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The Effects of Child Literacy and Self-Control on School Readiness Based on Teacher Report

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THE EFFECTS OF CHILD LITERACY AND SELF-CONTROL ON SCHOOL READINESS BASED ON TEACHER REPORT

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ABSTRACT

School readiness has been identified as one of the major determinants of an individual's later academic success (Cappelloni, 2011; Kim, 2008; Lunenburg, 2011). School readiness encapsulates academic readiness and socio-emotional development, and is impacted not only by the child, but also by the child's family, the early environment, the school, and the community (Cavanaugh, Lippitt, & Moyo, 2000; Huffman, Mehlinger, & Kerivan, 2000; Maxwell & Clifford, 2004; National Research Council and Institute of Medicine, 2000; Peth-Pierce, 2000; Raver, 2002).

Despite a plethora of studies in school readiness, there has been a lack of examination of school readiness through the lens of teachers. As parents and teachers vary in their expectations regarding the academic tasks children should be able to perform before entering school (Hains et al., 1989; O'Donnell, 2008; Piotrkowski et al., 2000; Wesley & Buysse, 2003), exploring the phenomenon of school readiness through teacher reports is warranted.

The current study will be well grounded in Urie Bronfenbrenner's ecological systems theory since this theory provides a framework for the impact of immediate family and school contexts on child outcomes (Bronfenbrenner, 1979, 2005). School readiness involves children, families, early environments, schools, and communities (Maxwell & Clifford, 2004). Each aspect is housed in the systems within Urie Bronfenbrenner's ecological systems theory. Since the three contexts of child, family, and community are critical factors for young children academically and socio-emotionally, Urie Bronfenbrenner's ecological systems theory (1979) can explain the variations in children's academic and socioemotional readiness.

The sample for this study included 13,383 first time kindergarteners from the Early Childhood Longitudinal Study- Kindergarten Cohort of 2011-11 (ECLS-K 2011). This nationally representative dataset was used to examine child factors and family backgrounds effects on school readiness based on teacher report.

This study found that the interaction between both high literacy and low self-control had significant outcomes on academic readiness. Those children with high literacy and low self-control had lower scores on academic readiness. In addition, low literacy and high self-control also had significant effects on academic readiness. Children with low literacy and high self-control had higher scores on academic readiness. These findings suggest that both literacy and self-control have significant effects on child academic readiness.

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CHAPTER 1

INTRODUCTION

School readiness has been identified as one of the major determinants of an individual's later academic success (Cappelloni, 2011; Kim, 2008; Lunenburg, 2011). A child's exposure to a responsive and expansive language environment, in the context of warm, positive relationships with parents and teachers sets the stage for positive language learning, a key indicator of academic readiness (Dickinson & Smith, 1994; Senchal & Lefarve, 2002; Lonigan, Burgess & Anthony, 2000). A child is expected to partake in well-regulated and goal- directed activity, including sustained behavioral inhibition, compliance with rules, and capacity to initiate and sustain interpersonal relationships with teachers and peers to be academically ready for school (Campbell & von Stauffenberg, 2008; Kellam, Rebok, Ialongo, & Mayer, 1994). In response to the passing of No Child Left Behind (2001), there has been a focus on enhancing a child's readiness to succeed in school, both academically and socio-emotionally.

Well documented research- based evidence found that there are close relationships among school readiness and child gender and family background including language, ethnicity, family structure, and socioeconomic status (Duncan, et at. 2007; Guhn, Milbrath, & Hertzman, 2016; Payne, Whitehurst, & Angell, 1994; Senechal, LeFevre, Thomas, & Daley, 1998). School readiness is related to family

background, with non-White children from nontraditional families and low socioeconomic status performing lower than their peers on literacy tasks along with exhibiting frequent problem behaviors (Barbarin et al, 2006; Brown, 2001; Heard, 2007; Mills-Koonce et al., 2016; Potter, 2012). It is conceivable that family background along with child background plays a critical role in child outcomes, including school readiness. School readiness encapsulates academic readiness and socio-emotional development. Readiness is impacted not only by the child, but also by the child's family, the early environment, the school, and the community (Cavanaugh, Lippitt, & Moyo, 2000; Huffman, Mehlinger, & Kerivan, 2000; Maxwell & Clifford, 2004; National Research Council and Institute of Medicine, 2000; Peth-Pierce, 2000; Raver, 2002).

Recent study outcomes have been based on parent report on children's school readiness (Diamond, Regan, Bandyk, 2000; Kim, Murdock, & Choi, 2005; Kim, 2008). While providing critical implications of school readiness based on parents' perceptions, it is imperative to consider teachers' perspectives as they spend most of the day with these students and have a less biased view. Piotrkowski, Botsko, and Matthews (2001), examined school readiness perceptions through parent and teacher report and views varied greatly between parents and teachers. Parents rated classroom-related readiness resources as more important than teachers, along with being able to communicate in English and to have basic knowledge and skills.

Despite the plethora of studies on school readiness, there has been a lack of examination of school readiness through the lens of teachers. Parents and teachers vary in their expectations regarding the academic and social emotional tasks children

should be able to perform before entering school; with teachers placing more focus on self-control abilities and parents with more academic driven abilities (Hains et al., 1989; O'Donnell, 2008; Piotrkowski et al., 2000; Wesley & Buysse, 2003); thus, exploring the phenomenon of school readiness through teacher reports is warranted. This study will examine impacts of child backgrounds and family background on school readiness (academic and socio-emotional readiness) through teachers' reports in order to better understand child school readiness.

CHAPTER 2

REVIEW OF LITERATURE

School readiness involves children, families, early environments, schools, and communities (Maxwell & Clifford, 2004). Each aspect is housed in the systems within Urie Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979, 2005). Since the three contexts of child, family, and community are critical factors for young children academically and socio-emotionally, Urie Bronfenbrenner's ecological systems theory will best explain the variations in children's academic and socioemotional readiness.

Theoretical backgrounds

Bronfenbrenner's ecological systems theory is made up of five concentric circles. These circles include the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1979, 2005).

Micro System. The micro system's setting is the direct environment we have in our lives, it includes direct social interactions with family, friends, classmates, teachers, neighbors, and others in the community in direct contact. This micro system in turn influences the construction of the environment in which the immediate interactions take place. A child's gender, language, and family structures are all housed within the microsystem. The child's parent's beliefs and behaviors within the

microsystem can affect a child's school readiness.

Mesosystem. The mesosystem involves the relationships between the microsystems in one's life. The instability and unpredictability of family life can affect a child's school readiness through the mesosystem. Teacher-student interactions are also influenced through the mesosystem. Therefore, family and teacher experiences relate to a child's school readiness. For example, if a child is neglected by their parents, they may have a lower chance of developing positive attitudes towards their teachers and may feel awkward in the presence of peers; they may resort to withdrawal from a group of classmates, leading to lack of socioemotional development and readiness.

Exosystem. The exosystem is the setting in which there is a link between the context wherein the person does not have any active role, and the context where the person is actively participating. A parent's work placement and schedules are housed in the exosystem, which can cause a negative impact on the child's readiness by their lack of interaction with the child. An example of a negative impact of an exosystem is that of a child's stronger attachment to one parent than the other if the more attached parent leaves for several months, the child may experience a conflict in his/ her social relationships. Conversely, the temporary removal of the more attached parent may result in a tighter bond between the less attached parent and the child.

Macrosystem. The macrosystem setting is the actual culture of an individual. The cultural contexts involve the socioeconomic status of the person, their family, the child's ethnicity or race, and where the individual lives. A child living in poverty may have a desire to strive to succeed so that they can eventually move out of poverty. The

family's culture can affect their beliefs regarding the importance of education, which may result in the child's consequent lack school readiness.

Chronosystem. The chronosystem includes the transitions and shifts in one's lifespan. This system may also involve the socio-historical contexts that may influence a person. War, financial crises, and traumatic life experiences all influence the chronosystem. The relationship between these concentric circles and the individual's working parts impact the child's physiology development which is an important factor in school readiness.

The microsystem for this study involves the child's development, and their sex. Microsystem also involves the child's relationships with their parents, teachers, school, and friends. The child gains independence from adults in this concentric circle. The mesosystem is where the influence of the child's parent's beliefs and practices intersect with the beliefs of the child's teacher, and other classmates. A parent that has more involvement in the child's schooling will result in child's positive sense of self and others. The exosystem involves the child's social settings that are impacted by a child's self-control, for example their ability to express emotional reactions properly while exhibiting effortful control of attention and action towards others. The macrosystem connects a family's socioeconomic status, ethnicity, language, and beliefs to the child. This system affects a child's ability to develop and maintain independence from their family. Literacy is influenced by the macrosystem; a lack of resources financially leads to less time spent with the child developing enriching behaviors such as letter recognition and foundational reading skills. The last concentric circle, the chronosystem, links the structure of a family to the child. In this

circle, children may exhibit learned behaviors they experience at home. All of these individual systems impact a child's academic readiness.

Factors that Influence Academic Readiness

This section will discuss demographic variables that may affect how a child's reading level, and academic readiness for school. Academic readiness is defined as the degree to which a student is prepared for learning. In this study, the child characteristics will be comprised of child gender, home language, and ethnicity. Family background characteristics will be comprised of family structure, and socioeconomic status.

Recent studies have found gender differences in academic readiness, specifically literacy development (Logan & Johnston, 2009; Mullis, Martin, Gonzalez, & Kennedy, 2003; Mullis et al., 2007). In a study conducted by Coley (2002) the researcher found that, overall, girls were more likely than boys to be proficient in letter recognition and in recognizing the beginning and ending sounds of words, although these differences were not large. Multiple other studies found that boys consistently perform lower than girls in regards to reading comprehension (Mullis et al. 2003; 2007; Logan & Johnson, 2009). Gender differences were also evident among White kindergartners, but not within the other racial/ ethnic groups (Mullis et al. 2003; 2007; Logan & Johnson, 2009). Overall, parents read to girls more frequently than to boys (Coley, 2002). Among racial/ethnic groups, White parents were more likely to read to girls every day than to boys. This parental behavior may help to explain why girls perform better than boys on reading related tasks.

While gender differences have been known to affect literacy development, a child's home language also has influences on language development. Bilingual children, (e.g. children with fluency in a heritage language as well as proficiency in the language of instruction) are typically academically successful, and both cultural background and bilingualism appear influential in their successful academic trajectories (Dinovitzer, Hagan, & Parker, 2003; Glick & White, 2003; Han, 2012; Portes & Hao, 2004; Zhou, 1997). Studies with young bilingual children indicate advantages in attentional control, executive function, metacognitive awareness, and abstract and symbolic awareness (Adesope et al., 2010; Barac & Bialystok, 2012; Barac, Bialystok, Castro, & Sanchez, 2014; Bialystok, 2001). Concordantly, two other studies noted acquiring a second language early in life yields stronger cognitive advantages than later acquisition (Adesope, Lavin, Thompson, & Ungerleider, 2010; Hammer et al., 2014).

Cultural differences are another influence on literacy development. One's culture affects the rates of language spoken to a child. North American mothers talk to their infants from (or before) birth, thereby building ‘‘conversations’’ out of baby's burps and sneezes (Hoff, 2006). In contrast, the Mayans of Mexico (Brown, 2001), the Walpiri of Australia and some groups of African Americans in the southern US, do not regard young children as potential or appropriate conversational partners, and children are not directly addressed by adults (Hoff, 2006).

Referenced cultural differences in the quantity and type of children’s early language experience have also been linked with differences in the course of early language development. Werker, Weikum, Yoshida (2006) argued that in cultures in

which adults speak directly to prelinguistic children, children begin talking by producing single words that the modified speech they hear helps them to isolate from the speech stream (Hoff, 2006). Reports of the Walpiri of Australia and the Mayan of Mexico describe these children as late talkers compared to North American children (Hoff, 2006; Werker, Weikum, and Yoshida (2006); Geneesee, Paradis, Cargo 2004; Brown, 2001).

The school readiness gap is paralleled by a racial and ethnic gap in children's experiences of income inequality, where African American and Hispanic-American children face substantially higher likelihood of spending a greater amount of time in poverty, than do white children (De Hower, 2005; Craig & Washington 2004; Brooks-Gunn, Duncan, & Maritato, 1997; Duncan & Aber, 1997; McLloyd, 1998). There are vast differences in school readiness among young White children and young African American children convincingly demonstrated to be a result of differences in income (Duncan & Magnuson, 2005; Duncan, Yeung, Brooks-Gunn, & Smith, 1998). African American children from low incomes are at an increased risk for school readiness deficits in terms of both cognitive and social development. These children are less prepared and less ready to learn like their peers from higher advantaged areas and backgrounds. Much of the research on contextual resources of academic readiness has focused on the role of childcare and preschool exposure for low income children (Ensminger & Fothergill, 2003; Pan, et al, 2005), particularly for low-income and minority children (Fletcher & Reese, 2005; Oller & Eilers, 2002).

In addition to previous factors, family structure is another aspect that must be examined. Today family structures vary; families can be made up of two biological

parents, a single parent, stepparent, divorced-parent, and same- sex parents (National Health Interview Survey, 2010; Family Structure, 2015). Children with two biological parents tend to do better than their peers in nontraditional families (Potter, 2012). Children in traditional families have higher test scores, greater learning trajectories, and complete more years of education relative to children in divorced, single-parent, and stepparent families (Heard, 2007; Sun & Li, 2011).

Sun and Li (2011) concluded that children from single-parent families, on average, had lower test scores and made fewer gains across the elementary school years than their peers living with two married biological parents. An exception to this pattern appears to be children from same-sex parent families. Children with lesbian mothers or gay fathers do not exhibit the poorer outcomes typically associated with nontraditional families; however, children from single-parent, divorced-parent, or stepparent households generally performed below their peers with two married biological parents (Amato, 2005; McLanahan & Percheski, 2008). Jeynes (2005) found that coming from an intact family and high parental involvement had a positive impact on the child's academic achievement. On the other hand, Hart and Risley, (1995) and Lareau (2004) found that single parents with a high socioeconomic status present their children with more cognitive stimulation at home. If the sources for learning are social the family's socioeconomic status is mediated by the child's learning. The link between a consistent family environment that is conducive to learning is also moderated by socioeconomic status (Crosnoe, et al. 2010).

The last critical factor is socioeconomic status as it has been found to be a critical factor for academic success. Understanding the mechanisms through which

poverty affects the brain, parenting behaviors, and language development may have implications for identification and treatment of individuals as well as social policy (Perkins, Finegood, & Swain, 2013). Children in lower SES families have slower rates of growth for expressive language skills as compared to children in higher SES families. In other studies, it has been found that a child's cognitive abilities and school achievements are affected by parental socioeconomic status (Jednoróg, Altarelli, Monzalvo, Fluss, & Dubois, 2012). Pungello et al. (2009) concluded that race is associated with receptive language skills and both socioeconomic status (SES) and race are independently related to the growth of expressive skills. Another study also found low socioeconomic status and minority race/ethnicity are characteristics that are often negatively associated with school readiness (Barbarin et al., 2006).

Factors that Influence Self-Control

Self-control has been defined in multiple ways. Cognitive self-regulation includes planning, sustaining attention, effortful control of attention or action, task persistence, and inhibition of impulsive responses (Duncan et al, 2007). Emotional self-regulation includes the ability to control anger, sadness, joy, and other emotional reactions, which predict both externalizing and internalizing problem behaviors (Duncan et al, 2007).

A large and growing literature has documented the impact of social and behavioral skills (abbreviated below as "social/behavioral skills") on cognitive outcomes, on educational attainment, and on labor market success. The term "non-cognitive skills" illustrates the lack of specificity in conceptualizing as well as measuring these skills. Duncan et al. (2007) note that psychologists classify many of

these skills under the categories of either “cognitive self-regulation” or “emotional self-regulation.” There is now growing evidence that children’s control is positively related to academic skills or school achievements, including measures of students’ reading, math, and linguistic abilities (Fabes, Martin, Hanish, Anders & Madden-Derdich, 2003; NICHD Early Child Care Research Network, 2003; Valiente, Lemery-Chalfant, & Castro, 2007).

Self-control is widely regarded as a capacity to change and adapt the self so as to produce a better, more optimal fit between self and world (Rothbaum et al., 1982). Central to our concept of self-control is the ability to override or change one’s inner responses, as well as to interrupt undesired behavioral tendencies and refrain from acting on them. From this perspective, self-control should contribute to producing a broad range of positive outcomes in life. In fact, empirical evidence indicates that people with high dispositional self-control have better outcomes in various spheres (Gliebe, 2011). In two independent studies, Gliebe (2011) sought to replicate and extend these prior findings, taking advantage of two large ongoing investigations in which multiple outcomes were being assessed.

Findings suggest that self- control from a young age is expressed by the ability to trust adults, internalize rules, delay gratification, control anger impulses, find internal ways to be more patient despite frustrations, empathize with others’ feelings, take turns, and find way to cheer up when feeling sad (Duncan, 2007). In a study conducted by Skibbie, Montroy, Bowles, and Morrison (2018) it was found that earlier self-regulation trajectories were associated with both higher levels and earlier development of both decoding and reading comprehension, but not faster

development. Children with early self-regulation trajectories developed phonological awareness earlier than those with late self-regulation trajectories. Finally, children with early self-regulation trajectories had higher levels of vocabulary than children with intermediate trajectories but did not differ on the rate or timing of vocabulary development. Findings point to the enduring and interconnected nature of self-regulation and children's language and literacy development. Self-regulatory abilities prior to kindergarten predict math and literacy achievement throughout the school years, as well as college completion (McClelland et al. 2012). There are relatively few studies of these skills in children with developmental disabilities. The extant research suggests that this subgroup of children show poorer self-regulation skills than their typically developing peers (Baker et al. 2007; Gerstein et al. 2011). Deficits in these skills are particularly salient for children with behavior difficulties in addition to developmental disabilities or delays (Gerstein et al. 2011), given the central role of self-regulation in the development of behavior problems (Olson et al. 2005).

A study conducted with preschool children demonstrated that children have the ability to work longer on a task such as a puzzle or a coloring book when focused on a reward. The presence of a reward such as a cookie or a sticker created enough frustration and arousal to energize and facilitate goal- oriented work. It has also been observed that children required to wait for the reward instead of working while waiting for the reward, found the presence of the rewards debilitating because the children could not do anything while waiting (Gliebe, 2011). Self-control develops when children begin to differentiate between short-term and long- term outcomes. When they realize that a long-term outcome is better, they may choose to delay

gratification in their best interest. Researchers have found that the ability to choose delayed rewards increases with age (Gliebe, 2011).

Overcrowded and chaotic environments sabotage the development of self-control (Duncan, 2007; Honig & Lansburgh, 1991). Self- control develops in a coherent environment, where expectations are clear and rules are explained and enforced. Ideal environments for children provide challenges for children to strive toward new levels of self-sufficiency and productivity. Working through difficulties and achieving success bolsters self-control and perseverance. Coherent environments foster motivation which is a key ingredient for learning; this is important for young children whose standard for performance increases (Valiente et al., 2007; Bronson, 2000).

The benefits of self-control extend beyond formal academic learning: Self-control also predicts social competence and positive relationships with both adults and peers (Eisenberg, Hofer, Sulik, & Spinrad, 2014; Eisenberg et al., 2009); lower levels of cigarette, alcohol, and drug use (Romer, Duckworth, Sznitman, & Sunhee, 2010; Wills & Stoolmiller, 2002); and better physical health (Tsukayama, Toomey, Faith, & Duckworth, 2010). Recently, a longitudinal study found that self-control measured in childhood predicts success and well-being in adulthood, including income, savings, and physical and mental health, with effect sizes comparable in magnitude to those of general intelligence or family socioeconomic status (Moffitt et al., 2011). These positive life outcomes were partially explained by better decisions made in adolescence (e.g., staying in school, not smoking, and avoiding becoming a teenage parent).

Furthermore, gender not only affects a child's academic readiness but also has influences on a child's self-control. Studies have found that boys began the school year at a significant disadvantage in self-regulation in comparison with girls, and although they improved, they did not catch up by spring (Matthews, Ponitz, & Morrison, 2009). Other studies have also found gender differences in prosocial behavior, with significantly higher scores in females (Calvo et al., 2001; Etxebarria, Apodaca, Eceiza, Fuentes, & Ortiz 2003; Rotenberg et al., 2005; Sánchez et al., 2006). Research studies illustrate a significant relationship between social maturity and females (Matthews et al., 2009; Angenent & deMan, 1989). The Matthews study (2009) found girls appeared to be more socially mature than boys. Additionally, 20% of boys were identified as not ready for school compared to 11% of girls. Consistent with these studies, Zill (1999) states boys tend to have more academic and behavioral problems than girls.

Abundant literature reports that boys have greater social-emotional developmental problems than girls (Buchmann, DiPrete, & McDaniel, 2008). Boys have higher rates of antisocial behavior, attention disorders, reading disabilities, mental retardation, stuttering, delayed speech, and other related phenomena (Halpern, 1997; Muter, 2003; Rutter et al., 2004). The lower rate of antisocial behavior of girls in early childhood persists into the pre-school and elementary years, where they exhibit less disruptive conduct than boys. Several studies have demonstrated stronger tendencies towards externalizing behavior by boys (Entwisle, Alexander, and Olson, 2005; Raffaelli, Crockett, and Shen, 2005). Gilliam (2005) reports that boys are five times as likely as girls to be expelled from pre-kindergarten due to externalizing

behaviors. In early elementary school they continue to be more disruptive than girls, and they also are less engaged in classroom learning (Ready et al., 2005; Zill and West, 2000). These gender differences persist through high school (Downey and Vogt Yuan, 2005; Dumais, 2005). Boys are happier than girls, however, girls express more positive feelings. Girls perform better in school, even though girl's experiences can be fraught with heightened feelings of doubt, alienation, and anxiety. Boys on the other had are able to internalize problems better than girls (Smith, 2016).

A child's exposure to language can also have effects on his/ her self-control. Researchers have found advantages in areas of social-emotional development for bilingual children (Halle et al., 2014), Winsler et al. (2014) conclude Spanish-speaking kindergarten dual language learners (DLL) who gained the greatest proficiency in English had stronger social-emotional skills in preschool than their less proficient DLL peers, suggesting a bidirectional influence of social-emotional skills and second language skills. In agreement, those dual language learners who have limited proficiency in the language of instruction or who are monolingual in their heritage language have been found to have the poorest social-emotional outcomes (Halle et al., 2014; Han, 2010).

The effects of social interactions on cognitive and behavioral development may be mediated by language and symbols as suggested through developmental theories. It is purported that executive functioning is developed through language internalization (Sammeroff, 2009; Vygotsky & Kozulin, 1986; Zivin, 1979) and that internal language is the active vehicle for thinking, reflection, analysis, and learning from experience (Barkley, 2001; Winsler, Diaz, Atencio, McCarthy, & Chabay, 2000).

Child language skills may thus mediate the linkage between family SES and child executive function (Noble et al., 2005, 2007).

Ethnicity and race have been linked to differences in children's self-control. Research by Crosnoe (2006) has found that children in Mexican immigrant families showed strengths in self-control by exhibiting fewer externalizing behavior problems than children in native families, an effect that persisted even after family background factors were controlled. Immigrant children also showed more emotional maturity and competence in peer relations and in-class behavior (Crosnoe, 2006). First-generation immigrant children also exhibited considerable strengths in socio-emotional protective factors and were rated as significantly higher in this area across time points (De Feyter & Winsler 2009). Galindo and Fuller (2010) state Cuban and South American children were rated the highest on the Social Skills Rating System, which measures socio-emotional competencies. South American children scored the closest to White children, while Puerto Rican children scored significantly lower than White children. The same was true for Mexican children, with Latino children with higher scores on social competence showed larger gains in math than those with lower math scores (Galindo & Fuller, 2010).

The structure of a family has been associated with a child's self-control. Family structure is an ever-evolving construct comprised of biological parents, single parents, divorced parents, and same sex parents. Students on average, who had spent time in mother-only households had lower grade-point averages, college expectations, and more behavior problems in school (Heard, 2007). Lesbian mothers or gay fathers and their children are a notable and socially contentious example of a family structure

whose influence on children's development continues to be debated (Powell et al., 2010). In general, prior studies have found that children living with same-sex parents were similar to their peers living with married, opposite-sex parents on several developmental outcomes (Anderssen, Amlie, & Ytteroy, 2002; Biblarz & Stacey, 2010; Tasker, 2005). As an example, children in same-sex parent families adjusted equally well during the transition from home to school (Perry et al., 2004), displayed comparable levels of self-esteem, anxiety, and depression (Bos, van Balen, Sandfort, & van den Boom, 2006; Fulcher, Sutfin, & Patternson, 2008; Gartrell & Bos, 2010). Based on Bos, van Balen, & van den Boom, 2007; Golombok et al., 2003; Wainright & Patterson, 2008; Wainright, Russell, & Patterson, 2004). It is conceivable that young children from lesbian and gay families exhibit similarly low levels of risky and problematic adolescent behaviors. Wainright et al. (2004) concluded youth living with lesbian mothers tended to feel more connected to school than their peers with opposite-sex parents.

Children who experience persistent poverty also face developmental deficits (Bernheim, Ray, Yellekin, 2015; Duncan, BrooksGunn, Klebanov, 1994; Korenman, Miller, & Sjaastad, 1995). One reason may be that low-income families are not able to afford adequate food, shelter, and other material goods that foster healthy cognitive and social development of children (Bernheim, Ray, Yellekin, 2015; Hanson, McLanahan, & Thomson, 1997; Hill et al., 2001). Children in higher income communities are more likely to receive positive peer influences that encourage achievement and prosocial behavior (Moffit, 2011; McLanahan & Sandefur, 1994). In addition, poverty and economic stress may lead to less effective parenting which, in

turn, has adverse consequences for children's development and adjustment (Evans, 2005; Conger et al., 1992; Dodge, Petit, & Bates, 1994).

It has been well documented that low socioeconomic status is a major detrimental factor for problem behaviors interacting with other family factors such as household chaos, parenting behaviors, such as child conduct problems and callous unemotional behaviors (Lyons- Ruth, Repacholi, Mcleod, & Silva, 1992; Mills-Koonce, Willoughby, Garrett-Peters, Wagner, & Vernon- Feagans, 2016). Across levels of SES, behavioral problems are more common among lower-SES children, with behavior problems in children having impact well into adolescence and adulthood (Mills- Koonce et al, 2016). Many of these children develop chronic and debilitating mental health problems in adulthood, experience academic problems in school, and may even be involved in criminal activity (McGrath & Elgar, 2015).

Alexander et al. (2003) determined that the gender gap in retention rates was larger for poor children (i.e. those eligible for free or reduced-price lunch) than for non-poor children. Other scholars have also found a social class component to the gender gap in reading (Bianchi, 1984; Burbridge, 1991; Mickelson, 2003). Entwisle et al. (2007) report that a significant gender gap in conduct marks, in retention, and in reading scores and reading score growth from first to fifth grade for poor children, though all these gaps are negligible for non-poor children. In their data, 44% of the female advantage in reading gain for poor children by fifth grade was explained by teacher conduct marks in years 2 and 4, even as conduct has no relationship with reading gain for non-poor children. Entwisle et al. (2007) explain the pattern of conduct marks as a consequence of favoritism by elementary school teachers who

themselves are overwhelmingly middle class and female (Entwisle et al., 1997; Entwisle et al., 2007). Processes that link social class and gender in early childhood may be related to the class component in the growing female advantage in educational attainment in recent decades (Buchmann & DiPrete, 2006).

Growing up in a single-parent household has also been associated with adverse child outcomes (East, Jackson, & O'Brien, 2006; McLanahan & Sandefur, 1994), albeit inconsistently across investigations. In fact, family SES and single parenthood often covary, complicating efforts to disentangle the correlates of poverty versus single parenting. For example, in a nationally representative sample, found growing up in a single-parent household to be associated with problem behaviors, psychological distress, and poor academic performance (Calvo & Bialystok, 2014). On the contrary, in the National Longitudinal Study of Youth (NLSY), Ricciuti and colleagues found that there was little evidence of negative effects on children from being reared in a single-parent home (Ricciuti et al, 2004). Family SES and child executive functions studies have found that the adverse effects of growing up with one parent may be exacerbated by the presence of further adversity such as financial constraints and low SES (Calvo & Bialystok, 2014; Barber & Eccles, 1992). Studies of family SES associations with child executive functions, on the other hand, have not considered the role of single parenthood, a problematic oversight given the need to disentangle socioeconomic and parenting contributions to the development of executive functions.

Areas of Research Needs in Academic Readiness

The studies in this literature review have established their findings through parent report and clinician-based evaluations; therefore, teacher's perspectives are

needed to better understand child's literacy and self-control influences on their academic readiness. Teachers spend their day enriching and evaluating children's learning needs, they are trained individuals in child reporting and evaluation of skills that a child should have when entering school and those that should be emerging throughout the early kindergarten and elementary school years. Thus, it is important to analyze data on each child from teacher report to determine areas of need in school settings to enhance children's learning environments to provide meaningful learning experiences that will follow the child throughout his/her life. Although researchers have focused on child school readiness, many have failed to evaluate both academic and socio-emotional readiness concordantly with child factors and family backgrounds.

This study will use reading scale scores and teacher reported self- control as predictors of academic readiness. The two predictor variables work together to examine the cognitive domains and socioemotional measures effects on a child's academic abilities. When a child is able to focus their attention on a set task they are more likely to have higher rates of academic abilities. Examining which predictor variable has more influence on academic outcomes will help to improve interventions for children.

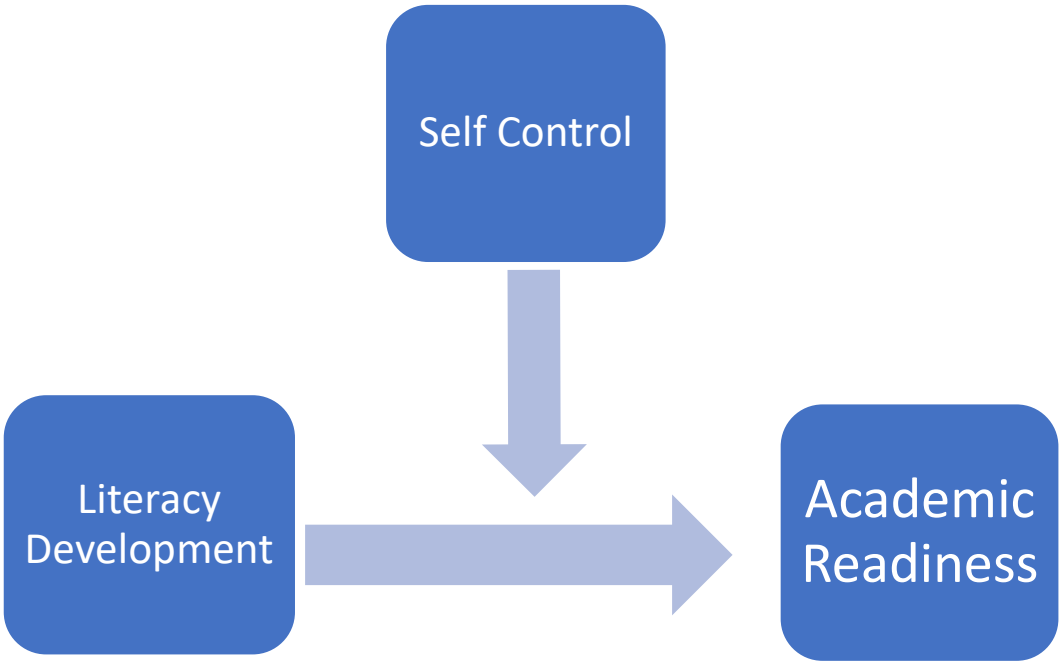
CHAPTER 3

METHODOLOGY

A review of the literature on school readiness revealed a lack of examination of school readiness through the lens of teachers. As such, this study investigated the impact of literacy development and self-control on academic readiness as reported by teachers. A moderator model was used to explore if literacy development and self-control interacted to differentially impact academic readiness.

The outcome variable, academic readiness, includes reading, math, and science scores evaluated through teachers rating. The first predictor variable, literacy development, includes an understanding of words, sounds, and ordering of letters. The second predictor variable, self-control, involves the child's ability to self-regulate and control their emotions towards others and themselves. Figure 1 illustrates the study model. The impact of demographic variables in the study were also explored, specifically home language, ethnicity, family structure, and socioeconomic status. To better understand school readiness in a holistic way, Bronfenbrenner's ecological systems theory (1979) was employed.

Figure 1.
Study Model



Research Hypotheses

The following explorative and predictive hypotheses will be tested in the current study:

(1) To explore demographic variables that impact literacy development and self-control.

(2) Hypothesis 1: High levels of literacy development and high levels of self- control will result in the highest levels of school readiness.

(3) Hypothesis 2: High levels of literacy development and Low levels of self- control can result in high academic readiness.

(4) Hypothesis 3: Low levels of literacy development and High self-control can result in low academic readiness.

Data Sources

The present study examined school readiness using data from the Early Childhood Longitudinal Study—Kindergarten Cohort of 2010-11 (ECLS-K 2011), a large, nationally representative dataset of U.S. kindergarteners for the Fall 2010. This data was sponsored by the National Center for Education Statistics (NCES), the ECLS-K followed approximately 18,174 children from kindergarten entry in 2010 through elementary school. The children in the ECLS-K:2011 comprise a nationally representative sample selected from both public and private schools attending both full-day and part-day kindergarten in 2010-11. The children came from diverse socioeconomic and racial/ethnic backgrounds, and the sample includes both children in kindergarten for the first time and kindergarten repeaters. Also participating in the study were the children's parents, teachers, schools, and before- and after-school care

providers. The ECLS-K:2011 is a voluntary study; no one selected for the study was required to respond to the questionnaires or to participate in the assessments. The information participants chose to provide was and will be kept private. All responses that relate to or describe identifiable characteristics of individuals are used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose, unless compelled by law. ECLS-K: 2011 will be used to better understand children's development and experiences in the elementary grades, and how children's early experiences relate to their later development, learning, and experiences in school.

Children, their families, teachers, schools, and care providers submitted information on children's cognitive, social, emotional, and physical development. Information was also collected on children's home environment, home educational activities, school environment, classroom environment, classroom curriculum, teacher qualifications, and before- and after-school care. The ECLS-K:2011 is a longitudinal study, with the same children followed from kindergarten through the fifth grade. Information was collected in the fall and the spring of kindergarten (2010-11), the fall and spring of first grade (2011-12), the fall and spring of second grade (2012-13), the spring of third grade (2014), the spring of fourth grade (2015), and the spring of fifth grade (2016). Note that although the study refers to later rounds of data collection by the grade the majority of children were expected to be in (that is, the modal grade for children who were in kindergarten in the 2010–11 school year), children were included in subsequent data collections regardless of their grade level. Field tests, pilot tests, and cognitive interviews were conducted at various points in the life of the study

to develop psychometrically sound cognitive assessments and to gather information from teachers, school administrators, and parents to inform the development of new survey items.

Trained field staff, assessed children in their schools and collected information from parents. The majority of parent interviews were conducted by telephone though interviews were conducted in person for parents who did not have telephones, were difficult to contact by telephone, or preferred an in-person interview. Teachers and school administrators were contacted at their schools and asked to complete hard-copy self-administered questionnaires. Before- and after-school care providers were asked to complete hard-copy self-administered questionnaires in the children's kindergarten year.

Sample

The original sample for the ECLS-K 2011 study, included all first-time kindergartners in fall of 2010 (N = 18,174). The 18,174 original sample cases were narrowed down to 13,383 total cases. Cases were narrowed down based on three criteria. To remain in the sample, the cases had to have data for the ITR Reading Scale Score, Teacher Reported Self- Control, and Academic Readiness Scale Score. In order to achieve this an IF statement was created, IF (ReadingScaleScore >= 1 & SelfControl >= 1 & ARS>= 25), N= 13,383.

The average age of first-time kindergartners in fall of 2010 at the start of the kindergarten year was 5.5 years in this sample. Approximately one-half the sample was male (51%). The racial and ethnic backgrounds of the sample were 50.2% White Non-Hispanic, 13.4% Black Non-Hispanic, 21% Hispanic, 2.5% Hispanic, No Race

Specified, 7% Asian, .5% Native Hawaiian/ Pacific Islander, and 1% American Indian, and 4.7% Two or More Races Non-Hispanic.

Variables

Demographic Variables. Independent variables for this study focused on child characteristics were gauged using: Child sex (X_CHSEX_X): with the attributes of (1) Male and (2) Female, Child Primary Home Language (X4LANGST): with the attributes of (1) Speak Non- English Language at Home, (2) Speak English at Home, Child race/ethnicity (X_RACETH_R): with the attributes of (1) White Non-Hispanic (2) Black/ African American Non-Hispanic, (3) Hispanic, Race Specified, (4) Hispanic, No Race Specified, (5) Asian Non-Hispanic, (6) Native Hawaiian/ Pacific Islander, Non-Hispanic, (7) American Indian/ Alaska Native, Non-Hispanic, (8) Two or More Races, Non-Hispanic. Independent variables focused on family background will be gauged using: Family type (X4HPARNT): with the attributes of (1) Two biological/ adoptive parents (2) One biological/ adoptive parent and one other parent/ partner, (3) One biological/ adoptive parent only, and (4) Other Guardian(s), Socioeconomic status (X4SESL_1): reflects socioeconomic status of the household at the time of data collection. The five components used to create the SES are as follows: Parent/ guardian 1's education level, Parent/ guardian 2's education level, Parent/ guardian 1's occupational prestige score, Parent/ guardian 2's occupational prestige score, and household income. The values of each SES component were then normalized so that the component had a mean of 0 and a standard deviation of 1. In this normalization (also known as the z-score) step, -1 (not applicable) values are treated as missing. For the *h*-th SES component, a z-score z_{hi} for the *i*-th household

was computed as $z_{hi} = x_{hi} - x_w / \text{sd}(x_w)$. Where x_{hi} is the value of the *h*-th SES component for the *i*-th household; $\bar{x}w$ is the weighted mean of x_{hi}; and sd ($\bar{x}_w$) is the standard deviation of $\bar{x}_w$. Note that where h is household income, x_{hi} is the natural log of the midpoint of the detailed income range (ECLS-K 2011). Descriptive statistics for the demographic variables are presented below.

Literacy Development. The independent variable, literacy development was measured using IRT Reading Scale Score (X1RSCALK1). The reading assessment included questions measuring basic skills such as; print familiarity, letter recognition, beginning and ending sounds, rhyming words, and word recognition. Other skills measured were vocabulary knowledge and reading comprehension. Reading comprehension questions asked the child to identify information specifically stated in text (e.g., definitions, facts, supporting details), make complex inferences within and across texts, and consider the text objectively and judge its appropriateness and quality. Item Response Theory (IRT) had several advantages over raw number scoring. By using the overall pattern of right and wrong responses and the characteristics of each item to estimate ability, IRT adjusted for the possibility of a low- ability child guessing several difficult items correctly. If answers on several items were wrong, the probability of a correct answer on a difficult item was be quite low. Omitted items were also less likely to cause distortion of scores, as long as enough items had been answered to establish a consistent pattern of wrong and right answers. Unlike raw number- right scoring, which treats omitted items as if they had been answered incorrectly, IRT procedures used the pattern of responses to estimate the probability of a child providing a correct response for each assessment question.

Finally, IRT scores makes it possible longitudinal measurement of gain in achievement, even when the assessments that were administered to a child are not identical at each point. IRT is used in large scale assessments such as GRE, SAT, Quality of life Survey, Law school admission tests. IRT is the best approach to psychometric test design compared to classical test theory (CTT) because IRT is sample independent, applicable for adaptive testing, links across multiple forms, measures high and low placing students as opposed to just centered students, takes into account item difficulty, and accounts for guessing. Internal consistency was good with α= .85 to .91 for the measures created from preLAS Simon Says Raw Number right, preLAS Art Show Raw Number Right and preLAS Total Raw Number Right.

Self-Control. The second independent variable, self-control was gauged based on the information pertaining to: Child self-control (X1TCHCON); The teacher scale was as follows: self-control (4 items), that indicated the child's ability to control behavior by respecting the property rights of others, controlling temper, accepting peer ideas for group activities, and responding appropriately to pressure from peers. The variable has Likert scale attributes of (1-4) never to very often. Internal consistency was acceptable at α= .91.

Academic Readiness. The dependent variable of academic readiness was comprised of a computed Academic Rating Scale. The Academic Rating Scale was designed to overlap and to augment the information gathered through the direct cognitive assessment battery. Most important, the Academic Rating Scale included items designed to measure both the process and products of children's learning in school, whereas the direct cognitive battery is limited. The Academic Rating Scale

(ARS), a teacher report measure, was developed to enhance the value of the assessment battery using best practices for ensuring the accuracy of teacher ratings of students' academic performance (Perry & Meisels, 1996; U.S. Department of Education, 2002a). This measure captured information about the process of children's learning, such as the strategies that they use when reading or solving math problems, which could not be measured well by the direct child assessment. It also served as a source for information about children who could not participate in the direct child assessment due to a disability or language issue. Example skills evaluated included; the use of complex sentence structures, communicates scientific information, and sorts, classifies, and compares math materials by various rules and attributes. Attributes for this scale includes the values of (1) Not yet, (2) Beginning, (3) In Progress, (4) Intermediate, and (5) Proficient. The ARS scale was created by combining the twenty-five single question items that evaluate literacy, math, and science abilities. A total score was calculated through combining the twenty-five items. Internal consistency of the scale in this sample was good at $\alpha = 93$.

Missing Values. This study did not include unanswered and not ascertained values. Those variables that included missing values coded as -9 were recoded to system missing.

Data Analysis

In order to examine the research questions, this study employed multiple statistical strategies using SPSS 24. Skewness and kurtosis were determined for the variables. Pearson product moment correlations, *t*-tests and ANOVAs will be utilized. Demographic variables significantly correlated with independent variables were

controlled for in analysis. Power analyses will also be employed. Power and sample size estimation constitutes an important component of designing and planning modern scientific studies. It provides information for assessing the feasibility of a study to detect treatment effects and for estimating the resources needed to conduct the project (Cohen, 1988). A large effect size over .06 was employed, a medium to large power was also utilized. Moderator analysis will be used to determine interactions between independent variables regressed on the dependent variable. Three regression models will be used to analyze the relations among primary study variables. All three model's dependent variables are academic readiness. All three models' will use control variables to determine which demographic factors have an effect on literacy development and self-control readiness. The demographic variables of parent type and socioemotional readiness were the major determinants of academic readiness and thus were controlled in the regressions. Parent type needed to be transformed into a dummy variable. The new variable consisted of single parent, two parents, and other.

The first model examined high literacy x high socio-emotional readiness on school readiness. The second model examined high literacy x low socio-emotional readiness on school readiness. The third model examined low literacy x high socio-emotional readiness on school readiness. Moderator analysis specifies the conditions under which a given predictor is related to an outcome (Aiken & West, 1991). Moderation affect can enhance, increasing the moderator increased the effect of the independent variable on the dependent variable. Moderation can also buffer, meaning the increasing of the moderator would decrease the effect of the independent variable on the dependent variable. Antagonistic affects can also occur, meaning increasing the

moderator would reverse the effect of the independent variable on the dependent variable.

To create the interaction terms for the moderated regressions the variables of academic rating scale, reading scale score, and teacher reported self-control were centered. To center each variable the means needed to be recoded. The variable to be centered was then subtracted from its mean creating a centered variable. Creating the interaction was done through computation combining the centered reading and self-control measures through multiplying the two together. Further interaction terms were created to analyze the research hypotheses 1-3. The variables of centered reading and self-control were divided into high reading, low reading, high self-control, and low self-control based on the mean of each variable Each variable was split so that anything below the mean was coded as low and anything above the mean was coded as high for each dependent variable. New interaction terms were created by multiplying low reading and high self-control, high reading and low self-control. Three total interaction terms were created, reading scale score x self-control, high reading scale score x low self-control, and low reading scale score x high self-control.

CHAPTER 4

FINDINGS

Preliminary Findings

First, Crosstabs were run to compare those who remained in the sample and those who were omitted. Among the demographic variables there were significant differences among child race, non-English spoken at home, and socioeconomic status ($p < .001$). For child race, those that remained in the sample 53% (40% out) were White Non-Hispanic, 22% (23% out) were Hispanic, Race Specified, 1% (5% out) were Hispanic No Race Specified, 7% (10% out) were Asian Non-Hispanic, and .4% (1% out) were Native Hawaiian/ Pacific Islander Non-Hispanic. The other categories of Black non- Hispanic (11% in; 15% out), American Indian/ Alaska Native, Non-Hispanic (1% in; 1% out), and Two or More Races, Non-Hispanic (5% in; 4% out) did not have significant differences.

The variable Non-English Spoken at Home had significant differences between those who remained in the sample who spoke Non-English at home accounted for 3% (4% out) and those who spoke English at home were 97% (96% out).

The means of the sample for socioeconomic status were significantly different with those who had lower socioeconomic status being removed from the sample with a mean of -.14 (SD= 0.8). Those that remained in the sample had a mean of -.01 (SD= 0.81). Those with a low socioeconomic status were likely to be removed from the sample, thus leaving those with higher socioeconomic status in the sample.

Descriptive statistics were run for the demographic variables along with the independent and dependent variables (n = 9,623). The means and standard deviations for the demographic variables are presented in Table 1.

In Table 2, correlation coefficients were computed among the eight variables (child sex, child race, non-English spoken at home, continuous socioeconomic status, types of parents in household, academic rating scale, reading scale score, and self-control). Using the Bonferroni approach to control for Type I error across the 28 correlations, a *p* value of less than .01 was required for significance. The results of the correlational analyses presented in Table 2 in the appendices shows that 28 out of the 28 correlations were statistically significant and were greater than or equal to .00. Due to the 28 correlations effect size was taken into account to allow for more accurate results. An effect size of .06 or greater needed to be achieved to be considered for further analyses. Power analyses were also conducted to determine the effect size. Respectfully the results ranged between medium and large. Seven of the 28 correlations achieved an effect size of .06 or greater.

t-Tests and ANOVAs

Findings of Literacy Development. As shown in Table 2, the correlation between socioeconomic status and reading scale score was statistically significant and was equal to .406. In general, the results suggest that the higher the socioeconomic status the higher the reading scale score.

A one-way analysis of variance was conducted to evaluate the relationship between parent type and reading scale score. The independent variable of parent type included Two biological/ adoptive parents, One biological/ adoptive parent and one

other parent/ partner, One biological/ adoptive parent only, and Other Guardian(s). The dependent variable was reading scale score. The ANOVA was significant at the .05 level, $F(3, 9616) = 106.5$, $p = .000$. The strength of the relationship between parent type and reading scale score, as assessed by η^2, was strong, with parent type accounting for 3% of the variance of the dependent variable.

Follow up tests were conducted to evaluate the pairwise differences among the means. Because the variance between groups ranged from 75.7 to 151.3, the test of homogeneity of variance was significant, $p = .000$. Post Hoc tests were conducted and there were significant differences between the four parent type groups, Two biological/ adoptive parents, One biological/ adoptive parent and one other parent/ partner, One biological/ adoptive parent only, and Other Guardian(s). The 95% confidence intervals for the pairwise differences, as well as the means and standard deviations for the four parent type measures. These findings illustrate that children with two parents had a mean of 49.3 and standard deviation of .14 on the results of their reading scale score.

Findings of Self-Control. The correlation coefficient was computed among the socioeconomic status and teacher reported self-control. Using the Bonferroni approach to control for Type I error across the correlations, a p value of less than .01 was required for significance. The results of the correlational analyses show that the correlation between socioeconomic status and teacher reported self-control were statistically significant and was equal to .13. In general, the results suggest that the higher the socioeconomic status the higher the teacher reported self-control.

An independent samples *t*- test was conducted to evaluate the significance between the variables of Child Sex and Teacher Reported Self Control after significant effects were found in the preliminary correlation. The test was significant, $t(13336.4) = -21.3$, $p = .000$. The 95% confidence interval for the difference in means was small, ranging from -.25 to -.21. The eta square index indicated that 3% of the variance of the teacher self-control variable was accounted for by child sex.

A one-way analysis of variance was conducted to evaluate the relationship between parent type and teacher reported self- control. The ANOVA was significant at the .05 level, $F(3, 9616) = 75.7$, $p = .000$. The strength of the relationship between parent type and teacher reported self-control, as assessed by η^2, was strong, with parent type accounting for 2% of the variance of the dependent variable. Follow up tests were conducted to evaluate the pairwise differences among the means. Due to the variance between groups ranged from .28 to .35. The test of homogeneity of variance was significant, p= .000. Post Hoc tests were conducted and there were significant differences between the four parent type groups, Two biological/ adoptive parents, One biological/ adoptive parent and one other parent/ partner, One biological/ adoptive parent only, and Other Guardian(s). Those children with two parents also exhibited higher scores on teacher reported self-control with a mean of 3.2 and standard deviation of .007.

Findings of Academic Readiness. The correlation coefficient was computed among the socioeconomic status and calculated academic rating scale score. Using the Bonferroni approach to control for Type I error across the correlations, a p value of less than .01 was required for significance. The results of the correlational analyses

show that the correlation between socioeconomic status and calculated academic rating scale score were statistically significant and were greater than or equal to .25. In general, the results suggest that the higher the socioeconomic status the higher the calculated academic rating scale score.

A one-way analysis of variance was conducted to evaluate the relationship between parent type and academic rating scale score. The ANOVA was significant at the .05 level, $F(3, 9616) = 36.3$, $p = .000$. The strength of the relationship between parent type and academic rating scale score, as assessed by η^2, was strong, with parent type accounting for 1% of the variance of the dependent variable. Findings suggest that children with two biological parents had a higher calculated academic rating scale score.

Follow up tests were conducted to evaluate the pairwise differences among the means. The variance between groups ranged from 655.4 to 707.6 and were homogenous ($p = .094$). Post Hoc tests were conducted and there were significant differences between the four parent type groups: Two biological/ adoptive parents, One biological/ adoptive parent and one other parent/ partner, One biological/ adoptive parent only, and Other Guardian(s). Findings suggest that children with two biological parents had a higher calculated academic rating scale score. Two biological parents had a mean of 89.3 with a standard deviation of 29.63 the least variance compared to the other three groups in parent type.

Multiple Regression Analyses

A multiple regression analysis (See Table 4) was conducted to predict the overall academic rating scale score from reading scale score and self-control. The

regression tested the centered interaction term of literacy and self-control would result in high levels of academic readiness. The first block in the regression model controlled for gender, socioeconomic status along with two biological parents versus other type of parent due to being significantly correlated with reading scale, self-control, and academic rating scale. The second regression block results of this analysis indicated that reading scale score and self-control did account for significant amount of academic rating scale score variability, R^2 = .16, F(2, 9616)=544, p =.00, indicating that those children that had higher scores in reading and self-control tended to have higher score on the academic rating scale. Reading accounted for 28% of academic rating scale score and self-control accounted for 14% of the variance. The third regression block was conducted to evaluate whether the interaction between reading scale score and self-control over and above reading scale score and self-control separately. The interaction term did not account for significant proportions of academic rating scale score variance. R^2 change= .00, F(1, 9615)= 3.32, p = .07. Table 3 presents the differences in means between the different interaction groups on academic readiness.

A second multiple regression analysis (see Table 5) was conducted to predict the overall academic rating scale score from reading scale score and self-control. The regression tested the first hypothesis that the interaction term of high levels of literacy and self-control would result in high levels of academic readiness. The first block in the regression model controlled for gender, socioeconomic status along with two biological parents versus other type of parent due to being significantly correlated with reading scale, self-control, and academic rating scale. The second regression block

results of this analysis indicated that reading scale score and self-control did account for significant amount of academic rating scale score variability, R^2 = .16, F(2, 9627)=548.3, p =.000, indicating that those children that had higher scores in reading and self-control tended to have higher score on the academic rating scale. Reading accounted for 28% of academic rating scale score and self-control accounted for 14% of the variance. The third regression block was conducted to evaluate whether the interaction between high reading scale score and high self-control over and above reading scale score and self-control separately. The interaction term did account for significant proportions of academic rating scale score variance. R^2 change= .002, F(1, 9626)= 20.2, p = .000.

A third multiple regression analysis (See Table 6) was conducted to predict the overall academic rating scale score from high reading scale scores and low self-control. The predictors were the interaction between high literacy and low self-control, while the criterion valuable was the academic scale score. The regression tested the second hypothesis that high levels of literacy development and low levels of self-control can result in high academic readiness. The first block in the regression model controlled for gender, socioeconomic status along with two biological parents versus other type of parent due to being significantly correlated with reading scale, self-control, and academic rating scale. The linear combination of the interaction measures in the second regression block was significantly related to academic rating scale score, R^2 = .16 F(2, 9616) = 544, p = .00. Reading accounted for 28% of academic rating scale score and self-control accounted for 14% of the variance. The third regression block was conducted to evaluate whether the interaction between high reading scale

score and low self-control over and above reading scale score and self-control separately. The interaction term accounted for significant proportions of academic rating scale score variance. R^2 change= .00, F(1, 9615)= 5.33, p = .02.

A fourth multiple regression analysis (See Table 7) was conducted to predict the overall Academic rating scale score from low reading scale scores and high self-control. The predictors were the interaction between low literacy and high self-control, while the criterion valuable was the academic rating scale. The regression tested the third hypothesis that low levels of literacy development and high self-control can result in low academic readiness. The first block in the regression model controlled for gender, socioeconomic status along with two biological parents versus other type of parent due to being significantly correlated with reading scale, self-control, and academic rating scale. The second block in the regression determined that the linear combination of the interaction measures was significantly related to calculated academic rating scale score, R^2 = .16 F(2, 9616) = 544, p = .00. Reading accounted for 28% of academic rating scale score and self-control accounted for 14% of the variance. In table 5, I present indices of the individual predictors. The third regression block was conducted to evaluate whether the interaction between low reading scale score and high self-control over and above reading scale score and self-control separately. The interaction term accounted for significant proportions of academic rating scale score variance. R^2 change= .001, F(1, 9615)= 12.1, p = .001.

CHAPTER 5

CONCLUSION

The current study explored the effects of reading scale scores and self-control on academic readiness through moderation. Academic Readiness is influenced through literacy along with self-control. Findings showed that the interaction between centered literacy development and centered self- control appeared to be insignificant in the testing of the centered interaction. The moderation was antagonistic reversing the effect of reading scale score and self-control on academic rating scale score. Findings showed that the interaction between the high levels of literacy development and high levels of self- control appeared to be significant in the testing of the first hypothesis as high levels of literacy development and high levels of self- control will result in the highest levels of school readiness. The moderation enhanced the effect of reading scale score and self-control on academic rating scale score. Upon further testing of the final two hypotheses there was significance between the two interactions; high reading scale score and low self-control, and low reading scale score and high self-control.

Hypothesis 2, high levels of literacy development and low levels of self-control can result in high academic readiness, was found to be significant; however, the higher the literacy and lower self-control the lower the score on the academic rating scale. Thus, not supporting the second hypothesis. This moderation buffered the effects of reading scale score and self-control on academic rating scale score. The third hypothesis, low levels of literacy development and high self-control can result in

low academic readiness, was also found to be significant; conversely from the second hypothesis, the lower the literacy score and higher the self-control the higher the academic rating scale score. The third hypothesis was also not supported. The third moderation enhanced the effect of reading scale score and self-control on academic rating scale score.

Teachers are trained in viewing children's skills academically and socio-emotionally and comparing them to that of other students and other children their age. Due to teachers training in school procedures in assessment they are able to provide a more accurate view of child outcomes. Teacher- child relationship quality is a predictor of child's readiness. Gregoriadis and Grammatikopoulos (2014) found that teacher-child closeness was positively associated with kindergarteners' school liking, self- directedness, and academic performance. Additionally, Rudasill and Rimm-Kaufman (2009) found that close teacher- child relationships in kindergarten were predictive of fewer behavior problems such as conduct problems, learning problems, and anxiety, while promoting competence behaviors such as assertive social skills and peer sociability. Teachers are also able to set rules and use other students as role models to demonstrate tolerated and positive behaviors within the school and classroom. These rules are later reinforced by the ecosystem in the school.

Parent report is not an accurate measure since parents may feel they need to over enhance their child's abilities. Parents views of readiness are related to their ethnic, cultural, and educational backgrounds. Diamond, Reagan, & Bandyk (2000) found that 18.8% of African American, 21.8% of Hispanic, and 28% of other parents had concerns about child's school readiness. While Caucasian parents making up

13.5% were concerned with their child's school readiness. These findings illuminate the cultural differences in views of school readiness along with parent's perceptions focused on academics neglecting socioemotional readiness.

Views of child school readiness through parent report would be expected to be different. As parent's views of school readiness and self-control are based on their demographic backgrounds it is key to take into account the key findings based on trained teacher reports. Children may exhibit more self-control at school because there are rules and expectations in place from teachers, principals, and administrators, when children do not follow those rules there are undesirable consequences. Considering this, teachers get to see the child's full potential of self-control because expectations are set high based on the teacher's other students. Parents on the other hand do not have an average of twenty children around them to compare their child to and set expectations for self-control and academic achievements. Therefore, it can be said that children will have more self-control at school as opposed to at home, thus providing a more accurate report of child self-control from a teacher's perspective because they are able to see what the child can fully achieve.

These findings illustrate that a student's level of reading is not the only determining factor when it comes to academic readiness. A child's self-control skills are another key factor in determining his or her overall academic readiness. Cognitive abilities account for one part of child's ability to perform academically. Non-cognitive abilities such as cognitive self-regulation encompasses, planning, sustaining attention, effortful control of attention or action, task persistence, and inhibition of impulsive responses. Emotional self-regulation includes the ability to control anger, sadness, joy,

and other emotional reactions which predict externalizing and internalizing problem behaviors. The findings of this study corroborate previous findings of Raver and Knitzer (2002) that children who have higher levels of self-control and lower levels of acting out their academic performance rises over and above the child's cognitive skills and family backgrounds. Skibbe et al. (2018) found that self- regulation development was associated with language and literacy skills which is consistent with the current study. Earlier self-regulation was also associated with higher skills and earlier development (Skibbe et al. (2018). Elliott and Gresham (2007) found teaching socially acceptable learning behaviors enable students to interact and learn effectively with others. Ability to exhibit prosocial behaviors allows for communication, cooperation, assertion, responsibility, empathy, engagement, and self-control which are key to learning effectively (Elliott & Gresham, 2007). Students with high amounts of regulation have goal-directed behaviors and higher mastery motivation and engagement which are linked to academic success (Zhou et al., 2007; Zimmerman, 1998).

There were significant differences within child race, those that remained in the sample 53% (40% out) were White Non- Hispanic, 1% (5% out) were Hispanic No Race Specified, and 7% (10% out) were Asian Non-Hispanic. The other categories of Black non- Hispanic (11% in; 15% out), American Indian/ Alaska Native, Non-Hispanic (1% in; 1% out), and Two or More Races, Non- Hispanic (5% in; 4% out) did not have significant differences. These findings illustrate that the groups of Black non-Hispanic, American Indian, and Two or more races remained representative of the sample and gave insight into minority groups influences on academic readiness. There

were also significant differences between those who spoke English at home and those that did not that remained in the sample. Those individuals that spoke English at home made up 97.2% (96% out) and those who did not speak English at home accounting for 2.8% (4% out) of the sample. These findings illustrate that the sample was dominant in English spoken at home.

Child sex was found to have effects on a child's self-control. Females had a higher mean on the teacher reported self-control. Females exhibit more behaviors than males. This can be explained by Smith (2016) with boys being able to internalize behaviors better than females, while expressing their externalizing behaviors more frequently than females.

The means of the sample for socioeconomic status were significantly different with those who had lower socioeconomic status being removed from the sample with a mean of -.14 and a standard deviation of .8. Those that remained in the sample had a higher mean of -.01 and standard deviation of .81. There were significant findings between higher socioeconomic status and higher reading scale score, higher self-control, and higher calculated academic readiness. Those with higher socioeconomic status may have the resources to provide meaningful learning experiences for their children and protective factors to create positive self- control. Controlling for socioeconomic status in the multiple regressions meant representing high socioeconomic status households results on academic readiness.

Parent type was also found to have significant influences on reading scale score, self-control, and academic readiness. Those individuals with two parents, either biological or adoptive, had significantly higher scores on reading scale score, teacher

reported self-control, and academic rating scale scores. Children with two parents had a mean of 49.3 and standard deviation of .14 on the results of their reading scale score. Those children with two parents also exhibited higher scores on teacher reported self-control with a mean of 3.2 and standard deviation of .007. It was also found that children with two parents had higher scores on academic rating scale with a mean of 89.3 and standard deviation of 25.63.

Limitations

Although this study has a number of strengths, a few key limitations should be noted. First, ECLS-K:2011, unlike the previous ECLS-K, did not select a sample of kindergarten teachers. As a consequence, there is no kindergarten teacher weight, and it is not possible to use the data from the ECLS-K:2011 to produce teacher-level estimates. This changes the analytic approach and the way that the findings are reported. All estimates of kindergarten teachers and their classrooms will be reported at the child level. Cross-cohort analyses of teachers and classrooms will need to be done at the child level.

Second, information on children's home life comes from parent responses to a set of interview items. Social desirability is always a concern when using data derived from such responses, and as Bassok, Daphna, et al. (2016) discuss, socially desirable responses can impact the gaps seen in children's early experiences if norms have changed differentially for different groups of parents (for example, parents in low- versus high-income families). In addition, the measures of family investments used in both cohort studies are limited to the frequency of child–parent interactions and children's exposure to different experiences. There are no data on the quality of

parent–child interactions or the quality of the experiences. To a large degree this is a function of decisions made originally by the ECLS-K study design team that were reconfirmed by the team responsible for the design of the ECLS-K:2011. In both cases, the decision was made to focus more on the breadth than on the depth of information the study would collect. The decision was also made not to visit children's homes, a decision that was based primarily on cost considerations. This decision ruled out any use of non-survey methods, such as observations of parent–child interactions.

Lastly, limitations for this study also include the elimination of the nearly 9,000 cases which in turn created a less representative sample of the total population of the United States racially, socioeconomically, and linguistically. The sample size being large may have created significance where significance was not warranted. Due to this, a high power was needed to create a more representative sample which may have omitted demographic variables that had influences on child reading scale score, and child self-control. Controlling for potentially confounding variables minimizes the potential for an alternative explanation of moderation effects and provides more confidence that effects are due to the independent variables. Testing threat can also occur when changes in test scores occur due to repeated testing, this is why Type I error was utilized. Regression threat can also have occurred when splitting groups into high and low for both reading and self-control. Multicollinearity is also a limitation of the study. Multicollinearity occurs when two explanatory variables; literacy and academic readiness, are highly linearly related. Seeing that reading scale score along with academic rating scale score both measured literacy skills in children multicollinearity occurred. An alternate limitation of this study is the fact that the

study was not experimental therefore causation cannot be inferred. An alternate limitation was the use of teacher report, although teacher report for this study was the more representative there are still limitations to teacher report. Teachers reporting on their student's abilities could rate those students that they have a positive relationship with better than those students that are seen as trouble makers. Teachers could also report harsher outcomes for those students who are not native English speakers, which may not provide an accurate picture of the child's abilities. The culture of the teacher also comes into play, when students vary in their cultural expectations they may act differently than other students when it comes to their self-control behaviors, their academic behaviors could also be thwarted by their culture (Lane, Wehby &Cooley, 2006; Rubie-Davies, Hattie, Hamilton, 2006).

Future Directions

These findings suggest that improving both reading and self-control skills in children may help to improve their academic readiness. Creating interventions in the school, community, and at home equip students with the tools they need to be successful students socially, emotionally and academically. Examining the implementation of these programs in congruence with regular academic practices would be interesting to view how students in an elementary school, middle school, and high school were affected in their personal views of self and others along with their testing scores. Creating interventions that work to use a child's self-control to work on enhancing literacy skills would help to strengthen academic abilities. When a child has self-control, they are able to focus their attention on a task and complete that task, therefore it is key that these self-control abilities be used for the child in all their

academics. Conversely, if a child has low self-control but high literacy teachers and parents could use books that illustrate self-control as a means for teaching that child skills towards emotional self- regulation and self- regulation.

A child's self-competence, emotional regulation, problem solving and school readiness are all within the micro system. The concentric circles around the microsystem produce positive and negative interactions that shape the individual in the microsystem to who they become. Goals towards self-control include parent- child interactions that are housed in the mesosystem. Increasing parental support is in this system as well when parents approve of a child's behaviors and choices the child feels more supported and has positive view of self and others, creating valuable relationships throughout their lives. The exosystem involves the child's social settings that are impacted by a child's self-control, for example their ability to express emotional reactions properly while exhibiting effortful control of attention and action towards others. Teachers and other adults that work to prevent, reduce, and treat social and emotional problems in young children are influencing the child's exosystem in a positive way. The macrosystem is where parents, teachers, and community members work to prevent conduct disorders, school dropout, delinquency and substance abuse. A family's socioeconomic status, ethnicity, language, and beliefs influence a child's ability to cope with internalizing and externalizing behaviors. The chronosystem involves the time spent by the child in positive nurturing environments that promote positive behaviors and coping strategies.

Bronfenbrenner's ecological systems model works to create protective factors in each level of the system, through fostering positive relationships between the child,

peers, adults, role models, and community members. This system is similar to that of a school system, the more positive environment the more socially emotionally developed the child will be at that time and later in life. Focusing on fostering socio-emotional programs allows for positive interventions in areas of child need such as reading, math, and science. If a child is able to express how they are feeling at the time of stress and frustration teachers, parents, and other community members can work to find other intervention strategies that will better suit that child.

Currently, there are several programs that focus on socioemotional development that should continue to be used in school settings. One program in particular Incredible Years designed to promote emotional and social competence to prevent, reduce, treat aggression and emotional problems in children aged 0- 12. This program found classroom social skills and problem solving increased child's school readiness in terms of their social competence, emotional regulation and parent involvement, along with increased problem- solving and decreased conduct problems. Teacher classroom management increased proactive teaching strategies including positive discipline and more focus on students' social and emotional competence. Classrooms that teachers implemented these strategies had children who were more cooperative, on task, and showed fewer behavior problems.

Collaborative for Academic, Social, and Emotional Learning (CASEL) focuses on self-awareness, self- management, social awareness, relationship skills, and responsible decision making. These skills increase self- efficacy, self- discipline, respect for others, teamwork, and problem solving. Students who completed CASEL showed improvements in academic achievement along with improved classroom

behavior, increased ability to manage stress and depression, along with better attitudes about themselves, others, and school.

At the school level social and emotional learning can be implemented in the classroom along with throughout the school through promoting safe and positive school climates and cultures positively affect academic, behavioral, and mental health outcomes. Adults modeling social and emotional competence exhibit clear norms, values, and expectations for students and staff members. Multiple individuals modeling creates an environment that is positive increasing student's self-perceptions, school connectedness, positive social behaviors, increase in school grades, achievement test scores, all while reducing problem behaviors.

APPENDICES

Table 1
Descriptive Statistics for the Sample of Children Dataset (N= 9,623)

	N	%	Minimum	Maximum	Mean	SD
Child Sex	9623	100%	1.0	2.0	1.49	.50
Male	4897	51.1%				
Female	4726	49%				
Child Race	9621	99.7%	1.0	8.0	2.31	1.83
White Non-Hispanic	5120	53%				
Black Non- Hispanic	1088	11.3%				
Hispanic Race Specified	2099	22%				
Hispanic No Race Spec.	84	1%				
Asian Non-Hispanic	655	6.8%				
Native Hawaiian/ Pacific Islander Non-Hispanic	37	.4%				

American Indian/ Alaska Native	75	.8%				
Non-Hispanic						
Two or More Races Non-Hispanic	463	4.8%				
Non- English	9621	100%	1.0	2.0	1.97	.17
Non-English Language at Home	268	3.0%				
Speak English at Home	9353	97.2%				
Parent Type	9623	71.9%	1	4	1.54	.88
Two Biological/ Adoptive Parents	6787	70.5%				
One Biological/ Adoptive Parent	666	6.9%				
and Other Parent or Guardian						
One Biological/ Adoptive Parent	1979	20.6%				
Only						
Other Guardians	191	2.0%				
Socioeconomic Status	9623	100%	-2.33	2.23	-.01	.81

Table 2

Pearson Correlation Matrix among Demographic, Independent, and Dependent Variables

	1	2	3	4	5	6	7	8
1. Child Sex	-							
2. Child Race	.007	-						
3. Parent Type	.004	.025*	-					
4. Non-English	-.011	-.146**	.054**	-				
5. Socioeconomic Status	.005	-.096**	-.343**	.003	-			
6. Reading Scale Score	.052**	-.021*	-.176**	.008	.406**	-		
7. Self- Control	.181**	-.015	-.148**	-.003	.128**	.193**	-	
8. Academic Rating Scale	.040**	-.049**	-.105**	.057**	.248**	.347**	.205**	-

*$p < .05$. **$p < .01$. ***$p < .000$.

Table 3

Means and Standard Deviations of Interactions and Academic Rating Scale Scores

	N	M	SD
High Reading x High Self- Control	2683	98.4	21.4
High Reading x Low Self- Control	1690	92.5	23.0
Low Reading x High Self- Control	2443	84.8	25.4
Low Reading x Low Self- Control	2807	76.6	27.3

Table 4

Summary of Hierarchical Regression Analysis for Variables Predicting Academic Rating Scale (N = 9,623)

	Block 1				Block 2			
Variable	*t*	*B*	*SE B*	*β*	*t*	*B*	*SE B*	*β*
Reading Scale Score	27.4	.63	0.23	.28***	27.4	0.63	0.02	.29***
Self- Control	14.6	6.0	.41	.14***	14.5	5.96	0.41	.14**
Centered Interaction					-1.83	-.062	.034	-.017
R^2			.16				.16	
R^2 Change			.1				.000	
F for change in R^2			544.0***				3.3	

Note: Parent type and Socioeconomic Status were controlled for. Reading and Self- Control were centered at their means.
*$p < .05$. **$p < .01$. *** $p < .001$.

Table 5

Summary of Hierarchical Regression Analysis for Variables Predicting Academic Rating Scale (N = 9,623)

	Block 1				Block 2			
Variable	*t*	*B*	*SE B*	*β*	*t*	*B*	*SE B*	*β*
Reading Scale Score	27.4	.63	0.23	.28***	20.3	.56	.03	.26***
Self- Control	14.8	6.1	.41	.14***	7.8	4.4	0.56	.13***
High Reading x High Self- Control					-4.5	-1.6	.351	-.070***
R^2			.16				.16	
R^2 Change			.1				.002	
F for change in R^2			548.3***				20.2***	

Note: Parent type and Socioeconomic Status were controlled for. Reading and Self- Control were centered at their means.
*$p < .05$. **$p < .01$. *** $p < .001$.

Table 6

Summary of Hierarchical Regression Analysis for Variables Predicting Academic Rating Scale (N = 9,623)

	Block 1				Block 2			
Variable	*t*	*B*	*SE B*	*β*	*t*	*B*	*SE B*	*β*
Reading Scale Score	27.4	.63	0.23	.28***	21.2	.59	.3	.27***
Self- Control	14.6	5.9	.41	.14***	12.6	6.8	0.54	.16***
High Reading x Low Self- Control					-2.31	-.789	.341	-.032*
R^2			.16				.16	
R^2 Change			.1				.000	
F for change in R^2			544.0***				5.33**	

Note: Parent type and Socioeconomic Status were controlled for. Reading and Self- Control were centered at their means.
*$p < .05$. **$p < .01$. *** $p < .001$.

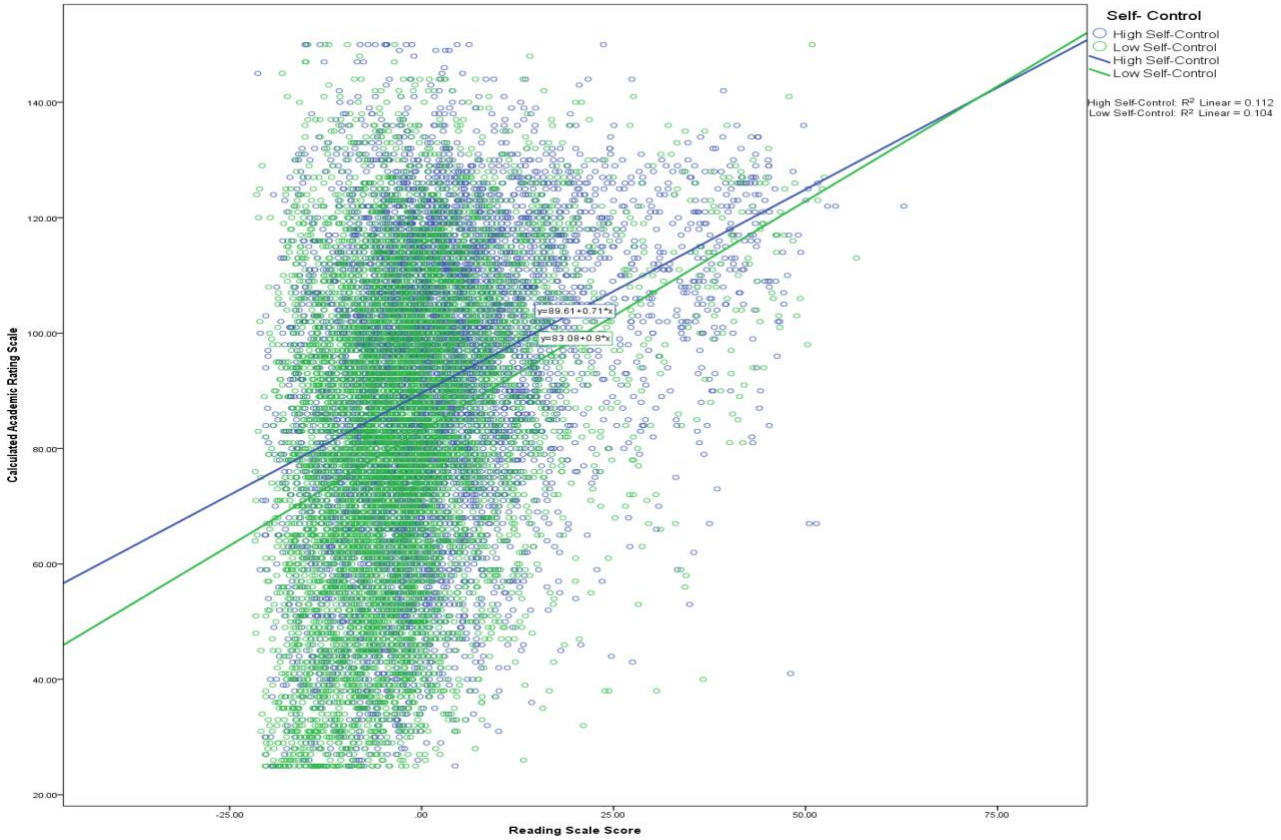
Table 7

Summary of Hierarchical Regression Analysis for Variables Predicting Academic Rating Scale (N = 9,623)

	Block 1				Block 2			
Variable	*t*	*B*	*SE B*	*β*	*t*	*B*	*SE B*	*β*
Reading Scale Score	27.4	.63	0.23	.28***	20.7	.57	.03	.26***
Self- Control	14.6	5.9	.41	.14***	13.6	7.12	0.53	.17***
Low Reading x High Self- Control					3.5	1.2	.36	.5***
R^2			.16				.16	
R^2 Change			.1				.001	
F for change in R^2			544.0***				12.1***	

Note: Parent type and Socioeconomic Status were controlled for. Reading and Self- Control were centered at their means.
*$p < .05$. **$p < .01$. *** $p < .001$.

Figure 6. Scatter Plot of Interaction between Reading Scale Score and Self-Control on Academic Readiness



Academic Rating Scale

The Academic Rating Scale is separated into three areas: (1) Language and Literacy, (2) Science, and (3) Mathematical Thinking. Please rate the child's skills, knowledge, and behaviors within each of these three areas based on your experience with the child identified on the cover of this questionnaire. This is NOT a test and should not be administered directly to the child. Each question includes examples that are meant to help you think of the range of situations in which the child may demonstrate the identified skills and behaviors. The examples do not exhaust all the ways that a child may demonstrate what he/she knows or can do. The examples do, however, indicate a level of proficiency a child should have reached in order to receive the highest ratings. Some of these examples describe a very high level of performance (beyond typical students) in order to evaluate achievement levels of the highest performing students.

The following five-point scale is used for each of the questions. It reflects the degree to which a child has acquired and demonstrated the targeted skills, knowledge, and behaviors.

- Not yet = Child has not yet demonstrated skill, knowledge, or behavior.
- Beginning = Child is just beginning to demonstrate skill, knowledge, or behavior but does so very inconsistently.
- In progress = Child demonstrates skill, knowledge, or behavior with some regularity but varies in level of competence.

- Intermediate = Child demonstrates skill, knowledge, or behavior with increasing regularity and average competence but is not completely proficient.
- Proficient = Child demonstrates skill, knowledge, or behavior competently and consistently.
- Not Applicable or Skill Not Yet Taught = Skill, knowledge, classroom setting. or behavior has not been introduced in

Rate only the child's current skills, knowledge, and behaviors. Rate each child compared to other children of the same age level. Please consider the full range of ratings when answering. If the skill, knowledge, or behavior has been introduced in the classroom, please rate the child by placing an "X" in the appropriate box for your rating. Place an "X" in the box for "Not Applicable or Skill Not Yet Taught" only if the skill, knowledge, or behavior has not been introduced in your classroom setting.

SECTION I: LANGUAGE AND LITERACY

This Child…	MARK ONE RESPONSE FOR EACH ITEM					
	Not yet	Beginning	In Progress	Intermediate	Proficient	Not Applicable or Skill Not Yet Taught
1. Uses complex sentence structures - for example, says "If she had brought her umbrella, she wouldn't have gotten wet," or "Yesterday it was raining cats and dogs," or "Why can't we go on the field trip at the same time as the first grade?"						
2. Understands and interprets a story or other text read to him/her - for example, by retelling a story just read to the group, or telling about why a story ended as it did, or connecting part of the story to his/her own life.						
3. Easily and quickly names all upper- and lower-case letters of the alphabet.						
4. Predicts what will happen next in stories by using the pictures and storyline for clues.						

5. Reads simple books independently - for example, reads books with a repetitive language pattern.						
7. Demonstrates early writing behaviors - for example, by using initial consonants to spell words ("d" for the word "dog"), or using letter names to represent sounds ("r" for the word "are"), or phonetic spelling ("hrt") for the word "heart," to convey words or ideas.						
8. Composes simple stories, for example, by writing about a personal experience in a journal.						
9. Demonstrates an understanding of some of the conventions of print - for example, by using both upper and lower case letters when writing, or putting spaces between words, or using a period at the end of a sentence.						

SECTION II: SCIENCE

This Child…	MARK ONE RESPONSE FOR EACH ITEM					
	Not yet	Beginning	In Progress	Intermediate	Proficient	Not Applicable or Skill Not Yet Taught
10. Uses his/her senses to explore and observe - for example, observes and notes the habits of classroom pets, or describes the differences in clay before and after water is added.						
11. Forms explanations based on observations and explorations - for example, describes or draws the conditions (water, soil, sun) that help a plant grow, or explains that a block will slide more quickly down a steeper slope.						
12. Classifies and compares living and non-living things in different ways - for example, classifies objects according to "things that are alive and not alive," or "things that fly and things that crawl."						
13. Makes logical predictions when pursuing scientific investigations - for example, observes and identifies patterns in nature and predicts what happens next (e.g., predicts if a new object will float or sink).						

14. Communicates scientific information - for example, records or describes the properties of common objects verbally or through drawings or graphs.						
15. Demonstrates understanding of physical science concepts - for example, makes observations that different materials have different properties or compares the relative sizes and characteristics of objects.						
16. Demonstrates understanding of life science concepts - for example, recognizes the five senses and the related body parts, or describes the similarities and differences in the appearance of plants.						
17. Demonstrates understanding of earth and space science concepts - for example, describes properties of rocks, soil, and water; or identifies that the sun gives light and heat to Earth.						

SECTION III: MATHEMATICAL THINKING

This Child…	MARK ONE RESPONSE FOR EACH ITEM					
	Not yet	Beginning	In Progress	Intermediate	Proficient	Not Applicable or Skill Not Yet Taught
18. Sorts, classifies, and compares math materials by various rules and attributes - for example, by creating a rule for sorting keys, such as "keys with numbers" in one pile and "keys without numbers" in another pile, or by sorting shapes by several attributes such as "large plastic shapes" and "small wooden shapes."						
19. Orders a group of objects - for example, by ordering rods or sticks by length, or arranging paints from lightest to darkest or musical instruments from softest to loudest.						
20. Shows an understanding of the relationship between quantities - for example, knows that a group of ten small stones is the same quantity as a group of ten larger blocks.						
21. Solves problems involving numbers using concrete objects - for example, "Vera has six blocks, George has three, how many blocks are there in all?" or "How many do I need to give George so he						

will have the same number of blocks as Vera?"						
22. Demonstrates an understanding of graphing activities - for example, by looking at a picture graph on favorite ice-cream flavors and knowing which flavor is the most popular and which one is the least popular.						
23. Uses instruments accurately for measuring - for example, by using a balance scale to compare the weight of two objects, or using tablespoons and teaspoons during a cooking project, or using a measuring tape to measure the length of different objects.						
24. Uses a variety of strategies to solve math problems - for example, by using manipulative materials, looking for a pattern, or acting out a problem.						
25. Models, reads, writes, and compares fractions for example, shows that ½ of the candy bar is ¼ + ¼, or shows that ¼ of a set of 12 is 3.						

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