, inhibition and self regulation will be considered social-emotional skills and not cognitive skills. Other features of social-emotional development in the Head Start framework are cooperation and social relationships.

Cooperation and Social Relationships

Cooperation is a skill that is essential for success in life. The development of cooperative skills begins in early childhood. By definition, children who are cooperative have successful interactions with peers and use compromise in their interactions with peers (U.S. Department of Health and Human Services, 2013). The experience of early childhood education often offers the opportunity for children to develop cooperative skills. Developing social relationships in early childhood is dependent on and supports other domains of social-emotional development. Head Start notes that social relationships include successful interactions with familiar adults, and an interest in developing friendships with peers as demonstrated through emotions like sympathy and empathy (U.S. Department of Health and Human Services, 2013).

Definitions. Often, the term 'social cognition' is used to measure "children's thoughts, beliefs and attitudes about relationships and social situations" (Raver & Zigler, 1997, p. 369). Raver and Zigler break down the domain of social cognition into three main foci: children's thoughts about conflict, children's knowledge of emotion, and children's awareness of emotion in social contexts. What distinguishes this body of literature from self-control is the focus on social context and relationships as a variable of interest.

The bioecological theory recognizes and emphasizes the importance of social relationships in the processes of change (Bronfenbrenner & Morris, 2006). For example, peer relationships can be influential in a variety of domains. Wentzel and Asher (1995) suggest that peer acceptance is important in the context of academic achievement. Vitaro, Boivin, Brendgen, Girard, & Dionne, (2012) found similar results in a sample of twins between over a time frame of 1 year: negative peer relationships at age six uniquely predicted academic achievement at age 7. Similarly, Buhs and Ladd (2001) "hypothesized that classroom participation is an important mediator of the effects of negative peer treatment on children's emotional adjustment in the school context" (p. 552). Cross-sectional and longitudinal data of kindergarteners' academic achievement support this primary hypothesis: evidence suggests that the relationship of peer acceptance and adjustment are mediated through classroom participation and peer interactions (Buhs & Ladd, 2001). Successful social relationships in early childhood are therefore dependent on cooperation skills. It is suggested that there is an interdependent relationship among cooperation, social relationships, and self control.

Inter-relationship of Self Control, Social Relationships and Cooperation

Often, the skills that fall under social-emotional development – self control, social relationships, and cooperation – are interrelated. For example, Carlson and Wang (2007)

collected data with four- and five-year-olds to better understand the relationship between inhibition and emotion regulation. The authors found that individual differences in inhibition and emotion regulation were significantly positively related, but only for the four-year-old sample and not for the five-year-old sample. Carlson & Wang measured inhibition both in action (e.g., behavioral inhibition, measured through tasks such as gift delay and Simon says) and in emotion expressions (e.g., emotion regulation, measured through tasks such as the disappointing gift task and parental questionnaires). The data suggest that there is overlap in the development of these two processes, with a divergence sometime between ages four and five years old. To better understand this longitudinal and developmental relationship, it would be interesting to include a sample of three-year-olds with a repeated measure design. In doing so, research questions about the inter-relationship between inhibition and emotion regulation could be clarified in younger children.

Similarly, Rhoades, Greenberg, and Domitrovich (2009) found that inhibition was positively related to social skills in a sample of 246 children between the ages of two and half and five years old. Measures of inhibition included a Stroop-like task redesigned for children called the Day/Night task (Gerstadt, Hong, & Diamond, 1994) and a Peg Tapping task (Diamond & Taylor, 1996) that measured a child's ability to follow counterintuitive rules. Social-emotional competence was measured through the Preschool and Kindergarten Behavior Scales, as well as a teacher reports of social behaviors and skills in young children (Merrell, 1996). Despite evidence to suggest that inhibition was related to overall social-emotional development, the authors noted that these measures of inhibition were not standardized. Similar to previous research, specific developmental trajectories of inhibition and social skills have not been clearly identified with multiple comprehensive measures of social-emotional skills.

The social expectation for social-emotional skills in early childhood is two-fold: (1) to decrease dependence on others to regulate individual states, and (2) to increase 'dependence' on others for positive, social engagement. Generally speaking, children who are able to follow rules and have positive relationships are deemed as having a normative, and positive developmental trajectory in regards to social-emotional skills. Children who are enrolled in preschool demonstrate gains in a variety of domains, both cognitively and socially (e.g., Skibbe, Connor, Morrison, & Jewkes, 2011).

Developmental Trajectory of Social-Emotional Skills for Children who live in Low-Income Households

Bioecological theory posits that the environmental context is an important consideration for understanding development. One such environmental context is growing up in a low-income household. Children growing up in low-income households are often at risk for several negative outcomes (see Evans, Eckenrode, & Marcynyszyn, 2010, for a review). Garner and Spears (2000) aimed to better understand low-income young children and their negative emotions, and observed ninety preschoolers (mean age 4.5 years old) enrolled in a Head Start program. Observations took place every day for a two month period during free play/recess; their behaviors, emotions and peer interactions were coded by observers every 10 minutes. Data indicated that low-income children did not differ from previously reported results in overt anger in middle-income children, and the cause of overt anger did not differ (e.g., conflict over toys). However, the children's response to their own emotions did differ. On average, young children showed more outward anger responses and more controlled responses to sadness compared to a previously reported data of middle-income children. The authors theorized that it may be beneficial to look and act 'tough' while growing up in poverty, and that showing sadness may

make them ‘vulnerable’ (p. 259). These finding highlight between-group comparisons, but unfortunately do not provide any longitudinal findings beyond the two month observation time. While objective observations of children’s behavior are often ideal to eliminate biases, children’s behaviors in one context (e.g., the school playground) may not apply to all contexts (e.g., the classroom, home, church, etc.). This finding provides evidence that it is important to consider children’s responses to his or her own emotions an important factor in self-reflection and self-regulation. Additionally, Garner and Spears (2000) provide evidence that suggests there are socioeconomic differences in why children have specific emotional responses when comparing this sample with previously reported data.

In contrast to comparing two different samples, profiling is a common tool used to demonstrate differences within a specific sample. Profiling is used in developmental psychology to help categorize children based on performance on a variety of measures specific to one domain of interest. Once homogenous groups have been established, group comparison on related variables can answer specific research questions. For example, Mendez, Fantuzzo, and Cicchetti (2002) used several measures of social competence (e.g., temperament, emotion regulation and autonomy, expressive/receptive language) and cluster analysis to identify six different clusters of social competence for preschool-aged children enrolled in a Head Start program (n = 141; mean age = 52 months). The different clusters were grouped statistically using both variable-centered analyses and person-centered analyses, on seven different dimensions. Contrary to previous research on low-income children, Mendez et al., (2002) emphasized individual differences in this sample, and variability within low-income children. Additionally, data collected included observational, direct child assessment, and teacher-reports. The authors note that developing these profiles could help in identifying resilience and risk-factors attributed

to social-emotional development. However, similar to Garner and Spears (2000), these findings by Mendez and colleagues lack longitudinal analysis necessary to capture the developmental nature of social-emotional skills in early childhood.

Profiling can help identify group differences in social-emotional development. Denham and colleagues (2012) incorporated demographic information for 275 preschool-aged children enrolled in either a Head Start program or a private preschool program. The authors used cluster analysis to identify three specific profiles of social-emotional development: social-emotional learning risk, social-emotional learning competent-expressive, social-emotional learning competent-restrained. Not only were there group differences in school success, there were also demographic differences. For example, boys were more prominent in the risk group, and less prominent in the competent-restrained group. Similarly, scores on measures of academic success in kindergarten were lower for the risk group compared to the other two.

Beyond these few articles described above, there is little empirical evidence that specifies the trajectory of these social-emotional skills, especially in young children who grow up in low-income homes. In fact, a longitudinal study of parenting reported that child behaviors in regards to social-emotional development, based on parental reports, were stable over time in low-income families (Eisenberg et al., 1999, p. 519). The research that has been conducted on longitudinal trajectory of social-emotional skills often is limited in its sample size, and longitudinal nature (e.g., 1-2 years vs 3 or more years).

There also are theoretical and empirical debate about how low-income children develop social-emotional skills. For example, Raver (2004) and Cole, Martin and Dennis (2004) suggest that the body of literature on various measures of social-emotional skills (e.g., delay of gratification) demonstrate little differences in behavioral strategies between low-income and

middle-income children. However, in contrast there is a body of literature that demonstrates that there are differences in how children use specific social-emotional skills (e.g., Evans & English, 2002). One explanation for such differences is recognizing the unique stressors that low income children and families may experience. However, little research has attempted to empirically identify specific aspects of poverty that can influence the development of social-emotional skills.

Social-Emotional Development and Academic Achievement

The study of academic achievement typically measures cognitive skills learned in the school environment. Similar to the field of social-emotional development, the study of cognitive development often encompasses a plethora of subfields, such as executive functioning and problem solving. Executive functioning is another broad term in cognitive psychology that focuses on skills such as attention and regulation in the ability to problem solve, and is related to basic academic skills like reading, writing and numeracy. There is evidence to suggest that there is a relationship between cognitive skills and social-emotional skills. For example, Brock, Rimm-Kaufman, Nathanson, and Grimm (2009) briefly reviewed the literature that identifies and describes the differences between "cool" executive functioning and "hot" executive function (pp. 337-338). Cool executive functioning is cognitive problem solving, and hot executive functioning is emotional problem solving. There is clearly a focus on pure cognitive skills (problem solving), but emotional information can be pertinent to problem solving suggesting that these two domains may be interdependent. Following is a brief review of the development of cognitive skills in early childhood including inhibition, theory of mind, literacy and numeracy, and language development. Also provided is a review of the literature that identifies the relationship between social-emotional development and academic achievement.

Cognitive Development and Theory of Mind

Cognitive development incorporates memory, perception and language skills necessary to navigate the world successfully. One commonly used measure of cognitive development is IQ. Many researchers have established a link between IQ and social-emotional development. For example, Bellanti and Bierman (2000) found a relationship among IQ, inattentiveness (similar to inhibition), and peer relationships. Using longitudinal data from kindergarten to first grade, Bellanti and Bierman identified a predictive and mediational relationship between low IQ and

attention, and prosocial behavior (e.g., cooperation). On average, Children with low cognitive abilities in kindergarten were found to have more problems with peer relationships and higher scores of aggressiveness in first grade. However, it is unclear what processes underlie these relationships. It could be argued that other cognitive skills, such as perspective taking, also mediate these relationships. Additionally, it is possible that specific home and school variables may influence these relationships. To help clarify, specific dimensions of cognitive development have been studied in conjunction with social-emotional development, including theory of mind and inhibition.

Theory of mind is a broad term that defines an individual's understanding of how the mind and body are connected, and the individualist nature of that connection (Wellman, 2002). Wellman hypothesizes that children develop specific theory of mind skills in early childhood, like an understanding of one's and others desires, beliefs, and mental thoughts. In early childhood, theory of mind often is measured through perspective taking tasks and false belief tasks. Inhibition, on the other hand, is the conscious ability to constrain initial reactive responses to specific stimuli. Both of these skills require memory and attention, and often are used to problem solve in social situations.

There is evidence to support the idea that there is an interdependent relationship between inhibition and theory of mind. For example, Carlson and Moses (2001) found that, in a sample of preschool-aged children, inhibition was necessary for successfully passing theory of mind tasks. Inhibition was measured through several tasks, such as the day-night Stroop task, the tower task, and the gift delay task (the gift delay task is a modern version of the marshmallow task in that children are asked to inhibit their need to open a gift in exchange for opening two gifts at a later

time). The inhibition tasks measured both behavioral and cognitive inhibition. Children who successfully passed the theory of mind tasks did significantly better on the inhibition tasks.

A major limitation of Carlson and Moses (2001)was that the data were not longitudinal. As a follow up study, Carlson, Mandell, and Williams (2004) examined the role of theory of mind and cognitive inhibition in two year olds, and tested the children one year later when the participating children were three-years-old. In both waves of data collections (year two and year three), the authors collected data twice using the same measures 1 week apart to better capture and account for individual variability. Cognitive inhibition was defined as a type of executive functioning and measured with tasks like reverse categorization (Perner & Lang, 2002), multi-location search, a modified A-not-B task (Diamond, 1988), a snack delay task (similar to the marshmallow task, a measure of delay of gratification; Mischel, Shoda, & Rodriguez, 1989), and tower building task (Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996). Data collected provided evidence that the relationship between theory and mind and cognitive inhibition was not apparent until age three, suggesting that theory of mind and inhibition develop separately in early childhood. The authors suggest that well-developed cognitive inhibition lends itself to better social skills (e.g., ability to stay on task and play with other children), and thus provides an opportunity to perspective take. In other words, inhibitory skills in early childhood benefit the development of theory of mind skills through social interactions with peers. In addition to theory of mind, other cognitive dimensions of academic achievement, like literacy and numeracy, also can influence social-emotional skills.

Academic Knowledge: Literacy and Numeracy

Theory of mind and inhibition are only a few of the cognitive skills (e.g., measures of executive functioning) that develop and can be measured in early childhood. Academic skills like

basic literacy and algebraic knowledge often have often used as measures of cognitive development. Such measures of academic skills are typically used as outcome measures of general development, curriculum evaluations, and other research endeavors like social-emotional development. Raver (2002) suggests that the relationship between emotional development and academic achievement may be bidirectional, and mediated by language development. For example, Izard (2002) reports that a part of accurately labeling emotions—one of the two basic skills of emotional knowledge—is highly language dependent, with correlations between emotional development and language development ranging from 0.30 to 0.60.

In 2007, Blair and Razza examined the relationship among cognitive skills (executive function, effortful control, and false belief understanding) in pre-kindergarten's math and literacy outcomes in first grade. The authors defined self-regulation as both cognitive and emotional regulation displayed through individual behaviors. In approaching self-regulation in this manner, they used measures of behavior regulation as a representation of cognitive and emotional regulation. Blair and Razza found that self-regulation in pre-kindergarten predicted variation in mathematics knowledge and letter knowledge in first grade. Similarly, skills like effortful control and inhibition, as well as successful completion of false belief tasks at an earlier age, were positively related to academic outcomes in first grade.

Similar to the interdependent relationship between cognitive skills and academic skills, emotional knowledge has been shown to predict academic performance between the ages of five and nine (Izard et al., 2001). Izard and colleagues collected longitudinal data for a sample of 72 preschool-aged children from low-income families. Positive correlations and hierarchical regressions supported their hypothesis that emotional knowledge at age five accounted for a significant portion of variability in academic competence at age nine. More importantly, the

study provided evidence that emotional knowledge mediates the already demonstrated relationship between verbal ability and academic competence (e.g., Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994). Academic competence, however, was measured by teachers using the Social Skills Rating System (SSRS; Gresham & Elliott, 1990). The SSRS is a commonly used measured and has been empirically validated. However, it is limited in making any kind of objective measure of academic skills: it is not a standardized measure of academic achievement or competence.

A more recent study focused on academic literacy and social-emotional development (Rhoades, Warren, Domitrovich, & Greenber, 2011). Data were collected for children between preschool and first grade over a total of three years. Attention was measured using the Leiter-Revised Attention Sustained Task (Roid & Miller, 1997), and conceptually intended to measure inhibition and self-control. In contrast to Izard and colleagues (2001), academic competence was measured using the standardized Woodcock-Johnson Psycho-Educational Batter-Revised (Woodcock, 1990). Additionally, variables such as maternal education, family income and receptive language skills were included as covariates. Using a path model analysis design, Rhoades, Warren, Domitrovich, and Greenber demonstrated a significant relationship between emotional knowledge in preschool and first grade academic competence. Additionally, the model they tested shows that attention is a mediator of the relationship between emotional knowledge in preschool and 1st grade academic competence. The model held true even when controlling for the covariates.

Another longitudinal study demonstrated the relationship between social and academic competence between first and third grade (Welsh, Parke, Widaman, & O'Neil, 2001). Even though this data analysis did not include preschool-age information, the results are consistent

with previously discussed research (Blair & Razza, 2007; Izard et al, 2001; Rhodes, Warren, Domitrovich & Greenber, 2011) in that a relationship was found between social-emotional development and academic skills. Notably, Welsh, Park, Widaman and O'Neil demonstrated that this relationship is bi-directional in that social-emotional skill and academic skills "influence each other reciprocally over time" (p.474). Measures of social competencies included peer and teacher rating, and academic competence was measured with report cards and teacher ratings.

To summarize, researchers have identified a relationship between social-emotional development and academic achievement (Blair & Razza, 2007; Izard et al, 2001; Rhodes, Warren, Domitrovich & Greenber, 2011; Welsh, Park, Widaman & O'Neil, 2001). However, due to different conceptualizations of social-emotional development among researchers, it is unclear what particular components in social-emotional development influence academic achievement. Measures of social-emotional skills vary across this body of literature; however, we know that these skills are interdependent. Measures of academic competence or achievement also are inconsistent. Another dimension of academic achievement that can facilitate how children navigate social interactions is language development.

Language Development

There is evidence that there is a relationship between language development and self-regulation in children. For example, Mendez, Fantuzzo, and Cicchetti (2002) used measures of expressive/receptive language in their profiling of social competence and found that children with better language skills socialized more successfully with peers. Preschool-aged children often are encouraged to use their language skills to regulate emotions, and to be proactive in their social interactions.

A recent study with 146 low-income toddlers between the ages of 14 and 36 months tested the hypothesis that language skills support the development of self-regulation (Vallotton & Ayoub, 2011). Using growth model analyses, three major relationships were found. First, vocabulary was a better predictor of self-regulation growth than talkativeness; specifically vocabulary at two years of age. Second, there were significant gender differences in the development of self-regulation, and thus the impact of vocabulary on self-regulatory skills is different: boys use language to help shape their development of self-regulation. Finally, language was a unique predictor after controlling for other cognitive skills measured during this time. The study's findings demonstrated a clear critical period in which language facilitates the development of social-emotional skills, such as self-regulation. However, less empirical attention has been paid to how parents influence this relationship.

Vallotton and Ayoub (2011) highlight the relationship between vocabulary and self-regulation, but a focus on parents and home life can help support the premise that ecological and contextual factors are important to study. In a recent book chapter by Cole and colleagues (2010), a review of research on this topic suggests that "the integration of expressive language and emotion regulation is not automatic and that both child characteristics (e.g., language skill) and parent-child discourse contribute to the development of self-regulation of emotion" (p. 60). In their chapter, Cole and colleagues discussed research that demonstrates that both language learning and emotional expression utilize similar cognitive resources while relying on different cognitive processes (e.g., Bloom, 1993; Bloom & Capatides, 1987). For example, Baker and Cantwell (1992) investigated the role of Attention Deficit Disorder (ADD) on speech and language delays. Children with a diagnosis of ADD (low levels of self-regulatory skills) had higher levels of speech and language delays. Additionally, knowledge of emotions and emotional

words leads to better socio-emotional competence in children (Fabes, Eisenberg, Hanish & Spinrad, 2001). Review of the extant literature indicates that there are some significant interactions between language development and self-regulation, but Cole and colleagues (2010) emphasize that parental discourse is an important part of the equation. Within this framework of a bioecological approach, specifically the study of proximal processes, parents may contribute to this relationship. The next section will review research on how parents support social-emotional development.

Social-emotional Development and the Role of Parents

Bronfenbrenner's bioecological theory indicates that context is an important factor to consider when understanding development (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2006). Similarly, Vygotsky emphasizes the importance of cultural transmission: interactions with the cultural environment are essential for developmental change (Bruner, 1997). Environments are not simply the physical spaces in which a child grows up: environments also include experiences. For example, culturally specific parenting styles, social structures of schools, and political structures can influence trajectories of development. In order to fully understand how social-emotional development influences academic skills, it is necessary to understand how environmental factors shape this relationship.

For example, research indicates that peer relationships – the experiences of socializing and having friends – is related to a variety of social-emotional skills. Self control, cooperation and successful peer relationships are highly dependent on one another (Denham, 2006). Children who are unable to maintain self control are less likely to have successful peer relationships (Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000). Similarly, young children with basic emotional knowledge often have successful peer relationships (Smith, 2001; Dunn & Cutting, 1999). Just as it is important to understand how peer relationship can help promote social-emotional development, it is equally important to understand how parents can provide opportunities for these skills to develop at home and not just in the classroom.

Characteristics of the home can be useful information in understanding the environment a children grow up in. For example, Cutting and Dunn (1995) concluded that specific home variables can influence the development of social-emotional skills. The authors originally sought to understand the relationship between emotional understanding and false belief tasks in four

year olds. In comparison to other research studies, Cutting and Dunn also collected information about the child's home life (e.g., family structure, number of adults in the home, number of languages spoken in the home). Data about the child's relationship with their siblings (the Sibling Relationship Interview, Colorado Adoption Project; Stocker, Dunn, & Plomin, 1989) were included in this set of variables. Cutting and Dunn (1995) noted that "our findings suggest that [emotion understanding and false belief] are to some extent distinct from each other, at least at the age of 4, and that the correlation that exists between them is a result of the influence of other factors such as age, language, and family background" (p. 863). While it is important to understand the co-developing trajectories of cognitive and emotional development, it is equally important to consider environmental factors, such as parenting practices and parental characteristics.

Parental Characteristics

Parents provide a specific context for children's development. Early childhood is important in relation to the unique cultural demands and expectations of the family. For example, Bulotsky-Shearer, Wen, Faria, Hans-Vaughn & Korfmacher (2012) found that parents highly engaged in Head Start had children with positive social-emotional development at the end of their first year in Head Start. The authors included attributes of control, engagement, and cooperation were included in social-emotional outcomes. More recently, McWayne & Bulotsky-Shearer (2013) differentiated between parent characteristics and parent activities, and found that both predicted two social-emotional skills in their children: cooperation and behavioral attributes. Similarly, it appears that this relationship also can be negatively correlated. For example, children of parents disengaged in their children's schooling exhibit more externalizing behavioral problems (McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004). In addition,

mothers may specifically contribute uniquely to the development of social-emotional skills and academic achievement (e.g., Clark, Menna, & Manel, 2013; Frankel et al., 2012; Garner & Spears, 2000).

Maternal Influences. Mothers often are primary care givers, and receive much attention from researchers who study parents. For example, Frankel et al., (2012) studied the relationship between parenting style by mothers and their child's self-regulatory skills in the context of eating. They found that parent modeling, responsiveness, and assistance, as well as environmental motivators help children learn how to self-regulate their hunger. Garner and Spears (2000) used hierarchical linear modeling to understand better how parenting practices by mothers influenced a child's emotion regulation process. In their study, parenting and family context proved to have an important effect on how children regulate emotion: children from homes with inconsistent disciplinary procedures would respond to their own levels of sadness differently.

Not only do children respond differently to various parenting practices, parents also respond differently to their child's emotional temperament. To highlight this bi-directional relationship, Clark, Menna, and Manel (2013) found that scaffolding was used differently with mothers of aggressive preschool-aged children compared to mothers of non-aggressive children. Scaffolding, derived from a Vygotskian perspective, is when an "expert" provides useful information to help a novice obtain a goal. Scaffolding was measured by coding mother-child interactions on a specific joint task using colored building blocks. Child aggression was measured through two parent reports of behavior, the Child Behavior Check List (Achenbach, 1991) and the Social Skills Rating Scale (Gresham & Elliot, 1990). Not only did the authors find an effect of scaffolding on social skills, but they also demonstrated a moderating effect of group

status of aggression/non-aggression children. In summary, how mothers processed the joint activity predicted variability in social skills, and the pattern of prediction was different for aggressive compared to non-aggressive children. Unfortunately, there were several limitations to these findings. First, data on social skills were self-report from the mother; a more objective measure of the child's social skills or reports of social skills for a variety of sources (e.g., peers and teachers) would have made this finding more robust. Additionally, unlike previous research presented in this literature review, this study was not conducted with low-income families, and has limited generalizability. Nonetheless, this research provides evidence that maternal scaffolding may have an effect on a child's broad social-emotional skills. Additional data on fathers also is important to collect.

Longitudinal data on the effects of parenting on social-emotional development are especially limited with respect to early childhood. Eisenberg and colleagues (1999) published a longitudinal analysis of social-emotional skills that followed 3-4 year olds until they were 10-12 years old. In their study, teachers and parents provided information on the child's social-emotional development at five different time points. A number of interesting findings emerged. One important finding relates to what a parents thought about their own parenting (meaning, did they think they did a good job as a parent). This variable was a valuable predictor of social-emotional skills for their children. While these parenting attributes have some validity in measuring how parents parent, classic measures of parenting styles have also been researched in the context of social-emotional skills.

Parenting Style

Baumrind is well known in developmental psychology as identifying and measuring different parenting styles, like authoritative and authoritarian (Baumrind, 1973; Baumrind,

1991). Authoritative parenting occurs when parents are high in warmth and high in demandingness. For example, parents who set clear boundaries and rules with their children while also giving them comfort and love are considered authoritative. In contrast, authoritarian parents are only high in demandingness. Parents who embrace this style often have high expectations of their children, and set very specific rules to control their children's behaviors. Much research has been devoted to the developmental outcomes children might have as a result of experiencing these specific parenting styles (e.g., Bolkan, Sano, De Costa, Acock, & Day, 2010; Rinaldi & Howe, 2012), suggesting more positive outcomes for authoritative and more negative outcomes for authoritarian style. For example, Bolkan and colleagues found that adolescent perceptions of parenting practices, specifically that of authoritarian style, were strongly related to deviant behaviors.

Recent research has explored the relationship of parenting styles with social and behavioral skills with young children. For example, Rinaldi and Howe (2012) asked mothers and fathers about their parenting styles, and measured the behaviors of their toddlers. They found that generally authoritarian parents had toddlers with more externalizing behaviors (demonstrated by an inability to follow rules or self-regulate), and authoritative parents had toddlers with more internalizing behaviors (demonstrated by shyness and fear), with some differences between mothers and fathers.

Similarly, there's a large body of research that demonstrates cultural variability in parenting styles, and subsequent positive or negative outcomes (e.g. Dearing, 2004; Ispa, Fine, Halgunseth, Harper, Robinson, Boyce, et al., 2004; Lamborn, Dornbusch, & Steinberg, 1996). Ispa and colleagues discussed the idea that culture may moderate the effects of parenting styles (measured as intrusiveness and warmth) for low income families. Families who participated in

the study were enrolled in an Early Head Start program, and the authors videotaped and coded parent-child interactions. Their findings demonstrated group differences among African-American parents, Mexican-American parents, and European-American parents, in that mother intrusiveness for a child at 15 months old predicted negative features (e.g., child negativity towards mother) of parent-child interactions 10 months later. This research supported previous findings relating parenting styles and parent ethnicity with adolescent outcomes (Lamborn, Dornbusch, & Steinberg, 1996).

Most of this research comes to a similar conclusion: ethnic, immigrant, and low-income families utilize different parenting styles as a reflection of either their native culture, the neighborhood they live in, or their socioeconomic status. Low income neighborhoods are often unsafe and dangerous to navigate, requiring parents to employ a stern parenting technique where rules, control, and limitations must be set. Additionally, the stress of having limited economic means may exhaust the emotional availability they can give to their children. The socio-cultural context in which low-income parents live drastically changes the nature of their parenting practices, and impacts or changes the positive or negative outcomes for their children.

Dissertation Overview

Rationale

In 1986 Bronfenbrenner wrote, “In place of too much research on development ‘out of context,’ we now have a surfeit of studies on ‘context without development’” (p. 288). To date, there is a great deal of literature on social-emotional development in early childhood. However, there are several methodological limitations or gaps in the current body of literature as it pertains to preschool-aged children growing up in poverty or low-income households.

First, social-emotional development is a compilation of skills, including self control, cooperation, and social relationships. The research reviewed in previous chapters of this dissertation demonstrates that social-emotional development in early childhood often measures only one or two components of social-emotional development in early childhood. It is unclear how the different social-emotional skills are related to each other. Additionally, there is no clear normative developmental trajectory for how self control, cooperation and social relationships develop together between the ages of three and six. Cross sectional and profiling data indicates a significant relationship among these variables. The longitudinal data that has investigated these variables have limited generalizability due to small sample sizes (e.g., Carlson, Mandell, & Williams, 2004; Mendez, Fantuzzo, & Cicchetti, 2002), used limited measures such as employing only parental reports (e.g., Clark, Menna, & Manel, 2013; Eisenberg et al., 1997), and a general lack of focus on low-income children (e.g., Halle et al., 2014).

Second, much of the research focuses on socioeconomic status and school environments without incorporating the role of parents in the model. There is no available research to date that incorporates how parenting and home life could influence the relationship between social-emotional development and academic achievement. The research that does address the influence

of parents on social-emotional development often is not longitudinal, nor does it focus on the preschool years (e.g., Clark, Menna, & Manel, 2013; Garner & Spears, 2000). By using the bioecological theory, analyses on the processes between parent and child can be examined within the context of low-income households on multiple levels (e.g., micro-, exo-, and macro-).

A third gap – not methodological – is that there is no literature to date demonstrating the longitudinal relationship among social-emotional development, academic achievement and parenting practices for children growing up in low-income households. As previously discussed, there is a body of recent research which demonstrates that there is a link between social-emotional development in early childhood and later academic achievement. However, this research does not focus on the preschool years (e.g., Izard et al., 2001; Welsh, Park, Widaman, & O'Neil, 2001), and measures of academic achievement were sometimes not standardized or normed (e.g., Izard et al, 2001). Furthermore, another limitation of the current research on these topics is that findings are often not discussed within a theoretical framework. A theoretical framework may be provided to justify the research, but the findings are not explicitly interpreted within the framework presented.

To address these gaps in this dissertation, research questions and hypotheses are presented using the Bronfenbrenner's bioecological framework. Tudge, Mokrova, Hatfield, and Karnik (2009), suggested that researchers using the bioecological framework should focus on proximal processes over time, including parent-child interactions (p. 207). Consistent with these recommendations, this dissertation examined how low-income parent-child interactions are related to a child's social-emotional skills and academic skills between the ages of three and five. The four features (person, process, context, and time) of the bioecological approach will be addressed in the proposed dissertation. The person – the child – will be understood through his or

her disposition, resources, and demand in the context of social-emotional skills and academic skills. For example, attention can be a measure of demand: a child's attention could promote or discourage the development of social-emotional skills, like self control, in social interactions. By breaking down social-emotional development into measureable skills of the child, the child's development can be better described. Proximal process were measured through parental reports of engagement with their child. Additionally, this dissertation will focus on low-income families, a context that is very specific. Children who grow up in low-income homes have limited opportunities putting them at risk for a variety of negative outcomes. A more focused discussion of the environmental features of low-income households could benefit the current body of literature on social-emotional development. And, last, this dissertation used longitudinal data with preschool-aged children collected between their entry into an early childhood education program and the end of their first year in kindergarten.

Purpose, Goals and Research Questions

The primary purpose of this dissertation was to understand social-emotional development in early childhood for children growing up in low-income families. A major goal of the proposed dissertation was to better understand how social-emotional development is related to developmental outcomes like academic success at the end of kindergarten, and how parenting practices and home life influence this relationship. This dissertation uses the bioecological approach to provide a framework for the research questions. Similarly, the bioecological framework is used to help interpret the results. To address this purpose and fill the gaps in the literature, the dissertation addressed three specific research questions.

First, what is the relationship among self-control, cooperation, and social relationships for three and four year old children growing up in low-income households who attend Head

Start? The bioecological model promotes the study of the person as dispositional, resources, and demand characteristics. These characteristics are related to each other and together can influence the proximal processes of developmental change (Bronfenbrenner & Morris, 2006, p.796). Using this model, it was hypothesized that the measures of self-control, cooperation, and social relationships for children growing up in poverty at age 3 will be significantly related to each other. It is important to identify what measures of social-emotional development explain the most individual variability between the ages of three and five. A more complete understanding of the longitudinal relationship among these social-emotional skills may inform curriculum development in early childhood and inform educational policy.

A second research question is whether social-emotional skills between the ages of three and four predict academic achievement at age five for children who grew up in a low-income household and attended Head Start? Specifically, how much variability of academic achievement is predicted by individual growth of either a composite of or individual skills of social-emotional development? Similar to question 1, and still within the bioecological framework of studying the person, it was hypothesized that measures of language, literacy and mathematics will not be significantly related to each other at age 5 for children growing up in low-income households. Consistent with the idea that time is an important variable to consider using the bioecological approach, it was hypothesized that academic achievement at age 5 will be predicted by social-emotional skills at age 3. Understanding the nature of this relationship may help to identify children at risk for poor academic performance.

A third research question identified the proximal processes that may contribute to the relationship between social-emotional development and academic achievement. More specifically, what variables related to parenting practices and home life explain the variation in

individual slopes and intercepts for each child? By using the bioecological framework and the focus on proximal processes and time, it was hypothesized that parental attributes will moderate the relationship between social-emotional skills at age three and academic achievement at age five for children growing up in low-income households.

To answer these questions and address the limitations of previous research, secondary data analysis was employed using a large, nationally representative, longitudinal data set from Head Start. The Head Start Family and Child Experiences Survey (FACES) follows children, their families and their teachers during their enrollment in a Head Start program and into the child's kindergarten year. FACES data collection began in 1997, with a new cohort every three years. This dissertation used data from the 2009 data collection, which followed children from the Fall of 2009 until the Spring of 2012. Data collected included information on social-emotional development and cognitive development, and used a variety of resources to measure the child's skill set (e.g., direct child assessment, parent interviews, teacher interviews, as well as classroom and school characteristics). Data analysis included backwards regression modeling moderation analysis.

Methods

Head Start

Head Start is a federally funded pre-school program designed to support low-income families. The program began in 1969 as a summer program and has developed into a full early childhood education program that recognizes the whole child, and is free to families who qualify. In doing so, programs support not only the cognitive needs of preschool-aged children, but also provide health services and parent educational classes. In order to qualify for Head Start, families must meet income criteria (e.g., for a family of 2, families making less that $15,730 would fall into the poverty category; U.S. Department of Health & Human Services, Office of the Assistant Secretary for Planning and Evaluation, 2014).

In light of evidence that (1) early childhood education is important for school preparedness at age 5 (e.g., Camilla, Vargas, Ryan, & Barnet, 2010), and (2) low-income families have limited access to early childhood education (e.g., Phillips & Styfco, 2007), Head Start is an opportunity for poor families to overcome the economic risk factors that shape child development. The Head Start program began in 1965, and has focused on providing services (not just educational services) to poor families.

As of 2013, social-emotional development in Head Start funded programs continues to be a major focus for curriculum development and training for teachers and educators (U.S. Department of Health and Human Services). Social & Emotional Development is one of 11 domains in the current Head Start Child Development and Early Learning Framework. Other domains include logic and reasoning, language development, physical development and health, to name a few. Specific skills that Head Start programs focus on in the social and emotional domain are promoting healthy social relationships, the development of self-confidence and self-

efficacy, creating environments to support the development of self-regulation in emotions, attention, impulses and behavior, and supporting the experience of a wide range of emotions. All these social-emotional skills require specific cognitive abilities, such as language capacity, perspective-taking skills, and executive functioning skills such as inhibition.

FACES 2009

This dissertation used secondary data collected from the 2009 Head Start Family and Child Experiences Survey (FACES 2009). FACES is a multi-wave, multi-cohort, multi-site longitudinal project used to study the Head Start program, with the first cohort data collection starting in 1997.

FACES 2009 followed three- and four-year olds from entry into a Head Start program to the end of their kindergarten year. Three-year old children were followed for three full years, and four-year old children were followed for two full years. Data was collected over four waves: Fall 2009, Fall 2010, Spring 2011, and Spring 2012. Data from each was used to better understand specific outcome measures of academic achievement. Additionally, corresponding data about parents and home life for each wave was used.

Data collected for FACES 2009 includes survey data, observational data, and direct assessment. Methods for data collection included direct child assessment, classroom observation, telephone interviews, web-based questionnaires, and in-person interviews. Data was collected from the child, parents, teachers (both Head Start and kindergarten), and Head Start staff including Head Start Program Directors.

Sample. The FACES 2009 data includes information on 3,349 children in in 486 classrooms from 60 different programs. Of the 60 programs selected, up to two classrooms per program were included, and up to 10 children per classroom are included. Selection of programs,

centers and classrooms were based on probability proportion to size from the 2007-2008 Head Start Program Information Report. Parents of children in selected classrooms were asked to participate and parents provided informed consent for their child's participation in the 2009 FACES data collection. Programs not included in the selection process were those located outside the 50 US states and the District of Columbia, programs likely to lose grantee status, and programs under the Migrant and Seasonal Worker program or American Indian and Alaskan Native program. The data includes weights to account for variation in probability in selection, which allows for conclusions to be made about the population of Head Start participants from 2009-2012.

Measures. Data used for this dissertation included direct child assessment, self-report of parenting practices, and parent and teacher observations/report of the child[1]. Each measure included in the analysis is discussed in detail below, and is listed in Tables 1, 2 and 3.

Social-emotional development. Consistent with the Head Start definition and approach to social-emotional development, three out of the five aspects of social-emotional development were studied: self-control, cooperation, social relationships (U. S. Department of Health and Human Services, 2013). Self-concept and knowledge of families and communities are not measured in the FACES 2009 data collection. Below are descriptions of each measure as discussed in the user-guide for the FACES 2009 data set (Child Care and Early Education Research Connections & United States Department of Health and Human Services, 2013) and testing manuals when applicable. Table 1 lists the specific variables from the FACES 2009 child data set intended to be used for data analysis to answer each research question.

[1] Note: When needed, assessments or questionnaires were given in Spanish. A language screener was given to identify English proficiency for each child, and if parents requested their interview to be conducted in Spanish it was done so.

Several variables were included in the data analysis. There were two reasons for this. First, a single measure of any kind of skill may not completely reflect an individual's actual ability in a specific domain. Having multiple measures can capture a wider breath of within-individual difference as opposed to one measure. Second, measures should come from a variety of sources, include teachers and parents. While there is value in objectivity from an outside assessor, there is also value in including information from those most knowledgeable about the child. Teachers and parents are able to provide a more average and reliable profile of the child when answering questions. However, there is the validity concern of subjectivity. Including both objective and reliable data can be most informative. Each sub domain of social-emotional skills (self control, cooperation and social relationships) uses measures from the assessor, as well as teacher and parent reports.

Simon Says. Children were first evaluated on the English proficiency skills using a task called Simon Says (Duncan & DeAvila, 1998). This task and similar tasks have been used in the literature on self-control, and measures the ability of a child to follow rules and directions. Children were assessed as either following directions or not for 10 items, and scores could range from 0-10. The psychometric properties of this test have not been established, and the test is not standardized.

Pencil tapping. To measure self control, children were given the exercise of pencil tapping. This was added to the FACES data collection in 2009. A number of investigators have used pencil tapping as a measure of self control (e.g., Rhoades, Greenberg, and Domitrovich, 2009; Blair, 2002; Diamond and Taylor, 1996). Children are asked to do the opposite of the assessor: tap once when asked to tap twice, and tap twice when asked to tap once. Scores in the FACES 2009 data set are reported either as a composite score or a percentage of how many

times the child tapped correctly. This task was only administered to 4 year olds, and has strong internal reliability (alpha) of 0.82 with a similar task (peg tapping; Blair & Razza, 2007).

Leiter International Performance Scale Revised (Leiter-R). The Leiter-R is a commonly used measure where assessors are asked to rate the child after each testing session using the Leiter-R (Roid & Miller, 1997). Four of the eight subscales are used in the FACES 2009 data collection: Attention, Organization/Impulse control, Activity level, and Sociability. The measure is not dependent on expressive language or literacy skills, and includes activities that are game-based. Statements about the child's performance during the testing session are rated on a 4-point scale: rarely/never, sometimes, often, or usually/always. The subscales have good internal reliability with one another, and have been found to have good predictive validity (Roid & Miller, 1997). The FACES 2009 data provides both raw scores and standardized scores for all four subscales of the Leiter-R. Including data from this measure will provide a more robust and complete analysis of social-emotional skills in early childhood. Instead of using the composite variable for the Leiter-R, the analysis will use each subscale score to distinctly identify the different components of social-emotional skills such as self-control, cooperation, and social relationships.

Personal Maturity Scale (PMR). Teachers and parents were asked to rate each child on 13 different items using a 3 point scale (never to very often) using the Personal Maturity Scale (Entwisle, Alexander, Pallas, & Cadigan, 1987). Three specific subscales are included among the 13 items, participation, cooperation, and attention span, with alpha reliabilities ranging from 0.74 to 0.85 (Child Care and Early Education Research Connections & United States Department of Health and Human Services, 2013). The PMR is included in the FACES 2009 dataset under a composite variable with items from the Social Skills Rating System, the Behavior Problems

Index, and the Preschool Learning Behaviors Scale. Use of this scale will be included in the analysis under ‘cooperation’.

Social Skills Rating System (SSRS). Similar to the PMR, teachers and parents were asked to rate each child on several statements on a 3 point scale (Gresham & Elliott 1990). Higher values indicate more cooperative behaviors. The SSRS is included in the FACES 2009 dataset under a composite variable with items from the Personal Maturity Scale, the Behavior Problems Index, and the Preschool Learning Behaviors Scale. Similarly to the PMR, this scale will be included in the analysis under ‘cooperation’ as a reflection of the teacher’s working knowledge of the child in the classroom, and the parent’s working knowledge of the child at home.

Behavior Problems Index (BPI). Only parents were asked to rate their child on several statement related to behavior from the Behavior Problems Index; the statements were partitioned into two subsections, under control and over control of behaviors (Peterson & Zill, 1986). The BPI is included in the FACES 2009 dataset under a composite variable with items from the Personal Maturity Scale, the Social Skills Rating System, and the Preschool Learning Behaviors Scale. The BPI will be included in the analysis under ‘cooperation’.

Preschool Learning Behavior Scale (PLBS). The Preschool Learning Behavior Scale is an assessment of children’s approaches to learning (McDermott et al., 2000). The scale includes three dimensions: competence motivation, attention/persistence, and attitudes toward learning. Only parents were asked to rate their child on several of the item from the PLBS using a 3-point scale: Most often applies; Sometimes applies; or Doesn’t apply. Appropriate divergent and convergent validity on the three dimensions have been established (McDermott, Leigh, & Perry, 2002). The PLBS is included in the FACES 2009 dataset under a composite variable with items

from the Personal Maturity Scale, the Social Skills Rating System, and the Behavior Problems Index. The PLBS will be included in the data analysis under ‘cooperation’.

Academic Achievement. Several measures of academic achievement were included in the FACES 2009 dataset; these measures were collected primarily through direct assessment. Table 2 lists the specific variables to be used from the child data set, FACES 2009. Children were screened at the beginning of each assessment to determine if tests should be administered in English or Spanish through two short tasks: Simon Says and Art Show. The assessor determined if the child would be more successful in completing the assessments in Spanish. Where appropriate, tests were administered in Spanish. All of the variables listed below are assessor based. Measures of academic achievement will be used when the child was at the end of their kindergarten year.

Expressive One-Word Picture Vocabulary Test. The Expressive One-Word Picture Vocabulary Test (EOWPV, Brownwell, 2000; Spanish version, 2001) is a measure of expressive language development where children are asked to identify pictures of specific objects. This measure has strong test-retest reliability and can be standardized. The standardized score will be used in for this data analysis.

Peabody Picture Vocabulary Test. The Peabody Picture Vocabulary Test (PPVT; Dunn, Dunn, & Dunn, 2006) is a measure of receptive language development. Children are asked to point to the correct picture when given a verbal prompt. This measure has been normed and had strong test-rest reliability. The standardized score will be used for this data analysis.

Woodcock Johnson. FACES 2009 includes 4 sub scales of the Woodcock-Johnson Tests of Achievement (WJ III; McGrew & Woodcock, 2001): letter-word identification, applied

problems, spelling and word attack. This is a standardized measure of achievement, and the standardized score will be used for this data analysis.

Early Childhood Longitudinal Study-Mathematic. In addition to the applied problem subsection of the WJIII, children were also given the Early Childhood Longitudinal Study – Mathematics either Birth or Kindergarten versions (ECLS–B and ECLS–K, Snow et al. 2007; U.S. Department of Education, National Center for Education Statistics, 2002). The ECLS measures a child's ability to understand quantity, shapes, numbers and patterns. Children will have demonstrated counting skills as well as word problem solving skills.

Parenting practices. Parenting practices are measured through self-report interviews. Questions included in the current data analysis include information about the child's home life and parent's interactions with their child.

Child Rearing Practice Report. The FACES 2009 data collection included several statements from the Child Rearing Practice Report (CRPR; Block, 1965). Specifically, statements about two different types of parenting patterns were included: statements that reflect an authoritative parenting pattern and statements that reflect an authoritarian parenting pattern. Additionally, statements about parental warmth and energy were included. Parents were asked to rate themselves in regards to each statement on a five point Likert-type scale. All four subscales from the CRPR will be included in the data analysis.

Composite Variables. Several composite variables will be included in the data analysis. Composite variables include either a summation or a mean score of several statements that are not reflective of a standardized subscale in any of the above measures.

Teacher reported behavior problems. This composite variable is the summation of statements from the Personal Maturity Scale (PMR) and the Behavior Problems Index (BPI).

Statements included in this variable were only administered to teachers. This variable will be included in the analysis under ‘cooperation’.

Parent reported social skills. This composite variable includes the summation of copy-written statements from the Personal Maturity Scale (PMR), the Social Skills Rating System (SSRS), the Preschool Learning Behavior Scale and the Behavior Problems Index (BPI). Statements included in this variable are administered only to parents. This variable will be included in the analysis under ‘social relationships’.

Weights. The FACES 2009 data set has over 40 weights to be used with cross-sectional data or longitudinal data to make conclusions about the Head Start population. Because the current dissertation research questions were both cross-sectional and longitudinal, a combination of weights were used depending on the research question under investigation. Specific information about what weights were used can be found in the results section.

Overview of Analysis

All data analysis included in this report was completed using SPSS v. 21. The FACES 2009 user manual notes that other statistical software can be used with this dataset. Both cross-sectional and longitudinal weights were used, and varied by research question. Unweighted and weighted descriptive data is provided. For all regression analyses, the FACES 2009 user manual suggest using the modeling option for complex dataset (Complex Sample Module for Taylor Series Linearization, p. 8 & 161), which uses the Taylor Series approach to weighting in SPSS. Each regression analysis used the suggested variables for the strata (“STRAT”) and cluster options (“PSU”), which uses a weighting with replacement design. The sample design is not a random sample, and therefore the option to use finite population correction when estimating variances was not selected in SPSS when preparing the data analysis in the Complex Sample

Module menu. This is in accordance with the statistical procedures outlined in the FACES 2009 user manual. Additionally, only the child-based data set was used for the analysis; the data set that contains only information about the Head Start center/program and the data set that contains only information about the classroom/teacher was not used. The child-based data set includes all variables of interest in relation to the research questions presented.

The Complex Sample Module in SPSS is limited in some of the procedures. For example, an analysis of normality of variables could not be conducted with the weighted data, and correlation matrixes could not be produced using the weights. Additionally only specific descriptive statistics were provided when running data using the Complex Sample Module. As such, both unweighted and weighted data are provided.

Filters. All questions relate to social-emotional variables collected at age three and again at age five. As such, only children in the three year old cohort were included in all three analyses. A filter was created using the "COHORT" variable. Additionally, only children with a non-zero weight were included in the analysis. Again, this is in accordance with the statistical procedures outlined in the FACES 2009 user manual.

Research Question One: What is the relationship among self-control, cooperation, and social relationships for children growing up in a low-income household at age 3? Reflecting the Head Start approach to the social-emotional domain in early childhood, the various measures of self control, cooperation, and social relationships are distinct from one another, but represent a holistic construct known as 'social-emotional skills'. However, it is unclear what specific measures may more accurately identify variability in the whole domain. To address this, weighted and unweighted means, standard deviations and other statistics are reported, including correlation tables.

Self control. Four variables were included in the initial analysis of self control: Simon Says (AnSIMON), Pencil Tapping (AnPTTOT), the Leiter-R Attention subscale (AnATT), and the Leiter-R Organization/Impulse Control subscale (AnORG). These variables were included as a reflection of the theoretical definitions of self control discussed in the literature review.

Cooperation. Three variables were included in the initial analysis of cooperation: the Behavior Problems Index (PnPBEPRB), the Leiter-R Activity Level subscale (AnACT), and the composite variable of teacher report of problem behaviors (RnBPROB2). These variables were included in the analysis as they come from parental report, teacher report, and assessor ratings. Additionally, the BPI and the Activity subscale are standardized measures of how children engage with social rules and behavior accordingly in early childhood.

Social relationships. Three variables were included in the initial analysis of social relationships: the Social Skills Rating System (RnSSRS), the Leiter-R Sociability subscale (AnSOC), and the composite variable of parent report of social skills (PnPSSPAL). The variables were included in the analysis as a representation of how successful a child is at engaging with others. Additionally, these variables represented an objective measure by the assessor, as well as teacher and parent reports.

Research Question Two: Do social-emotional skills at age three predict academic achievement at age five? To answer this question, data analysis was broken out into two steps: describing the outcome variables of academic achievement, and conducting several step-wise regression models. The outcome variable, Academic Achievement, was broken down into three specific categories: language, literacy and mathematics. All outcome variables were measured at age five, and are standardized measures of achievement. Descriptive statistics (means, standard

deviations) for five year olds are reported, as well as a correlation table. Table 3 lists the specific variables used in the data analysis.

Academic Achievement – Language. Two variables were included as a representation of the child's language ability at the end of kindergarten: Expressive One-Word Picture Vocabulary (AnEOWPTR) and the Peabody Picture Vocabulary Test (AnPPVT or ANTVIPR).

Academic Achievement – Literacy. Three different subscale of the Woodcock Johnson were included as a representation of the child's literacy ability at the end of kindergarten: letter-word identification (AnWMLWS), spelling (AnWMSS), and word attack (AnWJWAS). Only standardized scores are reported.

Academic Achievement – Math. Two variables were included as a representation of the child's mathematical competency: the Early Childhood Longitudinal Study-Mathematics (AnECMCNT), and the Woodcock Johnson applied problems subscale (AnWMAPS).

Regression Models. Several backwards step-wise regression models were conducted. Initially, all three components of social-emotional skills (self control, cooperation, and social relationships) were included in the model.

$$\hat{y} = \alpha + \beta x_i + e$$

$$\text{Academic Achievement} = Intercept + \beta(Social\ Emotional\ Development) + random\ error$$

R^2 was assessed for each model, as well as B values for each predictor. Three final regression models are presented, each predicting one of the three outcome measures of academic achievement. The final best fit model to predict academic achievement is presented. Again, this process was repeated for all three outcome measures of academic achievement.

Research question Three: What attributes of parents and home life influences the relationship between social-emotional development and academic achievement?

This research question is a reflection of the bioecological approach to development, where contextual factors such as parenting approaches can influence child development. A consideration of the child's home life may be able to explain the variance in the relationship between academic achievement and social-emotional skills. Similar to the second research question, data analysis for this question was divided into two parts: describing the moderating variable of parenting practices, and conducting moderating regression analyses.

Parenting and home life. Four subscales of the Child Rearing Practices Report were included as potential moderating variables in each regression model predicting academic achievement. The subscales include parental warmth (PnWARM), parental energy (PnEnergy), parental authoritarian score (PnAuthtv), and parental authoritative score (PnAuthrn). Descriptive statistics (means, standard deviations) at age three for each of these variables were reported.

Regression Models with Moderators. Using the best fit model that predicts each measure of academic achievement, regression models were conducted to test the moderating effect of parental attributes between social-emotional skills at age three and academic achievement at age five.

Results

The FACES 2009 child data set includes data points for 3,349 children who attended a Head Start program between 2009 and 2011. Due to the use of weights and the filter for only the three year old cohort, the sample included in the analysis was 1,674 children. This sub sample included 820 females (49%). Children's race was identified by the parents during the parent interview. Children were primarily African American, Non-Hispanic (n = 593, 35.5%) or Hispanic/Latino (n = 594, 35.5%). Twenty percent of the sample of children were White, Non-Hispanic (n = 339), and the remaining sample of children were identified as either American Indian or Alaska Native, Asian or Pacific Islander, Mult-Racial/Bi-Racial, Non Hispanic, or Other (n = 145, 9%). Parents did not provide information about race for three children.

The Relationship among Self Control, Cooperation, and Social Relationships

To begin to answer the first research question, 'What is the relationship among self-control, cooperation, and social relationships for children growing up in a low-income household at age three?" the data was weighted using the variable "PRA1WT". This weight is a Fall 2009 cross-weight, and is weighted for parent interview data in combination with teacher child reports and child assessment data (p. 147, FACES 2009 user guide). Additionally, this weight is intended to be used with the child as the unit of analysis. All variables included in this data analysis for research question 1 are at the child level, either as a direct assessment, a teacher report, or a parent report. Both unweighted data and weighted data is provided in Table 4, and Frequency Distributions of the unweighted data are provided in Figures 1-10.

Self Control. Four measures of self control were included in the analysis: a Simon Says activity, a Pencil Taping activity, and the assessors rating of the Leiter-R attention and the

Leiter-R organization/impulse control subscales. The Simon Says activity and the Pencil Taping activity were both given by the assessor.

Simon says. Children were asked to follow directions and touch different parts of their body, similar to the commonly known children's game Simon Says. The assessor gave 10 directions, and the assessor recorded how many times the child was able to follow the direction accurately. A higher score can be interpreted as an increased ability to follow directions. The unweighted mean score for the sample of three years old was 4.74 (SD = 3.46). The weighted mean score for the population for the population was 4.78. Notably, 23% (n = 386) of Three Year Olds scored a zero on the Simon Says activity. Figure 1 displays the unweighted Frequency Distribution for Simon Says.

Pencil taping. Children were given the Pencil Taping task to measure inhibition. They were instructed by the assessor to follow two rules: when the assessor taped their pencil once, the child should tap twice. And if the assessor taped their pencil twice, the child should tap once. The assessor gave each child 16 trials, and recorded when the child correctly tapped according to the rule. A higher score can be interpreted as an increased ability to inhibit and follow specific rules. The unweighted mean score for the sample of Three Year Olds was 4.19 (SD = 4.38). The weighted mean score for the population was 4.04. Only 202 Three Year Olds were given this task, and 22% (n = 45) of the sample scored a zero on the task. Figure 2 displays the unweighted Frequency Distribution for Pencil Taping.

Leiter-R attention. The assessor rated each child on the Leiter-R Attention scale using 10 statements and a 4 point scale ranging from zero to three, where zero indicates 'rarely or never'. Scores are then added for a summative value, and can range from 0-30. The unweighted mean score for the population for the sample of three years old was 16.94 (SD = 7.75). The weighted

mean score was 16.79. Higher scores can be interpreted as having higher levels of attention, or goal-directed attention. Indicative of the three level scoring system for this scale, there are several spikes in the Frequency Distribution at the 10 point, 20 point, and 30 point values (see figure 3).

Leiter-R Organization/Impulse Control. Similar to the Leiter-R Attention subscale, the assessor rated each child using the Leiter-R Organization/Impulse Control subscale. Eight items are included in the subscale, with a four point scale exactly like the one used in the Leiter-R Attention subscale. Scores for the Leiter-R range from 0-24. The unweighted mean score for the sample of Three Year Olds was 13.50 (SD = 6.08). The weighted mean score for the population was 13.36. Higher scores can be interpreted as increased skills in being able to control impulses and organize ideas and thoughts. Unlike the distribution for the Leiter-R Attention subscale, the Leiter-R Organization/Impulse Control subscale did not demonstrate a pattern of spikes. Figure 4 displays the unweighted Frequency Distribution for the Leiter-R Organization/Impulse Control subscale.

Cooperation. Three measures of cooperation were included in the analysis: a parent report of behavior problems (The Behavior Problem Index), a teacher report of behavior problems, and the assessor's report of activity level (Leiter-R Activity Level).

Parental report of behavior problems. During the parent interview conducted on the phone, parents were asked to rate their child on 20 statements using a scale from 0 (not true) to 2 (very true). Statements came from the Behavior Problem Index (BPI). The scores are then summed, and can range from 0-20. A higher score can be interpreted as more behavior problems at home. The unweighted mean score for the sample of Three Year Olds 5.30 (SD = 3.48). The weighted mean score for the population was 5.29. Notably, the Frequency Distribution indicates

that parents did not report many behavior problems as demonstrated by the skewed distribution. Figure 5 displays the unweighted Frequency Distribution for parents reports of behavior problems.

Teacher report of behavior problems. A composite variable was provided in the FACES 2009 child data set, which includes teacher ratings on statements from the Behavior Problems Index and the Personal Maturity Scale. Teachers are asked to rate each child using 12 statements from each scale on a 3 point scale from 1 (not true) to 3 (very true or often true). Scores were then recoded to reflect a zero to two scale, with a final range of scores among 0-36. A higher score can be interpreted as more behavior problems in the classroom. The unweighted mean score for the sample of three year old children was 5.12 (SD = 4.74). The weighted mean score for the sample was 5.18. Similar to parents, teachers did not report many behavior problems as indicated by the skewed distribution in figure 6. In fact, 18% (n = 294) of three year old children were reported to have no behavior problems in the classroom. Figure 6 displays the unweighted Frequency Distribution for teacher report of behavior problems.

Leiter-R activity level. Again, the assessor was asked to rate each child on four statements using a scale from 0 (rarely/never) to 3 (usually/always). Due to the phrasing of the statements, lower scores on the scale can be interpreted as higher levels of activity. An example statement is "focuses without fidgeting". Scores can range from 0-12. The unweighted mean score for the sample of three year old children was 6.96 (SD = 3.44). The weighted mean score for the population was 6.92. Similar to the Attention subscale, the Frequency Distribution found in figure 7 shows spikes at the four, eight, and 12 point values.

Social Relationships. Three measures were included in the analysis for social relationships: a parent report of social skills, the Social Skills Rating System completed by the teacher, and the Leiter-R Sociability subscale completed by the assessor.

Parent report of social skills. The FACES 2009 child data set included a composite variable of eight statements rated by parents from the Social Skills Rating System, the Personal Maturity Scale, the Behavior Problems Index, and the Preschool Learning Behavior Scale. Using a scale from 0 (not true) to 2 (very true), a higher score can be interpreted as a child have more social skills. Scores could range from 0-16. The unweighted mean score for the sample of three-year-old children was 11.86 (SD = 2.50). The weighted mean was 11.88. Parents primarily reported high levels of social skills. Figure 8 displays the unweighted Frequency Distribution for the parent report of social skills.

Teacher report of social skills. Teachers were asked to rate each child on 12 statements using a scale from 0 (never) to 2 (very often), using the Social Skills Rating System (SSRS). A higher score can be interested as a child having higher levels of social skills in the classroom. Scores could range from 0-24. The unweighted mean score for the sample of three year old children was 14.37 (SD = 4.82). The weighted mean score for the population was 14.24. The Frequency Distribution indicates that some children had higher levels of social skills in the classroom than others. Figure 9 displays the unweighted Frequency Distribution for the teacher report of social skills.

Leiter-R sociability. The assessor was asked to rate each child on five statements using a scale from 0 (rarely/never) to 3 (usually/always). A higher score can be interpreted as a child having higher levels of sociability in their interactions with the assessor. Scores can range from 0-15. The unweighted mean score for the sample of three year old children was 10.67 (SD =

3.50). The weighted mean score for the population was 10.64. The Frequency Distribution found in figure 10 highlights a skewed distribution towards higher levels of sociability.

Correlations. Unweighted Pearson's correlations among these 10 variables are provided in Tables 5 and 6. SPSS cannot do complex sample correlation tables at this time, and thus weighted correlations are not provided. All values are either significant at the .001 level or not significant at all by the .05 standard.

As expected, measures of self-control were correlated with an r value of .22 or higher. However, measures of cooperation did not have strong or significant correlations. Parent report of behavior problems was not correlated with the assessors' report of activity level ($r = -.046$, $p > .05$). Additionally, the assessors' reports of activity level (Leiter-R, Activity subscale) was negatively related to the teachers' reports of behavior problems ($r = -.234$, $p < .01$). Inconsistent with assessor and teacher report for measures of cooperation, sociability scores between assessors and teachers were positively correlated ($r = .254$, $p < 0.01$). And, all Leiter-R subscales were highly correlated as should be expected (see Table 6).

Brief Discussion

Despite the large sample size, many of the variables of interest for social-emotional skills are not normally distributed (see Figures 1-10 for Frequency Distributions with normal curve). Correlations indicate some relationship among the various measures of self control, cooperation, and social relationships, suggesting that these measures are facets of the larger construct of social-emotional skills. However, it is clear that these measures may not directly relate to the three constructs of social-emotional development as previously hypothesized: self control, cooperation, and social relationships. Clearly each measure provides a unique understanding of a child's skill as they relate to social and emotional development, but future analyses could include

a factor analysis among the measures to determine if they load on to hypothesized factors such as self control, cooperation, and social relationships.

An alternative approach is to look at the correlations among measures of social-emotional skills depending on the evaluation: the assessor, the parent, or the teacher. The assessor used solely the Leiter-R subscales. While all four subscales had fairly high r values with each other, there were some interesting trends in the Frequency Distribution for the attention subscale and the activity subscale.

The two scales that teachers reported on – a composite variable of behavior problems in the classroom and the Social Skills Rating System – had a strong, negative, and significant correlation ($r = -.63$, $p < .01$). This finding may suggest that the more behavior problems a child has in the classroom, the less developed their social skills may be. In other words, children who have behavior problems have lower levels of social skills. As a follow up to these initial correlations, it would interesting to study the covariance among these variables, and the longitudinal relationship of how teachers report on social skills and behavior problems.

Similarly, looking at the relationship among the two parenting reports – parent report on the Behavior Problems Index and a composite variable of social relationship – a negative, significant but not strong correlation is evident ($r = -.29$, $p < .01$). Again, children with strong social skills according to parents, have fewer behavior problems at home. Future analysis should further investigate the relationship among these measures both as a cross-sectional analysis as well as a longitudinal analysis.

The relationships among social-emotional variables collected by parents are not as strong as one would hope. This is also the case with teacher-report variables. Campbell and Fisk (1959) identify the importance of independence when evaluating correlations. In the context of

convergent and divergent validity, the relationship among social-emotional variables reported by the same source (e.g., parent or teacher) are not obviously related as one would hypothesize. As suggested by Campbell and Fisk, these correlations may be a reflection of independence, and each measure is unique. What is not apparent in these findings is the halo effect (Thorndike, 1920): evaluators, either as teachers or parents, are not consistent among measurements of social-emotional development.

Weighting the data provides a unique opportunity to create population estimates, and is strongly encouraged when using the FACES 2009 data set. The data collection was designed specifically with the intention to use weights to make estimates of the population. The unweighted means and the weighted means did not different significantly, indicating that the sample used here was a good representation of the population. The weights will continue to be used in the remaining analyses. However, due to limitations with SPSS, correlations could only be reported with unweighted data. This process may underestimate the relationships among the measures of social-emotional development.

As a result of these findings, two important decisions were made before moving forward with the remaining research questions. First, due to the small sample size, pencil tapping was removed from the remaining analyses (n = 202). It is unclear why only a small sample of children were given this exercise, and even more unclear why so many children received a score of zero. The FACES 2009 user manual, along with other materials published on the dataset, provides no indication why this is the case. It was noted that this measure was a unique, and specific edition to the FACES 2009 data collection, having not been included in previous cohorts. It is unfortunate to remove pencil tapping from the analysis as it would have provided a measure of inhibition – an important feature of self-control – that no other measure included in

the FACES 2009 data set really captured. However, if pencil tapping were to be included in the remaining analyses it would significantly limit interpretation of the findings.

The regression analyses for the remaining two research questions included children who have every measure of social-emotional development. If pencil tapping were to be included, the analysis and subsequent interpretation is limited to those 220 children, compared to the 1760 children (unweighted) who have all the measures of social-emotional development. Methodologically there is no clear reason why only 220 children have a score for this measure; there may have been some systematic or non-systematic reason, making this sample of children different from the rest, and thus impacting any conclusions made about the population of Head Start children.

Second, each measure of social-emotional skills at the age of three will be treated as a unique predictor in the upcoming regression models. If the measures had correlated significantly with each other and a factor analysis was performed (this was not included in the original analysis plan), it would be reasonable to create regression models that include factors, such as ‘self control’, ‘cooperation’, and ‘social relationships’. However, such correlations were not supported and therefore each measure is treated individually.

Social-Emotional Skills and Academic Achievement

To begin to address the second research question, "Do social-emotional skills at age three predict academic achievement at age five?" new weights and filters were used. Additionally, descriptive information about the outcome measures of academic achievement were reviewed, and new composite variables were created. Data analysis for this research question used the 'WESTATWT' weight. This is a kindergarten longitudinal weight that can be used for parent interview data from the fall 2009 or spring 2010 data collection, in combination with child assessment data from the fall 2009 or spring 2010 data collection, and child assessment data in the kindergarten year (p. 157, FACES 2009 user guide). Similar to the first research question, **t**o ensure that the comparison between unweighted and weighted data included all eligible participants, any individual that had a value of zero for the weight WESTATWT was not included in this analysis.

Sample descriptive statistics. The FACES 2009 data collection experienced some attrition between fall 2009 and spring 2012. Only children who were in the 3 year old cohort, meaning they attended Head Start in the Fall of 2009, and continued in Head Start for their 4th year, and was re-interviewed in the Spring of 2012 (the end of their kindergarten year), were included in this part of the analysis. The original sample of children in the three year old cohort was 1,674 children. The final sample of three year olds who remained in the program into kindergarten year was 921. This sub sample included 464 females (50%). Children's race was identified by the parents during the parent interview. Children were primarily African American, Non-Hispanic (n = 305, 33%) or Hispanic/Latino (n = 365, 40%). Nineteen percent of the sample of children were White, Non-Hispanic (n = 175), and the remaining sample of children were identified as either American Indian or Alaska Native, Asian or Pacific Islander, Mult-Racial/Bi-

Racial, Non Hispanic, or Other (n = 76, 8%). Similar to question 1, three children did not have information about their race.

Academic Achievement

Academic achievement in kindergarten was divided into three components: language, literacy, and mathematic skills. Two measures of language skills were included in the analysis: the Expressive One-Word Picture Vocabulary Test (standard score) and the Peabody Picture Vocabulary Test. Three measures of literacy skills were included in the analysis: the Woodcock Johnson letter-word identification sub-scale, the Woodcock Johnson spelling subscale, and the Woodcock Johnson word attack subscale. And, two measures of mathematics were included in the analysis: the Woodcock Johnson applied problems subscale and the Early Childhood Longitudinal Study-Mathematics scale. Tables 7-9 and Figures 11-17 provide descriptive data (both weighted and unweighted) and unweighted Frequency Distributions for all measures of academic achievement.

Language skills. Children were given several standardized tests on language skills, including expressive and receptive measures of language development. The unweighted, standardized mean score for the Expressive One Word Picture Vocabulary Test (EOWPVT) was 85.61 (SD = 12.29), and the weighted mean was 85.56. The unweighted mean score for the population for the Peabody Picture Vocabulary Test (PPVT) was 91.38 (SD = 12.96), and the weighted mean was 91.82. The Frequency Distributions (Figures 11-13) indicate a normal distribution around the mean. Additionally, there was a high and significant correlation between these two outcome variables for language (EOWPVT and the PPVT, $r = .747$, $p < .01$). Therefore, a new variable was created (‘EADLANG’) that was a mean score of the EOWPVT

and the PPVT. The unweighted mean score for the population for the derived variable for language skills was 88.45 (SD = 11.87), and the weighted mean for the population was 89.01.

Literacy skills. Children were given three standardized tests on literacy skills, all from the Woodcock Johnson. The unweighted mean score for the population on the letter-word identification sub-scale was 107.40 (SD = 12.58), and the weighted mean was 107.79. Figure 13 displays the unweighted Frequency Distribution for the letter-word identification sub-scale. The unweighted mean score for the population on the spelling subscale was 106.01 (SD = 14.29), and the weighted mean for the population was 106.18. Figure 14 displays the unweighted Frequency Distribution for the spelling sub-scale. The unweighted mean on the word attack subscale was 113.57 (SD = 14.75), and the weighted mean for the population was 113.81. Figure 15 displays the unweighted Frequency Distribution for the word attack sub-scale. All of these scores were standardized, and the Frequency Distribution of scores for these measures indicate normal distributions around the mean.

There was a high and significant correlation among the three outcome variables for literacy: Letter Word & Spelling ($r = .723$, $p < 0.001$); Letter Word & Word Attack ($r = .757$, $p < 0.001$); and, Spelling & Word Attack ($r = .624$, $p < 0.001$). Therefore, a new variable was created ('EADLIT') that was a mean score of these three measures of literacy. The unweighted mean score for the sample for the derived variable for literacy skills was 108.82 (SD = 12.58), and the weighted mean for the population was 109.31.

Mathematic skills. Children were given two measures of mathematical skills: the Woodcock Johnson applied problems subscale and the Early Childhood Longitudinal Study-Mathematics scale. The unweighted mean score for the population on the applied problems subscale was 93.69 (SD = 14.33), and the weighted mean was 14.33. The unweighted mean score

for the population on the ECLS-Mathematics scale was 17.34 (SD = 5.13), and the weighted mean was 17.23. Figure 16 displays the unweighted Frequency Distribution for the applied problems subscale. The applied problems subscale was standardized.

However, the ECLS-Mathematics scale is a measure of the child's ability to count to 20. 70% (n = 631) of the kindergarteners were able to count to 20, indicating a very skewed distribution (see figure 17). Additionally, there was a very weak correlation between the two measures of mathematics (r = .138, p < 0. 01). As such, the ECLS-Mathematics measure was removed from the analysis, and only the standardized score from the Woodcock Johnson applied problems subscale was included in the analysis.

Basic Regression Model

The analysis presented here was conducted to identify the relationship between social-emotional skills at age three, with academic achievement at age five. The basic regression model is:

$$\boldsymbol{Academic\ Achievement} = \boldsymbol{Intercept} + \boldsymbol{\beta}(\boldsymbol{Social\ Emotional\ Development}) + \boldsymbol{random\ error}$$

Several, backwards stepwise regression models were evaluated for each outcome of academic achievement: the derived variable for language, the derived variable for literacy, and the applied problems subscale from the Woodcock Johnson for mathematics. Each step in the backwards regression modeling procedure is discussed. All regression models use weights with the Complex Sample Design in SPSS as recommended by the FACES 2009 user manual. All models began with all nine measures of social-emotional skills. The predictor with the highest p-value was removed in each step, and the model was rerun. One predictor was eliminated at a time until all predictors were found to be significant in the model, using the .05 standard for significance.

Backwards Stepwise Regressions for Language. Table 10 provides all R^2 values for each iteration of the model, the estimate B values for each predictor, and the significance value for that predictor. In the first iteration with a model predicting language skills at age five, the predictor with the highest p-value was the Leiter-R Organizational/Impulse Control subscale (p = .72). The Leiter-R Organizational/Impulse Control subscale was removed, and a second iteration of the model was run. In the second iteration, the Leiter-R Sociability subscale had the highest p-value (p = .53), and was removed. In the third iteration, the composite variable of the teacher report of behavior problems had the highest p-value (p = .39), and was removed. In the fourth iteration, the composite variable of parent report of social skills had the highest p-value (p = .27), and was removed. In the fifth iteration, the Leiter-R Activity subscale had the highest p-value (p = .06), and was removed. In the sixth iteration, the teachers report of social skills using the Social Skills Rating System had the highest p-value (p = .06), and was removed. In the seventh, and final, iteration, all remaining predictors (Simon Says, Leiter-R Attention, and Parent Report of Behavior Problems) of language skills were significant and resulted in the following model:

$$\text{Language Skills at Age 5} = 82.636 + 1.356(Simon\ Says\ at\ age\ 3) + 0.174(LeiterRAttent.at\ age\ 3) - 0.456(BPI\ at\ age\ 3)$$

The negative B value for BPI (Parent Report of Behavior Problems) in the model should be noted. The final model explains 23.7% of the variance in language skills at age five.

Backwards Stepwise Regressions for Literacy. Table 11 provides all R^2 values for each iteration of the model, the estimate B value weight for each predictor, and the significant value for that predictor. In the first iteration with a model predicting literacy skills at age five, the

predictor with the highest p-value was the Leiter-R Organizational/Impulse Control subscale (p = .89). The Leiter-R Organizational/Impulse Control subscale was removed, and a second iteration of the model was run. In the second iteration, Simon Says, a measure of self control, had the highest p-value (p = .80), and was removed. In the third iteration, the composite variable of parent report of social skills had the highest p-value (p = .76), and was removed. In the fourth iteration, the Leiter-R Sociability subscale had the highest p-value (p =.57), and was removed. In the fifth iteration, the Leiter-R Activity subscale had the highest p-value (p = .44), and was removed. In the sixth iteration, the parent report of behavior problems, the BPI, had the highest p-value (p = .29), and was removed. In the seventh iteration, the teacher report of social skills, the SSRS, had the highest p-value (p = .16), and was removed. In the eighth and final iteration, two remaining predictors (Leiter-R Attention subscale, Teacher report of behavior problems) of literacy skills were significant and resulted in the following model:

$$\text{Literacy at age 5}$$
$$= 108.548 + 0.168(LeiterRAttention\ at\ age\ 3)$$
$$- 0.402(Teacher\ Report\ of\ Behavior\ Problems\ at\ age\ 3)$$

This model produced a very small r-squared (0.042), meaning that these two predictors only explain 4% of the variance in literacy. Additionally, the negative B value of teacher report of behavior problems should be noted.

Backwards Stepwise Regression for Mathematics. Table 12 provides all R^2 values for each iteration of the model, the estimate B value for each predictor, and the significant value for that predictor. In the first iteration with a model predicting mathematic skills at age five, the predictor with the highest p-value was the composite variable of teacher report of behavior problems (p = .95). This variable was removed, and a second iteration of the model was run. In

the second iteration, the Leiter-R Activity subscale had the highest p-value (p = .79), and was removed. In the third iteration, Leiter-R Sociability subscale had the highest p-value (p = .65), and was removed. In the fourth iteration, the Leiter-R Organizational/Impulse Control subscale had the highest p-value (p =.60), and was removed. In the fifth iteration, the composite variable of parents report of social skills had the highest p-value (p = .43), and was removed. In the sixth iteration and final iteration, four remaining predictors (Simon Says, Leiter-R Attention subscale, Behavior Problem Index - Parent Report), Social Skills Rating System - Teacher Report) of mathematical skills were significant and resulted in the following model:

$$\text{Math Skills at age 5}$$
$$= 84.698 + 0.639(Simon\ Says\ at\ 3) + 0.211(LeiterRAtten.at\ 3)$$
$$- 0.482(BPI\ at\ 3) + 0.394(SSRS\ at\ 3)$$

Similar to the final model for language, the negative B value for BPI (Parent Report of Behavior Problems) in the model should be noted. The final model explains 11% of the variance in mathematic skills at age five.

Brief Discussion

Several interesting findings come from the 21 regression models run, and the work done to create the derived outcome variables. First, the derived variables for language and literacy skills at age five proved to be fairly straightforward. The measures of interest had normal distributions, which was not surprising for standardized measures of academic achievement. The measures also had strong, positive correlations, providing justification for creating the new derived variables. However, the ceiling effect of counting to 20 for five year olds was not necessarily surprising. The recent efforts in early childhood education to promote mathematical knowledge may be a reflection of this finding.

Second, it is interesting to note the pattern and order in which predictors were removed from each regression model. For example, the Leiter-R Impulse/Organizational score was the first predictor to leave the model for both language and literacy. Similarly, the Leiter-R Activity score was removed in the fifth iteration for both language and literacy. Additionally, it should be noted that these measures (completed by the assessor) did not remain in any of the models. The only Leiter-R subscale that remained significant in all three models was the Attention subscale. Attention – the only lasting measure of self control – was found to have a significant relationship with each measure of academic achievement. Additionally, the relationship between attention and each measure of academic achievement was positive in that children who had higher levels of attention at age three, had higher levels of academic achievement at age five.

Third, it is interesting to note what variables remained significant for each model. The final model for literacy ended up with only two significant predictors: attention and teacher report of behaviors. As mentioned previously, attention was positively related to literacy, and teacher report of behavior problems was negatively related. Children who had higher levels of behavior problems in the classroom at age three as reported by the teacher, had a lower score on literacy skills at age five.

For the final model for language (receptive and expressive language skills), parental reports of behavior problems was a better predictor compared to teacher report. In fact, for language, teacher report of behavior problems was removed from the model after the third iteration. Similar to literacy, though, the relationship between parental report of behavior problems and language skills was negative: children who were reported to have higher behavior problems at home at the age of three as reported by the parent, had lower language scores at the age of five. In addition to the shift of teacher report to parent report of behavior problems

between the literacy model and the language model, a third significant predictor remained for language but not for literacy: Simon Says. Considering that the measure included receptive vocabulary skills (following the verbal rules of what body part to touch), it should be expected that this skill would be significantly related to language skills. However, this measure not only represents a child's ability to understand verbal language, but is in fact a way to measure a child ability to follow rules and self-regulate in the context of a goal.

The third regression model, mathematical skills, was left with four significant predictors: Simon Says, attention, parent report of behavior problems, and teacher report of social skills. Put into the context of many early childhood education curriculums, many math-based activities utilize group work during early childhood. Math skills are often embedded in problem solving skills, and with an increase in peer-based learning, many teachers find that group work is an environment that supports the development of problem solving skills.

Lastly, it should be noted that measures which came from the assessor, the teacher, or the parent were included in the final models. This result supports the idea that children's environments are interrelated, as noted by the mesosystem in Bronfenbrenner's theory and that multiple measures of one skill or attribute can be very informative. The three final regression models will be used to answer the final research question of this project: a moderation analysis of parenting approaches.

Moderation Analysis: Parenting, Social-Emotional Skills and Academic Achievement

The third and final research question -- "What attributes of parents and home life influence the relationship between social-emotional development and academic achievement?" -- requires a moderation analysis of the three models found in the previous analysis. The weights and filters used for this analysis are the same used for research question two, as it includes the necessary longitudinal weights for multiple waves of data.

Parenting and home life. Four subscales were considered to be moderators of the relationship between academic achievement and social-emotional skills: parental warmth, parental energy, parental authoritarian score, and parental authoritative score. Parents were asked questions related to these scales during the Spring of 2010 and the Spring of 2011. Descriptive statistics are provided in table 10, and derived variables were created as a mean score between these two time points.

Parental warmth. Parents were asked to rate five statements about their interactions with their child on a scale ranging from "not at all" to "exactly", with a total score ranging from 0-5. The mean unweighted score for parental warmth was 4.29 (SD = 0.50) during the Spring of 2010, and the mean unweighted score for parental warmth was 4.29 (SD = 0.51) during the Spring of 2011. These scores had a moderate and significant correlation ($r = .44$, $p < 0.01$). A new derived variable for parental warmth was created ("EADWARM"), and the unweighted mean score for the population for the derived variables was 4.30 (SD = 0.44). Figures 18 and 19 display the unweighted distributions for parental warmth for Spring 2010 and Spring 2011, respectively.

Parental Energy. Parents were asked to rate three statements about their interactions with their child on a scale ranging from "not at all" to "exactly", with a total score ranging from 0-5.

The mean unweighted score for parental energy was 3.97 (SD = 0.75) during the Spring of 2010, and the mean unweighted score for parental warmth was 3.97 (SD = 0.74) during the Spring of 2011. These scores had a moderate and significant correlation ($r = .47$, $p < 0.01$). A new derived variable for parental warmth was created ("EADENERGY"), and the unweighted mean score for the population for the derived variables was 3.98 (SD = 0.67). Figures 20 and 21 display the unweighted distributions for parental energy for Spring 2010 and Spring 2011, respectively.

Authoritative parenting. Parents were asked to rate four statements about their interactions with their child on a scale ranging from "not at all" to "exactly", with a total score ranging from 0-5. The mean unweighted score for parental authoritative was 3.53 (SD = 0.59) during the Spring of 2010, and the mean unweighted score for parental warmth was 3.48 (SD = 0.51) during the Spring of 2011. These scores had a moderate and significant correlation ($r = .40$, $p < 0.01$). A new derived variable for parental authoritative was created ("EADAUTHTV"), and the unweighted mean score for the population for the derived variables was 3.50 (SD = 0.49). Figures 22 and 23 display the unweighted distributions for authoritative parenting for Spring 2010 and Spring 2011, respectively.

Authoritarian parenting. Parents were asked to rate three statements about their interactions with their child on a scale ranging from "not at all" to "exactly", with a total score ranging from 0-5. The mean unweighted score for parental authoritarian was 2.19 (SD = 0.75) during the Spring of 2010, and the mean unweighted score for parental warmth was 2.25 (SD = 0.76) during the Spring of 2011. These scores had a moderate and significant correlation ($r = .47$, $p < 0.01$). A new derived variable for parental authoritative was created ("EADAUTHRN"), and the unweighted mean score for the population for the derived variables was 2.21 (SD = 0.67).

Figures 22 and 23 display the unweighted distributions for authoritarian parenting for Spring 2010 and Spring 2011, respectively.

Correlations. Table 11 provides correlations among the four derived variables, which are mean scores between the Spring 2010 and Spring 2011 parent interviews. As expected, the measures of authoritative and authoritarian are not significantly correlated ($r = -.030$, $p > 0.05$). However, there is a moderate relationship between warmth and energy ($r = 0.36$, $p < 0.01$).

Moderation Analysis

To begin the moderation analysis, all final predictive variables were centered to help with the interpretation of the interaction term. Additionally, to evaluate the moderating effect of the parenting variable of interest, predictors were evaluated individually with each moderator. The final predictors in each model had high correlations supporting this method of moderation analysis. Additionally, the theoretical approach that these predictors all fall under the same larger concept of social-emotional skills supports this method. Last, by proceeding in this fashion, the interpretation of any significant moderating effect becomes evident by using the simplest design possible.

Language, social-emotional skills, and parenting. Table 13 provides an overview of the B value and R^2 values for each predictor and moderator. Figure 26 provides a conceptual model for language.

Parental warmth. Three different models were run to identify significant moderating effects of parental warmth on the relationship between Simons Says at the age of three, Leiter-R Attention subscale at the age of three, or Parental Report of Behavior Problems at home at the age of three on language skills at the age of five. Non-significant models were produced.

Parental energy. Three more models were run to identify significant moderating effects of parental energy on the relationship between Simons Says at the age of three, Leiter-R Attention subscale at the age of three, or Parental Report of Behavior Problems at home at the age of three on language skills at the age of five. The first model displayed a significant main effect for Simon Says ($B = 3.92$, $p < .01$) and a significant interaction ($B = -0.59$, $p < .01$) on language skills. However, there was a non-significant main effect for parental energy ($B = -0.27$, $p > .05$) on language skills. This model explained 22% of the variance in language scores at age 5. The second two models – one with the Leiter-R Attention subscale and the Parental Report of Behavior Problems – showed no significant main effects or interactions.

Authoritative parenting. Three more models were run to identify significant moderating effects of authoritative parenting on the relationship between Simons Says at the age of three, Leiter-R Attention subscale at the age of three, or Parental Report of Behavior Problems at home at the age of three on language skills at the age of five. Similar to parental warmth, non-significant models were produced with all three predictors.

Authoritarian parenting. Finally, three more models were run to identify significant moderating effects of authoritarian parenting on the relationship between Simons Says at the age of three, Leiter-R Attention subscale at the age of three, or Parental Report of Behavior Problems at home at the age of three on language skills at the age of five. All three models displayed significant interactions. There was a significant main effect for Simon Says at age three on language skills at age five ($B = 2.58$, $p < .01$), and a significant interaction between Simon Says and authoritarian parenting on language skills at age five ($B = -0.46$, $p < .05$). That is to say, the relationship between Simon Says at age three and language skills at age five is negatively

dependent on authoritarian parenting practices. However, there was not a significant main effect for authoritarian parenting on language skills at age five (B = -1.09, p > .05).

For the Leiter-R Attention subscale, there was a similar pattern with a significant main effect for attention at age 3 on language skills at age 5 (B = 0.64, p < .01), and a significant interaction between attention at age 3 and authoritarian parenting on language skills at age 5 (B = -0.15, p = .05). However, there was not a significant main effect for authoritative parenting on language skills at age 5 (B = -1.53, p > .05).

For the Parental Report of Behavior Problems at age three, a similar pattern occurred: a significant main effect for parental report of behavior problems (B = -1.77, p < .01), a significant interaction (B = 0.44, p = .05), and a non-significant main effect of the moderator, authoritarian parenting (B = -0.93, p > .05).

Literacy, social-emotional skills, and parenting. Table 14 provides an overview of the B value and R^2 values for each predictor and moderator. Figure 27 provides a conceptual model for literacy.

Parental warmth. Two different models were run to identify significant moderating effects of parental warmth on the relationship between a child's score on the Leiter-R Attention subscale at the age of three or Teacher Report of Behavior Problems at the age of three, on language skills at the age of five. Non-significant models were produced.

Parental energy. Two more models were run to identify significant moderating effects of parental energy on the relationship between a child's score on the Leiter-R Attention subscale at the age of three or Teacher Report of Behavior Problems at the age of three, on language skills at the age of five. Non-significant models were produced.

Authoritative parenting. Two more models were run to identify significant moderating effects of authoritative parenting on the relationship between a child's score on the Leiter-R Attention subscale at the age of three or Teacher Report of Behavior Problems at the age of three, on language skills at the age of five. Non-significant models were produced.

Authoritarian parenting. Finally, two more models were run to identify significant moderating effects of authoritarian parenting on the relationship between a child's score on the Leiter-R Attention subscale at the age of three or Teacher Report of Behavior Problems at the age of three, on language skills at the age of five. Non-significant models were produced.

Mathematics, social-emotional skills, and parenting. Table 15 provides an overview of the B values and R^2 values for each predictor and moderator. Figure 27 provides a conceptual model for mathematics.

Parental warmth. Four different models were run to identify significant moderating effects of parental warmth on the relationship between a child's score on Simons Says at the age of three, the Leiter-R Attention subscale at the age of three, Teacher Report of Behavior Problems at the age of three, or Parental Report of Behavior Problems at home at the age of three, on language skills at the age of five. Non-significant models were produced.

Parental energy. Four more models were run to identify significant moderating effects of parental energy on the relationship between a child's score on Simons Says at the age of three, the Leiter-R Attention subscale at the age of three, Teacher Report of Behavior Problems at the age of three, or Parental Report of Behavior Problems at home at the age of three, on language skills at the age of five. Non-significant models were produced.

Authoritative parenting. Four more models were run to identify significant moderating effects of authoritative parenting on the relationship between a child's score on Simons Says at

the age of three, the Leiter-R Attention subscale at the age of three, Teacher Report of Behavior Problems at the age of three, or Parental Report of Behavior Problems at home at the age of three, on language skills at the age of five. Two interesting models were produced with significant interactions.

First, for the Leiter-R Attention subscale, there was a non-significant main effect for attention at age 3 on language skills at age 5 ($B = -0.408$, $p > .05$) and a non-significant main effect of authoritative parenting on language skills ($B = 1.74$, $p > .05$). However, there was a significant interaction between attention at age 3 and authoritative parenting on language skills at age 5 ($B = 0.22$, $p < .05$). The relationship between attention at age three and math skills at age five is moderated by authoritative parenting.

Second, for the parental report of behavior problems, both main effects and the interaction were significant. There is a negative relationship between problem behaviors at home at age three and mathematic skills at age five ($B = -2.90$, $p < 0.01$); there is a positive relationship between authoritative parenting and mathematic skills ($B = 2.16$, $p < .01$); and, the relationship between problem behaviors and mathematic skills depend on authoritative parenting ($B = 0.626$, $p < .01$).

Authoritarian parenting. Finally, four more models were run to identify significant moderating effects of authoritarian parenting on the relationship between a child's score on Simons Says at the age of three, the Leiter-R Attention subscale at the age of three, Teacher Report of Behavior Problems at the age of three, or Parental Report of Behavior Problems at home at the age of three, on language skills at the age of five. Non-significant models were produced.

Brief Discussion

The new measures of interest in this research question, parenting approaches, included data about parents in between the time the child's social-emotional skills were being measured and when their academic achievement was measured (Spring 2010 and Spring 2011). By including a moderator of this nature, the model embraces a longitudinal approach unique to previous research. This design also embraces a Bronfenbrenner approach by incorporating features of proximal processes over time to better understand specific demand characteristic of a child.

The results of this final analysis – 36 moderation regressions – proved to be very interesting. Figures 26-28 display a conceptual map of each regression model with the significant moderators. Across the board, parental warmth had no moderating effects of social-emotional skills on academic achievement. Parental energy was found to only moderate the effects of Simon Says on language, but negatively both as a main effect and as moderator. In other words, the relationship between the Simon Says task, the ability to follow instructions, and language is dependent on parental energy.

Authoritative parenting seemed to moderate the effects of attention and parental report of behavior problems on mathematic skills. In addition, authoritarian parenting moderated all the variables of interest for language: Simon Says, attention, and parent report of problem behaviors. Authoritative and Authoritarian parenting practices often had negative B values for the interaction term. The relationship between following instructions, attending to a task, or problem behaviors at home at age three, and language skills at age five is dependent on authoritative parenting styles. In sum, parenting approaches served to moderate the relationship between social-emotional skills at age three and academic achievement at age five.

General Discussion

The purpose of this dissertation was to identify the relationship among specific aspects of social-emotional skills at age three, and identify if there is a relationship between social-emotional skills at age three and academic achievement at age five. Finally, this dissertation took into account parenting variables that may influence the relationship between social-emotional skills and academic achievement.

The relationship between self control, cooperation, and social relationships

It was hypothesized that there would be a relationship between the measures of self control, cooperation, and social relationships. While there were strong, significant, and interesting correlations between the 10 measures of social-emotional skills, there was not enough evidence to support the idea that the measures clearly related to a specific factor, such as self control, cooperation, and social relationships. To address this concern, a factor analysis could have been completed; however, this was beyond the scope of this dissertation. The relationship among the specific measures of social-emotional skills support Bronfenbrenner's theoretical concept of dispositional attributes. Further analyses, like cross sectional and longitudinal analyses, would be beneficial to better understand how these measures of social-emotional skills develop over time.

The relationship between social-emotional skills at age three to academic achievement at age five

It was hypothesized that there would be no relationship between the measures of academic achievement, when in fact Pearson's correlations indicated that there were significant, positive and strong relationships between the measures of academic achievement. It was also hypothesized that measures of social-emotional skills at age three would be related to academic

achievement at age five. Using backwards, stepwise regression, three final models of academic achievement indicate that not only do different aspects of social-emotional skills at age three explain some variance of academic achievement at age five, but that different evaluators of a child's social-emotional skills uniquely contribute to the model. The results of this analyses support Bronfenbrenner's theoretical importance of time. There is evidence to suggest that the developmental skills involved with social-emotional skills, like cooperation, self control, and social relationships, influence academic achievement including language, literacy, and mathematic skills at a later time, i.e. kindergarten.

The moderating role parents have between social-emotional skills at age three to academic achievement at age five

It was hypothesized that parental attributes, such as warmth, energy, and authoritative and authoritarian parenting, would moderate the effects of social-emotional skills at age three on academic achievement at age five. Moderation analysis confirmed this hypothesis, but only partially. Measures of parental warmth did not moderate the relationship between social-emotional skills at age three and academic achievement at age five. However, measures of parental energy, authoritative parenting practices, and authoritarian parenting practices moderated specific elements of social-emotional skills in their relationship to academic achievement. Most notably, authoritarian parenting – parents who demand a lot, but do not necessarily provide a lot of warmth – moderated the relationship between social-emotional skills at age three and language development at age five. The results from this analysis highlight Bronfenbrenner's idea of context. This moderation analysis indicates that how a parent interacts with their child may influence dispositional attributes of their child beyond the context of the

home. The proximal processes between parent and child transcend the home environment and have the potential to influence learning outcomes like academic achievement.

Additionally, it should be noted that there was fairly consistent self-reporting of parental attributes between the Spring of 2010 and Spring of 2011, with correlation values greater than .40. Considering that these children are growing up in low-income homes, parents are likely to be experiencing direct stress as a result of the family's income status. This situation may lead to erratic parenting styles (e.g. Low, Sinclair, & Shortt, 2012). However, this small finding may indicate otherwise. The consistency in this kind of reporting validates Bronfenbrenner's idea of context. Parenting approaches provide a specific context through which children develop and grow.

Parenting approaches play a critical role in child development. The questions used in this study represent specific kinds of parenting approaches and were intended to capture specific features of authoritarian and authorities parenting styles. However, the questions presented in both subscales are not standardized and therefore may not fully capture what Baumrind (1971) had identified so clearly.

Theoretical Implications

Bronfenbrenner's bioecological approach provides a framework to ask questions about child development. The basic concepts of his theory are addressed in this research: person, process, context, and time. Characteristics of both child and parent were included in the analysis. The primary goal of this dissertation was to understand the dynamics between child and parent and how those parent-child dynamics influence social-emotional skills and academic achievement. The context of growing up in a low-income household creates a unique environment. The development of such person-related skills and the processes between child and

parent are a point of interest. Time was accounted for in the analyses by looking at the relationship between specific social-emotional skills at age three and academic achievement at age five.

The design, research questions, and hypotheses presented in this dissertation were developed under the theoretical framework of Bronfenbrenner's bioecological model. As such, there are several strengths of this dissertation. First, this dissertation included several measures of social-emotional development. In doing so, the models presented explained some variance of academic achievement, and incorporated several key perspectives of a child's development: the parent, the teacher, and an objective assessor. By highlighting the relationships between these dispositional attributes, we are able to better understand the developmental function of social-emotional skills at age three is better understood.

Second, this research used longitudinal data in a within subjects design. In an effort to better understand how social-emotional skills influence academic achievement, a longitudinal outcome relationship was identified: children's social-emotional skills at age three predict some variance in academic achievement at age five. This findings emphasizing the importance of developing successful social-emotional skills as early as three years of age. Additionally, these findings support the general idea that social skills can influence cognitive development on a long-term basis.

However, as evident in previous literature (e.g., Cole, Martin, & Dennis, 2004; Garner & Spears, 2000), there is still some conceptual overlap between social-emotional skills and cognitive skills. Specifically, the role of self-regulatory skills such as inhibition may be used in a variety of domains: emotional, cognitive, and behavioral. By establishing a longitudinal

relationship between the measures of inhibition here, we might better understand the interconnectedness of the varying types of inhibition.

Third, the findings of this research indicate that parental attributes moderate this relationship. Authoritarian parenting, typically found to be cold and very structured, moderates the longitudinal relationship of social-emotional skills at age three and academic achievement at age five. Previous research has alluded to this relationship (e.g. Bolkan, Sano, De Costa, Acock, & Day, 2010; Rinaldi & Howe, 2012), and Bronfenbrenner's theory would support this relationship. Parent-child processes and interactions, as measured by authoritarian parenting practices, can mitigate the interactions between the microsystems that a child may experience. And, even more notable, these findings suggest this occurs as early as three years old.

Fourth, in contrast to previous research that has demonstrated the relationship between social-emotional skills and academic achievement, these findings focus on the preschool years. With new political forces offering universal pre-kindergarten, this information can be beneficial in not only shaping curricula, but also finding ways to support parents and families in the home. By providing parents with support – just as the Head Start model intends to do – there is the potential to support child outcomes, both indirectly and directly.

Parental Engagement. The Head Start program is not just a preschool program – it is an early childhood education program that focuses on the whole child, and encourages parental engagement. The current analyses center on this population: families who meet income criteria that limit their financial access to early childhood education. The findings from this research indicate that parents play a very important role in how children develop social-emotional skills, and how those skills are related to academic achievement. Early childhood education programs, beyond that of Head Start, may benefit by actively engaging parents into the process of child

development. Programs that are evidence-based can be designed to help promote effective strategies for parents to help their children regulate emotions, behaviors, and thoughts at home.

Limitations

While this dissertation adds new knowledge to the field by using a nationally representative data set of children who attended a Head Start program from 2009-2011, there are limitations in generalizing the results to the larger population of children who attend any early childhood education program. Specific measures of social-emotional skills in early childhood are not included in the data collection: knowledge of family and community and self-concept. In order to be consistent with the Head Start model of social-emotional development, a more robust set of measurements on these two factors would have been beneficial in order to more fully understanding social-emotional development in young children. Additionally, some of the measures of social-emotional skills are not standardized, and have not been normed.

The descriptive statistics and Frequency Distributions for some of the social-emotional skills might indicate that assessors, teachers, and parents did not complete items with thought and consideration. The spikes found in the distributions for the Leiter-R subscales may be a cause for concern, and might make one wonder the efficacy of the data collection for all participants. Similarly, it would be interesting to determine the explanation for such a low sample of children who have data for pencil tapping. With such a large sample, it is easy to think attrition may be a factor, or other non-systematic error in data collection may be the culprit for these unusual findings in the descriptive statistics. The self-report nature of the parental interviews, and the high work demand of both teachers and assessors, data collection training and processes may have been compromised for a nationally representative sample. Additionally, parental reports may have been influenced by external factors like social desirability.

While the results of this research may actually be generalizable to the population of children who attended Head Start between 2009 and 2012 (thanks to the use of a variety of weights), there are limitations in making any causal relationships. With the lack of a comparison-control group (e.g. children who did not attend Head Start, or children who do not grow up in low-income homes) and a randomized sample, possible causal relationships are not addressed. The research findings presented here will remain correlational, but have the potential to be informative for child development and family practices in low-income households.

Future Directions

The FACES 2009 data collection was designed to be representative of children attending Head Start. While the data does not include nor represent all children, further analysis could compare this group of preschool-aged children with preschool-aged children who attend a different program or, perhaps, preschool-aged children who do not attend any program before entering kindergarten. Additionally, analyses were not conducted on the nature of the moderating variables. Future research should work to identify how parenting practices may influence the relationship of social-emotional skills and academic achievement for preschool-aged children.

Similarly, further research may investigate the longitudinal and normative trajectory of these social emotional skills. For example, the negative correlation between teacher reported behavior problems and teacher reported social skills is one to ponder. The FACES 2009 data has the longitudinal data to complete such an investigation, and the results could support the findings presented in this study.

Findings from this project support the notion that parents contribute greatly to their child's social-emotional development and academic achievement, even before the child enters kindergarten. Consistent with the Bronfenbrenner approach to child development it is imperative

that we as psychologists consider the whole child when studying development, including specific proximal processes such as parent-child interactions. Evidence from this study suggests that parental involvement with early childhood education programs may help promote effective parenting strategies that ultimately support child development and growth.

The purpose of Head Start is to lessen the gap of school readiness for children who grow up in low-income households. To better understand if the Head Start model and approach to early childhood education is effective, randomized control comparisons would be necessary. The current investigation did not use this methodology, but the results from the current study have the potential to inform future research. In today's political climate of advocacy for universal pre-kindergarten, it is necessary to have empirical evidence demonstrating normative development, from which programs, and interventions can be developed to help at-risk children and their families.

Appendix A

Table 1

Measures Included in Analyses for Social-Emotional Development

Variable Name in Data File	Measure	Range of Scores	Method of Collection
Social-Emotional Skills: Self Control			
AnSIMON	Simon Says Score	0-10; higher score means better following rules	Direct Assessment
AnPTTOT	Pencil Tapping	0-16; higher score means higher number of correct taps	Direct Assessment
AnATT	Leiter-R: Attention	0-30; higher scores mean better skills in attention	Assessor Rating
AnORG	Leiter-R: Organization/ Impulse Control	0-24; higher scores mean better control over impulses	Assessor Rating
Social-Emotional Skills: Cooperation			
PnPBEPRB	Behavior Problems Index	0-20; higher scores mean more behavior problems	Parent Report
RnBPROB2	Teacher report of problem behaviors (composite variable of SSRS and PMR)	0-36; higher scores mean more behavior problems	Teacher Report
AnACT	Leiter-R: Activity Level	0-12; higher scores mean lower levels of activity	Assessor Rating
Social-Emotional skills: Social Relationships			
PnPSSPAL	Parent report of social skills (composite variables of SSRS, PMR, BPI, and PLBS)	0-16; higher scores mean better social skills	Parent Report
RnSSRS	Social Skills Rating System	0-24; higher scores mean better social skills	Teacher Report
AnSOC	Leiter-R: Sociability	0-15; higher scores mean better social skills	Assessor Rating

Table 2

Measures Included in Analyses for Academic Achievement

Variable Name in Data File	Measure	Spanish Version	Range
Academic Achievement-Language			
AnEOWPTS	Expressive One-Word Picture Vocabulary Test, standard score	Yes: AnEOWSBS	45-145 (Standardized Score)
AnPPVT4S	Peabody Picture Vocabulary Test	Yes: AnTVIPS	20-160 (Standardized Score)
Academic Achievement-Literacy			
AnWJLWS	Woodcock Johnson: letter-word identification subscale	Yes: AnWMLWS	0-200 (Standardized Score)
AnWJSS	Woodcock Johnson: spelling subscale	Yes: AnWMSS	0-200 (Standardized Score)
AnWJWAS	Woodcock Johnson: word attack	Yes: AnWMWAS	0-200 (Standardized Score)
Academic Achievement-Mathematics			
AnWJAPS	Woodcock Johnson: applied problems	Yes: AnWMAPS	0-200 (Standardized Score)
AnECMCNT	Early Childhood Longitudinal Study - Mathematics	No	0-20

Table 3

Measures Included in Analyses for Parenting Approaches

Variable Name	Measure	Range of Scores
PnWarm	Parental warmth score; from Child Rearing Practices Report --My child and I have warm intimate moments together. (Reverse coded) --I encourage my child to be curious, to explore, and to question things. (Reverse coded) --I am easygoing and relaxed with my child. (Reverse coded) --I make sure my child knows that I appreciate what (he/she) tries to accomplish. (Reverse coded) --I believe physical punishment to be the best way of disciplining.	1-5; higher scores reflective of warm parenting
PnEnergy	Parental energy score; from Child Rearing Practices Report --There are times I just don't have the energy to make my child behave as (he/ she) should. (Reverse coded) --I have little or no difficulty sticking with my rules for my child even when close relatives (including grandparents) are there. (Reverse coded) --Once I decide how to deal with a misbehavior of my child, I follow through on it	1-5; higher scores reflective of energetic parenting
PnAuthtv	Parental authoritative score; from Child Rearing Practices Report --I control my child by warning (him/her) about the bad things that can happen to (him/her). (Reverse coded) --I teach my child that misbehavior or breaking the rules will always be punished one way or another. --I encourage my child to be curious, to explore, and to question things. (Reverse coded) --I encourage my child to be independent of me. (Reverse coded)	1-5; higher scores reflective of authoritative parenting
PnAuthrn	Parental authoritarian score; from Child Rearing Practices Report --I do not allow my child to get angry with me. --I believe that a child should be seen and not heard. (Reverse coded) --I believe physical punishment to be the best way of disciplining. (Reverse coded)	1-5; higher scores reflective of authoritarian parenting

Table 4

Descriptive Statistics of Social-Emotional Skills at age 3 (Fall 2009)

	Unweighted						Weighted		
	Min.	Max.	Mean	Std. Deviation	Skewness (SE)	N	Estimate	Standard Error	Population Size
Simon Says Score	0	10	4.74	3.46	-0.19 (0.06)	1674	4.78	0.19	275,156
Total Score for Pencil Tapping	0	16	4.13	4.38	1.28 (0.17)	202	4.04	0.33	32,628
Assessor reported attention level (Leiter-R Attention subscale)	0	30	16.94	7.75	-0.18 (0.06)	1670	16.79	0.35	273,930
Assessor reported organization/impulse control (Leiter-R Organization/Impulse Control subscale)	0	24	13.50	6.08	-0.17 (0.06)	1670	13.36	0.32	273,930
Parent Report of Behavior Problems (BPI)	0	24	5.30	3.48	0.91 (0.06)	1673	5.29	0.14	275,003
Teacher Report of Behavior Problems (Composite of SSRS and PMR)	0	24	5.12	4.74	1.08 (0.06)	1673	5.18	0.23	275,077
Assessor reported activity level (Leiter-R Activity subscale)	0	12	6.97	3.44	-0.20 (0.06)	1670	6.92	0.18	273,930
Parent Report of Social Skills (Composite of SSRS, PMR, BPI, and PLBS)	3	16	11.86	2.50	-0.37 (0.06)	1674	11.88	0.07	275,156
Teacher Report of Social Skills (SSRS)	0	24	14.37	4.81	-0.12 (0.06)	1674	14.24	0.24	275,156
Assessor reported sociability (Leiter-R Sociability subscale)	0	15	10.67	3.50	-0.56 (0.06)	1670	10.64	0.19	273,930

Table 5

Unweighted Pearson's Correlations and Sample Sizes of Social-Emotional Skills at age 3 (Fall 2009)

	2	3	4	5	6	7	8	9	10
1:Simon Says Score	.299**	.244**	.216**	-.223**	-.082**	.067**	.123**	.145**	.223**
2:Total Score for Pencil Tapping	--	.342**	.363**	-.104	-.188**	.243**	.122	.215**	.257**
3:Leiter-R Attention		--	.911**	-.068**	-.253**	.792**	.088**	.281**	.733**
4:Leiter-R organization/impulse control			--	-.067**	-.260**	.832**	.083**	.270**	.762**
5:Parent reported total behavior problems index				--	.118**	-.046	-.285**	-.141**	-.071**
6:Teacher reported behavior problems					--	-.234**	-.160**	-.628**	-.224**
7:Leiter-R Activity						--	.073**	.229**	.701**
8:Parent Report of Social Skills							--	.160**	.084**
9:Teacher Report of Social Skills								--	.254**
10:Leiter-R Sociability									--

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6

Unweighted correlations of all Leiter-R subscales

	2	3	4
1:Assessor reported attention level	.911**	.792**	.733**
2:Assessor reported organization/impulse control	--	.832**	.762**
3:Assessor reported activity level		--	.701**
4:Assessor reported sociability			--

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7

Descriptive Statistics of Academic Achievement at Age Five (Spring 2012)

			Unweighted					Weighted		
	Min.	Max.	Mean	Std. Deviation	Skewness (SE)		N	Estimate	Standard Error	Population Size
EOWPVT Standar Score	45	125	85.61	12.29	-0.13	(0.08)	906	85.56	0.76	179,606
PPVT-4 Standard Score	33	134	91.38	12.96	-0.10	(0.08)	906	91.82	0.93	179,565
WJ Letter Word Standard Score	64	153	107.40	12.58	-0.26	(0.08)	904	107.79	0.78	178,616
WJ Spelling Standard Score	30	145	106.01	14.29	-0.88	(0.08)	904	106.18	0.78	178,629
WJ Word Attack Standard Score	67	152	113.57	14.75	-0.35	(0.08)	884	113.81	0.77	174,741
WJ Applied Problems Standard Score	33	134	93.69	14.33	-0.51	(0.08)	898	93.79	0.61	177,232
ECLS-B Response to "count to 20"	1	20	17.34	5.13	-2.00	(0.08)	905	17.23	0.36	179,405

Table 8

Unweighted Pearson's Correlations of Measures of Academic Achievement at the End of Kindergarten (Spring 2012)

	2	3	4	5	6	7
1: EOWPVT Standard Score	.747**	.378**	.352**	.357**	.458**	.055
2: PPVT- 4 Standard Score	--	.379**	.376**	.316**	.527**	.071*
3: WJ Letter Word Standard Score		--	.723**	.757**	.460**	.102**
4: WJ Spelling Standard Score			--	.624**	.477**	.153**
5: WJ Word Attack Standard Score				--	.408**	.066
6: WJ Applied Problems Standard Score					--	.138**
7:ECLS-B Response to "count to 20" item						--

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 9

Unweighted Pearson's Correlations of all Woodcock-Johnson Measures of Academic Achievement at the End of Kindergarten (Spring 2012)

	2	3	4
1: WJ Letter Word Standard Score	.723**	.757**	.460**
2: WJ Spelling Standard Score	--	.624**	.477**
3: WJ Word Attack Standard Score		--	.408**
4: WJ Applied Problems Standard Score			--

**. Correlation is significant at the 0.01 level (2-tailed).

Table 10

Summary of B-Values and P-Values for Backwards Regression Models for Language

	Iteration 1		Iteration 2		Iteration 3		Iteration 4		Iteration 5		Iteration 6		**Iteration 7**	
	R^2 = .25		R^2 = .25		R^2 = .25		R^2 = .25		R^2 = .25		R^2 = .24		**R^2 = .24**	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	**B**	**Sig.**
Intercept	76.41	.00	76.46	.00	76.87	.00	78.08	.00	80.57	.00	80.11	.00	**82.64**	**.00**
Simon Says Score	1.27	.00	1.27	.00	1.29	.00	1.29	.00	1.29	.00	1.34	.00	**1.36**	**.00**
Leiter-R: Attention	0.21	.12	0.24	.02	0.26	.01	0.26	.01	0.26	.01	0.15	.03	**0.17**	**.01**
Leiter-R: org/impulse	0.07	.72	--	--	--	--	--	--	--	--	--	--	--	--
Parent Report of Behavior Prob.	-0.40	.02	-0.39	.02	-0.39	.02	-0.39	.02	-0.42	.01	-0.43	.01	**-0.46**	**.01**
Teacher Report of Behavior Prob.	0.08	.40	0.08	.41	0.08	.39	--	--	--	--	--	--	--	--
Leiter-R: Activity	-0.41	.07	-0.37	.03	-0.32	.06	-0.33	.06	-0.32	.06	--	--	--	--
Parent Report of Social Skills	0.22	.25	0.22	.26	0.22	.26	0.22	.27	--	--	--	--	--	--
Teacher Report of Social Skills	0.24	.02	0.24	.02	0.25	.02	0.20	.05	0.21	.05	0.20	.06	--	--
Leiter-R: Sociability	0.11	.56	0.12	.53	--	--	--	--	--	--	--	--	--	--

Table 11

Summary of B-values and P-values for Backwards Regression Models for Literacy

	Iteration 1		Iteration 2		Iteration 3		Iteration 4		Iteration 5		Iteration 6		Iteration 7		**Iteration 7**	
	R^2 = .05		R^2 = .05		R^2 = .05		R^2 = .05		R^2 = .05		R^2 = .05		R^2 = .05		**R^2 = .04**	
	B	Sig.	B	Sig.	B	Sig.	B	B	Sig.	Sig.	B	Sig.	B	Sig.	**B**	**Sig.**
Intercept	107.62	.00	107.59	.00	107.53	.00	106.75	.00	106.35	.00	106.07	.00	105.10	.00	**108.55**	**.00**
Simon Says Score	-0.01	.80	-0.04	.80	--	--	--	--	--	--	--	--	--	--	--	--
Leiter-R: Attention	0.27	.12	0.26	.05	0.25	.04	0.25	.03	0.23	.04	0.15	.01	0.15	.01	**0.17**	**.01**
Leiter-R: org/impulse	-0.04	.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Parent Report of Behavior Prob.	-0.15	.28	-0.15	.28	-0.14	.34	-0.13	.31	-0.13	.32	-0.13	0.29	--	--	--	--
Teacher Report of Behavior Prob.	-0.28	.05	-0.28	.06	-0.28	.06	-0.28	.06	-0.28	.06	-0.28	0.06	-0.27	.06	**-0.40**	**.01**
Leiter-R: Activity	-0.19	.63	-0.20	.53	-0.19	.53	-0.19	.53	-0.22	.44	--	--	--	--	--	--
Parent Report of Social Skills	-0.06	.77	-0.07	.78	-0.07	.76	--	--	--	--	--	--	--	--	--	--
Teacher Report of Social Skills	0.21	.16	0.21	.16	0.21	.16	0.20	.16	0.20	.19	0.20	.019	0.21	0.16	--	--
Leiter-R: Sociability	-0.08	.67	-0.09	.63	-0.10	.58	-0.10	.57	--	--	--	--	--	--	--	--

Table 12

Summary of B-values and P-values for Backwards Regression Models for Mathematics

	Iteration 1		Iteration 2		Iteration 3		Iteration 4		Iteration 5		**Iteration 6**	
	R^2 = .11		R^2 = .11		R^2 = .11		R^2 = .11		R^2 = .11		**R^2 = .11**	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	**B**	**Sig.**
Intercept	86.68	.00	86.54	.00	86.54	.00	86.15	.00	86.15	.00	**84.70**	**.00**
Simon Says Score	0.65	.00	0.65	.00	0.66	.00	0.65	.00	0.65	.00	**0.64**	**.00**
Leiter-R: Attention	0.13	.52	0.13	.52	0.13	.54	0.12	.55	0.21	.00	**0.21**	**.00**
Leiter-R: org/impulse	0.20	.47	0.20	.47	0.20	.51	0.14	.60	--	--	--	--
Parent Report of Behavior Prob.	-0.51	.00	-0.51	.00	-0.51	.00	-0.50	.00	-0.50	.00	**-0.48**	**.00**
Teacher Report of Behavior Prob.	-0.01	.95	--	--	--	--	--	--	--	--	--	--
Leiter-R: Activity	-0.09	.79	-0.09	.79	--	--	--	--	--	--	--	--
Parent Report of Social Skills	-0.14	.45	-0.14	.45	-0.14	.45	-0.14	.45	-0.14	.44	--	--
Teacher Report of Social Skills	0.40	.00	0.40	.00	0.40	.00	0.40	.00	0.40	00	**0.39**	**.00**
Leiter-R: Sociability	-0.09	.71	-0.09	.71	-0.10	.65	--	--	--	--	--	--

Table 13

Summary of B-values and P-values for Moderation Analysis for Language

	Simon Says		**Attention**		**Parent Report of Behavior Problems**	
	B	sig	B	sig	B	sig
Predictor	1.81	ns	0.71	ns	-0.34	ns
Parental Warmth	0.53	ns	0.71	ns	-0.51	ns
Interaction	-0.60	ns	-0.09	ns	-0.09	ns
R^2	.21		.04		.05	
Predictor	**3.92**	**p = .00**	0.40	ns	-0.18	ns
Parental Energy	-0.27	p = .66	1.78	p = .03	0.70	ns
Interaction	**-0.59**	**p = .00**	-0.02	ns	-0.13	ns
R^2	**.22**		.05		.06	
Predictor	2.29	ns	0.02	ns	-1.34	ns
Authoritative	-1.92	ns	-1.62	ns	-1.23	ns
Interaction	-0.21	ns	0.08	ns	0.18	ns
R^2	.22		.05		.06	
Predictor	**2.58**	**p = .00**	**0.64**	**p = .01**	**-1.77**	**p = .00**
Authoritarian	**-1.09**	**p = .19**	**-1.53**	**p = .06**	**-0.93**	**p = .18**
Interaction	**-0.46**	**p = .04**	**-0.15**	**p = .05**	**0.44**	**p = .05**
R^2	**.22**		**.06**		**.06**	

Table 14

Summary of B-values and P-values for Moderation Analysis for Literacy

	Attention		**Parent Report of Behavior Problems**	
	B	sig	B	sig
Predictor	0.27	ns	0.61	ns
Parental Warmth	0.15	ns	-0.00	Ns
Interaction	0.01	ns	-0.25	ns
R^2	.02		.03	
Predictor	-0.24	ns	-0.32	Ns
Parental Energy	0.95	ns	0.77	Ns
Interaction	0.12	ns	-0.04	Ns
R^2	.03		.03	
Predictor	-0.09	ns	-0.80	ns
Authoritative	-0.24	ns	0.02	ns
Interaction	0.09	ns	0.09	ns
R^2	.02		.03	
Predictor	-0.12	ns	-0.10	ns
Authoritarian	-0.22	ns	-0.17	ns
Interaction	0.04	ns	0.25	ns
R^2	.02		.03	

Table 15

Summary of B-values and P-values for Moderation Analysis for Mathematics

	Simons Says		**Attention**		**Parent Report of Behavior Problems**		**Teacher Report of Social Skills**	
	B	sig	B	Sig	B	sig	B	sig
Predictor	1.31	ns	1.01	Ns	-0.25	ns	1.14	ns
Parental Warmth	0.95	ns	1.18	Ns	0.06	ns	1.01	ns
Interaction	-0.08	ns	-0.15	Ns	-0.10	ns	-0.13	ns
R^2	.06		.04		.03		.04	
Predictor	1.17	ns	0.26	ns	-0.45	ns	-0.31	ns
Parental Energy	0.19	ns	1.40	ns	0.26	ns	1.00	ns
Interaction	-0.06	ns	0.02	ns	-0.06	ns	0.22	ns
R^2	.06		.04		.03		.05	
Predictor	1.82	ns	-0.40	ns	**-2.90**	**p = .01**	0.86	ns
Authoritative	1.46	ns	1.74	ns	**2.16**	**p = .03**	1.85	ns
Interaction	-0.25	ns	**0.22**	**p = .04**	**0.63**	**p = .04**	-0.07	ns
R^2	.06		**.05**		**.04**		.05	
Predictor	0.23	ns	0.17	ns	-0.81	ns	0.40	ns
Authoritarian	-0.12	ns	-0.05	ns	-0.02	ns	-0.87	ns
Interaction	0.32	ns	0.08	ns	0.05	ns	0.10	ns
R^2	.06		.04		.04		.05	

Appendix B

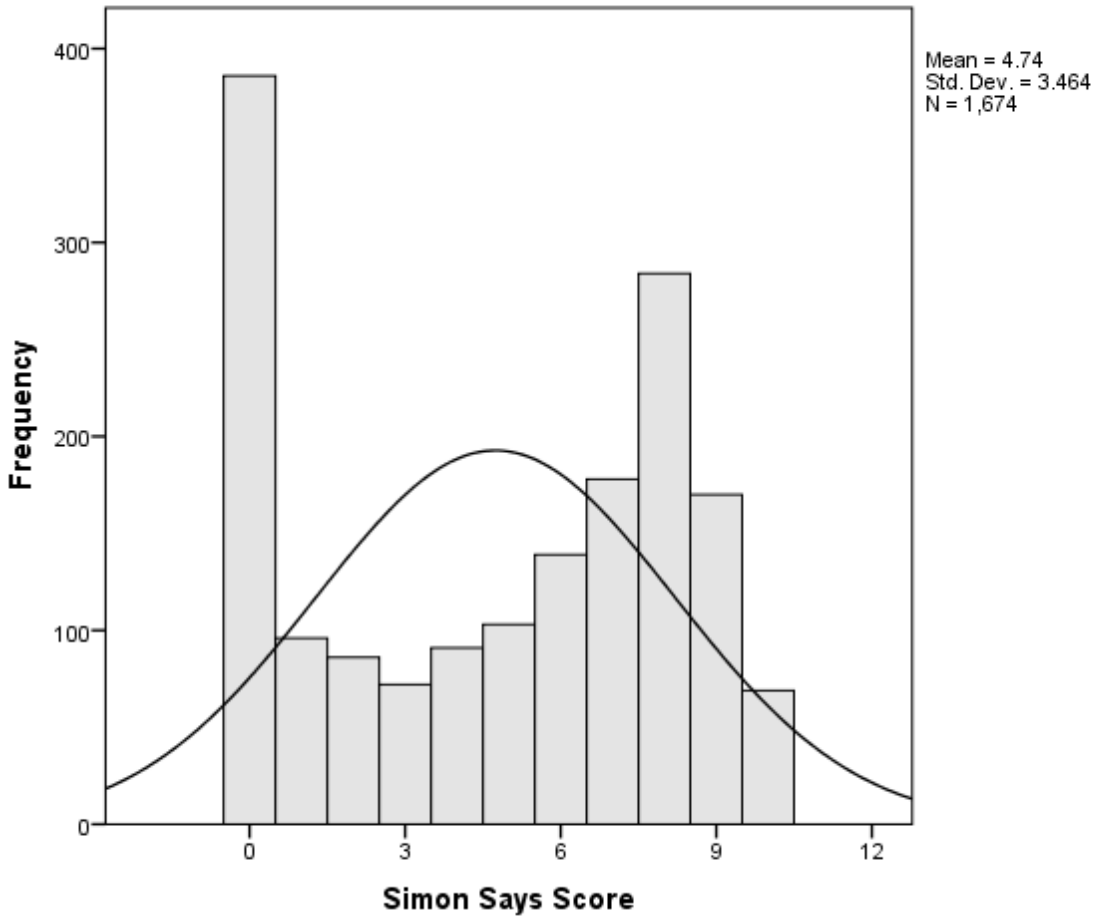

Figure 1. Frequency Distribution of Simon Says passes for Three Year Olds.

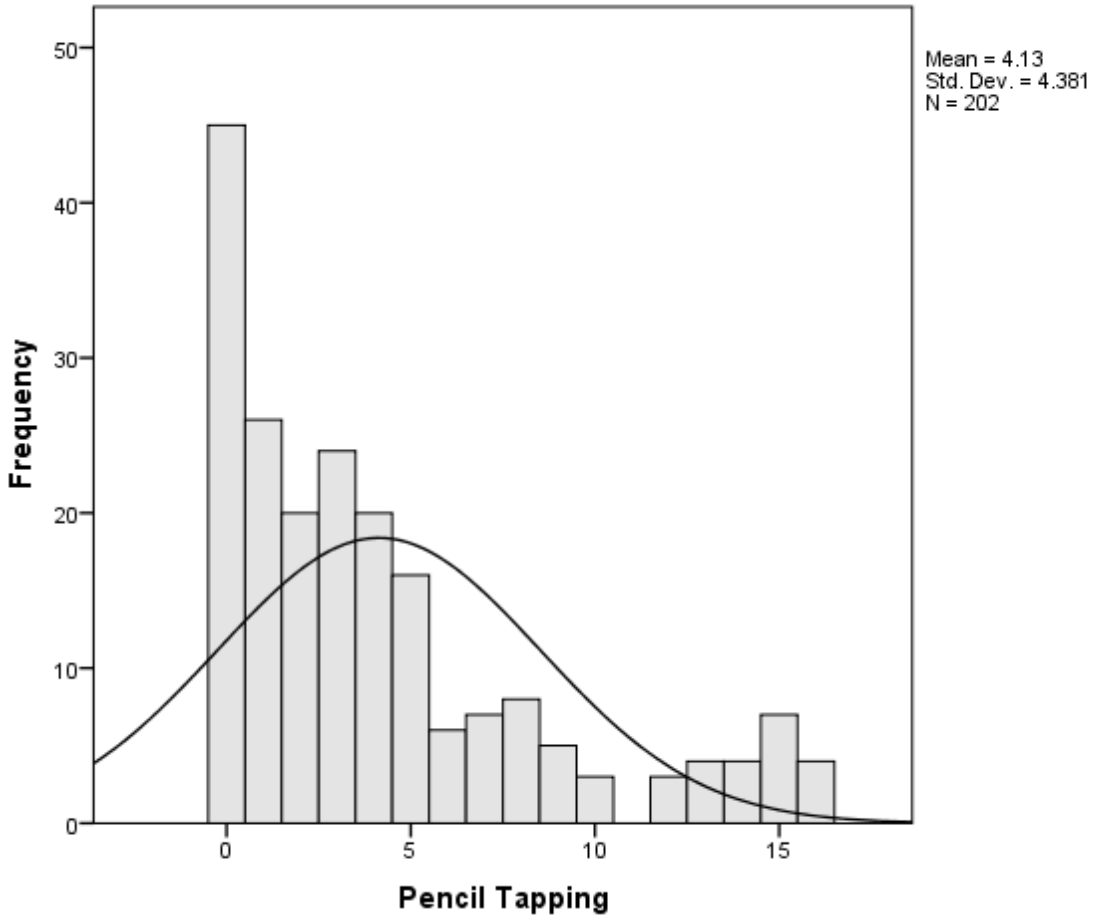

Figure 2. Frequency Distribution of Pencil Tapping passes for Three Year Olds.

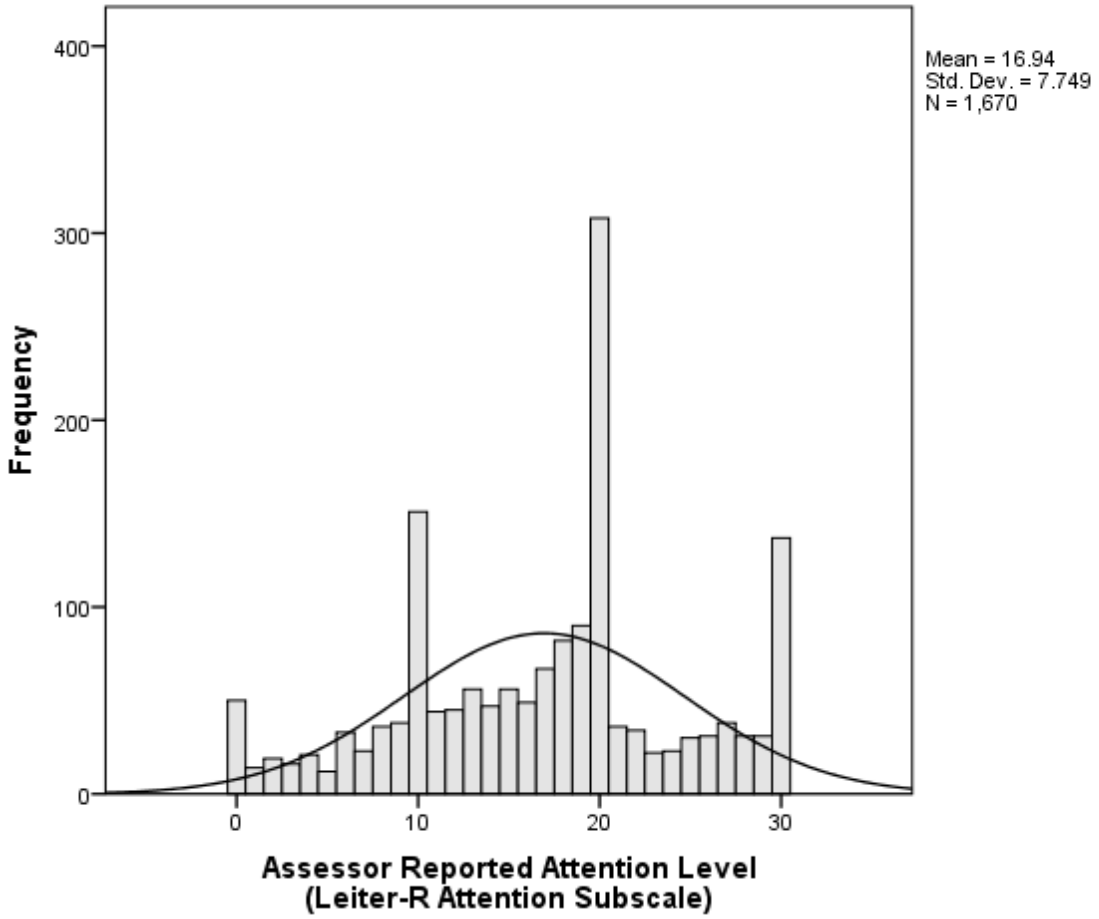

Figure 3. Frequency Distribution of the Leiter-R Attention Subscale for Three Year Olds.

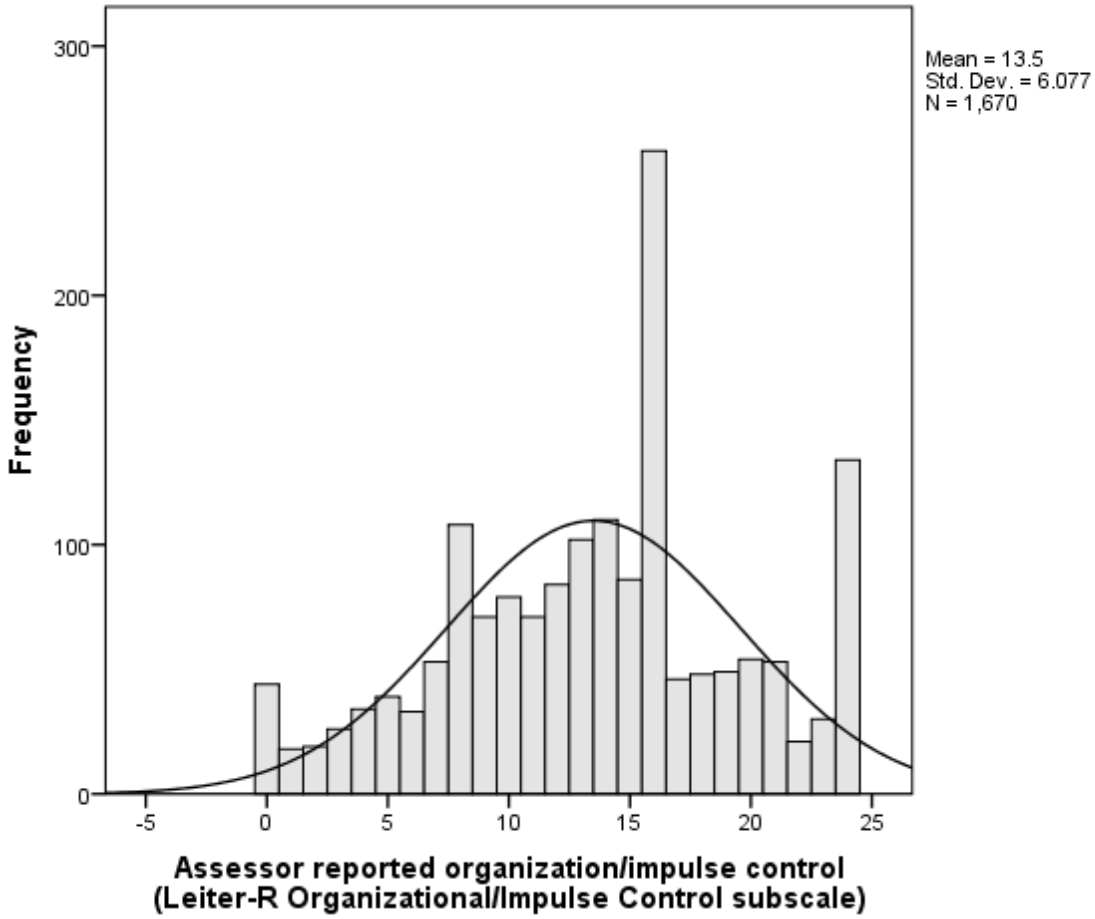

Figure 4. Frequency Distribution of the Leiter-R Organization/Impulse Control subscale for Three Year Olds.

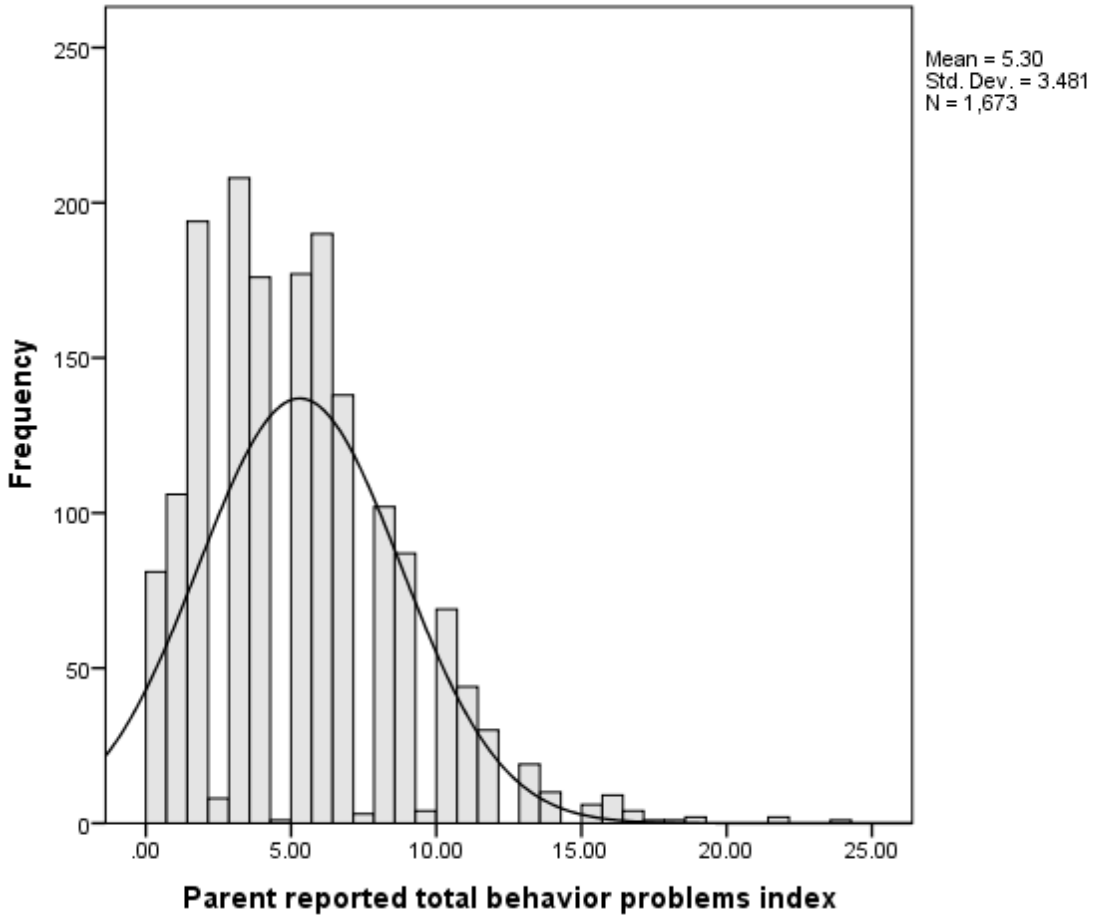

Figure 5. Frequency Distribution of Parent Reports of Behavior Problems for Three Year Olds.

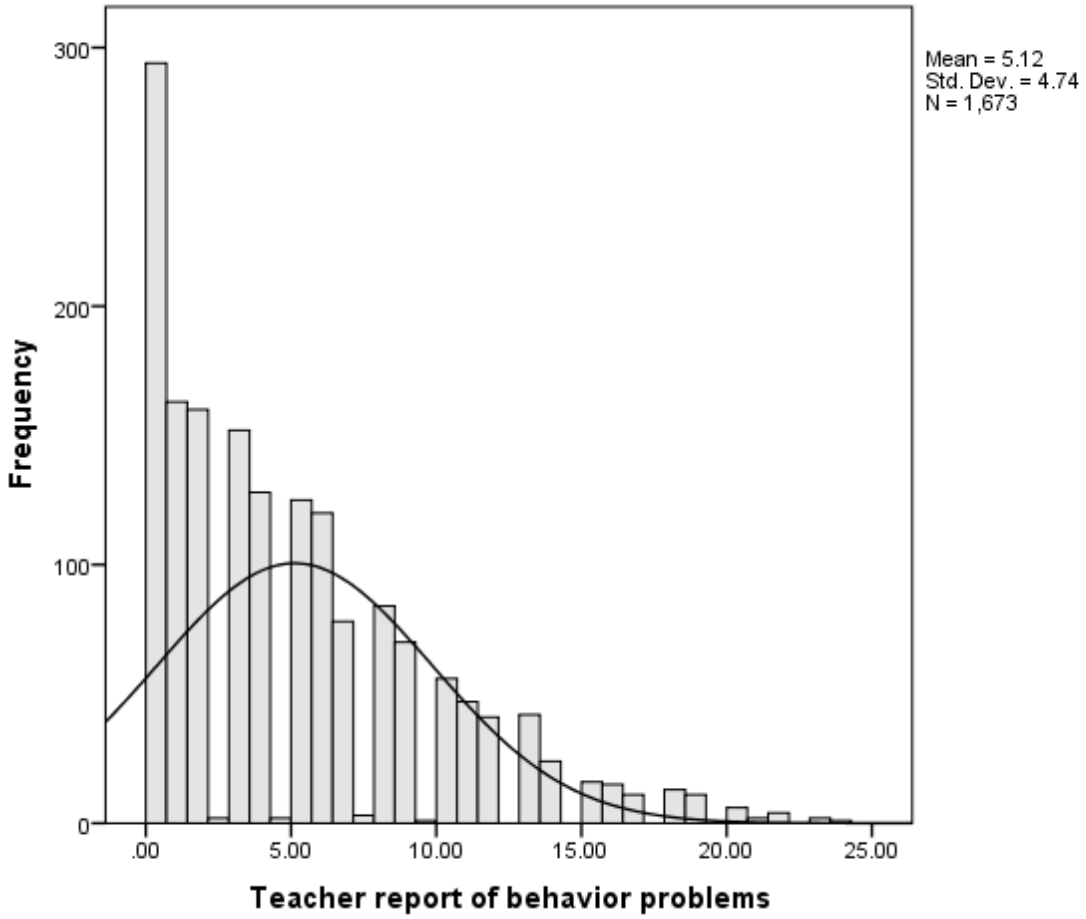

Figure 6. Frequency Distribution of Teacher Report of Behavior Problems for Three Year Olds.

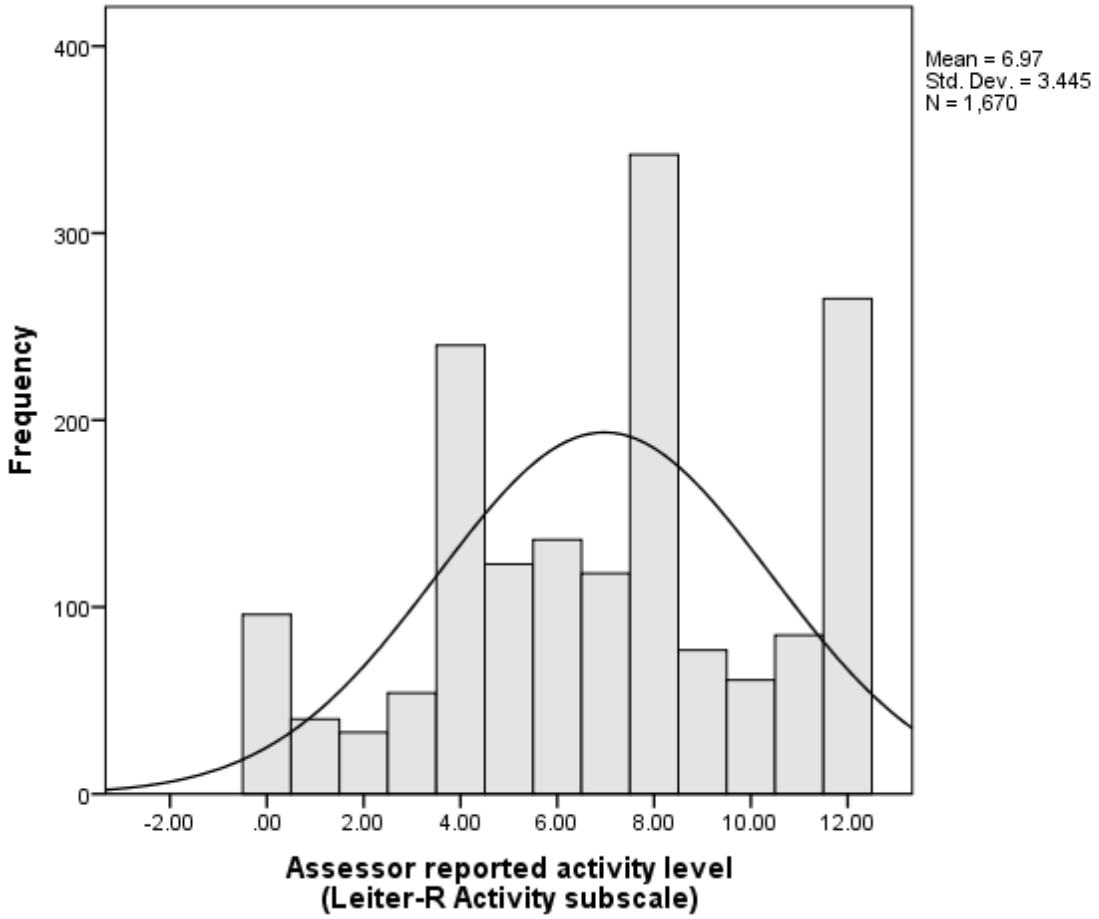

Figure 7. Frequency Distribution of the Leiter-R Activity subscale for Three Year Olds.

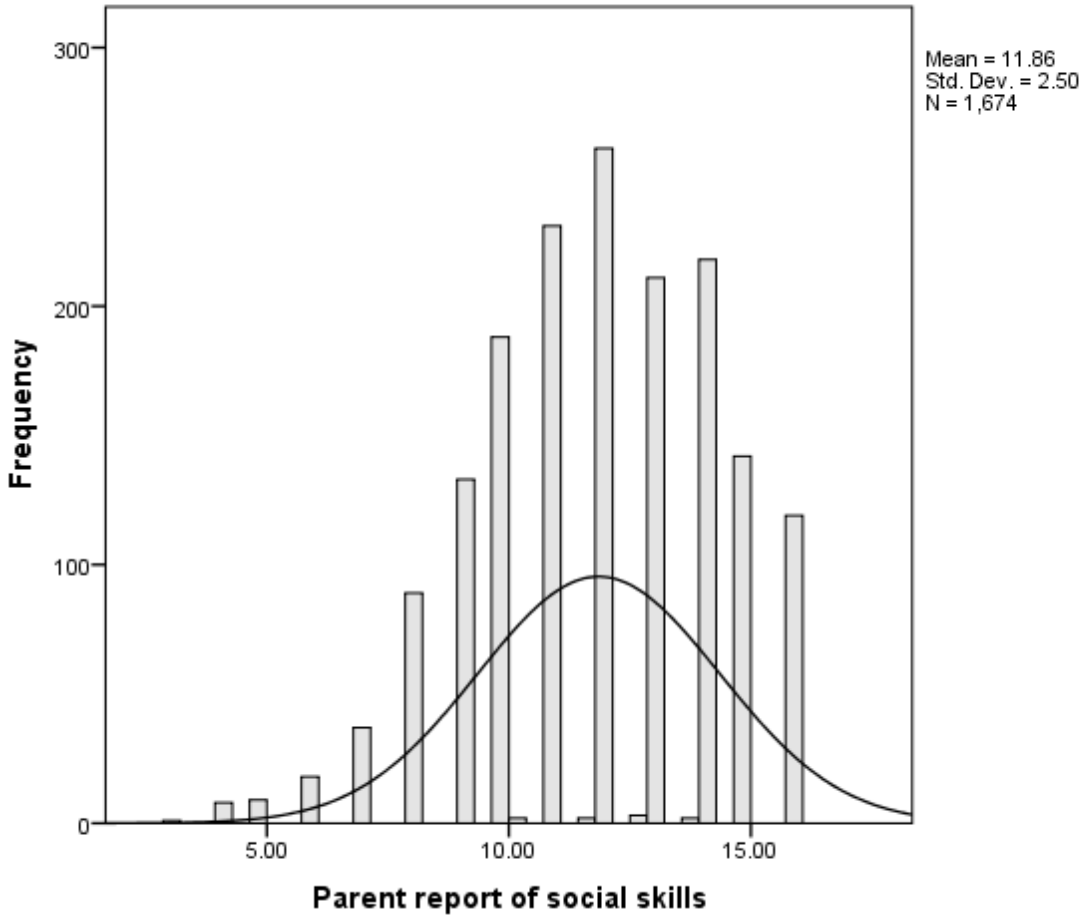

Figure 8. Frequency Distribution of the Parent Report of Social Skills for Three Year Olds.

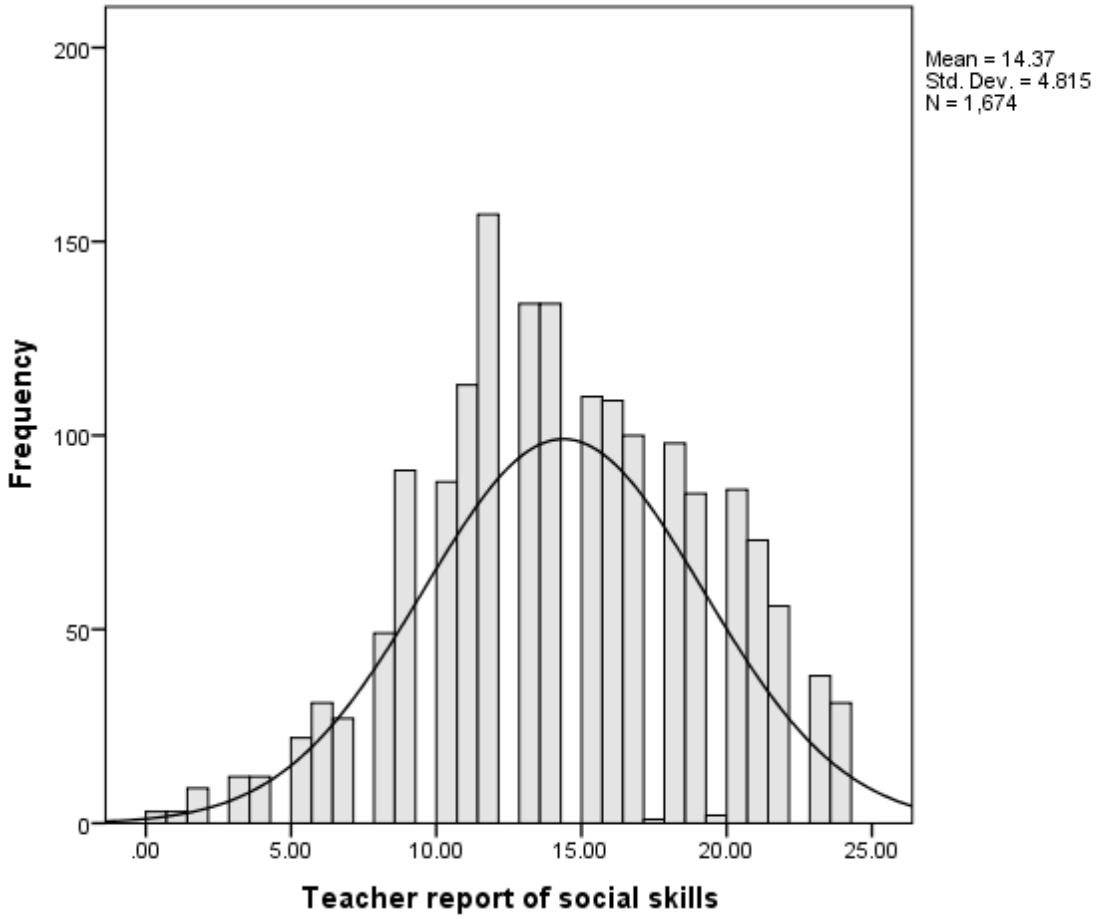

Figure 9. Frequency Distribution of Teacher Report of Social Skills for Three Year Olds.

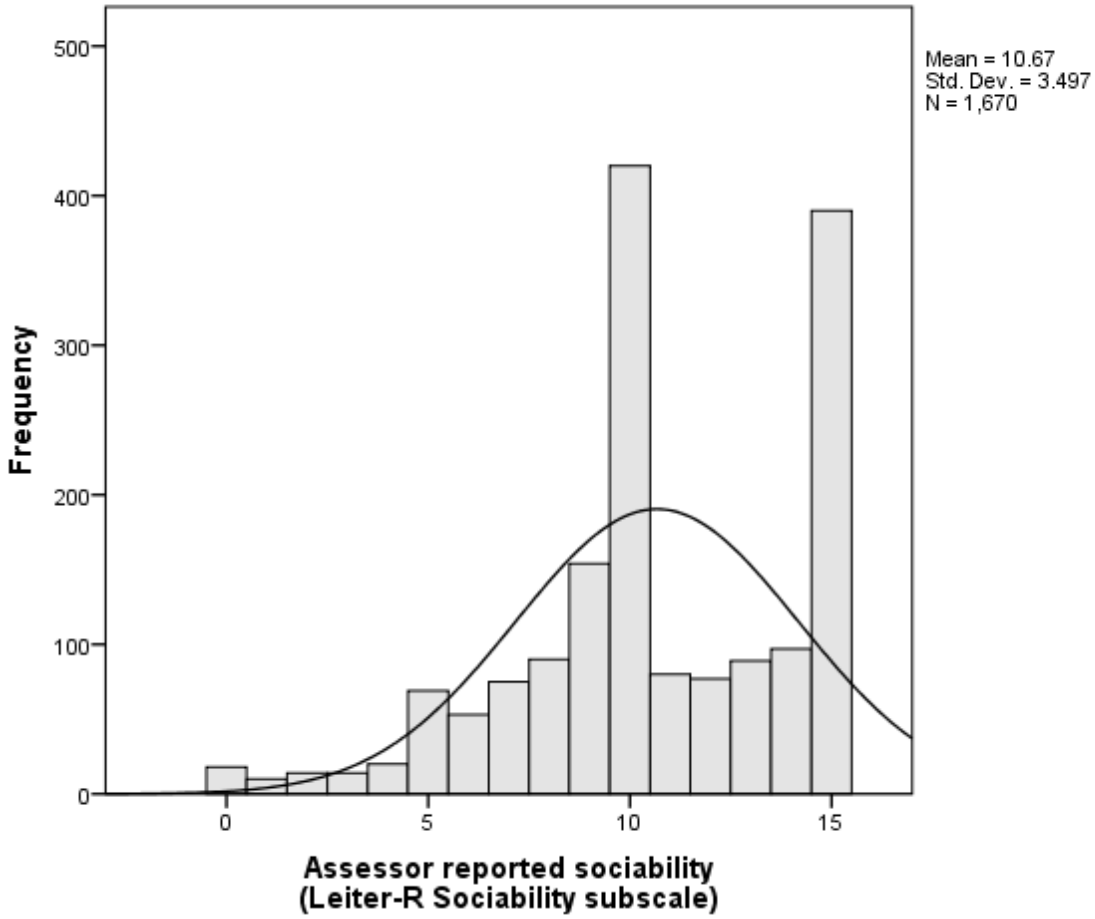

Figure 10. Frequency Distribution of the Leiter-R Sociability Subscale for Three Year Olds.

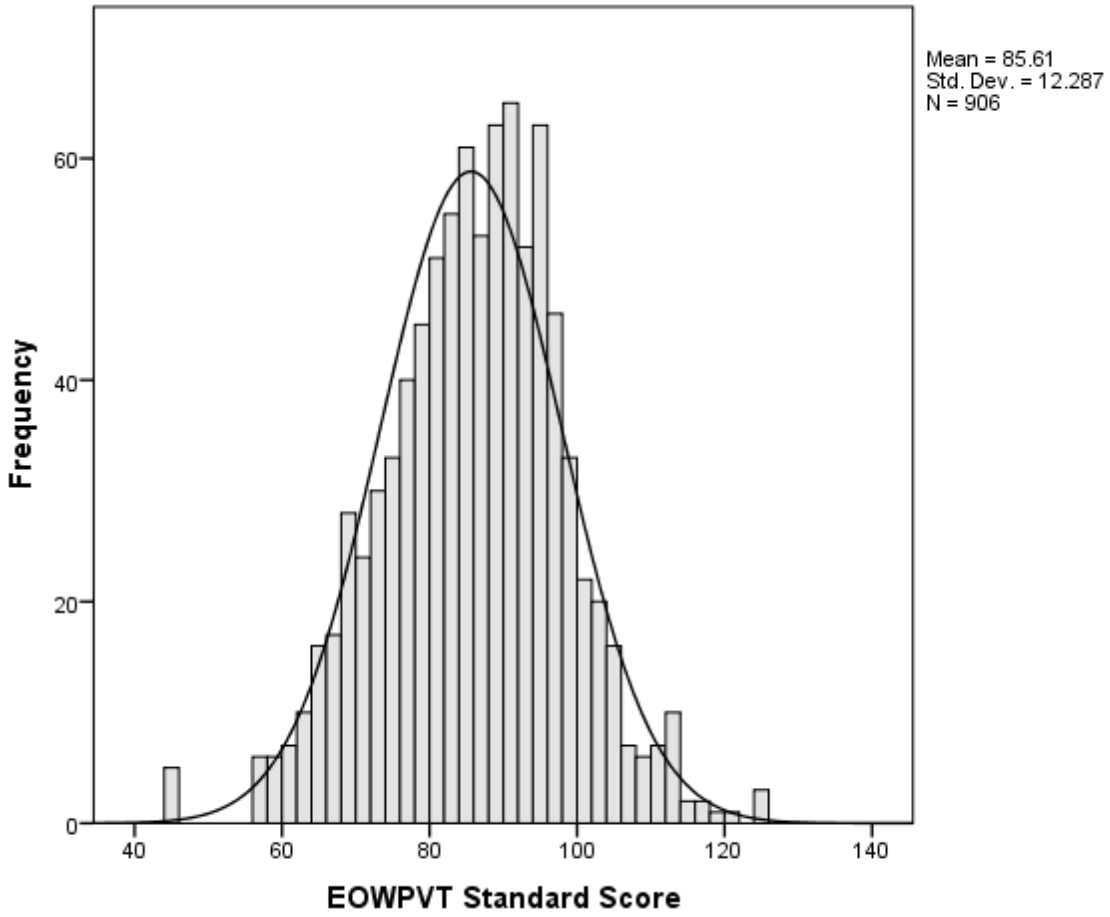

Figure 11. Frequency Distribution of the Expressive one Word Picture Vocabulary Test for five year olds.

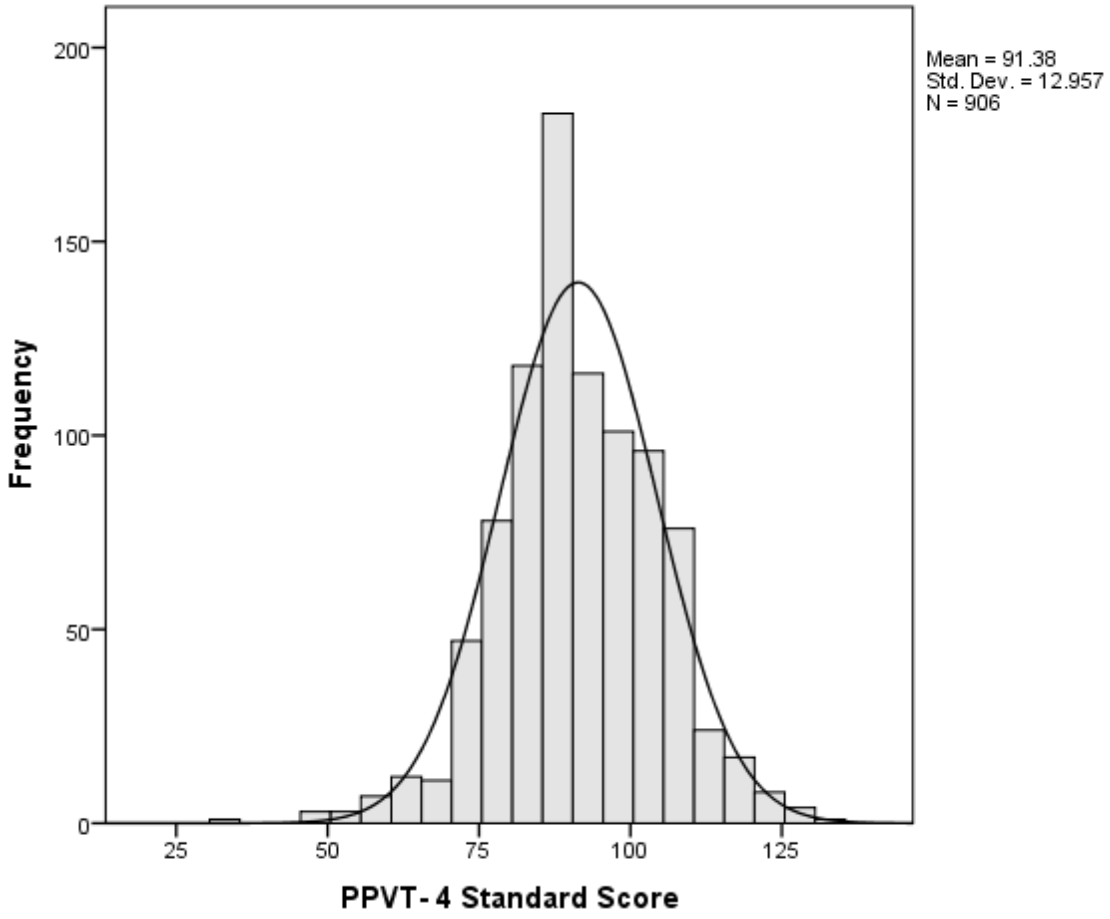

Figure 12. Frequency Distribution of the Peabody Picture Vocabulary Test for five year olds.

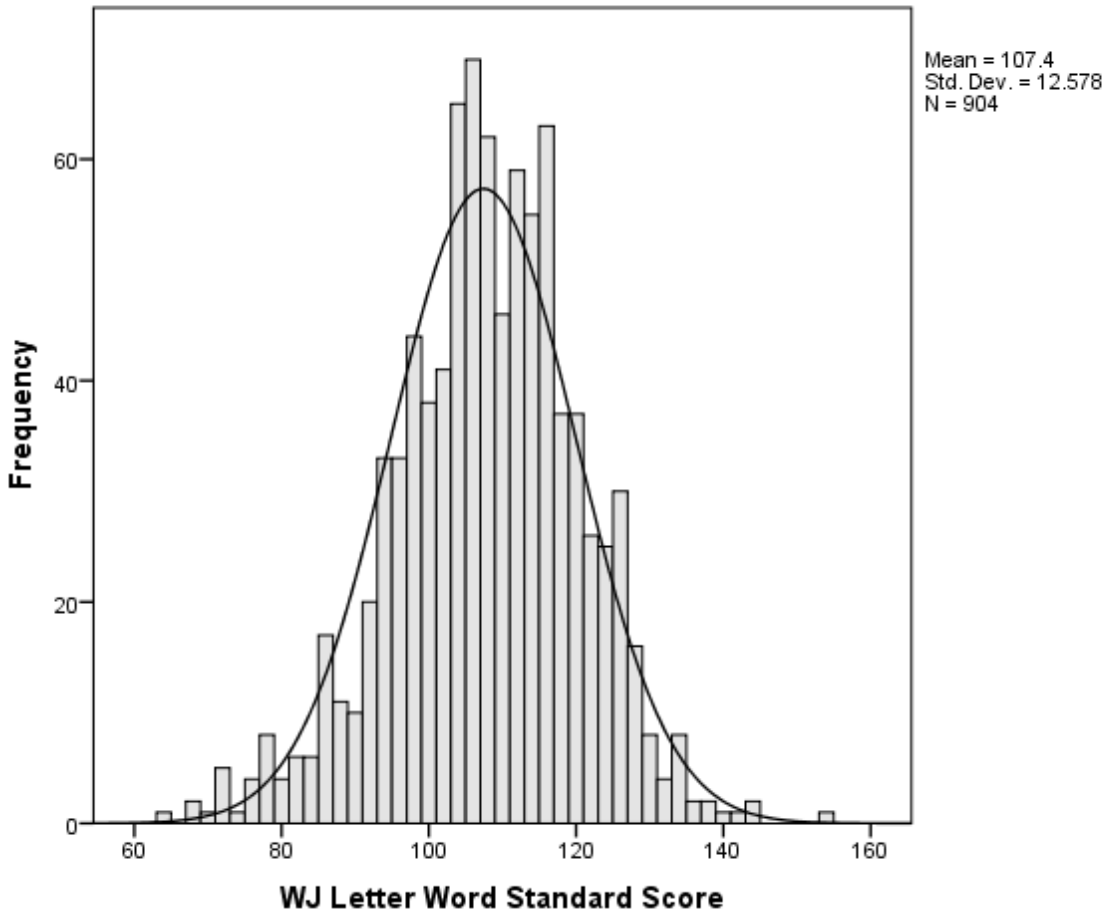

Figure 13. Frequency Distribution of the Woodcock Johnson Letter Word Score for five year olds.

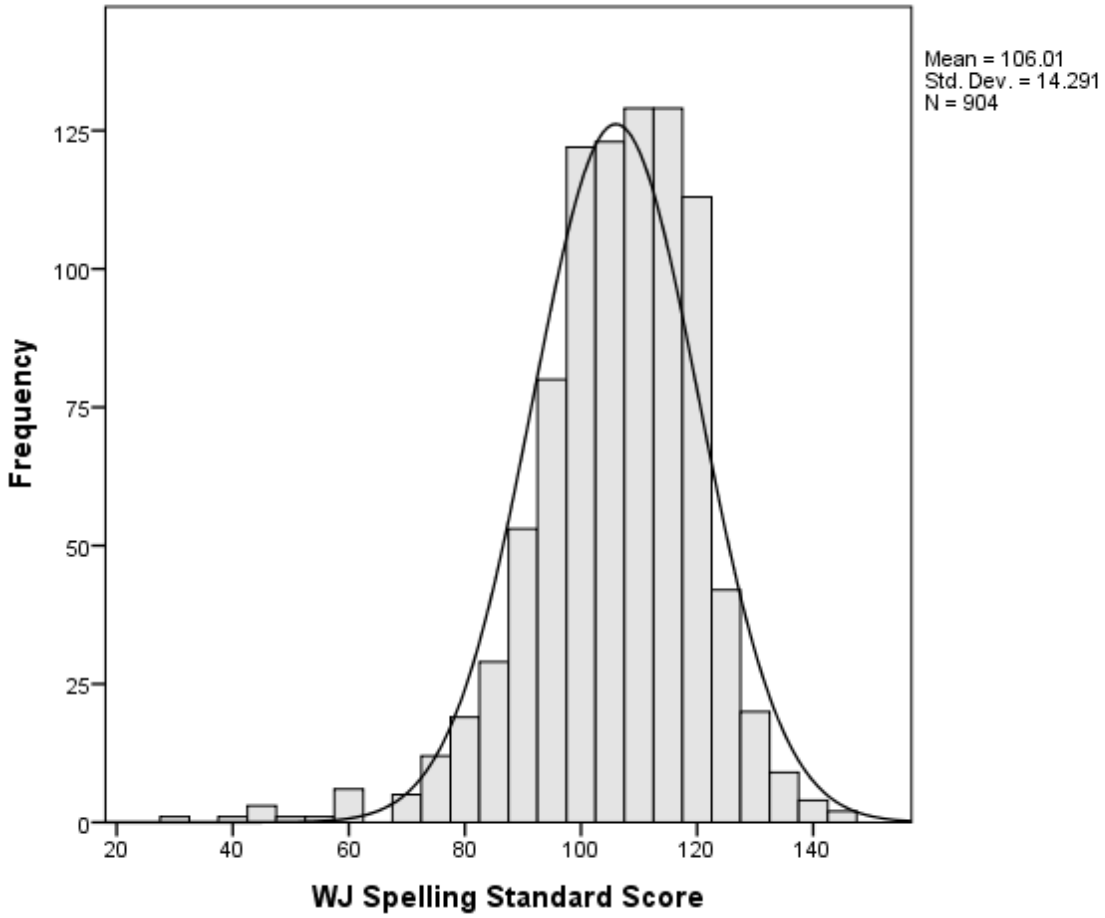

Figure 14. Frequency Distribution of the Woodcock Johnson Spelling Score for five year olds.

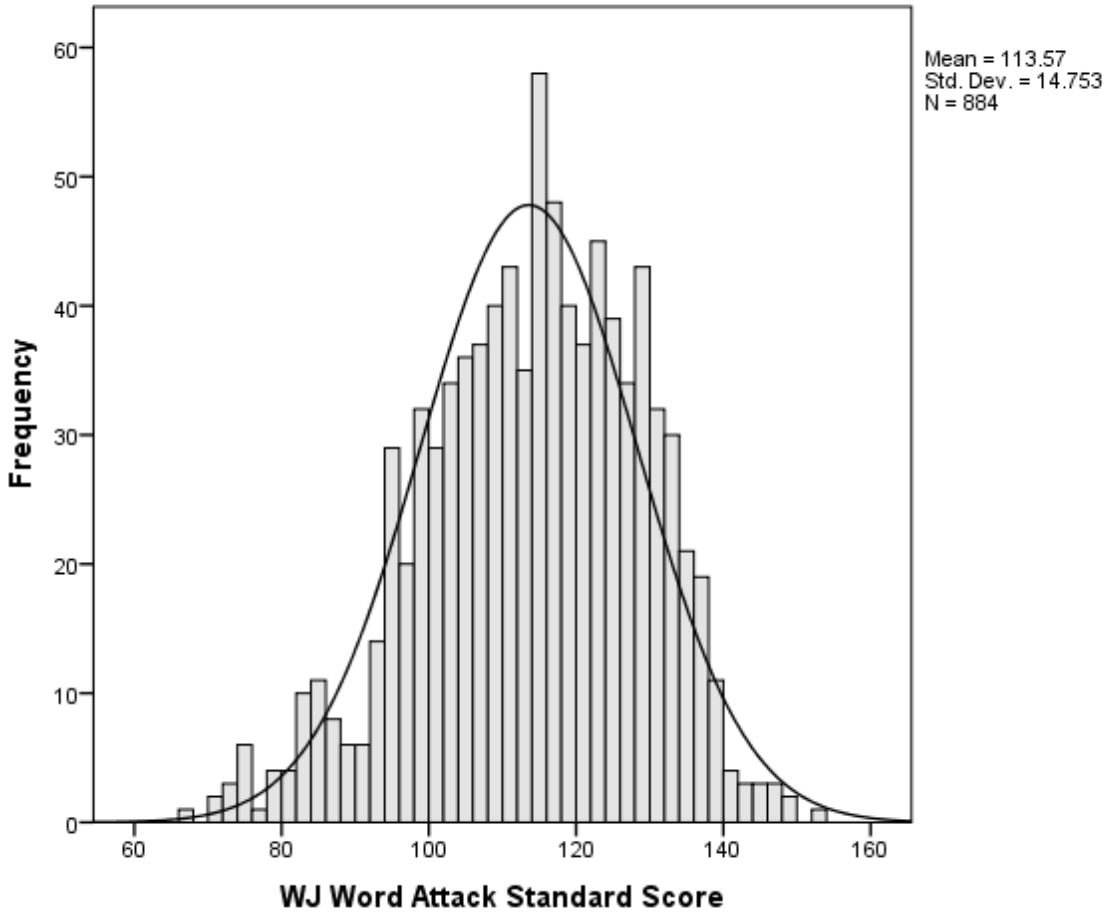

Figure 15. Frequency Distribution of the Woodcock Johnson Word Attack Score for five year olds.

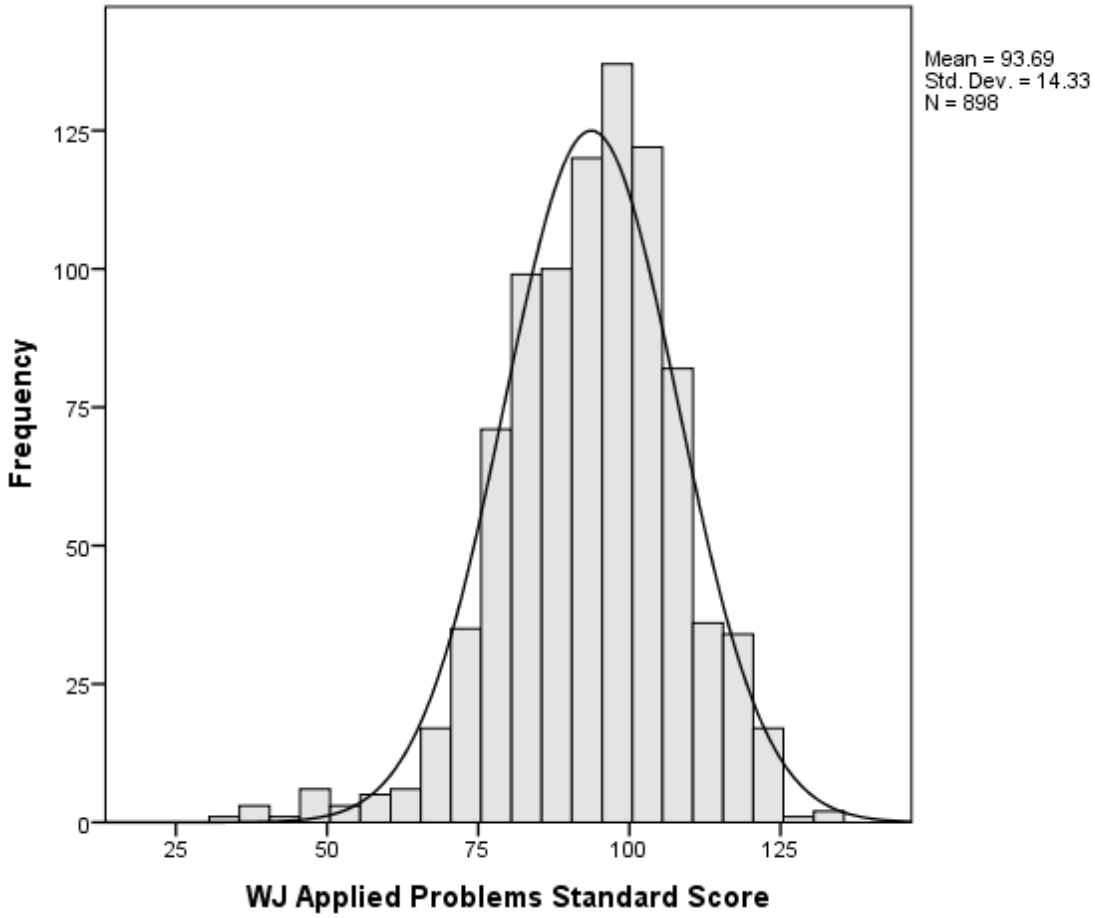

Figure 16. Frequency Distribution of the Woodcock Johnson Applied Problems Score for five year olds.

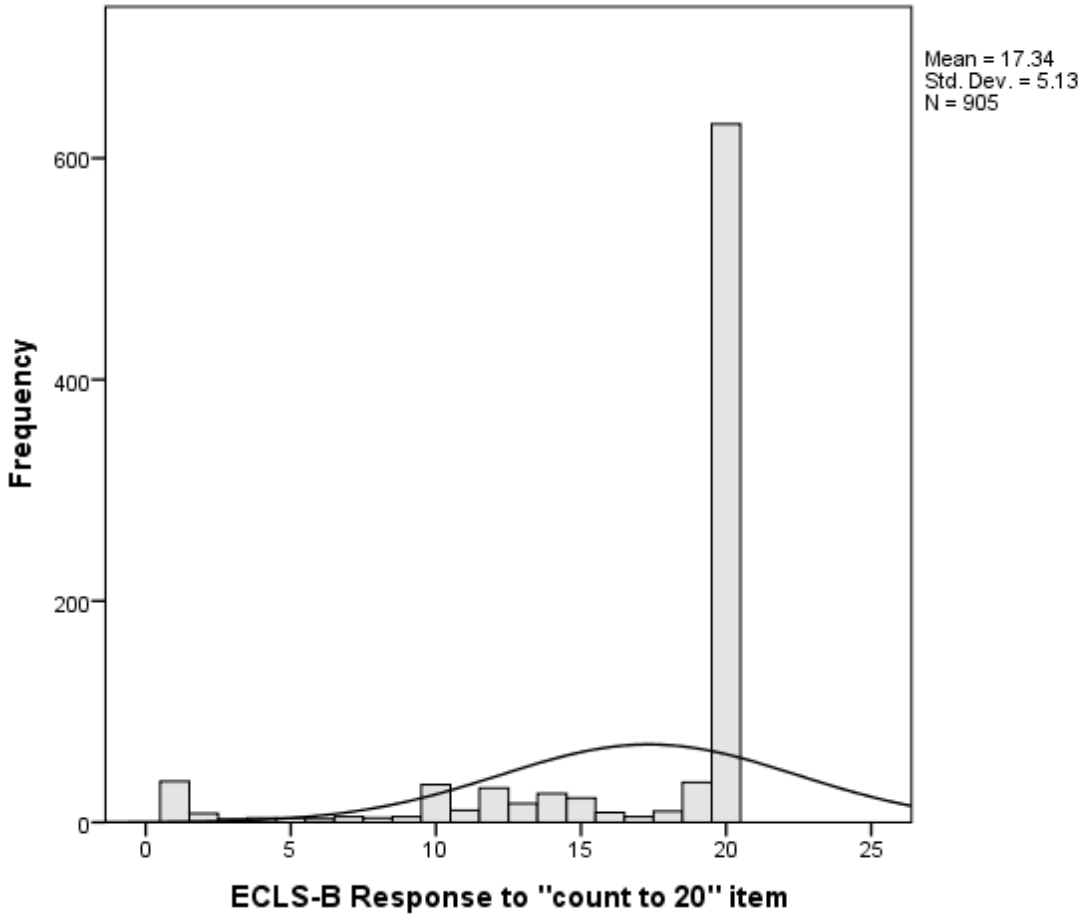

Figure 17. Frequency Distribution of the ECLS Mathematics Score for five year olds.

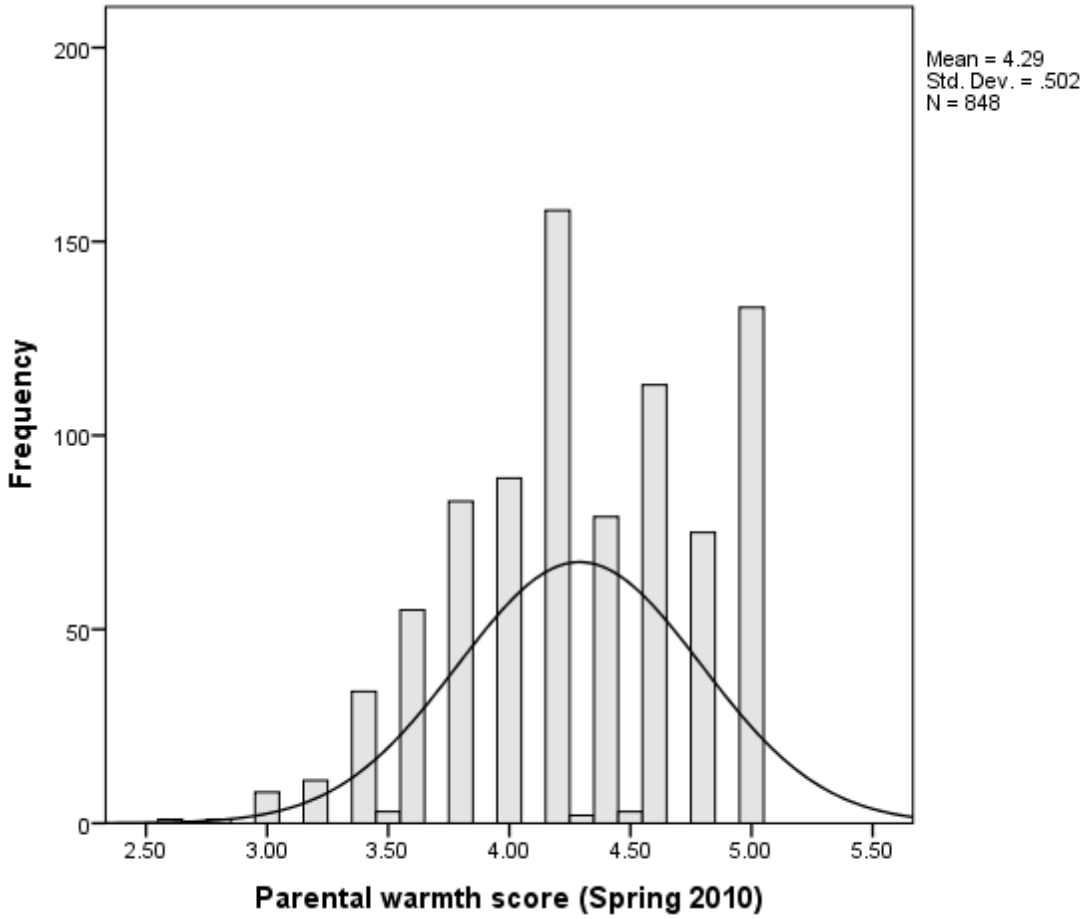

Figure 18. Frequency Distribution of the parental warmth score for parents during the Spring 2010 data collection.

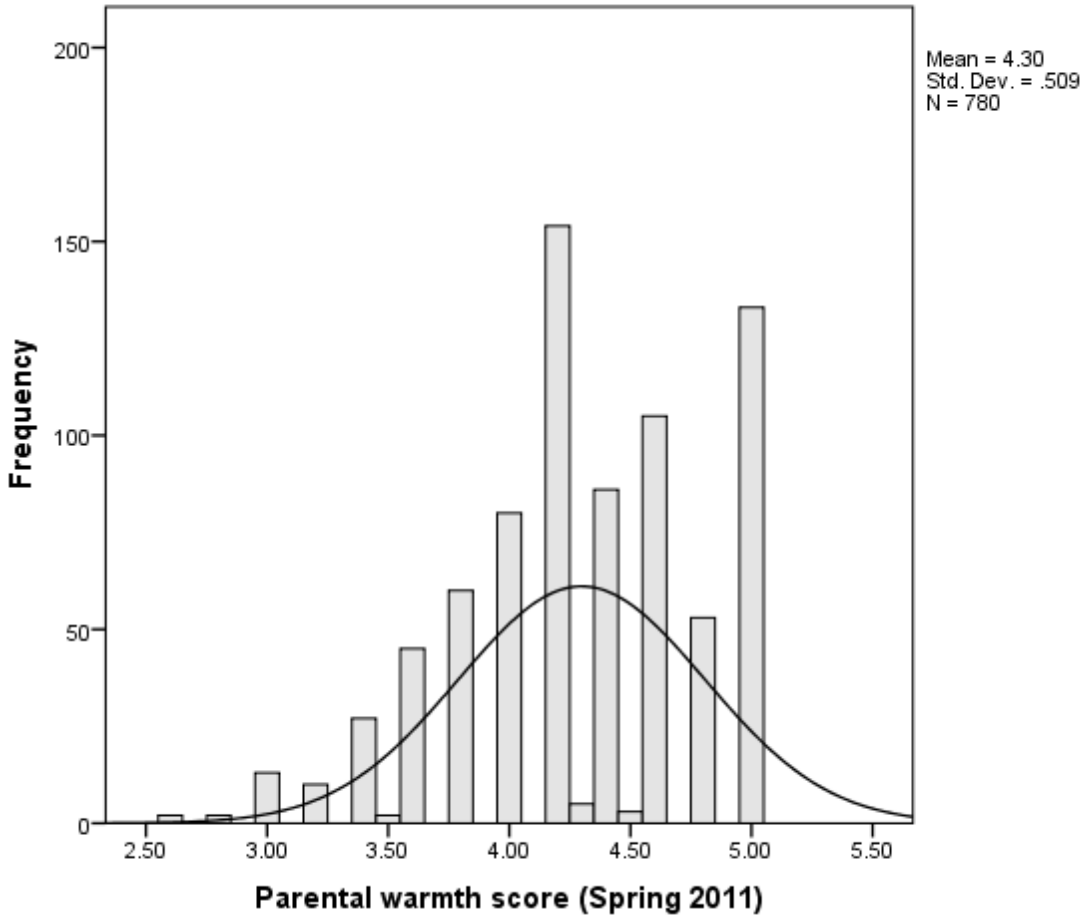

Figure 19. Frequency Distribution of the parental warmth score for parents during the Spring 2011 data collection.

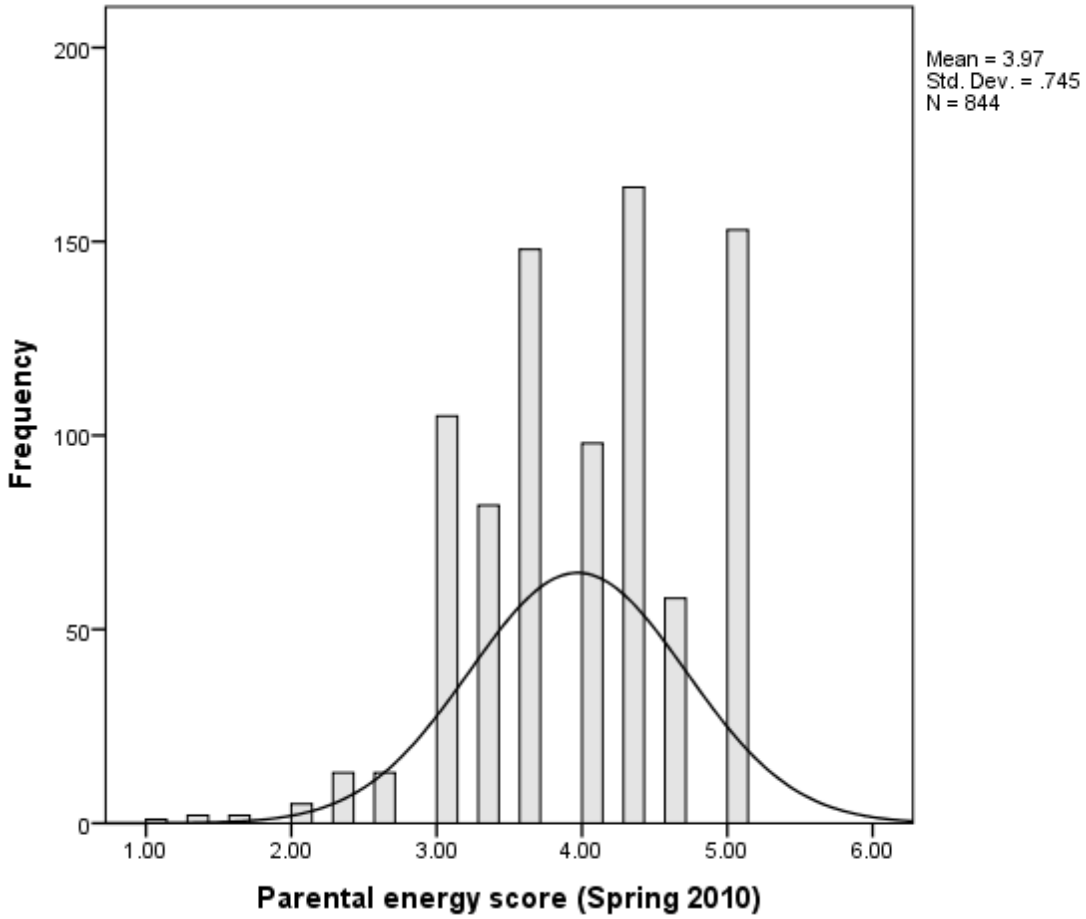

Figure 20. Frequency Distribution of the parental energy score for parents during the Spring 2010 data collection.

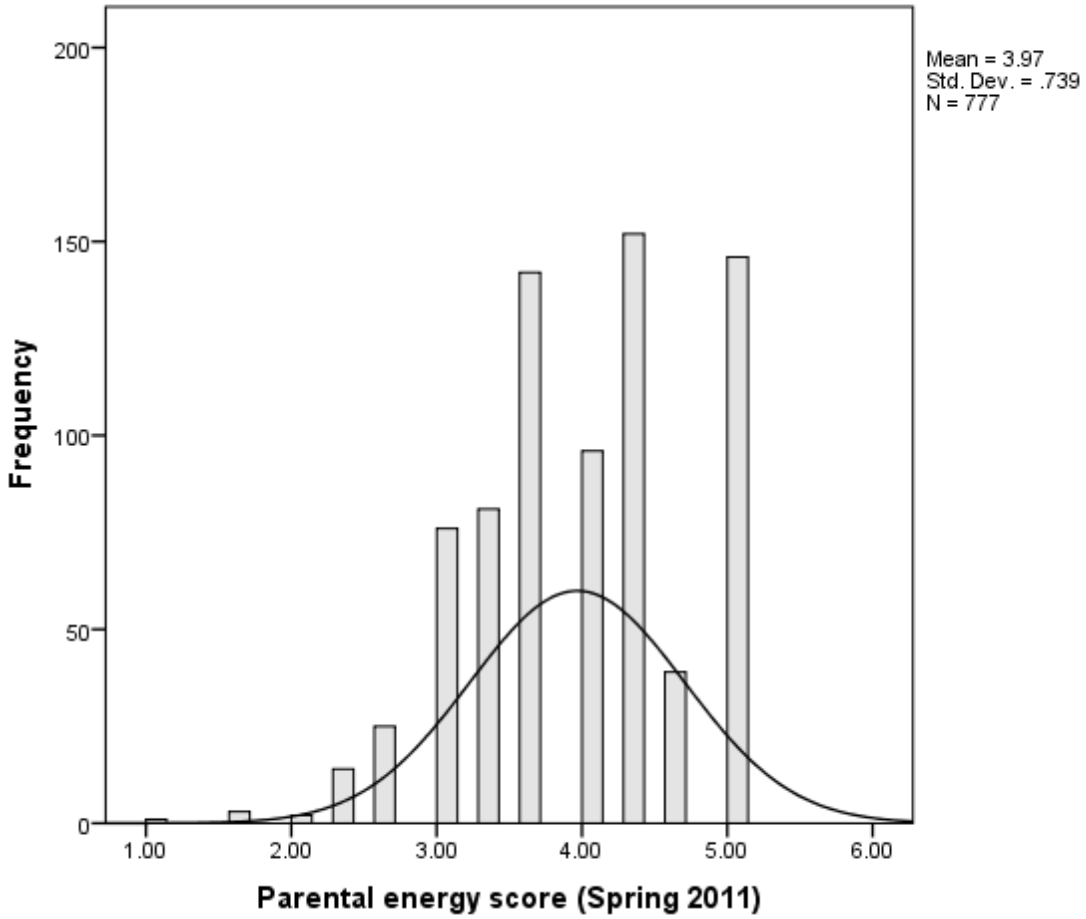

Figure 21. Frequency Distribution of the parental energy score for parents during the Spring 2011 data collection.

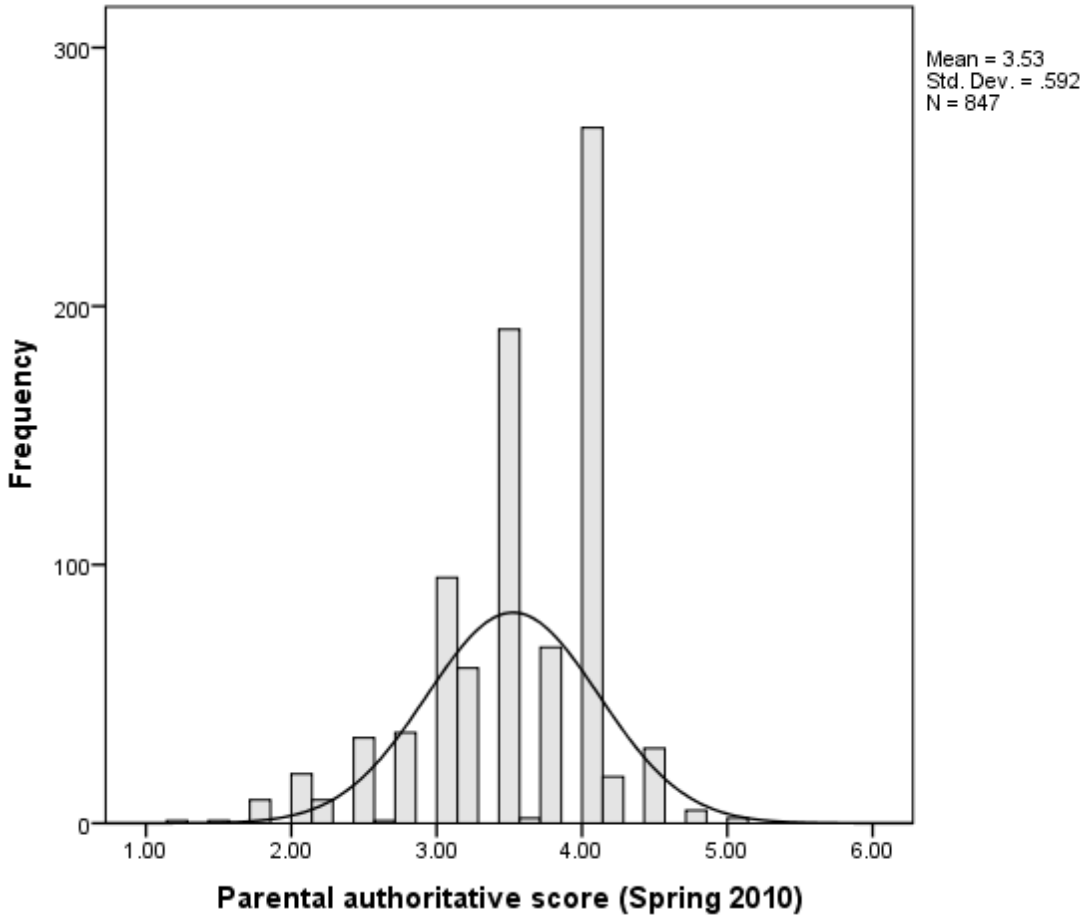

Figure 22. Frequency Distribution of the parental authoritative score for parents during the Spring 2010 data collection.

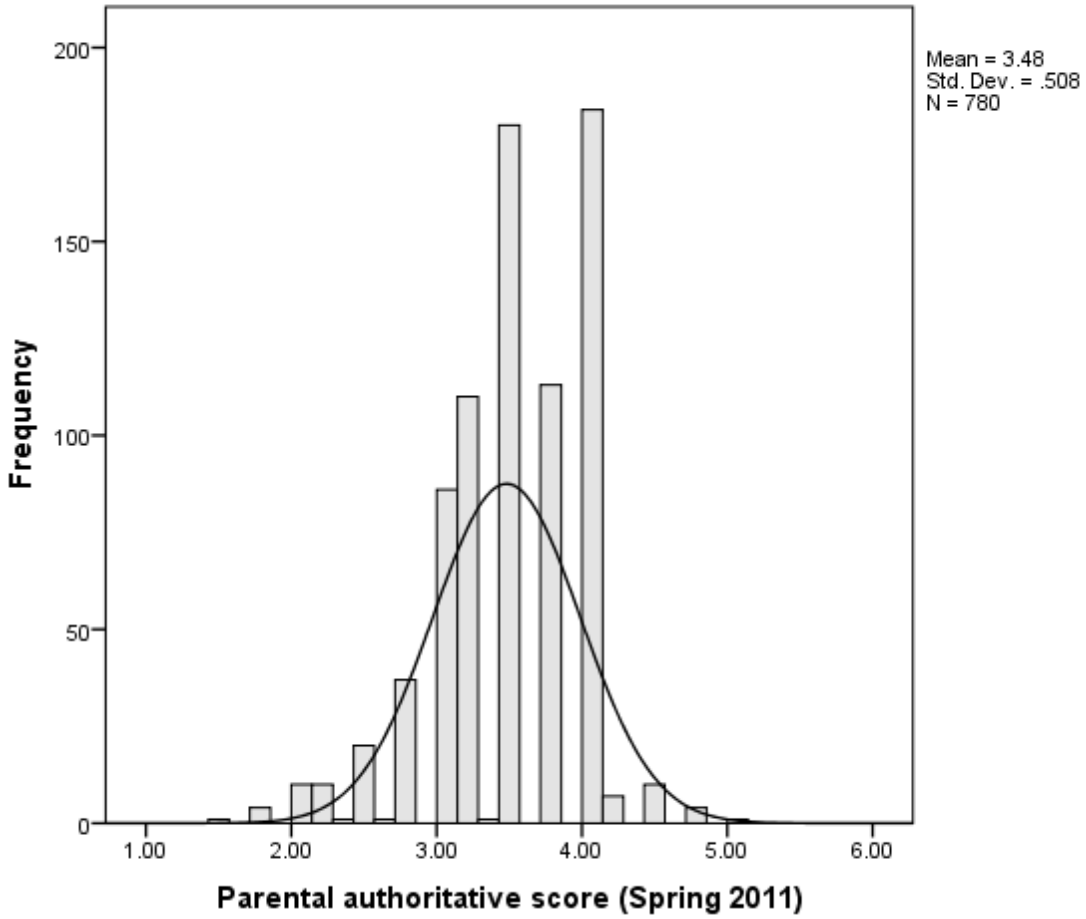

Figure 23. Frequency Distribution of the parental authoritative score for parents during the Spring 2011 data collection.

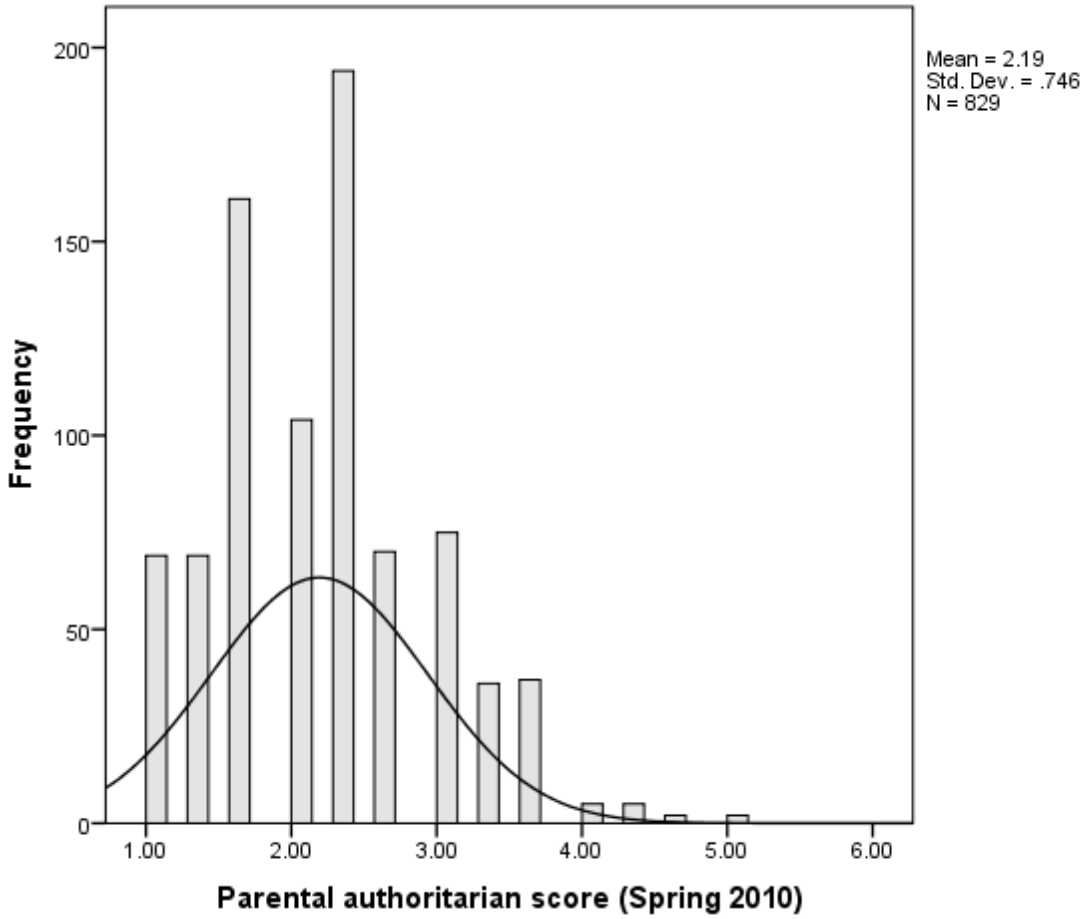

Figure 24. Frequency Distribution of the parental authoritarian score for parents during the Spring 2010 data collection.

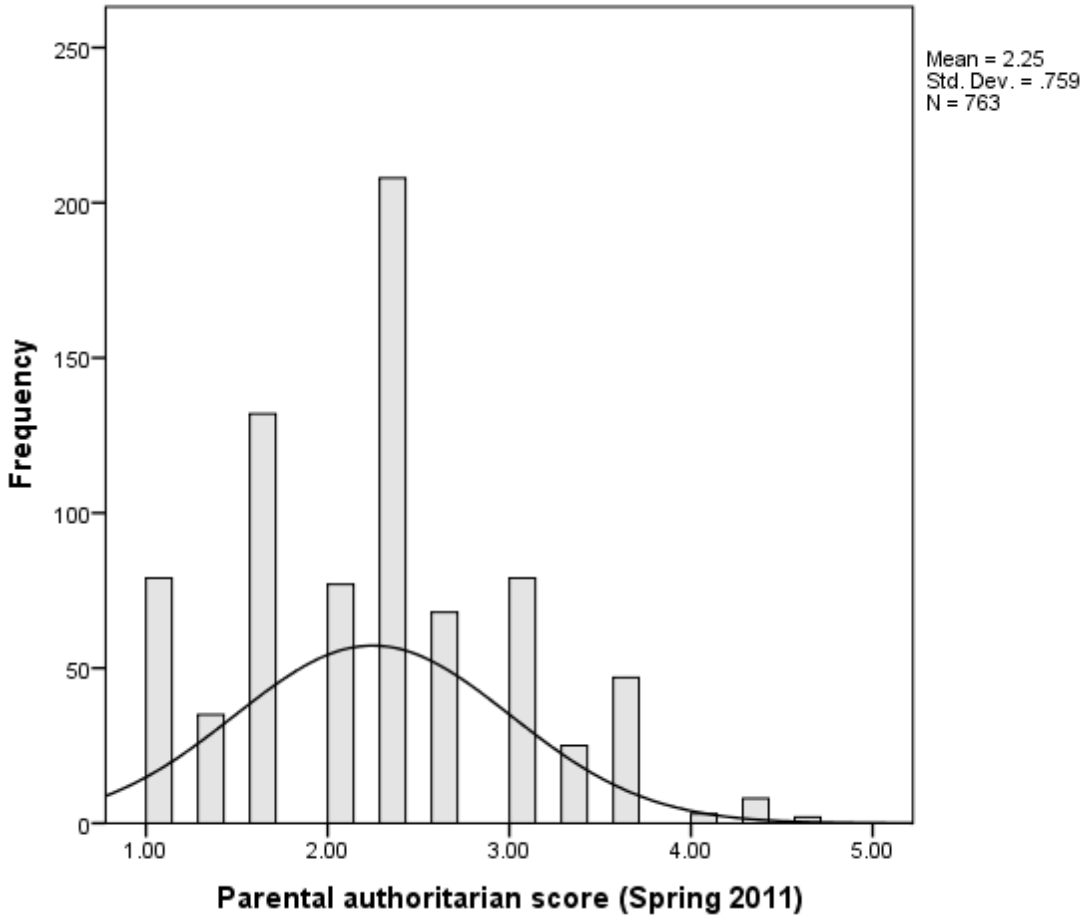

Figure 25. Frequency Distribution of the parental authoritarian score for parents during the Spring 2011 data collection.

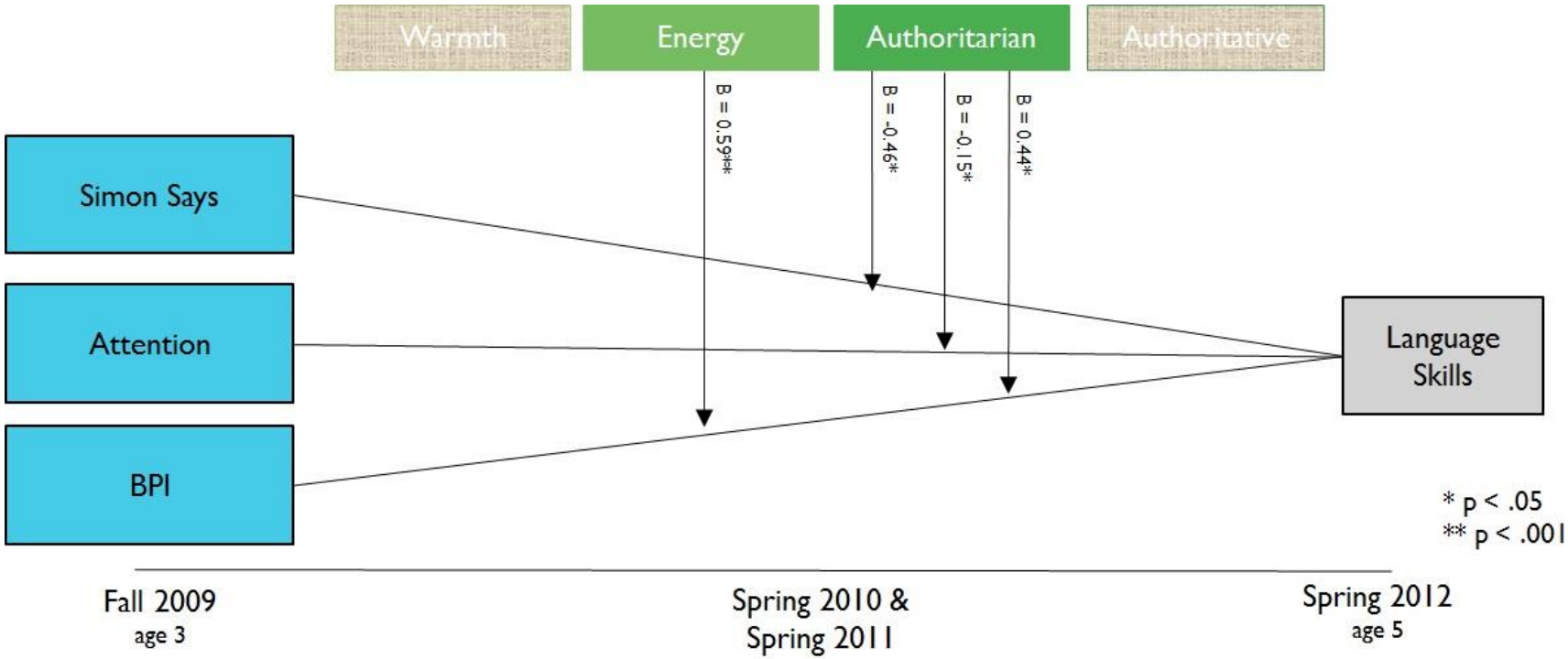

Figure 26. Moderation Model for Language, Social-Emotional Skills, and Parenting Approaches

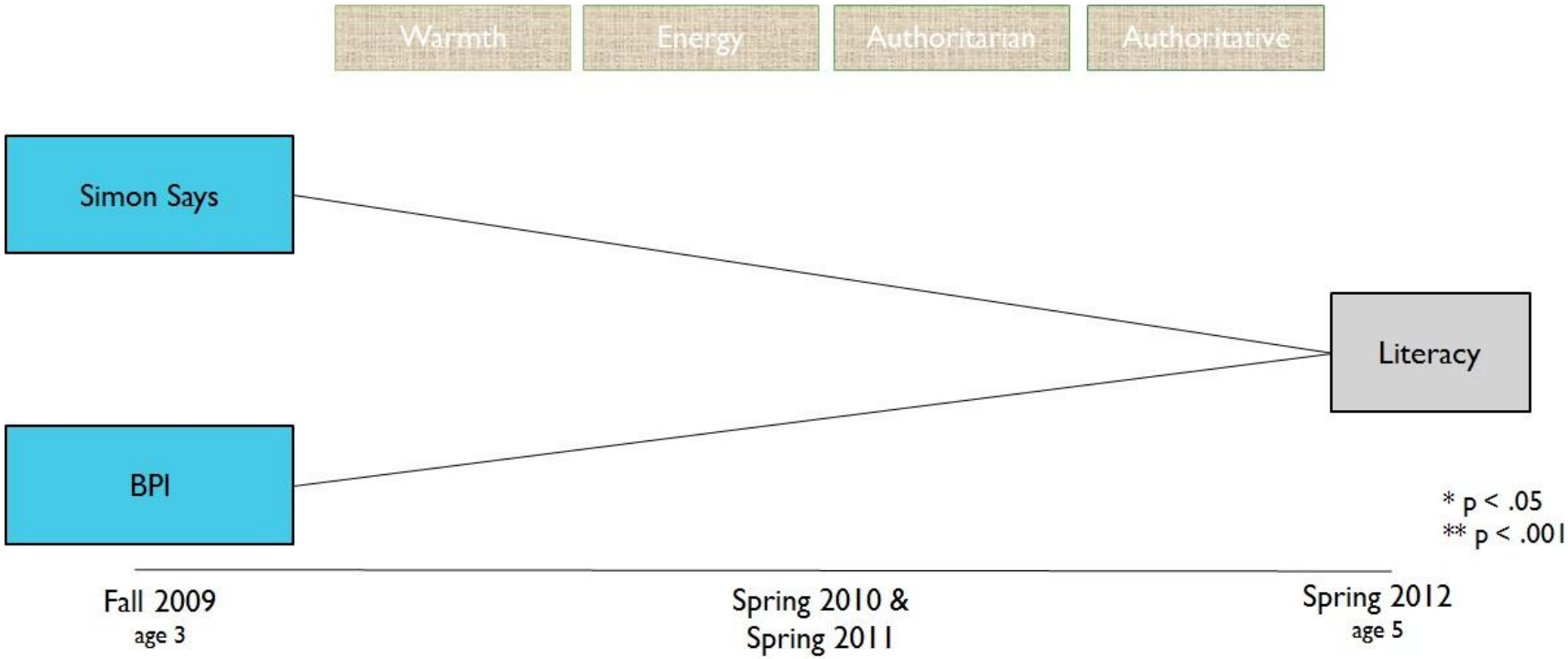

Figure 27. Moderation Model for Literacy, Social-Emotional Skills, and Parenting Approaches

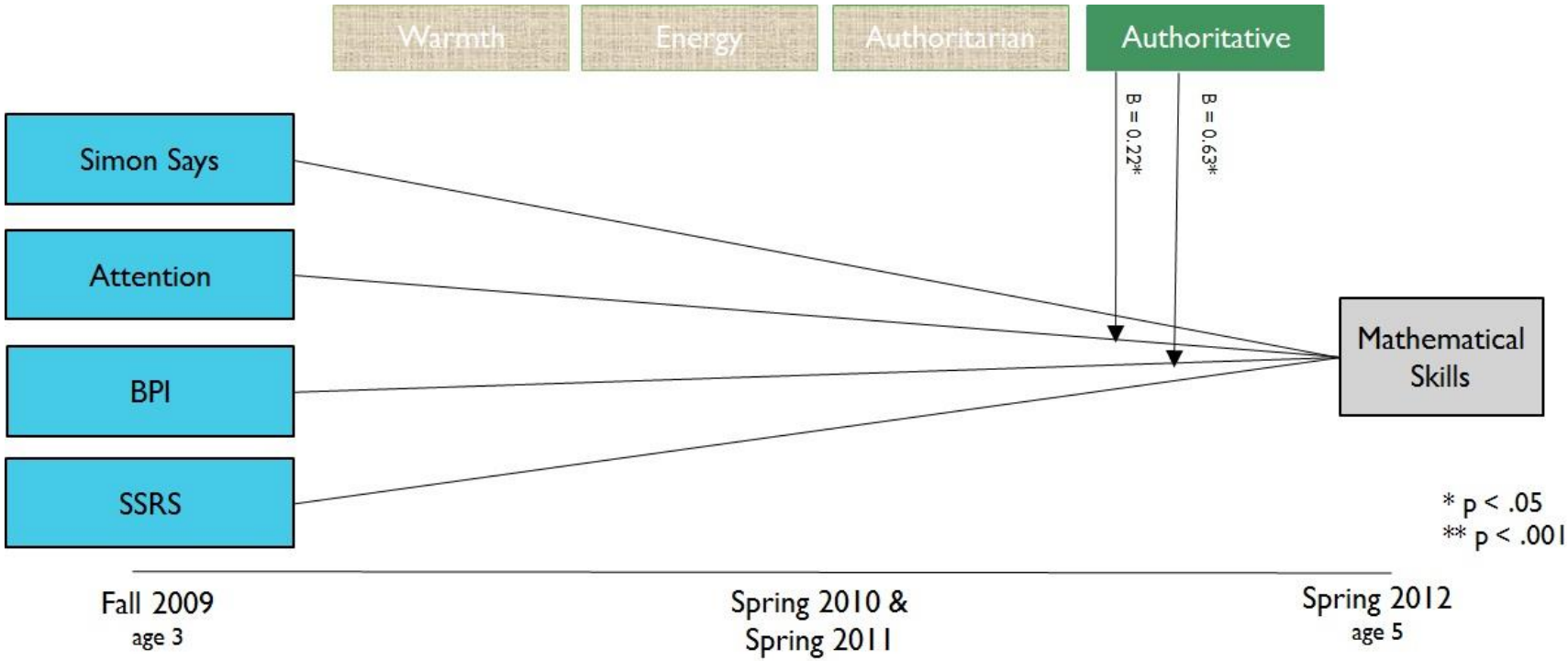

Figure 28. Moderation Model for Mathematics, Social-Emotional Skills, and Parenting Approaches

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