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Literacy and behavior in early childhood: Exploring the factors that impact achievement

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Literacy and Behavior in Early Childhood:
Exploring the Factors that Impact Achievement

by

Melissa Farino Todd

A dissertation proposal submitted in partial fulfillment
of the requirement for the degree
Doctor of Philosophy
Department of School Psychology
College of Education
University of South Florida

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Dedication

I would like to dedicate this dissertation to my amazing daughters, Kaitlyn and Olivia, who have demonstrated patience beyond their years during the many hours Mommy was writing (a.k.a., doing “homework”). I can only hope that through this process I have taught them the importance of education and perseverance. Girls, never stop reaching for the stars or let anything stand in the way of your dreams. Mommy did it, and so can you. I love you both more than you can imagine.

I would like to thank my husband, Shannon, for his unwavering love and support as I pursued my doctorate. Throughout that decade, you celebrated my achievements and helped me through the challenges. I am certain that this document would not have been completed without your support. You have been my rock....I love you.

Thank you, also, to my parents, Frank and Dianna Farino, who have been my cheerleaders since birth. You have always been on the sidelines encouraging me to do my personal best. Words cannot express my gratitude not only for all that you have taught me but for the love and support that you have given me throughout my life.

Finally, I would like to dedicate this dissertation to my late father-in-law, James C. Todd, Ph.D. Our frequent conversations about academia and your genuine interest in my scholastic endeavors have been a great source of motivation. I miss you tremendously and take comfort in knowing that you are celebrating this achievement in heaven. I hope that I have made you proud.

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Literacy and Behavior in Early Childhood:
Exploring the Factors that Impact Achievement

Melissa Farino Todd

ABSTRACT

Academic achievement has been the focal point in education for decades. In 2001, an Act of Congress was proposed to improve individual outcomes in education through evidenced based research using measurable goals, higher standards, and accountability. This federal legislation, known as the No Child Left Behind Act of 2001, mandates that all teachers be highly qualified by 2006 and that all students become proficient by the 2013/14 school year, specifically in the area of literacy. Consequently, kindergarten readiness has become an area of concern, thus placing preschool teachers under pressure to prepare children for school. The purpose of this study was to examine multiple factors that have been identified in the literature as impacting achievement in elementary and secondary education to ascertain their contribution toward literacy development in preschool children. Such factors included child (gender, race, home SES, attendance, behavior) and childcare site (teacher education, teacher experience, class size, site SES, class environment). Additionally, within-child protective factors were examined for their role in literacy development for children with and without challenging behaviors.

To examine early literacy and behavior in preschool children, hierarchical linear modeling (HLM) was conducted with literacy skills (expressive language and phonemic awareness) assessed at four points in time through the Individual Development and Growth Indicators (IGDI). A significant relationship was found between expressive language skills and race, attendance, classroom environment and class size. Phonemic awareness was significantly related to gender, home SES, and teacher education. Within-child protective factors positively impacted phonemic awareness skills for children in the non-challenging behavior group only. An in-depth description of the findings and limitations are discussed within this document.

Overall, this study suggests that many of the factors impacting achievement in elementary and secondary education also impact literacy development in preschool children. These findings support the use of early intervention and preventative services for this population as a means to promote kindergarten readiness and future achievement.

CHAPTER ONE

INTRODUCTION

Academic achievement, specifically in the area of literacy development, has been the focus of national concerns about effective schooling since the 1980's (A Nation At Risk, 1984). Since that time, state and federal legislation has placed increasingly higher expectations on public schools to improve student achievement. In 2001, the United States Congress re-authorized the Elementary and Secondary Education Act (ESEA) as the No Child Left Behind (NCLB) Act. The goal of this Act is to improve the performance of elementary and secondary schools by requiring schools to make Adequate Yearly Progress (AYP), with all students meeting proficiency (as set by the individual state) by the 2013-14 academic year (12-Year Timeline). Statewide accountability through annual assessment also was mandated, requiring disaggregated results (i.e., poverty, race, ethnicity, disability, and limited English proficiency) to measure the schools' effectiveness in teaching all children.

The 12-year timeline set by the NCLB Act was established to enable states and school districts to conform to the legislation and raise student achievement to predetermined benchmarks. In an effort to monitor progress over time, an expected trajectory was mapped out, thus providing a slope depicting the start and goal points of student proficiency. This slope shifts based on yearly

assessment outcomes and represents the rate of change over time (how far the school is from meeting the goal). When the NCLB Act was passed in 2001, the slope illustrated a gradual yearly progression toward the goal of student proficiency. In the 2007-08 academic year, 28.1% of schools in the United States did not maintain AYP. This is in comparison to 25.8% and 26% of schools failing to make AYP in the 2005-06 and 2006-07 years respectively. As the requirement for the percentage of students making proficiency increases, the difficulty of the task also increases.

As children enter kindergarten, they demonstrate variable levels of readiness that are dependent upon childhood experiences during the preschool years. Some groups (e.g., low SES) are more vulnerable. Early childhood educators (preschool teachers of three and four year old children) are, therefore, under pressure to ensure that students are 'ready' for school. The term 'ready' as it relates to education typically is defined as the specific set of cognitive, linguistic, social, and motor skills that enable the child to assimilate the curriculum (Lewit & Baker, 1995). In recent years, there has been an increased interest in improving student readiness for kindergarten. In 2002, a constitutional amendment was passed in Florida, and subsequently signed by Governor Bush in 2005, requiring a free and voluntary preschool program for all four-year-old children. This Voluntary Pre-kindergarten Education Program (VPK) is designed to prepare children for school by enhancing their pre-reading, pre-math, language, and social skills. There are approximately 220,000 four-year-old

children who are eligible for VPK each year. As of February 2008, 123,857 four year olds were enrolled.

Developmental Trajectories: Implications for Academic Achievement

Academic and social-emotional competencies are key contributors to healthy development and subsequent success in society. According to Ramey and Ramey (1998), a child's competencies increase steadily throughout his or her life to produce a pattern of typical development. This was depicted through their model illustrating the trajectories of children based on the quality of cognitive and social development. The basic premise is that the trajectory changes to illustrate a developmentally delayed course when cognitive and social competencies are deficient. As time passes, the gap between the typical and delayed trajectories increase, known as the zone of modifiability (Ramey & Ramey, 1998), or the area where remediation attempts are implemented. The significance of this model is the authors' theory that experiences in early childhood may alter children's competencies over time, therefore supporting the need for appropriate early prevention and intervention services.

Although intervention at any point in the trajectory is beneficial to the child, it is the first five years of life that are critical to development. Early experiences during this time fuel the neural connections that lay the foundation for language, reasoning, problem-solving, behavior, and emotional health (Getting Ready, 2004). Children are actively learning from the moment of birth through the various types of experiences the infant has with caregivers, which are ultimately related to all aspects of development (Ramey & Ramey, 2004). Research has

shown that children with developmental delays learn and benefit when they enroll in school; however, the *rate* of learning is not sufficient enough to compensate for the entry- level gaps, which often are in excess of 2 or more years (Ramey & Ramey, 2004). Efforts to close this gap and promote positive child outcomes must include several influences such as contributions of the family, neighborhood, and childcare setting (Getting Ready, 2004).

Unfortunately, low student achievement tends to be persistent over time (Snow, Burns, and Griffin, 1998). Persistent poor academic achievement has been identified as one of the primary factors leading to school drop out in a review conducted by the National Research Council (2001). It is important to begin intervention early, often prior to the typical start of school for students at-risk. This has been especially notable for children coming from economically disadvantaged families. These children tend to begin kindergarten lacking readiness skills (Getting Ready, 2004; Ramey & Ramey, 2004). Intervention prior to the entrance of elementary school addresses the maladaptive developmental trajectory, a trajectory that threatens future academic achievement.

Implications of Children At-Risk

Approximately 250,000 children between the ages of birth to three were identified having a developmental delay in 2001 (U.S. Department of Education) and consequently received Part C services (early intervention services for infants and toddlers with disabilities provided under Individuals with Disabilities Education Act). Many children enter the school system unprepared for the

demands and expectations set for them (Ramey & Ramey; 1998). Without the appropriate early intervention, these children become at-risk for low achievement, high retention rates, special education placement, and drop-out (Ramey & Ramey, 1998; Dodge, Petit, and Bates, 1994). Additionally, the probability that these children will experience teen pregnancy, delinquency, unemployment, and social dependency later in life increases (Barrera, et al., 2002; Ramey & Ramey; 1998). There are numerous factors that contribute to a child's success or failure in school. These include parental involvement in education, family socioeconomic status, self-regulation, and appropriateness of the school curriculum in relation to the child's needs, all of which impact the preschool and early elementary school years (Stipek, 2001).

The literature often refers to the aforementioned factors in terms of risk and protective factors. Risk, in social science, refers to the likelihood of adversities occurring to an individual or a group based on the presence of one or more factors (Garmezy, 1994; Werner, 1992). For example, a child may be at risk for reading difficulties if the parents are illiterate and provide no enrichment activities in the home. However, if the same child is enrolled in a preschool program with a strong emphasis on reading activities and accompanies his or her cousin to the local library each Saturday, the risk is decreased. The latter scenario refers to protective factors, which serve as safeguards promoting adaptation and enabling the individual to resist the adversity. Risk and protective factors are best considered within an ecological framework (accounting for

family, peer, home, school etc.) to appreciate the various factors affecting a child's development.

Academic achievement is a prominent outcome measure utilized in examining the impact of risk and protective factors. The NCLB Act has emphasized the importance of literacy development at the elementary school level. This has led to an increase in research on the development of readiness skills and early literacy development in preschool children. It has become clear that early literacy skills such as vocabulary, letter recognition and sound/letter correspondence are good predictors of children's reading abilities throughout their education (Getting Ready, 2004; National Reading Panel, 2000; Snow, Burns, and Griffin, 1998). However, Ramey and Ramey (2004) reported that nearly one third of children entering kindergarten were "not ready" for the typical kindergarten curriculum. A school district in west central Florida reported that 30.3% of children who enrolled in kindergarten were 'not ready' to begin the kindergarten curriculum (Pinellas County Schools Kindergarten Readiness Standards Report for 2002). This percentage increased to a range of 38% to 66.7% for the children in the school who were designated as "low socioeconomic students" through their enrollment in subsidized child care programs (e.g., Head Start) and supplemental educational services (e.g., Title 1).

At a statewide level, the results of the 2006-07 Florida Kindergarten Readiness Screener (FLKRS) illustrate the difference in readiness between children who attended VPK and children who did not. Ninety-three percent of the children who completed the VPK program scored "Ready" for the kindergarten

curriculum as measured by the Early Childhood Observation System. This is in comparison to 84% of children who did not participate in the program. When measured on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS), 84% of the children who completed the VPK program scored “Ready” on the Letter Naming Fluency component, compared to 64% of children who did not participate. Initial Sound Fluency is another area of the DIBELS that is used in the kindergarten screening process. Seventy-two percent of the children who completed the program scored “Ready” on this measure as opposed to 62% of children who did not participate in VPK.

Not surprising, early literacy skills also tend to be more developed in young children who have been read to on a regular basis by their caregiver and have been linked to increased academic achievement and later success in school (Child Trends, 2004, Ramey & Ramey, 2004). Unfortunately, the occurrence of this daily, beneficial parent-child interaction was reported as being slightly over 50% for children birth through five years of age, with 21% of children under the age of three being read to twice weekly or less. It is for these reasons that Ramey & Ramey (1998) argue that early intervention is imperative in the efforts to prevent poor intellectual development for children who do not receive adequate stimulation at home.

Academic-based tasks such as identifying letters and numbers are important when assessing student readiness (Ramey, 2004). However, the academic behavioral competencies (managing emotions and behaviors, attending to the task, etc.) of the child are often of equal or greater significance

(Lin & Lawrence, 2003; Webster-Stratton & Reid, 2004) when determining level of readiness for school. Johnson, Gallagher, Cook and Wong (1995) examined the views of kindergarten teachers regarding the skills deemed critical for success in their classrooms and found that academic skills were not as high of a priority as originally hypothesized. Rather, the skills highlighted as high priority were self-help skills, understanding, following classroom rules and routines, and working independently. Overall, 22 skills were listed, of which only 4 were academically oriented. The highest ranking developmental domain was the social domain with language ranked as a close second.

Behavioral Competencies and Academic Achievement

The relationship between appropriate classroom behavior and student achievement is well established (Patterson et al., 1982; Frick et al., 1991; Hindshaw, 1992; Arnold, 1997, Arnold, et. al, 1999; DSM-IV-TR, 2000; Squires, 2000; Nelson et al., 2003). Academic behavioral competencies such as self-control, attending to, and remaining on, task and following directions are associated with high academic achievement. Poorly developed academic behavioral competencies may compromise academic achievement and lead to subsequent antisocial behavior (Child Trends, 2004).

Conroy and Brown (2004) reported the prevalence of significant social/emotional delays in preschool children. Twelve to sixteen percent of 1 and 2 year olds (37% of these children continuing along a maladaptive trajectory throughout their preschool years) and 25% in 2-3 year olds (50% of this group remaining on the maladaptive track) demonstrate these delays. Data suggest

that developmental delays in the social/emotional domain are widely associated with problematic transition (difficulty adapting to the expectations and boundaries) into the school setting (Rimm-Kaufman, Planta, and Cox, 2000).

The Kindergarten Readiness Standards Report (2002) reported that a significant number of children who were enrolled in publicly funded childcare centers experienced difficulties in literacy development and demonstrated delays in social/emotional development. This report indicated that 30% of the children were unable to follow classroom rules, 25% were unable to handle a problem acceptably, and 15% did not interact appropriately with peers or adults. The need for augmented focus on children's literacy and social and emotional development is clear.

The co-occurrence of poor academic achievement and behavior problems often adversely impacts student achievement in reading (Farmer and Bierman, 2002; Hindshaw, 1992). Arnold et al. (1999) concluded that the more severe the behavior problem, the poorer the literacy achievement. Kamps (2000) and Kauffman (2001) reported that 60% of children who exhibited behavior problems also had academic difficulties, predominately in the area of reading.

Furthermore, children who did not develop basic literacy skills before they entered kindergarten were 3 to 4 times more likely to drop out of school in later years (Kamp, 2003). Kamps (2003) reported that there was an increased occurrence of disruptive behaviors negatively impacting instruction and student learning as well as an increased number of students who failed to acquire competent levels in reading. Although the relationship between deficits in

reading achievement and externalizing behavior problems has been well established (Torgeson, 2000; Hinshaw, 1992; Frick et al., 1991), no clear directionality has been determined. What is clear is that academic underachievement and behavior problems become less responsive to interventions over time (Hinshaw, 1992; Kazdin, 1987).

Academic Achievement and Behavioral Competencies: A Circular Relationship

The relationship between conduct problems and academic achievement is circular in nature meaning that it is difficult to ascertain where the problem begins. Arnold (1997), Arnold et al. (1999) and Stipek (2001) suggest that conduct problems limit the child's opportunities to learn. For example, if a child is either engaged in or being reprimanded for inappropriate behavior, the amount of academic engaged time is subsequently reduced. A cycle develops whereby continual behavior problems contribute to an increase in negative perceptions regarding school, decreasing motivation, which then augments the child's poor achievement, ultimately fueling the behavior problems. This pattern typically becomes stable over time, making the cycle less responsive to interventions. The second perspective examines the presence of poor academic skills in preschool or early elementary school, which consequently exacerbates behavior problems (Stipek, 2001). In this scenario, a child may engage in inappropriate behavior to mask the academic difficulty or to express frustration with the task. Teachers often contribute to the circular relationship by providing fewer learning opportunities (i.e., less likely to call on, question or provide information) to children who display behavior problems. This reinforces the child for avoiding

the aversive academic tasks, while at the same time limits the much needed instruction to increase skills. This cycle has been found in preschool environments as well, resulting in children learning to become disengaged from the academic environment prior to entering formal schooling (Arnold et. al, 1999).

Arnold (1997) reported that externalizing behaviors predicted academic skills and vice versa, with the relationship between the two strengthening with age. Increased levels of externalizing behaviors were reported for children who experienced early reading difficulties. According to Hindshaw (1992), the appearance of the behavior changes over time, pairing inattention and hyperactivity to childhood underachievement and antisocial behavior and delinquency to adolescent underachievement. When controlling for prosocial behavior, Caprara (2000) found that early academic achievement did not predict later achievement; rather prosocial behavior strongly predicted subsequent levels of achievement when holding early achievement constant. In summary, academic achievement is associated with the academic behavioral competencies that complement learning (Raver and Knitzer, 2002). The child's academic achievement and experiences with success or failure influence the foundation for future behavior and subsequent achievement as they affect the child's conduct and motivation.

Statement of the Problem

Educators across America have been challenged with the task of increasing the effectiveness of schools through the provisions of the NCLB Act. Early Reading First is a nationwide effort developed to improve the effectiveness

of instruction in early literacy in early childhood centers that serve low-income families. Scientifically based reading research was used to develop instruction to enhance language and cognitive skills and to improve the early reading foundation that prepares children for kindergarten and beyond (U.S. Department of Education, 2008).

Children with low academic skills are at risk for later academic difficulties (Ramey & Ramey, 2004; Stipek, 2001; Snow, Burns & Griffin, 1998), and early emergent behavior problems in preschoolers are likely to continue on a maladaptive trajectory (Hindshaw, 1992; Patterson, et al., 1992). However, these children are not predestined for failure. Rather, the research clearly supports the need for systems change in early education pertaining to policy and practice in an effort to circumvent the maladaptive trajectory. However, a substantial void remains with regard to which developmental domain should be the focal point. That is, while the case for early intervention is provided, it remains unclear as to which risk factors emerge first, behavior issues or poor achievement. Support has been established for the circular relationship between the two, with primary attention on elementary aged children and adolescents. Several limitations are evident in the literature to date. First, the research examining the relationship between academic achievement and behavioral competencies has not focused on preschool children. Second, many studies quantify academic achievement by obtaining normative scores on standardized measures. A more appropriate measure of academic achievement is curriculum-based measurement (CBM), which is a more sensitive method for gathering

information regarding student performance based on the child's curriculum.

Nichols et. al (2004) supports the notion that the use of CBM data to guide instruction results in greater growth in phonemic awareness skills despite gender, socioeconomic status (SES), preschool experience and race, a characteristic that is especially applicable in this line of research. Third, while the literature has addressed the role of an individual mediating factor (SES), there does not seem to be a line of research examining multiple factors and their potential roles in the achievement-behavior relationship.

Purpose of the Study

The purpose of this study is twofold. First, it will examine the relationship between literacy development and behavior difficulties in preschool children. Second, the role of within-child protective factors in literacy development will be explored. It is anticipated that data gleaned from this study will contribute to the literature as well as provide relevant information regarding the potential avenues for early intervention services.

Research Questions

1. How does positive and negative classroom behavior contribute to the rate of literacy development among preschool children?
2. What factors (i.e., gender, race, SES, teacher experience, classroom environment, class size) contribute to the rate and levels of literacy development for children identified with typical or challenging behaviors?
3. What differences are there between literacy development in children with challenging behaviors who have high scores measuring within-child

protective factors in comparison to children with challenging behaviors who have low scores measuring within-child protective factors?

Definition of Terms

The terminology and concepts utilized in the current study are presented in Table 1. The purpose of this table is to ensure the reader becomes familiar with terms used in the Early Learning Opportunity (ELO) grant.

Table 1.

| <i>Definition of Terms</i> | |
|--|---|
| <i>Concept/Term</i> | <i>Definition</i> |
| <i>Teacher Participant</i> | Early childhood educators who participated in the program evaluation component of the ELO grant. |
| <i>Student Participant</i> | Preschool children who were taught by the teacher participants and participated in the program evaluation component of the ELO grant. |
| <i>ELO Head Evaluators</i> | Three doctoral candidates from the University of South Florida who were hired to collect and manage the data obtained from the ELO evaluation activities. |
| <i>Home Socioeconomic Status (SES)</i> | The median household income within a geographical region (based on zip code) in which the child resides. |
| <i>Site SES</i> | The median household income within a geographical region in which the childcare site is located. |
| <i>Classroom Environment</i> | Represents the literacy-related environment (variety of books and writing materials easily accessible to the child) and teacher-child interaction (use of open-ended questions) within the preschool classroom. These data are based on a classroom observation checklist (e.g., ELOC) used in the program evaluation component of the ELO grant. |
| <i>Early Literacy Development</i> | Represents preschool achievement in Expressive Language and Phonemic Awareness as measured by the three subtests of the Individual Growth and Development Indicators (IGDI). |

Table 1. (Continued)

| <i>Definition of Terms</i> | |
|--|--|
| <i>Within-child protective factors</i> | Characteristics that enhance resiliency and discourage adverse outcomes in preschool children. These are represented by the Total score on the teacher-completed Devereux Early Childhood Assessment (DECA) questionnaire, which is comprised of three subtests (i.e., Initiative, Self-Control and Attachment). |
| <i>Behavior</i> | The academic behavioral competencies (e.g., self-control, attending to, and remaining on, task, and following directions) that typically aid in academic achievement. The Behavior Concerns score on the DECA represents high or low levels of behavioral competencies of the child participant. |

CHAPTER TWO

REVIEW OF THE LITERATURE

According to Stipek (2001) and Arnold et. al (1999), children's long term academic success is highly predicted by their academic skills as they begin school, with academic development beginning long before they enter formal schooling. Stipek (2001) linked academic achievement in first grade to high school completion, suggesting that low academic performance in the earlier grades leads to low performance in subsequent grades. Howse, Calkins, Anastopoulos, Keane, and Shelton (2003) stated that children's' academic performance remains "extremely stable" after the first grade. Specific to reading, Al Otaiba & Fuchs (2002) reported in a review of the literature that children experiencing reading difficulties in first grade remained poor readers in fourth grade, with the gap between these children and their fluent peers widening over time. Specific skills associated with this link included receptive and expressive language ability, both of which have been correlated with reading ability in the first few years of elementary school (Pikulski and Tobin, 1989; Scarborough, 1989).

To expand on the importance of early academic success, Stipek (2001) reported that the performance of elementary children segregated in low-skilled reading groups is substantially less than those children placed in the high-skilled groups. This difference in achievement gains was explained by the teaching

methods employed within each of the two groups. It was noted that the focus in the lower-skilled group centered on decoding whereas the higher-skilled group was involved in more meaningful questions and opportunities to connect reading to personal experiences. The former group will likely have difficulty catching up to the latter group due to this ability group placement method (Stipek, 2001). Another issue regarding children entering kindergarten with low skills is the common practice of grade retention. Although geared to assist children in “catching up,” the research has clearly proven the aversive affects, including a higher drop out rate. More specific, retention for one year leads to a 50% likelihood of dropout while retention for a second year has a dropout rate of 90% (Baker, et al., 2001). Despite this statistic and lack of research supporting retention (Jimerson, 2001), students continue to be retained based on inadequate academic progress. Furthermore, in 2002, the Florida legislature mandated that unless they meet “good cause exemption,” third graders who obtain a level 1 on the Florida Comprehensive Achievement Test (FCAT) would not be promoted to the fourth grade. This demonstrates that grade retention continues to be a widely used technique and further supports the view that children who enter school with poor academic skills are at a disadvantage.

Children demonstrating behavioral difficulties also are placed at a disadvantage in comparison to their more typically adjusted peers. In one study, Howse et al. (2003) explored the relationship between emotional regulation in early childhood and emotional/behavioral self-regulation and academic achievement in kindergarten. Results suggest that children who have difficulty

with emotional regulation in early childhood continue to experience challenges with regulation in the kindergarten classroom. Furthermore, children with higher emotional and behavioral regulation demonstrated higher achievement scores in literacy, math and listening comprehension. Howse et al. (2003) cited Blair (2002) in explaining these results, indicating that children who experience difficulty with emotional regulation are not able to simultaneously engage in problem solving tasks and may withdraw in response to anxiety evoking situations, thus interfering with their ability to remain academically engaged in the classroom.

Although a link has been established between academic achievement and behavior difficulties in elementary aged children and adolescents, there is little research examining these variables among preschool children. For example, reviews of the literature conducted by Al Otaiba & Fuchs (2002) and Nelson, Benner, & Gonzalez (2003) revealed evidence supporting the link between reading deficiencies and behavior problems in children. According to Nelson et. al (2003), sixty to 100 percent of children with behavior disorders also have poor reading performance, with three out of four espousing language deficits specific to phonological processing. Both of these statistics are known to be stable or increase over time. Lane, Wehby, Menzies, Gregg, Doukas, and Munton (2002) examined the effectiveness of early literacy instruction in first grade students who were at risk for anti-social behavior. Participants were selected based on their documented resistance to previous school-wide intervention attempts, which included a literacy and behavioral component. Children in the study participated

in 30 small group lessons, yielding a total of 15 hours of intervention across nine weeks. Effect sizes from the study indicated strong progress in decoding skills for all students, with increases in oral reading fluency for three of the seven children. Effect sizes also revealed significant decreases in disruptive behavior within the classroom setting.

Torgesen et. al (1999) stated that the two best predictors of a child's response to intervention in relation to reading achievement is the home environment (i.e., family income and parent education) and behavior problems. Torgesen et. Al (1999) and Torgesen (2000) have found that behavioral issues impede the child's ability to benefit from intervention, even in a one to one setting. Given that the majority of instruction is presented in a whole group format, it appears that these children are often not profiting from the much-needed academic material. However, Barrera et al. (2002) reported that the implementation of comprehensive interventions to prevent behavioral problems have a favorable impact on social development when it includes an academically-based instructional component. With the data stacking up in support of the achievement-behavior linkage, the focus of this literature review now turns to the underlying factors that influence development in these areas deemed essential for success in society.

Risk Factors Associated with Academic and Social-Emotional Development

The literature supports the aversive effects of risk factors in relation to child development (Atzaba-Poria, Pike and Deater-Deckard, 2004; Schulz & Shaw, 2003; Stipek, 2001; Ziegler & Styfco, 2001), indicating that 50% of

kindergarteners in the United States are from families with one or more risk factors for school failure (Landry, 2002). Thirty-three percent of these children who espouse only one risk factor will obtain reading scores in the bottom quartile (Landry, 2002). Researchers examining multiple risk factors have developed an argument pertaining to the effects of each risk, debating whether cumulative risks adhere to a threshold (Rutter, 1979) or linear (Sameroff et. al 1998) model. More specific, a threshold model implies that as risk factors are added the effect multiplies as opposed to a linear model where an increase results in a steady increase in problematic outcomes. A recent exploration of these models indicates a substantial increase in problem behaviors as a result of exposure to increased risk factors, particularly if exposure was at an early age; however, a threshold effect was not supported (Appleyard, et. al, 2005).

Flanagan, Bierman and Kam (2003) espoused a slightly different model, although maintained a similar construct. These authors suggested that aggression, hyperactivity-inattention, and social skills deficits are developmentally intertwined, with elevations in any one increasing the probability of elevations in the remaining two. The authors found that these characteristics assessed at school entry predicted later school difficulties in the behavioral, academic and social adjustment domains with increased levels of maladjustment being contingent upon the presence of more than one behavioral issue.

In a more specific study regarding risk factors relating to academic and behavioral development, Kamps (2003) conducted a 3-year longitudinal study examining the literacy growth and risk factors of young children, the majority of

whom were from culturally diverse and economically disadvantaged backgrounds. Screenings were conducted using the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) to assess literacy skills and the Systematic Screening for Behavior Disorders (SSBD) to tap into early behavior problems. Utilizing hierarchical linear modeling (HLM) the researchers found that early risk influenced students' progress in reading fluency over time. Of greater importance is that children who demonstrated the greatest difficulty becoming fluent readers were those who initially possessed both academic and behavioral risks (Kamps, 2003). The next group to demonstrate reading difficulties was the students with academic risks only, followed by those students with behavioral risks only. In comparison to the general population, Kamps (2003) found that children in early elementary school faced with a single risk factor, behavior or academic, performed lower in reading fluency assessments. Kamps (2003) concludes that children who begin school with lower skill levels are least ready and demonstrate slower progress over time; however, effective curricula and frequent progress monitoring can facilitate literacy success.

Implications of these research studies clearly indicate an intense need for early intervention services geared toward the reduction of risk factors in early childhood years in an effort to curb the potential for maladaptive pathways. Several risk factors appear prominent during this critical developmental phase including family-based, community-based and childcare center-based. For the purposes of this review, the latter two areas will be discussed.

Ecological Systems Theory

Bronfenbrenner (1979) formulated the ecological approach to human development, reasoning that children are influenced by their family, with the well-being of the family, in turn, influenced by the community in which they reside. Following Bronfenbrenner's Ecological Systems Theory where the child is viewed as developing within a complex system of relationships affected by multiple levels of the surrounding environment, The Child Mental Health Foundations and Agencies Network (FAN) reported risk factors associated with academic and behavioral problems at the beginning of school. This nested system includes the microsystem, mesosystem and exosystem pertaining to the child's dynamic and ever-changing environment. The discussion below will categorize each of the risk factors based on their place within this theory.

Microsystem

The innermost layer, the Microsystem, encompasses the activities and interaction patterns in the child's immediate surroundings, with all relationships being bi-directional and reciprocal. In applying this layer to young children there are two distinct areas including Family/Peers and Childcare, in addition to the general identifying characteristics of the child.

Effects of gender on achievement. In their extensive review of the literature, Diamond and Onwuegbuzie (2001) reported the trend of gender differences over time in the area of reading. More specific, the authors revealed that females obtained higher levels of reading achievement than their male counterparts while also espousing a more positive attitude toward the activity of

reading, particularly recreational. In addition, fewer females were referred for leaning problems in reading. According to Diamond and Onwuegbuzie (2001) the gender difference gap in reading achievement has been consistently found to be stable over time with differences in reading attitudes widening with age, both favoring females. Although gender differences were not found when children with diagnosed learning disabilities were examined, disparities were noted when children were informally identified by their teacher as struggling academically (Morgan and Dunn, 1988). Notably, girls and boys were described as “invisible” and “visible” respectively, based on their response to academic problems. Morgan and Dunn (1988) suggested that the former group presents themselves as less noticeable and more shy, often in an attempt to hide their uncertainty. This type of behavior does not disrupt the classroom environment, unlike the boy-specific “visible” behaviors (i.e., demanding teacher attention, acting out), therefore increasingly the likelihood of girl’s being under-identified as experiencing learning difficulties. In examining this premise further, Stowe, Arnold and Ortiz (2000) conducted a study of the relationship between language development and disruptive behaviors in preschool children based on gender. Their findings support the notion of “invisibility” in that preschool boys with deficient language skills were more likely to be disruptive than girls possessing similar deficiencies. In terms of referrals for special services, the findings indicated that perceptions of problematic behaviors rather than their language development predicted whether the child would be referred, which typically was for speech and language therapy. Quantitatively, Stowe, Arnold, and Ortiz

(2000) noted that children who had deficient language scores but demonstrated typical behaviors had a 2.3% chance of being referred whereas children who fell within the mean range for language but espoused behaviors 2 standard deviations above the norm had a 50.5% chance of being referred. Girls with early academic difficulty, then, are at a disadvantage when it comes to early intervention.

Effects of gender on behavior. Similar discrepancies have been documented with gender and behavior issues, with males demonstrating more behavior difficulties within the educational setting. A review conducted by Green et al. (1996) suggests that although the prevalence rate for childhood psychological disorders is the same for girls as it is boys, the latter population tends to receive more mental health services. Further research has illustrated the differences in topography between male and females behavior, noting that females characteristically display more internalizing issues whereas males are typically more externalizing (Green, Clopton, and Pope, 1996; MacMillan, Gresham, Lopez and Bocian, 1996; Atzaba-Poria, Pike and Deater-Deckard, 2004). Nelson et al. (2003) revealed that elementary aged girls received higher ratings than did boys on teacher report forms when items tapped into physical symptoms and fears. Overall, behavioral problems among girls are apparent and, in some cases, significant; however it has been repeatedly suggested that maladaptive behaviors must be present to a greater degree than boys in order to be appropriately identified and granted services (Nelson et al., 2003). Green et al. (1996) found that teachers based referrals on type of behavior such that boys

or girls with externalizing behaviors were viewed as needed services than either sex demonstrating internalizing behaviors. Furthermore, this study revealed that teachers were significantly less likely to refer children for behavioral issues if the student is doing well academically, a pattern also more prevalent in girls. This is consistent with other research (e.g., MacMillan et al., 1996) indicating that males routinely demonstrate severe externalizing behaviors combined with poor academic achievement, a trend not seen in their female counterparts, whose achievement is not compounded with behavioral issues. It, then, may be hypothesized that gender differences exist due to the higher incidence of internalizing behaviors and academic competence among girls in comparison to boys.

Effects of minority status on achievement. Disparities between minority and white students have been noted for decades and have been found as far back as the 1967 Report of the US Commission requested by President Johnson regarding racial isolation in the schools. The findings of this research clearly link economic status to achievement with children from low SES families exhibiting greater difficulties in core areas such as reading and mathematics. Although the children within these two groups demonstrated interest and aspirations in high achievement, the children in high SES environments were able to attain this goal due to increased opportunities and support (US Commission on Civil Rights, 1967). More recent, Diamond and Onwuegbuzie (2001) conducted a study examining ethnic differences as it relates to reading achievement. Although the researchers noted that overall reading achievement for Black students have

improved since the 1970's (whereas White students remained stable), they continue to exhibit significantly lower performance levels.

According to the NCES (2000), schools in America are becoming increasingly heterogeneous when considering demographic information such as race and ethnicity. Unfortunately, the schools are not prepared to handle such changes, leading to inequalities in academic achievement (Meece and Kurtz-Costes, 2001). In a review of the literature regarding ethnic minority children, Meece and Kurtz-Costes (2001) indicated that the prominent focus has been the difficulties minority groups have experienced in conforming to the school environment that tends to favor the mainstream culture. More specific, the authors noted that in an effort to resist the mainstream value of education minority groups often reject achievement, devaluing the importance of academic success.

Locally, data collected by the Florida Department of Education pertaining to the minority status of those children affected by Florida's third grade retention mandate indicates a gross overrepresentation of Blacks and Hispanics. Quantitatively, Black students constituted 24% of the third grade population in 2002-03, while Hispanic children accounted for 22% of the population. The retention status for these two minority groups was 39% and 29% respectively. This is in comparison to their White peers who made up 49% of the third grade population out of which only 28% were retained. These data clearly supports the differences in reading achievement in minority students.

Differences also were revealed in preschool aged children with reference to child care enrollment. More specific, Magnuson and Waldfogel (2005) noted that Black and Hispanic children are more likely to be enrolled in center care programs offering subsidies than white children, with such programs often providing lower-quality care. As such, the achievement gap is maintained. Disparities have been revealed outside of the formal child care environment, with Black and Hispanic children typically coming from homes with fewer reading and other educationally relevant materials, and being read to less frequently (Brooks-Gunn and Markman, 2005). Relating this to future performance, the author's reported the achievement gap between black and white children is reduced by 3 to 9 points when parenting is accounted for.

Referring back to Bronfenbrenner's theory, it is obvious that factors and 'systems' cross each other's boundaries, making clear associations between variables difficult. In response to the challenges portrayed in the research, Meece and Kurtz-Costes (2001) provided several limitations and future directions for conducting research with the minority population. First, they point out the entangled issue of SES and ethnicity, reporting that many samples representing minority families also are categorized as economically disadvantaged. In these situations it is challenging to ascertain whether the minority status variable is significant or whether the mediating effects of SES are contributing to the findings. Second, using the White population as the norm with which to compare other groups does not allow for cultural beliefs. In other words, is the child behaving in a manner that is consistent with his/her cultural/ethnic background in

which the behavior is acceptable? Third, the authors noted that there is less emphasis on protective factors leading to academic success when examining minority status. Fourth, there appears to be a lack of focus on outside contexts (other ecological factors) that are important to child's success. Finally, Meece and Kurtz-Costes (2001) discuss the failure to consider developmental perspective of the child in relation to their achievement.

Effects of minority status on behavior. Several research studies have been conducted examining the effects of race and behavior problems in the school setting. While they all take a different path in exploring this issue, the results all indicate a clear difference in the trajectory between minority children and their Caucasian peers. In detail, it was revealed that Black children display more externalizing behaviors than White children. (MacMillan et al., 1996; Epstein, March, Conners, and Jackson, 1998), with teachers rating Black students as demonstrating more behavioral difficulties accompanied by less behavioral competencies during the first two years of formal school as compared to Caucasian children (Sbarra and Pianta, 2001). All studies appreciate the influence of socioeconomic disadvantage as playing a mediating role in the negative trajectories, addressing the high correlation between minority status and SES. However, McLeod and Nonnemaker (2000) found that although Black children were rated as displaying more delinquent behaviors than White children, the effects of poverty increases the risks of such behaviors to a greater degree in White children. Regardless, it is clear that minority students are at-risk for

maladaptive social-emotional development, a course that has been proven to become stable over time.

Effects of family socioeconomic status on achievement. Poverty is a major risk factor for future school failure, as it may affect the rate of learning, which then influences intelligence and academic success (Sattler, 1990). More specific, children exhibit few differences in intellectual functions during the first two years of life related to race or social class; however, it is at ages 3-4 that the differences not only become apparent but remain stable through school years (Sattler, 1990). The 1999 Census data reported that 19% of children under 18 were growing up in a family below the poverty line. The statistics for minority groups such as African Americans and Hispanics yield numbers of 35% as compared to 14% of Whites who were living in poverty.

Academic achievement was discussed by Stipek (2001) in relation to socioeconomic status, supporting previous research findings that children from economically disadvantaged families, on average, begin school with poorer academic skills than their economically advantaged peers. It is important to reiterate, however, that SES does not directly effect achievement, rather it serves as a mediator between achievement and those factors that are associated with low SES (i.e., parental involvement, stress, expectations, availability of resources, stimulating environment), with these effects as more pronounced during early childhood (Baydar et al., 1993).

Nichols, Rupley, Rickelman and Algozzine (2004) found that children who came from a low socioeconomic background, had little or no preschool

experience and who were of Hispanic ethnicity were at a greater risk for not developing phonemic awareness and concepts of print in kindergarten as compared to their peers. Overall, it was noted that all children made gains with children of low SES backgrounds achieving lower scores on curriculum based assessments.

Orr (2003) suggests that wealth impacts academic achievement due to levels of financial and human capital, thus providing a rationale as to why the gap in test scores between African Americans and Caucasians exist. The argument lies on the theory that wealth spans beyond income and encompasses other assets, including interests and dividends that enable families to positively contribute to their child's achievement. More specific, Orr (2003) and Entwisle et al (1997) hypothesized that families are more likely to devote earned income to educationally rich items (i.e., books, computers, private schools, tutors, and visits to museum/zoo/concerts) when they have a financial back-up. These additional resources then increase the child's learning time and aids in the development of academic skills. The analysis of data derived from the National Longitudinal Survey of Youth supported this hypothesis; therefore solidifying the differences in academic achievement despite comparable levels of income.

Differences between students from economically disadvantaged and advantaged families were further demonstrated when achievement was measured after a summer break when school was not in session. To preface this, it was noted that both groups of students exhibited similar achievement gains during the school year. Heyns (as cited in Burkam et. al, 2004) suggested

that schools act as mediators during the school year, thus providing disadvantaged students with the cognitive experiences they lack from their home environment. However, access to these experiences is limited for these children during the summer months, placing their counterparts at a critical advantage (Burkam et. al, 2004; Ramey and Ramey, 2004; Alexander et al., 2001, Snow, Burns and Griffin, 1998). In addition, the quality and content of parental interactions appear to play a role in that higher SES parents tend to engage in more cognitive thinking skills (Burkam et al., 2004).

Another argument provided by Stipek (2001) regarding SES and achievement is the skewed expectations held by teachers in the lower elementary grades. In this line of research it is posited that teachers based educational decisions and learning opportunities according to their perceived notion of the child's ability level. Initially, this has been found to be the case in relation to low achieving students, whereby teachers placed children in lower "tracks" or provided them with easier/less work. Unfortunately, a trend also has been noted illustrating lower expectations for children considered as economically disadvantaged. Part of this circular model includes the stability of teacher expectations in that attention may only be given to evidence confirming the teacher's belief (Entwisle & Hayduk, 1982 as cited in Stipek, 2001). An example provided to demonstrate this is a case where the teacher does not adjust the academic assignment according to student performance (i.e., doesn't realize that the child is reading below skill level because he/she does not provide a more challenging book to read). The consequence in these situations is the

attenuation or restriction in learning opportunities and progress in developing skills (Stipek, 2001), which has been previously discussed as a possible precursor in the development of behavior problems.

Providing a different perspective of the relationship between SES and achievement, Gregory, Williams, Baker and Street (2004) explored the roles of social class, home-based resources and classroom approach on early literacy success for preschool children. In their longitudinal study, the authors followed classrooms from three Britain schools whose socio-economic composition varied extensively and found that progress was a product of several interacting components. For example, the demographics at one school were described as low SES, low percentage of minority students, low levels of parent involvement, and low home-based resources. This, coupled with a child-centered teaching approach focusing on socialization of the children as opposed to academic performance, led to the poor literacy success at the end of the school year. In contrast, a school deemed as rich in home-based resources, parental involvement, and SES excelled in literacy development. Although the teacher approach in this school also was child-centered, the families supplemented the insufficient literacy curriculum through extensive parental involvement and tutors. In this situation the children were essentially bringing skills to school to “practice” them as opposed to learning new skills. The literacy development of these children far exceeded the national average as they mastered the alphabet and began reading books. The third school was characterized as consisting of predominantly minority families with the lowest levels of economic resources as

compared to the previous two schools. The classroom approach was described as having a strong academic focus with high expectations. Interestingly, this school exceeded the literacy success of the first school, attaining scores that were comparable to the national average. Noteworthy is the performance of the second and third schools given their successes in light of the varying degrees of resources and academic supports. These findings indicate that while low SES can impact the academic development of children, literacy success can be evident through a strong school-based curriculum and through parental support of weak curricula's.

Effects of family socioeconomic status on behavior. One of the most commonly identified demographic family variables that is related to behavior problems in children is low socioeconomic status (SES). According to studies reported by Huaqing Qi (2003), the prevalence of behavior problems has been noted at 3-6% in the general child population, whereas a 30% incident rate has been associated with low-income preschool children. Although low SES does not cause severe behavior problems, numerous studies (Huaqing Qi, 2003; Frick et al., 1989; Haddad et al., 1991; Rutter, 1985; Behar & Stewart, 1984) have found that this characteristic is associated with its occurrence. As always, it is important to note that it is not low SES alone, but low SES in combination with other variables such as maternal antisocial personality, low family cohesion, and high family conflict (Frick et al., 1989; Hindshaw, 1992; Schultz & Shaw, 2003) that is associated with the development of disruptive behavior disorders. This finding suggests that low SES may be a mediating variable in that socioeconomic

disadvantage places the child at higher risk for the development of behavior disorders when low SES is combined with other variables (e.g., parental discord, aversive parent-child interactions). Due to the strong interconnected relationship between these variables, a causal relationship between SES and childhood behavior disorders cannot be assumed. According to Gauthier (2003), physical aggression is found more often in children who were raised in low SES environments. On the same note, we know that not all children from poor families develop aggressive tendencies, leading to additional research revealing that family characteristics account for the majority of the variance (53% versus 3% variance in low and high SES families respectively). Additionally, environmental conditions can play an integral role in the child's tendency to engage in destructive injurious behavior (Berk, 2000). This hostility is found more often in environments that are tense and competitive rather than friendly and cooperative. Further, these types of environments are more common in poverty-stricken neighborhoods with a wide range of stressors (poor quality schools, limited recreational and employment opportunities, negative adult role models). Relatedly, children raised in these environments have greater access to deviant peers and enrollment into gangs. Among low-income, ethnic minority children, such neighborhoods predict aggression beyond family influences (Kupersmidt, as cited in Berk, 2000) and place children at risk for severe emotional stress, deficits in moral reasoning and behavior problems.

Social class differences also are noted in the way parent raise their children. More specific, Berk (2000) reports that lower-income families tend to

use physical punishments and harsh command whereas middle-class families use more warmth, explanation, and verbal praise. In addition, parents who work in skilled/semi-skilled occupations tend to place a high value on external characteristics such as obedience, neatness and cleanliness. This is in contrast to parents in professional occupations who tend to emphasize inner psychological traits including curiosity, happiness and self control. These differences are hypothesized to be a result of the different life situations that these parents encounter. For example, low income families may feel a certain degree of lack of power outside the home where they are required to follow the rules and obey people in authority. They then duplicate this relationship at home with them as the figure in power. Additional stressors of meeting basic needs due to finances (i.e., food, shelter, clothing) also play a role in the amount of energy and attention the parent is able to devote to the child.

Effects of class size on achievement. Children who attend smaller schools have been found to demonstrate an increase in student achievement (Lee & Loeb, 2000), especially in schools with a high enrollment of minority students (Lee & Loeb, 2000; Ready, Lee, & Welner, 2004; Finn, Gerber, & Boyd-Zaharias, 2005). Nye, Hedges and Konstantopoulos (1999) suggested that small classes had immediate effects on academic achievement as well as lasting benefits, according to their 5 year follow up study. In examining the reading and math scores of students over time, Rivera-Batiz & Marti (1995) revealed that there was approximately a 2% to 9% difference between performances on proficiency tests of children in overcrowded, low-income schools as compared to

non-overcrowded, low income schools, with the former obtaining more failing scores. According to Achilles (2005), this can be explained through the teacher's ability to use good pedagogy as well as appropriately address diversity, inclusion and assessment within the classroom.

Blatchford et. al (2003) examined the effect of class size in the UK through a longitudinal analysis of children as they were followed from their kindergarten year through the end of second grade. Not surprising, the study suggests that smaller class size is related to an increase in teaching time and a greater quality of interactions between teachers and students. Literacy development appears to be the academic area most affected by class size, possibly due to the level of support the teacher is able to provide. Teacher read-aloud and individual support during independent reading occurs to a greater extent in smaller classes. Blatchford et al (2003) concludes that children who are most in need with respect to literacy development will benefit the most from smaller class size. Similarly, this classroom composition has positive effects on children of low ability or who come from economically disadvantaged families (Cooper, 1989, Achilles, 2005).

National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network revealed similar findings linking smaller class size to increased educational and emotional support and increased literacy skills. However, as stated by Snow, Burns and Griffin (1998), it is the quantity and quality of teacher student interactions that are crucial in student achievement, and although a large class size may hinder these interactions, they do not necessarily improve as class size is reduced.

Effects of class size on behavior. Similarly, behavior management within the classroom setting also has been found as positively affected by low teacher-pupil ratio. The NICHD, in addition to a review from Achilles (2005), suggest that improvement in students' behavior when enrolled in smaller classes may be attributed to the increased opportunities to participate in "learning communities," where they develop important prosocial skills and are more actively engaged.

Effects of attendance on achievement. A longitudinal study examining the relationship between school absences in elementary school and reading achievement was conducted by Easton & Engelhard (1982), revealing a negative correlation. That is, as student absence rates increase, the performance on both teacher assigned reading grades and standardized test scores decrease. These findings were based on a regression analysis, which controlled for variables such as previous achievement. More recently, Moonie, Sterling, Figgs, Castro (2008), reported a negative impact of absenteeism on standardized tests. Although this study focused on children with asthma, the analyses controlled for this health issue revealing no overall difference between children with and without the condition. Utilizing a two stage least squares format, Gottfried (2009) also explored the relationship between attendance and achievement, confirming the aforementioned findings. Despite the long standing interest with the impact of student attendance on academic achievement, focus has been on the elementary school years and upward, thus leaving a question regarding the link in preschool.

Effects of teacher experience and education on achievement and behavior. In examining the educational level of teachers within low versus high poverty schools, as measured by percentage of free/reduced lunch status, the National Center for Educational Statistics (2000) revealed that teachers employed in the former schools are less likely to have a master's degree than teachers in the latter school. Further, Darling-Hammond (1999) indicated that certification and higher degree levels are significantly and positively correlated with student outcomes. Chard's (2004) review of the literature supports this notion in his summative statement that "teacher quality has a significant effect of student academic achievement" (p. 175). A study conducted by Ascher and Fruchter (2001) analyzed New York City's schools, examining the teacher experience and quality on students' academic achievement. Findings suggest that there were a greater percentage of teachers who were temporarily placed, had less than five years experience, did not possess an advanced degree, and were fully licensed in lower performing schools as opposed to the high-performing schools. Additionally, it was revealed that there was a 10% higher absentee rate in the former schools. Overall, the study indicated that as teacher qualifications increased, reading achievement increased. An important caveat to these findings is the high percentage of economically disadvantaged and minority population in the low performing schools (93% and 98% respectively) as compared to the high performing schools (37% and 52%). The author's addressed this by suggesting these variables serve as "systematic mediators of a less professional teaching staff" (p. 213).

Child Trends (2004) indicated that higher quality childcare as defined by smaller teacher-child ratio and caregiver training and education, predicts positive outcomes in relation to cognitive, language and social development for at-risk children. In comparing the type of child care setting (i.e., center versus home based), they reported center-based care as housing staff with more education and training, in addition to providing more structured activities with greater access to child-oriented toys. Although the benefit of home-based care is the lower teacher-child ratio, center-based care has been reported as leading to better cognitive, language, and social outcomes (Child Trends, 2004).

In the Early Childhood Collaborative (2002) disseminated by the local county referred to throughout this document, there was a 59% turnover rate for the 2001 year, along with low wages and benefits. This trend has been consistently noted despite the increase in childcare costs, which seemingly serves as a catalyst for high attrition rates and difficulty attracting qualified personnel. With regard to trainings, the aforementioned annual report stated that while training workshops are offered, there is no organized protocol or follow-up/support provided for the training received. Furthermore, the training that is offered is through individual trainers as opposed to those professionals associated with research-based institutions in the field of early education or early childhood mental health.

Mesosystem

The mesosystem encompasses the relationships and avenues of communication between the various microsystems involved in the child's life.

Collaboration between home and child care setting, for example, is deemed crucial in the academic and behavioral development due to the benefits of consistency and support. This partnership focuses on the roles and responsibilities of each party as they promote the social and academic development of the child. According to Christenson, Rounds and Franklin (1992), it is the recognition that two systems working together can accomplish more than either could separately. The authors summarize four literature reviews concluding that parent involvement in education has several promising effects. More specific, higher student achievement as well as higher non-cognitive behavior (i.e., attendance, attitudes, self-concept, school behavior) are positively correlated with parent involvement, in addition to an increase in educational programs and schools that are deemed more successful and effective. The effects on achievement appear to be most significant and long lasting when such involvement and collaboration is initiated at an early age (Christenson et al., 1992).

Exosystem

Exosystem is the setting that does not contain the child directly but affects their experiences. This includes parents' workplace, welfare services, community resources etc.

Neighborhood disadvantage and achievement. Neighborhood poverty has been linked to poorer developmental outcomes including deficits in verbal ability, reading recognition and achievement scores (Child Trends, 2004). According to the data presented in Child Trends (2004) for the 1999 calendar year, 22% of

children under the age of five resided in neighborhoods in which 20% of the population was categorized as being below the poverty line. Four percent of children were living in neighborhoods with poverty percentages exceeding 40%. Unfortunately, low SES participates in a downward spiral of aversive trends. For example, low achieving children from economically disadvantaged families and neighborhoods tend to enroll in schools that have deprived resources (Child Trends, 2004; Stipek, 2001) and whose principals have a difficult time hiring qualified teachers (National Center for Education Statistics [NCES], 1998c). In addition, these teachers are often not certified in the area they teach (NCES, 1998b) and spend less time engaged in instruction due to their report of attending frequently to classroom management and discipline activities (NCES, 1998c). Monetarily, the schools that serve economically disadvantaged students have lower per-pupil expenditures (NCES, 1998a), thus facilitating the aforementioned spiral.

An additional component of neighborhood poverty is the perceived level of safety as reported by parents. More specific, if a parent views the community as unsafe they will be unwilling to utilize existing resources such as libraries, parks, and children's programs (Child Trends, 2004). Additionally, these fears tend to isolate children and reduce their exposure and interaction, thus negatively impacting their ability to learn and succeed (Child Trends, 2004). This impediment to academic success is more pronounced when considering community or school SES as opposed to family SES, suggesting that a child from a low SES family is at lower risk when enrolled in a moderate/high SES school,

thus further confirming the detrimental effects of neighborhood disadvantage (White, as cited in Snow, Burns, and Griffin, 1998). Statistically, White (1982) reported average correlations of .68 between SES at the school level and achievement in a meta-analysis, in contrast to average correlations of .23 between achievement and SES at the individual level, supporting the use of school SES in research studies.

Neighborhood disadvantage and behavior. Available community resources are deemed challenging for low income families living in neighborhoods that are higher in crime and lower in public services. In examining socioeconomic status as a risk factor contributing to the development of behavior disorders, McGee and Williams (1999) suggested several potential trajectories. First, they suggested that the persistent poverty experienced by low SES families places an extraordinary amount of stress on parents, resulting in an interference in parenting skills. Relatedly, Haddad (1991) noted that the parental values of low SES families might contribute to the high incidence of aversive behaviors among their children. In comparing high SES parents to low SES parents, Haddad noted that the former emphasized an internalized system of self-direction whereas the latter emphasized conformity to externally imposed rules. These differences in disciplinary styles are significant in the acquisition of values and behavior. Second, the lack of a significant income limits a family's access to health care, which hinders the probability of receiving effective treatment. Lastly, children from low SES homes are more likely to be exposed to unsafe or unhealthy environments. Such environments may include a range of

negative situations, from witnessing physical violence at home or in the community to lack of supervision and parental support. Exposure to such violence may hinder the child's ability to develop autonomy, security and trust, as well as facilitate the need for self-protective behaviors (Child Trends, 2004). Overall, socioeconomic disadvantage places increased levels of stress on the family coupled with fewer resources, thus facilitating the likelihood of caregivers responding in a more hostile and negative manner towards their child(ren) (Schultz & Shaw, 2003).

Research also has explored the implications of neighborhood economic disadvantage on the social/emotional outcomes of children over and above family socioeconomic status. Schneiders, Drukker, van der Ende, Verhulst, van Os, and Nicolson (2003) as well as Kalff, Kroes, Vles, Hendriksen, Feron, Steyaert, et al. (2001) found that increased levels of behavior problems were present at a statistically significant level despite controlling for gender, age and family SES, therefore suggesting that living in such environments serves as an independent risk factor for children. Possible hypotheses for this conclusion as provided by Schneiders, et al. (2003) include, (1) perceived danger leading to anxiety, (2) exposure to inappropriate peers and adults, (3) low levels of neighborhood cohesion, and (4) informal social control and collective efficacy. In keeping perspective, however, it is important to realize that familial SES plays a larger role in the presence of childhood behaviors than neighborhood SES (Boyle and Lipman, 2002). This is, in part, due to the immediate exposures of the family environment.

Neighborhood risk factors also were studied by Shaw, Owens, Giovannelli, and Winslow (2001), supporting the aforementioned findings that the community environment serves as an influence on the child's behavioral repertoire. More specific, the findings corroborate previous research revealing that children with externalizing behaviors are more likely than typical children to be exposed to maladaptive parenting practices and coercive interactions. Supplementing this well-established research trend is the significant role of the neighborhood in which the family resides. Shaw et al. (2001) concluded that children with disruptive behaviors have a higher tendency to live in more dangerous neighborhoods as compared to both typical children and children with ADHD. These findings were based on a longitudinal study that further documented the continued presence of externalizing problems throughout the preschool years.

Child care setting and academics. Childcare settings vary drastically and thus may impact the influence it has on the child's development and subsequent readiness for formal schooling. According to Magnuson and Waldfogel (2005), structural quality indicators are used to gauge the level of care provided to children. What they found was that 86% of school-based preschool teachers possessed a four-year degree, twice that of center care and Head Start teachers. Teacher salary also was higher for the former group and was in-line with elementary teachers. Overall, Magnuson and Waldfogel (2005) reported that preschool programs provide comparatively high quality care, particularly when meeting or exceeding the recommendations of the National Association for the

Education of Young Children (NAEYC) regarding class size and child-caregiver ratio. In terms of academic outcomes, the author's referred to previous studies pertaining to the positive outcomes of programs such as the Infant Health and Development Program (IHDP) and the Carolina Abecedarian Project; however, their interests lied in other types of programs, given that not all children go to model programs such as the ones mentioned above. Not surprising, the findings suggest that children who attended preschool (center care or school-based) fared better on measures of achievement skills than did their peers with no preschool experience (including parental child care). These effects were significant for three and four year olds; however the link to academic performance was not observed when child care was extended downward from birth to three (Magnuson and Waldfogel, 2005). As with previous research, the largest effects were noted for disadvantaged groups.

Child care setting and behavior. Finally, under the exosystem, is the issue of social-emotional adjustment as it relates to the amount of time spent in a child care setting. This topic is included here, as opposed to the microsystem (which is more closely tied to child care setting) due to the implications of reduced amount of caregiver/child time. In other words, risk factors as described within the exosystem pertain to circumstances in which the quality/quantity of caregiver time is compromised due to stress, employment, etc. As noted by the Bureau of Labor Statistics (2000), the rates of maternal re-employment prior to the child's first birthday have steadily increased from 27% in 1970 to 58% in 1999. As such, there are more and more children entering non-maternal childcare settings during

their infant, toddler and preschool years. According to a review of the literature, as well as an in-depth longitudinal study, conducted by the National Institute of Child Health and Human Development Early Child Care Research Network (NICHD, 2003) there is a significant link between the amount of time a child spends in a non-maternal care setting and the presence/extent of externalizing problems exhibited at 54 months of age and during kindergarten. These findings remained stable despite controlling for variables such as quality, type, and instability of the childcare center. Magnuson and Waldfogel (2005) reported similar findings, adding that children who received parental care with no formal preschool entered kindergarten with better behavior and self control, even when other child and family characteristics were controlled for.

Assessing Change over Time

Behavioral and Social sciences often seek to measure individual change over time; however this undertaking is frequently challenged by inadequacies in conceptualization, measurement and design (Bryk & Raudenbush, 1987, p.147). To elaborate, Bryk and Raudenbush (1987) noted that tests used to measure change typically compare individuals based on a fixed point in time, thus failing to address the rate of change among those individuals. Further, the design of many studies focus on data pertaining to observations at two points in time (pre/post test) which, according to Bryk and Raudenbush (1987) provide an inadequate basis for studying change. The application of hierarchical linear models (HLMs) presents an alternative to other methods by creating an integrated approach to examining the structure of individual growth. That is, growth trajectories and the

various characteristics that impact growth can be examined individually while holding different levels of influence constant. A detailed description of HLM can be found in chapter three. For the moment, a brief review of research supporting the use of HLM will be presented.

Recent studies (Cusumano, et al, 2006; Taylor et al; 2005, Armstrong, Dedrick and Greenbaum, 2001, Stipek & Miles, 2008) support the use of Hierarchical Linear Modeling (HLM) as a method to demonstrate change in educational research. Specifically, Cusumano et al (2006) explored the impact of early childhood educator training and coaching on literacy acquisition of preschool children. A three level model was structured, examining within-child differences (reading scores), child characteristics (age, race, etc.) and classroom characteristics (treatment intensity, etc). Taylor et al (2005) utilized HLM to analyze the impact of school and classroom level characteristics on the reading growth of elementary school students. Armstrong, Dedrick, & Greenbaum (2003) applied HLM to examine factors associated with community adjustment of young adults with serious emotional disturbances, whereas Stipek and Miles (2008) tested three hypotheses explaining the association between aggression and achievement through HLM. All studies were able to investigate change over time while holding variables with potential effects constant, thus providing more clear results.

Summary

In summary, the research thus far supports the relationship between poor academic achievement and social-emotional maladjustment in school aged children. More importantly, a host of risk factors have been identified as

underlying mechanisms that exacerbate the presence of a negative developmental trajectory, which remains stable and resistant over time. Although the above review of theoretical risk factors pertaining to academic and social/emotional development is compartmentalized, it goes without saying that attention to all levels of the ecological system be given when intervening with a child. As Finn, Gerber, and Boyd-Zaharias (2005) suggest, it is the culmination of experiences, often beginning in the early years, that lead to maladaptive outcomes.

Given this unequivocal need for prevention and early intervention, the current study attempts to explore the achievement-behavior relationship among preschool children, with specific emphasis on early literacy skills. A more in-depth analysis will address the particular pathways or behavioral profiles that affect the rate and levels of literacy acquisition. Additional analyses will examine the literacy development of children with challenging behaviors who experience varying levels of within-child protective factors.

CHAPTER THREE

METHOD

The purpose of this chapter is to present the research design, procedures and statistical analyses for the current study. A description of the archival study, of which this study is an extension, is provided, including participants, measures and procedures.

Research Design

The current study used archival data gathered from a quasi-experimental study that examined the impact of an early learning opportunity project on the literacy skills and social-emotional development of preschool children. The original study consisted of three cohorts of teachers who received the independent variable. Data were analyzed in that original study on two of the three cohorts. The present study added the data from the third cohort and addressed research questions for that cohort.

Description of the Original Study

This section describes the original study from which the Cohort Three data were obtained. The Pinellas County School Reading Coalition sought to improve levels of literacy, reading readiness and social-emotional functioning in children from birth to five years through the implementation of a community collaboration project. The Coalition designed the Pinellas Early Literacy Learning Community Project (LCP) to provide early literacy training and coaching for teachers and

child care professionals across a variety of preschool education settings (e.g., Head Start, subsidized child care, Early Intervention programs, faith-based programs). The LCP provided age-appropriate early experiences that supported development in the language and social domains, both of which are known to contribute to improved literacy outcomes (Barrera, et al., 2002; Kamps, 2003). The grant, entitled Early Learning Opportunities (ELO), was funded through a collaborative effort of four agencies including Coordinated Child Care of Pinellas County, Directions for Mental Health, Florida Mental Health Institute, and Pinellas County Childcare Licensing Board.

The project consisted of two primary activities: direct training for teachers in early literacy development skills and coaching support to teachers. Saint Petersburg Community College provided the literacy training to the early childhood professionals through a course entitled, "LAE 2000: Language Development for Young Children." The course, designed specifically for the study participants, used HeadsUp! Reading (HUR), a researched-based, early literacy distance-learning curriculum (National Head Start Association -NHTA) to enhance the early literacy skills of the participants. In addition, literacy coaches were provided to facilitate the transfer of skills from the college classroom to the preschool classroom. Data were collected to examine the effects of the intervention (training and coaching) on the literacy development of the preschool children.

ELO Participants

Early Childhood Teachers. A total of 48 early childhood teachers from Pinellas County participated in one of the Language Development in Children courses offered in the spring and summer of 2004. Recruitment of teacher participants initially consisted of three activities: an invitational package mailed to the 1,400 licensed childcare facilities registered through the Pinellas County License Board for Children's Centers and Family Day Care Homes; a project description in the local college course catalog; and a project description in the newsletters from the Coordinated Child Care of Pinellas and the Licensing Board. Interested teachers completed an application to participate in the grant (see Appendix A).

Participation in the project was limited to early childhood teachers of children between the ages of three and five employed at a childcare site, private pre-kindergarten, or Head Start program. Teachers who were employed at a family or home-based childcare setting were excluded in Cohorts One and Three. The 48 teachers who participated in the study were divided into three Cohorts. Cohort One was comprised of 12 teachers who received both training and coaching at the same time (Concurrent), 10 teachers who received training and no coaching (Delayed) and 19 teachers who received no training or coaching (Control). Cohort Two was comprised of 26 teachers, 19 teachers from the Control group of Cohort One and an additional seven teachers from family and/or home-based childcare centers. Seventeen teachers in Cohort Two received training and coaching (Concurrent) and nine received training and no coaching

(Delayed). Cohort Two did not have a Control group. Cohort Three was comprised of eight of the nine teachers in the Delayed group of Cohort Two. Four of the teachers in Cohort Three were assigned to the teaching and coaching group (Concurrent) and four were assigned to the teaching and no coaching group (Delayed). Since all eight teachers completed the training as part of Cohort Two, the sole difference between the two groups in Cohort Three was, theoretically, the coaching component (one group was scheduled to receive coaching and the other group was not to receive coaching). However, due to time constraints and organizational issues, coaching was not provided to either group. Assignment into Concurrent, Delayed, and Control groups differed based on cohort and will be described in the appropriate section.

Table 2 is a summary of the teacher participants in each cohort by treatment condition.

Table 2.

Teacher Participants in Cohorts One, Two and Three

| | Number of Teachers in Cohort | | |
|-----------------------------------|------------------------------|------------|--------------|
| | Cohort One | Cohort Two | Cohort Three |
| Concurrent: Training/Coaching | 12 | 17 | 4 |
| Delayed: Training/No Coaching | 10 | 9 | 4 |
| Control: No Training/ No Coaching | 19 | n/a | n/a |
| Total Sample | 41 | 26 | 8 |

Data collected on the ELO teacher participants included number of children assigned to the classroom, years of teaching experience, and highest level of education. See Table 3 for a summary of these data on Cohorts One and Two.

Table 3.

Descriptive Information on Teacher Participants in Cohorts One and Two by Condition

| | Number of Student Participants | Avg. Experience (in Years) | Highest Level of Education | | | |
|--------------|--------------------------------|----------------------------|----------------------------|--------------|----|-------------|
| | | | H.S. | Some College | AA | 4 Yr Degree |
| Cohort One | | | | | | |
| Concurrent | 165 | 8.24 | 8 | 2 | 1 | 1 |
| Delayed | 106 | 13.59 | 6 | 0 | 0 | 4 |
| Control | 115 | 7.99 | 1 | 9 | 5 | 4 |
| Total Sample | 386 | 9.68 | 15 | 11 | 6 | 9 |
| Cohort Two | | | | | | |
| Concurrent | 107 | 6.42 | 9 | 5 | 0 | 3 |
| Delayed | 54 | 11.22 | 1 | 1 | 0 | 7 |
| Total Sample | 161 | 8.16 | 10 | 6 | 0 | 10 |

Table 4 represents data obtained on the each of the teacher participants for the current study (Cohort Three).

Table 4.

Descriptive Information on the Eight Teacher Participants in Cohort Three by Site

| | Condition | Type of Childcare Site | Number of Student Participants | Years of Teaching Experience | Highest Level of Education* |
|----------|------------|------------------------|--------------------------------|------------------------------|-----------------------------|
| Site # 1 | Concurrent | Faith Based | 13 | 8 | A.A. |
| Site # 2 | Concurrent | Private Center | 5 | 3 | High School |
| Site # 3 | Delayed | Faith Based | 3 | 1 | A.A. |
| Site # 4 | Concurrent | Private Center | 19 | 20 | B.A. |
| Site # 5 | Delayed | Faith Based | 12 | 20 | Some College |
| Site # 6 | Concurrent | Private Center | 14 | 16 | B.A. |
| Site # 7 | Delayed | Private Center | 4 | ½ | Some College |
| Site # 8 | Delayed | Faith Based | 13 | 1 | Some College |

* Note. A.A. = Associate's Degree, B.A. = Bachelor's Degree

Preschool Student Participants. A total of 630 preschool children participated in Cohorts One, Two and Three of the program evaluation, with 386,

161, and 83 students respectively in each Cohort. Participation was limited to children who met the following criteria: (1) between three and five years of age, (2) English as the primary language, (3) no diagnosed cognitive delays, and (4) no hearing or visual disabilities. One additional criterion (i.e., has not previously been a student of a teacher who participated in the ELO grant) was included for Cohort Three. The focus of the current study is on the literacy development of preschool children within the Third Cohort. An overview of the student demographic data for Cohort Three is depicted in Table 5 below.

Table 5.

Demographic Information on Student Participants in Cohort Three

Number of Student Participants

| | <i>Age in Years</i> | | | <i>Gender</i> | | <i>Racial Distribution</i> | | | | |
|----------|---------------------|----|---|---------------|--------|----------------------------|------|-------|-------|-------|
| | 3 | 4 | 5 | Male | Female | White | A.A. | Hisp. | Asian | Other |
| Site # 1 | 1 | 12 | 0 | 7 | 6 | 11 | 1 | 1 | 0 | 0 |
| Site # 2 | 2 | 3 | 0 | 2 | 3 | 0 | 5 | 0 | 0 | 0 |
| Site # 3 | 2 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Site # 4 | 0 | 13 | 6 | 10 | 9 | 19 | 0 | 0 | 0 | 0 |
| Site # 5 | 3 | 9 | 0 | 9 | 3 | 9 | 2 | 1 | 0 | 0 |
| Site # 6 | 0 | 14 | 0 | 9 | 5 | 12 | 0 | 0 | 0 | 2 |
| Site # 7 | 3 | 1 | 0 | 3 | 1 | 1 | 2 | 0 | 1 | 0 |
| Site # 8 | 0 | 13 | 0 | 3 | 10 | 7 | 0 | 4 | 1 | 1 |
| Total | 11 | 66 | 6 | 44 | 39 | 59 | 13 | 6 | 2 | 3 |

Note. A.A. = African American, Hisp. = Hispanic

Research Variables

Predictor/Independent Variables. The independent variables in this study are categorized into two groups: child (demographics, within-child protective factors and behavior) and childcare site.

The child variables previously found to influence academic achievement include race, gender, age, attendance, home SES, presence of within-child protective factors (e.g., Initiative, Self-Control, Attachment) and student behavior.

Demographic data (i.e., race, gender and age) for each child participating in the project were obtained from teacher participants via a data information sheet (See Appendix B) developed specifically for this project. Teacher participants also provided the number of days (attendance) each child was absent during the semester of interest to quantify exposure to the literacy program. This information was documented on an attendance data sheet (See Appendix C) completed by the teacher. Home socioeconomic status for each child participant was assigned by obtaining the median household annual income of the neighborhood in which the child resides. Income levels were grouped into equal increments and were labeled for data entry (e.g., 1=\$10,000 -19,999; 2=\$20,000-29,999). This method was employed due to the barrier in obtaining income levels for the child participants from the childcare providers. Using an internet-based GIS Mapping system, the zip codes were entered to obtain an indicator of median neighborhood SES. The mapping system was developed by the Pinellas County Economic Development department as a tool for linking geographic locations with demographic indicators such as racial distributions, home values, and median household incomes (http://www.siliconbay.org/gis3/gis_content.cfm) in which the data are sorted by census tracts, municipalities, and zip codes. This method has become increasingly popular as a means to ascertain SES, particularly in mental health research (Krieger, Williams & Moss, 1997; Krieger, 1992). Krieger (1992) stated that it is a “valid and useful approach to overcoming the absence of socioeconomic data in most US medical records” (p. 709). Although using aggregate geographic data to proxy socioeconomic status does

not come without limitations, it is an alternative approach to obtaining such information (Krieger et al, 2002; Soobader, et al, 2001).

The level of within-child protective factors was determined by the sum of scores on three subtests (Initiative, Self-control and Attachment) of the Devereaux Early Childhood Assessment (DECA, LeBuffe & Naglieri, 1999). Protective factors refer to those characteristics (both individual and environmental) that buffer negative events or stressors and result in more positive psychological and behavioral outcomes (Masten & Garmezy, 1985). Children who demonstrate these characteristics are considered resilient while those children who lack protective factors are at a greater risk for developing behavioral and emotional problems (LeBuffe & Naglieri, 1999). The student behavior score was determined by using the 10-item subscale score of the Behavior Concerns Scale on the DECA.

Childcare site is the second independent variable previously found to impact academic achievement. Site variables examined in the study include teacher education, teacher experience, school SES, and classroom environment. Data on teacher education (highest degree obtained) and experience (in years) were collected from the application completed by teachers for grant participation. School SES was measured by obtaining the median annual household income of the neighborhood in which the childcare center was located. The last site variable, classroom environment, was evaluated through the Early Literacy Observation Checklist (ELOC), which measured teacher-child interaction (e.g.,

use of open-ended questions) as well as the literacy-related environment (e.g., availability of books in the classroom, presence of print/signs).

Outcome/Dependent Variable. Literacy development in preschool children is the outcome variable examined in the current study. Literacy development was assessed through growth in expressive language and phonemic awareness. These skills were assessed through the administration of the preschool version of the Individual Growth and Development Indicators (IGDI). The three subtests of the IGDI (Picture Naming, Alliteration and Rhyming) served as the measure of rate and levels of literacy development in the student participants.

Measures

Data were collected from an archival database for the teacher and student participants of the ELO grant for Cohort Three. See Table 6 for a summary of data sources for each variable.

Table 6.

Measures Used to Assess Research Variables

| Measure | Research Variable |
|--|---|
| Teacher Application for Inclusion in Grant | Teacher Education (P) Teacher Experience (P) School SES (P) |
| Student Demographic Data Sheet | Race (P) Gender (P) Age (P) Home SES (P) |
| Student Attendance Sheet | Attendance (P) |
| Individual Growth and Development Indicators – Preschool Version | Early Literacy (O) |
| Deveraux Early Childhood Assessment | Total Protective Factors (P) Behavior (P) |
| Early Literacy Observation Checklist | Classroom Environment (P) |

Note: P=Predictor Variable; O= Outcome Variable.

Demographic Sheet Information for each child was gathered via a demographic sheet completed by a childcare provider (see Appendix B). Data gathered on each child included: (1) date of birth, (2) gender, (3) race, (4) home zip code, and (5) primary language. A separate sheet (Appendix C) was used to obtain attendance information for each child.

Individual Growth and Development Indicators – Preschool Version. Early literacy skills were assessed utilizing the Individual Growth and Development Indicators (IGDI). The IGDI was developed by McConnell and McEvoy (2002) as part of the Early Childhood Research Institute on Measuring Growth and Development. These language and literacy assessment tools are used with children from birth through eight years of age and serve as General Outcome Measures (GOMs) of development. In a broader sense, GOMs depict individual children’s growth and development over time, thus tapping into both their current performance as well as their rate of development. Fuchs and Deno (1991) described GOMs as “reliable, valid and efficient procedures for obtaining child performance data to evaluate intervention programs” (p. 489). The IGDI used in the current study served as a GOM of literacy development, and can be used repeatedly over short periods of time to evaluate a student’s response to an intervention and to identify children at-risk. More specifically, the preschool IGDI is designed to measure early literacy skills in children from three to five years of age and was utilized with the student participants in all three cohorts. The three subtests of the IGDI used for this study were: Picture Naming, Alliteration, and Rhyming.

Picture Naming is a measure of expressive language that is assessed by presenting the child with pictures commonly found in their environment (e.g., food, animals, toys, vehicles). This subtest is initiated by a four-item demonstration provided by the examiner to ensure the child's understanding of the task. Next, the child is given the opportunity to practice with the same four items, and feedback is provided to the child. Following the sample items, the timed and scored portion of the IGDI is administered. The child is instructed to name the pictures as fast as he or she can. The examiner starts the stopwatch as the first picture is presented and at the one minute time limit the subtest is concluded. If at any time during the minute the child hesitates for three seconds the examiner prompts him or her by saying, "What do we call this?" The child is then given an additional two seconds at which time the next picture is presented, regardless of the child's response or lack thereof. The number of cards identified correctly is counted, thus becoming the child's Picture Naming score.

Phonemic awareness is assessed by the Alliteration and Rhyming subtests of the IGDI. It is a vital element in reading success (Snow et al., 1998) that typically develops during the preschool years (Lonigan, Burgess, Anthony, & Barker, 1998; Whitehurst & Lonigan, 1998). The Alliteration subtest measures phonemic awareness skills by assessing the student's ability to identify pictures that start with the same sound. The child is presented with cards containing one picture on the top (target picture) and three pictures across the bottom. The child is instructed to, "point to the picture that starts with the same sound as the top picture." The examiner demonstrates the concept to the child in addition to

allowing him or her to practice before moving on to the actual administration.

The demonstration is conducted with two standard cards and then four random cards are used for the child's sample items. Once the demonstration and sample items are complete, the test administration begins. The subtest is two minutes in length and prompting is provided for children who reach the three second delay point (i.e., "Which one starts with the same sound as ____."). The number of cards named correctly is considered the child's Alliteration score.

Rhyming is another measure of phonemic awareness. The child is presented cards that contain four pictures, with the target on top and three on the bottom. The child is asked to "point to the picture that sounds the same as, or rhymes, with the top picture." The child is provided with a demonstration as well as sample items for practice. If no response is provided after three seconds, the examiner prompts the child by asking, "Which one sounds the same as ____?" The number of cards identified correctly at the end of the two-minute time period is the child's Rhyming score.

Priest, Davis, McConnell, and Shinn (1999) examined the psychometric properties of the IGDI, supporting its effectiveness in measuring early literacy skills in preschool children. Concurrent validity coefficients between the IGDI Picture Naming and two norm-referenced measures of preschool language skills (e.g., Peabody Picture Vocabulary Test-Third Edition, PPVT-3 and Preschool Language Scale-Third Edition) ranged from $r=.47$ to $r=.69$. Correlations between expressive language scores and chronological age (assessing the tool's sensitivity to growth over time) were assessed with samples of typically

developing children ($r=.63$), children enrolled in Head Start ($r=.32$) and children receiving services in a preschool special education classroom ($r=.48$). One month alternate form reliability coefficients ranged from $r=.44$ to $.78$.

Missall & McConnell (2004) reported stable test-retest reliability of the Rhyming subtest ($r = .83$ to $.89$, $p < .01$) when measured over three weeks. Validity also was examined for the Rhyming subtest. Results revealed a positive correlation with other standardized measures of phonological awareness and early literacy development including the PPVT-3 ($r = .56$ to $.62$, $p < .05$), Concepts About Print (CAP; Clay, 1985; $r = .54$ to $.64$, $p < .01$) and Test of Phonological Awareness (TOPA; Torgeson & Bryant, 1994; $r = .44$ to $.62$). Significant correlations were found between chronological age and IGDI scores ($r = .46$, $p < .01$) supporting the sensitivity of the instrument in measuring growing phonological skills (Missall & McConnell, 2004).

Stable test-retest reliability also was found with the Alliteration subtest ($r = .46$ to $.80$, $p < .01$; Missall & McConnell, 2004) when measured over three weeks. Tests of validity revealed that Alliteration correlated with the PPVT-3 ($r = .40$ to $.57$, $p < .01$), TOPA ($r = .75$ to $.79$, $p < .01$), and CAP ($r = .34$ to $.55$, $p < .05$). A positive correlation with chronological age ($r = .61$) also was found.

Deveraux Early Childhood Assessment (DECA; LeBuffe & Naglieri, 1999). The Deveraux Early Childhood Assessment (DECA) is a strengths-based, norm-referenced behavior rating scale completed by the preschool teacher. It was designed to assess the level of within-child protective factors (i.e., initiative, self control, and attachment) evidenced by the preschool child and to measure the

level of emotional/behavior problems demonstrated by the child in the early childhood environment. The DECA is a 27-item rating scale and a 10-item behavior concerns screener for children ranging from ages two through five.

LeBuffe & Naglieri (1999) reported that the internal reliability for teacher informants ranged from .80 to .94 for the Behavioral Concerns and Total Protective Factors Scales respectively. Test-Retest reliability coefficients were obtained at a 24 to 72 hour interval and ranged from .68 to .94. Interrater reliability coefficients ranged from .59 to .77. Criterion related validity was conducted by comparing the scores of two groups of preschoolers; those with known emotional/behavioral problems and typical children within the community. Results revealed statistically significant differences between the groups indicating that the DECA discriminates between groups of children with and without emotional/behavioral problems (LeBuffe & Naglieri, 1999).

The DECA is the first published rating scale of within-child protective factors. Therefore, standard measures of content and construct validity are not available. The content of the DECA was derived from the resilience literature (i.e., behavioral descriptions found in the literature to identify resilient children) and from focus groups conducted with parents and teachers (LeBuffe & Naglieri, 1999). LeBuffe and Naglieri (1999) conducted a principal factor analysis with varimax rotation on the standardization data set to obtain the Protective Factor Scales (Initiative, Self-control and Attachment). Results of the factor study resulted in a three-factor solution with factor loadings ranging from .46 to .74. The 10-item Behavior Concerns Scale was created by selecting two items with

the strongest factor loading from each of five scales on the DECA (i.e., Attention problems, emotional control problems, aggression, withdrawal/depression, and increased concern problems).

Construct validity was assessed through an alternative technique that determines whether the instrument yields data that are consistent with the predictions generated from the underlying theory of the instrument. Lebuffe & Naglieri (1999) achieved this by obtaining measures of risk and stress in the same group of preschool children for whom data were collected using the DECA. A two-way Analysis of Variance (ANOVA) conducted by Lebuffe & Naglieri (1999) supported the use of the DECA in measuring protective factors related to resilience in young children ($p < .001$). That is, children with "high risk/low" protective factors scored higher on the Behavior Concerns Scale than those children with "low risk/high protective" factors.

Criterion-related validity was measured by comparing a group of preschool children identified as having emotional/behavioral problems to a group of "typical" preschool children (LeBuffe & Naglieri, 1999). Results of the Independent t-tests revealed statistically significant ($p < .01$) differences between the two groups on all scales of the DECA (LeBuffe & Naglieri, 1999).

Early Literacy Observation Checklist (ELOC; Justice, 2002) – The Early Literacy Observation Checklist (ELOC) assessed the literacy-related environment (e.g., availability of books in the classroom, presence of posters, signs and labels) as well as teacher-student interaction variables (e.g., Does the adult ask the children to help read the title?, Does the adult praise the children's

participation?) related to literacy (Justice, 2002). The literacy related environment refers to those settings and experiences that foster language and literacy growth through activities, including talking, playing, reading and writing (National Head Start Association -NHSA). For children receiving childcare services outside the home, the childcare provider represents an important resource for facilitating this growth. Recognizing this, the HUR curriculum strives to equip teachers with the research based techniques and strategies necessary to foster literacy development in children. Therefore, the purpose of the ELOC in the current study was to assess treatment integrity by examining the extent to which the childcare providers incorporated the knowledge and skills gained from the HUR curriculum and coaching sessions.

The ELOC is comprised of four sections, (1) Storybook Reading, (2) Classroom Library, (3) Writing Center, and (4) Overall Print Environment. Literacy-related environment was assessed by teachers' responses to a variety of forced-choice (yes/no, and multi-choice) and open-ended questions. For the purposes of this study, modifications were made to the ELOC. Specifically, the literacy coaches and instructors of the LAE2000 course requested that the ELO evaluation team incorporate the content of the HeadsUp! curriculum to more accurately reflect the skills and information taught to the teacher participants. The modifications proposed by the literacy coaches and course instructors included the addition of two items in the Overall Print Environment section, ("Are printed materials displayed prominently in the early learning environment?" & "Are posters and signs displayed at eye level?") and the extension of the rating

choices for two existing items. The original version of the ELOC contained an open-ended question in the Storybook Reading section regarding the frequency in which story time was held. The modification to this item required a forced choice response of never, one time per week, 2-3 times per week, once per day or more than once per day. The second item suggested for modification (“Is there a specific space for children’s independent and group writing activities?”) is located in the Writing Center section and originally required a yes/no response. This was changed to a three-point scale, which provided the following response options: specific writing center, center set up only during choice time and no place for writing.

The ELOC was completed as a pre- and post-measure to assess treatment integrity over time. Each item was assigned a weight on a 0 to 1 scale in .25 increments depending on the response format. Scores obtained included the four aforementioned sections in addition to an Overall Literacy Environment Score, which is the sum of all sections. Higher scores reflect a more literacy-rich childcare environment. Inter-rater agreement was obtained by calculating the results from observations completed by dyadic pairs consisting of Program Evaluators and school psychology graduate students. Specifically, each dyad completed the ELOC while observing a literacy activity in a preschool classroom. The number of agreements between each observer was divided by the total number of items on the measure to determine inter-rater agreement for the dyad. Inter-rater agreement of .85 or above was required prior to the utilization of the instrument in the ELO grant. To date, there have been no attempts to obtain

psychometric properties of the ELOC, as the developer's original intent of the measure was to provide a functional snapshot of the environment.

Procedures for Original Study

ELO grant activities were conducted between August 2003 and December 2004. Three cohorts were included. Table 7 depicts the activities and timeline relevant to each cohort.

An application to conduct the ELO grant was submitted in August 2003 and subsequently approved. Recruitment of early childhood education teachers began in November 2003, followed by a review of approximately 150 applicants and final selection of teacher participants. The Coalition led the selection process, choosing one teacher from each childcare site represented in the applications. Teachers were systematically chosen based on their limited experience in an effort to provide them with increased resources and promote skill building.

The interview process for Literacy Coaches (LC's) began in December 2003. Three baccalaureate-degreed female applicants were hired, all of whom had more than five years of experience within an early childhood education setting. Each LC was assigned seven to eight teachers to coach using the Early Literacy Learning Model (ELLM) for mentoring teachers who engaged in literacy instruction. The ELLM model, developed by the Florida Institute of Education at the University of North Florida, is a research-based comprehensive curriculum intended to improve language and early literacy skills of preschool children (Wood & Fountain, 2007). This model was chosen for use in the grant due to the

emphasis on instruction and coaching. Training was provided to the LC's by a consultant from Coordinated Child Care of Pinellas County.

The application for University of South Florida (USF) IRB approval was submitted in January of 2004 and obtained in February 2004. Due to the archival nature of the current study, an IRB application was submitted to obtain permission to review the ELO database. The project evaluation component of the grant was headed by an Associate Professor at USF who hired three doctoral candidates (ELO head evaluators) from the School Psychology Program, including the author, to complete data collection activities. Two of the doctoral candidates were practicing School Psychologists at the Education Specialist (Ed.S). level and were employed by Pinellas County Schools.

An additional seven graduate students were recruited to assist in the evaluation efforts due to the large number of preschool students who participated and to ensure timely data collection. Training on the assessment materials

(IGDI and ELOC) was provided for the seven graduate students and conducted by the three head evaluators. These training sessions included a presentation on the background of each measure, administration, scoring and interpretation procedures. Each graduate student was given materials to use while assisting with ELO data collection and was provided the opportunity to practice the assessments during the training. Additionally, the graduate students were required to administer the measures to three children outside the training

Table 7.

Summary of ELO Grant Procedures and Timeline for Cohorts One, Two and Three

| Initial ELO Grant Activities (August 2003 – January 2004) |
|---|
| <ul style="list-style-type: none">• Application submitted• Recruitment and Selection of early childhood education teachers• Literacy Coaches (LC's) interviewed and hired• Application for USF IRB approval submitted• ELO Head Evaluation Team training in IGDI measures• Recruitment and training of graduate students |
| Cohort One (January – May 2004) |
| <ul style="list-style-type: none">• First semester of the Language Development in Children course offered• Treatment conditions (Concurrent or Delayed) identified• ELLM training for LC's• Eligible Control group sites contacted by Head Evaluators• Parental permission obtained• Assignment of 3-4 childcare sites to each evaluator• Weekly coaching for concurrent group provided• Evaluation activities (ELOC and IGDI) were conducted two points in time• Teacher Participants (n = 41)<ul style="list-style-type: none">- Source: Applicants chosen by the Coalition- Concurrent (n = 12)- Delayed (n = 10)- Control (n = 19) |
| Cohort Two (May – July 2004) |
| <ul style="list-style-type: none">• Second, and final, semester of the Language Development in Children course offered (Summer 2004)• Evaluation activities (ELOC and IGDI) were conducted two points in time• Teacher Participants (n = 26)<ul style="list-style-type: none">- Source: Control group in Cohort One and reserve list of teachers not eligible for participation in Cohort One (family/home centers)- Concurrent (n = 17)- Delayed (n = 9)- Control (n/a) |
| Cohort Three (September – December 2004) |
| <ul style="list-style-type: none">• DECA added as an evaluation measure• Two progress monitoring points were added to assessment schedule• Evaluation activities (ELOC, IGDI and DECA) were conducted four points in time• Teacher Participants (n = 8)<ul style="list-style-type: none">- Source: Delayed group of Cohort Two- Concurrent (n = 4)- Delayed (n = 4)- Control (n/a) |

sessions while being observed for accuracy by their dyad partner. Dyads provided feedback to each other and continued to administer practice tests until 100% accuracy was obtained.

Data were collected from teacher participants and the preschool children in their classroom for whom consent was granted, as well as through direct observation of the classroom. These evaluation activities occurred in three consecutive stages spanning from January 2004 through December 2004 and consisted of three cohorts. Although data collection procedures were similar across the three groups, there were notable differences. The following sections are separated into Cohorts One, Two and Three to best describe the evaluation activities within each group.

Cohort One. The first Language Development in Children training course began during the IRB approval process in January 2004. It was through this venue that teachers were provided consent forms to document willingness to participate in the ELO grant evaluation activities (see Appendix D for blank consent form). Once consent forms were signed and returned the teachers were designated to one of two treatment conditions (concurrent or delayed coaching). These conditions were developed to evaluate the effectiveness of coaching on early literacy development (i.e., treatment integrity). This selection process was controlled to the extent that the age of students in the classrooms were equally represented in each treatment condition. For example, once a teacher was randomly selected to receive concurrent coaching, the age of the students was noted and all teachers with similarly aged students were placed in a pile. One

teacher was then randomly chosen from that group to receive delayed coaching. The control group was formed by soliciting teachers who met criteria for participation but were not selected for participation in Cohort One. Nineteen teachers from seven centers agreed to participate in the control group. Initial contact to the centers was made via phone by one of the three head evaluators and was followed up with an in-person visit to the site director to discuss procedures and deliver consent forms.

Permission from parents allowing their preschool children to participate was obtained via parental assent (See Appendix E). An information letter (see Appendix F) accompanied the consent form, both of which were sent home by the teacher participants. A second wave of forms was sent to parents if a response was not received within two weeks of the original distribution. Once consent forms were collected, file folders were created for each childcare site with information pertinent to the data collection activities. Basic information included the name of the childcare site, name of the director, contact telephone number, site address, and map with directions from USF to the childcare site. Blank data collection forms also were included as were the ages and identification numbers of the children for whom consent was obtained. The ID numbers were six digits in length, representing the treatment condition (7 = concurrent, 8 = delayed, 9 = control), teacher number assigned by the lead program evaluators, and child number. For example, the 10th child in the classroom of teacher #29 under the delayed coaching treatment condition would be assigned the ID number of 829010. The names of the children were never in

the file folders or directly linked with the data collected. To further ensure confidentiality the Director of each site held the master list of student participants, which contained their assigned number (e.g., the last digit(s) in the ID number). Data were locked in a filing cabinet at USF upon completion of data collection.

The three head evaluators assigned three to four childcare sites to each of the program evaluators, including themselves. This process considered the number of children in the classroom, amount of time the graduate students dedicated to data collection, and geographical distance between each site to ensure equal caseloads. For example, the sites were grouped based on number of children in each classroom and then further grouped into geographical location. A three-week data collection window was set during which time the program evaluators were responsible for scheduling visits and collecting data.

Observations of the preschool environment were conducted using the Early Literacy Observation Checklist (ELOC) and completed by the program evaluators and coaches. Prior to the onset of data collection for the study, inter-rater agreement trials were conducted. An agreement level of .85 or higher was required between dyad partners. Actual agreement levels ranged from .85 to .93. The coaches observed the classrooms of the teacher participants in the concurrent coaching group while the program evaluators observed the classrooms of both the delayed coaching and control groups. The teacher participants in the concurrent coaching group were given feedback by their coach on the results of the ELOC as part of the weekly coaching session. Feedback on the classroom observations of the delayed and coaching groups was not

provided. The ELOC took approximately 30 minutes to complete and was conducted in the last few weeks of February 2004. Teacher participants in all groups were briefly interviewed after the observation to answer the few questions on the ELOC that could not be completed by examining the classroom environment (e.g., Are children permitted to borrow these books for home use? Are there specific times set aside during the day for reading activities?). Aside from obtaining valuable data regarding the classroom environment, the observation provided the children with the opportunity to become comfortable with the examiner in their classroom prior to the individual assessment activities.

The preschool participants for whom consent was obtained were individually assessed for early literacy skills through the Individual Growth and Development Indicators (IGDI). The IGDI was administered in a separate area of the classroom to reduce distraction and prevent other children from prematurely viewing the materials. The evaluators spent approximately 5 to 10 minutes with each child, giving verbal praise and a sticker at the end of the assessment session as a reward for participating. Administration of the IGDI occurred within a three-week window beginning in the middle of February and continuing through the beginning of March 2004. Each evaluator followed the standardized instructions for administration and recorded scores from each child on the data form (See Appendix G) located inside the site-specific folder. Data were then entered into a Microsoft Excel spreadsheet by one of the three head evaluators and rechecked for accuracy.

A second wave of data collection occurred from the end of April to the middle of May 2004 at which time the classroom was observed utilizing the ELOC and the IGDI was re-administered to the preschool student participants. Additional data were collected on Cohort One in May focusing on the preschool student participants who were identified as entering kindergarten in the 2004-05 academic year.

Cohort Two. The training course was offered for a second and final time during the summer of 2004. Twenty-six teachers participated (17 in the concurrent coaching group and 9 in the delayed coaching group) in the ELO evaluation activities. The 17 teacher participants in the concurrent coaching group were obtained from two sources: the spring control group and the 'reserve list' of teachers who originally applied to participate in the grant but were not chosen for the first cohort. Evaluation activities and measures used to collect data were identical to Cohort One. Specifically, the IGDI and ELOC measured literacy growth and the preschool environment respectively at two points in time. Activities and evaluations related to Cohort Two took place between May and July 2004.

Cohort Three. Two significant procedure differences are noted in Cohort Three as compared to the procedures and activities of Cohorts One and Two: use of the DECA and number of student assessments. The DECA was added to the evaluation component of the grant because the goals of the evaluation team shifted and focused on further examining school-related behavioral competencies (e.g., attention, self-control) in preschool children. These behavioral

competencies were originally explored in the previous two cohorts through a teacher-completed Ages and Stages Questionnaire (ASQ, Bricker, D., & Squires, J.), which was organized and managed by an ELO grant committee member employed by Directions for Mental Health in St. Petersburg, Florida. Home-based mental health services were offered to families of children who scored within a predetermined range. The ASQ is a tool designed to screen infants and young children for developmental delays. Directions for Mental Health used the ASQ as part of their standard screening protocol of all children; therefore it was not used as part of the ELO evaluation activities. Although data were gathered on Cohorts One and Two as part of this standard screening, they were not included in the analyses conducted by the ELO evaluation team. The evaluation team replaced the ASQ with the DECA as a behavior screener to obtain information on both behavior concerns and within-child protective factors of the preschool students. This replacement also enabled the evaluation team to apply the same standardized procedures (ensuring confidentiality, collecting data according to evaluation timeline, double-checking scoring and data entry) to the behavior screener that were applied to all other grant related measures. The committee member at Directions for Mental Health was provided with the name and contact information of those children who scored in the at-risk category on the Behavioral Concerns Scale of the DECA to continue with the home-based referral services. The DECA was given to the teacher participants along with the demographic sheet once consent forms were received from parents. Results on the DECA were compared to data obtained on the IGDI to explore the differences

in literacy development among children with behavior concerns who had high scores measuring within-child protective factors in comparison to children with challenging behaviors who had low scores measuring within-child protective factors.

The second difference in the evaluation procedure was the number of times the student participants were assessed. Specifically, two progress monitoring points were added to the pre and post points, resulting in four total assessments for each student. Due to the reduced number of teacher participants, the three head evaluators completed all observations and assessments for the third cohort. Data were collected monthly during a five-day window, starting late September 2004 and ending mid December 2004.

Procedures for Selection, Review and Analysis of Archival Data in Current Study

Archival Data. The archival data consists of demographic information at the teacher (education, years of experience), child (gender, age, race, attendance, and home SES), and childcare site (class size,) levels, as well as data from observations of the preschool classrooms. These data were obtained from the following sources: the application form completed by the teacher for grant participation, a demographic information sheet, attendance sheet and the ELOC. In an effort to measure literacy growth and behavior levels of the preschool children, archival data from the IGDl (pre/post and two progress monitoring points) and DECA was reviewed. Child participant scores on the Behavior Concern Scale of the DECA was organized from lowest score to highest score. This method assisted in examining the outcome measure (literacy

development in preschool children) with respect to the teacher’s perception of the degree to which academic behavioral competencies are present in the classroom.

Research Design

The data were collected and entered into the comprehensive database, SPSS for Windows. Demographic characteristics (i.e., gender, age and race of students, home SES), attendance, years of education and experience of teachers, and site SES of the sample were calculated and basic descriptive statistics, such as the mean and standard deviation, were gathered to provide a description of the sample characteristics. Descriptive statistics for literacy development, within-child protective factors and behavior also were calculated. See Table 8 for a summary of the data source and respective range of data that were used for analysis in the current study.

Table 8.

Description of Measurement Data for Cohort Three.

| Data | Measured By | Data Range |
|--------------------|---|--|
| Age of student | Age in months at time of data collection | 36 to 72 months |
| Gender | Gender of participant | 1 = Male, 2 = Female |
| Race | Race of participant | 1 = White, 2 = African American, 3 = Hispanic, 4 = Asian, 5 = Other |
| Student Attendance | Number of days participant attended school during the course of the study | 0 to 64 days |
| Home SES | Median household annual income of the neighborhood in which the child resides | 1 = \$10,000-19,000; 2 = 20,000-29,000; 3 = 30,000-39,000 etc. |
| School SES | Median annual income of the neighborhood in which the childcare site is located | 1 = \$10,000-19,000; 2 = 20,000-29,000; 3 = 30,000-39,000 etc. |

Table 8 (continued).

Description of Measurement Data for Cohort Three.

| Data | Measured By | Data Range |
|--------------------------|--|---|
| Class Size | Highest number of students enrolled in a teacher's classroom | 12 to 20 |
| Teacher education | Highest degree obtained | 1 = High School Diploma or GED, 2 = Some College, 3 = AA, 4 = 4 Year Degree |
| Teacher experience | Years of experience in early childhood setting | 1-20 years |
| Classroom environment | Total score on the Early Childhood Checklist (ELOC) | 0 to 41 |
| Behavior | Total score on the Behavior Concerns Scale of the DECA | 30 to 70 |
| Total protective factors | Sum of the three subtest scores on the DECA | 30 to 70 |
| Early Literacy | IGDI – Picture Naming IGDI – Rhyming IGDI – Alliteration | 0 to 60 |

The current study sought to examine a complex integration of data consisting of various levels, all nested within one another. These levels include individual child factors (i.e., race, age, gender, and attendance), the preschool environment (i.e., class size, site SES, teacher experience, and classroom environment), and the behavioral competencies of the child (i.e., typical or challenging), all of which have the potential to affect literacy development. Within this nested organization, preschool students sharing the same classroom teacher increase group homogeneity and tend to be more similar to each other than preschool students selected from the population at random. As Osborne (2000) explained, this similarity occurs as a natural consequence at two levels. First,

students within a particular classroom typically come from the same geographic location and, thus, are not randomly assigned from the larger population (school district as a whole or from the national population). Second, students assigned to a particular classroom also share the experience of being exposed to the same environment, which consists of the same teacher, instruction and physical surroundings (Osborne, 2000). Therefore, the lower level unit of analysis (literacy growth of preschool students) is influenced by the higher-level variables (teacher and classroom environment characteristics). While traditional approaches (e.g., multiple regression, Analysis of Covariance) to multilevel data analysis disaggregate higher-level variables and/or aggregate lower level variables, the results are not without significant flaws (Osborne, 2000). Specific flaws of these approaches include lower levels of robustness, violation of independence of observations, and potential under/overestimation of observed relationships due to elimination of within-group information (Osborne, 2000). Since factors (e.g., teacher education, classroom environment, SES, gender) at each level influence each other (Hofmann, 1997) and have the potential of affecting outcomes (e.g., early literacy in preschool students), it becomes necessary to use a multilevel approach that enables the data to be separated based on individual and group effects. Hierarchical Linear Modeling (HLM) offers the option to examine both the effects of level 1 and level 2 variables on the outcome, as well as cross-level interactions. Through this statistical process, relationships between predictors and outcomes can best be estimated (Osborne, 2000). This is accomplished by

holding each level constant to examine nested layers for their role in the outcome variable. For a visual description of the HLM design see Appendix H.

As with any statistical procedure, assumptions are required. Specific to HLM, Bryk and Raudenbush (1997) initially discussed the issue of normality, suggesting that both individual outcomes and growth parameters assume normal distributions. This assumption can be validated through examination of histograms (for outcomes) and outliers (for growth parameters). Should outliers be present, analyses will be conducted with and without the observations to determine their contribution to the results. Covariance structure is the second assumption considered (Bryk and Raudenbush, 1997). HLM does not require identical data collection design for each subject, rather, the flexibility of the model accepts varying numbers of data points and spacing between observations. Therefore, HLM uses a covariance structure that estimates error variance. That is, it considers random effects (Bryk and Raudenbush, 1997). Last, assumptions regarding the metric used to assess the outcome variable require that each observation be measured on a common metric to allow for change in growth across time as opposed to changes in the measurement scale.

The first research question was developed to explore the contributing factors of positive and negative classroom behavior on the rate of literacy development. That is, how is literacy achievement in preschool children impacted by classroom behavior? The teacher ratings of classroom behavior were obtained through the Behavior Concerns scale of the DECA and were used as the predictor variable. Scores on the IGDI represented the outcome variable

(literacy development). The individual, or base, level of the HLM analysis reflected the literacy growth of the preschool children over four data points in time. This initially addressed the rate and levels of literacy development for the preschool children based on monitored performance on the IGDI. Specifically, the literacy scores obtained at Time One represented the intercept of the regression equation, while the slope documented the growth as measured during subsequent time points. The equation for Level one reads as follows:

$$Y_{ti} = \pi_{0i} + \pi_{1i} a_{ti} + e_{ti}$$

where Y_{ti} is the outcome measure (literacy) and a is the age, both representing time t for the i^{th} child, π_{0i} and π_{1i} are intercepts and slopes estimated for the i^{th} child and e is the amount of error. The covariance structure for the errors is assumed to be as follows:

$$\sigma^2 I = \begin{pmatrix} \sigma_1^2 & 0 & 0 & 0 \\ 0 & \sigma_2^2 & 0 & 0 \\ 0 & 0 & \sigma_3^2 & 0 \\ 0 & 0 & 0 & \sigma_4^2 \end{pmatrix}$$

In this structure, independence and equal variance are implied.

Level two of the HLM model reflects the individual factors related to the preschool child (i.e., race, gender, attendance and home SES) and begins to answer the second question of whether there are individual level variables associated with the variation across the individuals. In other words, each variable within Level two was examined to ascertain their contribution in literacy development, addressing such questions as, “do girls have higher literacy score

than boys?” Within this level, the intercept and slopes from the Level one analysis are utilized as dependent variables generating the following equations:

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{behavior}) + \beta_{02}(\text{gender}) + \beta_{03}(\text{race}) + \beta_{04}(\text{attendance}) + \beta_{05}(\text{home SES}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{behavior}) + \beta_{12}(\text{gender}) + \beta_{13}(\text{race}) + \beta_{14}(\text{attendance}) + \beta_{15}(\text{home SES}) + r_{1i}$$

An unstructured covariance matrix of covariance structure is assumed at level two, representing the following model:

$$\begin{matrix} r_{0i} \\ r_{1i} \end{matrix} \begin{pmatrix} T_{00} & T_{01} \\ & T_{11} \end{pmatrix}$$

The third HLM level focused on the preschool classroom variables, hypothesized as contributing to children’s’ literacy outcomes. These variables, considered predictors, include school SES, class size, teacher experience, teacher education, and classroom environment. Their inclusion in the regression model is as follows:

$$\beta_{00} = G_{000} + G_{001}(\text{school SES}) + G_{002}(\text{class size}) + G_{003}(\text{teacher experience}) + G_{004}(\text{teacher education}) + G_{005}(\text{classroom environment}) + u_{00}$$

$$\beta_{10} = G_{100} + G_{101}(\text{school SES}) + G_{102}(\text{class size}) + G_{103}(\text{teacher experience}) + G_{104}(\text{teacher education}) + G_{105}(\text{classroom environment}) + u_{10}$$

It is important to note the possible estimation issue surrounding the Level 3 analysis. The HLM model is based on large sample theory, so most recommend large numbers of units at the highest level. However, the current study is limited to 8 groups (preschool classrooms), which lead to nonconvergence

or an inadmissible solution (e.g., a negative variance estimate). As a result, the aforementioned classroom variables were presented as a fixed effect and the level-3 errors were dropped from the model.

Additional analyses were conducted to address the questions related to the within-child protective factors. The DECA was completed at one point in time (during the initial evaluation activities of Cohort Three) and served as the data source for the third, and final, research question. These data were analyzed via a two level structure with the child factors representing the first level and the preschool site representing the second level. The current study sought to examine the differences in children's literacy development based on within-child protective factors for children who were rated as having challenging behaviors on the DECA. Specifically, this analysis examined whether there are differences in literacy development for children with challenging behaviors who have high scores measuring within-child protective factors versus children with challenging behaviors who have low scores measuring within-child protective factors. A two level HLM model was conducted using a modification of the structural equation as discussed above for questions one and two. The modification centered on the inclusion of the DECA score as a predictor, which measures within-child protective factors.

CHAPTER FOUR

RESULTS

The purpose of this study was to examine the relationship between early literacy development and behavioral difficulties in preschool children. The role of within-child protective factors in literacy development also was explored. The current chapter will present results from each of the three research questions. First, descriptive information will be provided on each of the variables examined. Second, results of the hierarchical linear modeling (HLM) analysis will be presented to describe the relationships of interest.

Descriptive Statistics

Demographic characteristics for child (i.e., gender, age, race) and teacher (i.e., education, experience) participants were examined (Table 9). The sample contained approximately the same number of boys (53%) and girls (47%). Seventy-one percent of the participants were White. The age of the child participants ranged from 38 to 62 months with 79% of the children between 48 and 59 months of age. Level of education and years of experience varied across the eight teacher participants. More specifically, three teachers (37.5%) reported completing 'Some College,' whereas fifty percent of the teachers completed a two-year (n=2) or four-year (n=2) degree. Only one teacher listed 'High School' as the highest level of education obtained. A notable degree of variability was present in the amount of experience the teacher participants had in the

classroom setting. Three teachers (37.5%) had up to one year of experience, while 2 teachers (25%) reported twenty years in the field.

Table 9.

Descriptive Statistics related to Child and Teacher Demographic Characteristics

| Demographic Characteristics | N | % |
|--------------------------------|----|-------|
| <i>Child Characteristics</i> | | |
| Gender | | |
| Male | 44 | 53.01 |
| Female | 39 | 46.99 |
| Age (in months) | | |
| 36-41 | 2 | 2.41 |
| 42-47 | 9 | 10.84 |
| 48-53 | 41 | 49.40 |
| 54-59 | 25 | 30.12 |
| 60-65 | 6 | 7.23 |
| 66-72 | 0 | 0.0 |
| Race | | |
| White | 59 | 71.08 |
| African-American | 13 | 15.66 |
| Hispanic | 6 | 7.23 |
| Asian | 2 | 2.41 |
| Other | 3 | 3.61 |
| <i>Teacher Characteristics</i> | | |
| Education | | |
| High School degree | 1 | 12.5 |
| Some college | 3 | 37.5 |
| Two year degree | 2 | 25.0 |
| Four year degree | 2 | 25.0 |
| Experience (in years) | | |
| Up to one year | 3 | 37.5 |
| 2 – 6 | 1 | 12.5 |
| 7 – 11 | 1 | 12.5 |
| 12-16 | 1 | 12.5 |
| 17-21 | 2 | 25.0 |

Additional demographic information is reported in Table 10. More specifically, the mean annual income for the household was \$32,015.44 (SD = \$6,678.24) in comparison to \$28,940.65 (SD = \$6,050.70) reported for the site

based on the GIS zip code mapping system. The average number of days absent was reported as 5.46 (SD = 0.66) out of 68 possible school days.

Table 10.

| <i>Descriptive Statistics for Demographic Variables</i> | | |
|---|----------|---------|
| Demographic Characteristics | Mean | SD |
| Attendance (n=83) | 5.46 | 0.66 |
| Site SES (n=83) | 28940.65 | 6050.70 |
| Home SES (n=66) | 32015.44 | 6716.66 |

Next, the data were explored to determine normality. Normality was determined by obtaining skewness and kurtosis of the dependent measures (Table 11). Skewness (a measure of symmetry) and kurtosis (degree of peaks or flatness) refer to the extent to which the sample distribution departs from the normal curve (Hatcher & Stepanski, 1994). In general, a normal distribution yields skewness and kurtosis values of zero, whereas an obtained value greater or less than one indicates a non-normal sample distribution. For the current study, notable deviations in skewness and kurtosis occurred for the Alliteration subtest across all four points in time. The values were positive for both, indicating a right-skewed (meaning that there are relatively few high scores) and leptokurtic (an acute peak with the majority of scores falling around the mean) distribution. A higher kurtosis suggests that the variance is due to infrequent extreme deviations. Therefore, a visual inspection of the raw data was conducted, revealing one or more outliers. Consequently, the data were run both with and without the outliers to assess the sensitivity of the results due to these observations. Outcomes of the analyses were not influenced by these outliers.

Table 11.

| <i>Skewness and Kurtosis Values for Dependent Measures</i> | | | |
|--|----|----------|----------|
| | N | Skewness | Kurtosis |
| Time One | | | |
| Picture Naming | 76 | -0.24 | -0.15 |
| Alliteration | 76 | 1.68 | 2.16 |
| Rhyming | 76 | 1.12 | 0.13 |
| Time Two | | | |
| Picture Naming | 76 | -0.18 | 0.07 |
| Alliteration | 76 | 1.36 | 1.30 |
| Rhyming | 76 | 0.87 | -0.31 |
| Time Three | | | |
| Picture Naming | 73 | -0.78 | 1.01 |
| Alliteration | 73 | 1.62 | 2.23 |
| Rhyming | 73 | 0.84 | -0.71 |
| Time Four | | | |
| Picture Naming | 68 | -0.07 | -0.17 |
| Alliteration | 68 | 1.64 | 2.72 |
| Rhyming | 68 | 0.70 | -0.59 |

Means and standard deviations for the dependent variables were calculated across the four time points (Table 12). Scores on all subtests measuring literacy (i.e., Picture Naming, Alliteration, Rhyming) appeared to increase over time. Descriptive statistics for the DECA and ELOC also were calculated (Table 12). Scores for the Total DECA ranged from 31-66, with an average score of 49.66 ($SD=9.21$) while scores of the Behavior component ranged from 37 to 72 ($M=49.65$, $SD=9.97$). Sixteen percent of the study sample obtained a behavior score above sixty, which is the threshold for “elevated” on the rating scale. Observations of the classroom environment using the ELOC yielded scores ranging from 16.75 to 40 ($M=23.33$, $SD=6.97$) for the pre-test and a range of 29 to 57 ($M=45.86$, $SD=7.88$) for the post test. There was a 4-point increase in mean scores from the pre- to the post- measure.

Table 12.

Means and Standard Deviations for Dependent Variables

| | Mean | Standard Deviation |
|-------------------|-------|--------------------|
| Time One (n=76) | | |
| Picture Naming | 20.25 | 0.60 |
| Alliteration | 2.63 | 0.49 |
| Rhyming | 4.54 | 0.67 |
| Time Two (n=76) | | |
| Picture Naming | 20.70 | 0.82 |
| Alliteration | 3.50 | 0.53 |
| Rhyming | 5.11 | 0.67 |
| Time Three (n=73) | | |
| Picture Naming | 21.93 | 0.79 |
| Alliteration | 3.42 | 0.60 |
| Rhyming | 5.51 | 0.77 |
| Time Four (n=68) | | |
| Picture Naming | 23.24 | 0.84 |
| Alliteration | 4.88 | 0.76 |
| Rhyming | 6.69 | 0.84 |
| Other Measures | | |
| DECA (n = 77) | | |
| Initiative | 50.51 | 1.12 |
| Self Control | 53.70 | 1.21 |
| Attention | 46.90 | 0.85 |
| Total | 49.66 | 1.10 |
| Behavior | 49.65 | 1.19 |
| ELOC – Pre | 23.33 | 6.97 |
| ELOC – Post | 45.86 | 7.88 |

Linear graphs were constructed to view the relationships between behavior and the three IGDI subtests (Figures 1 through 3). To illustrate these trends, the student sample was split into two groups using the median DECA behavior score and was labeled as the low DECA behavior group and the high DECA behavior group. It is interesting to note that the expressive language and phonemic awareness skills as measured by Picture Naming, Alliteration and Rhyming were lower for those children who had high scores on the behavior

scale. Conversely, children with lower scores on the behavior scale obtained higher scores on the three literacy measures.

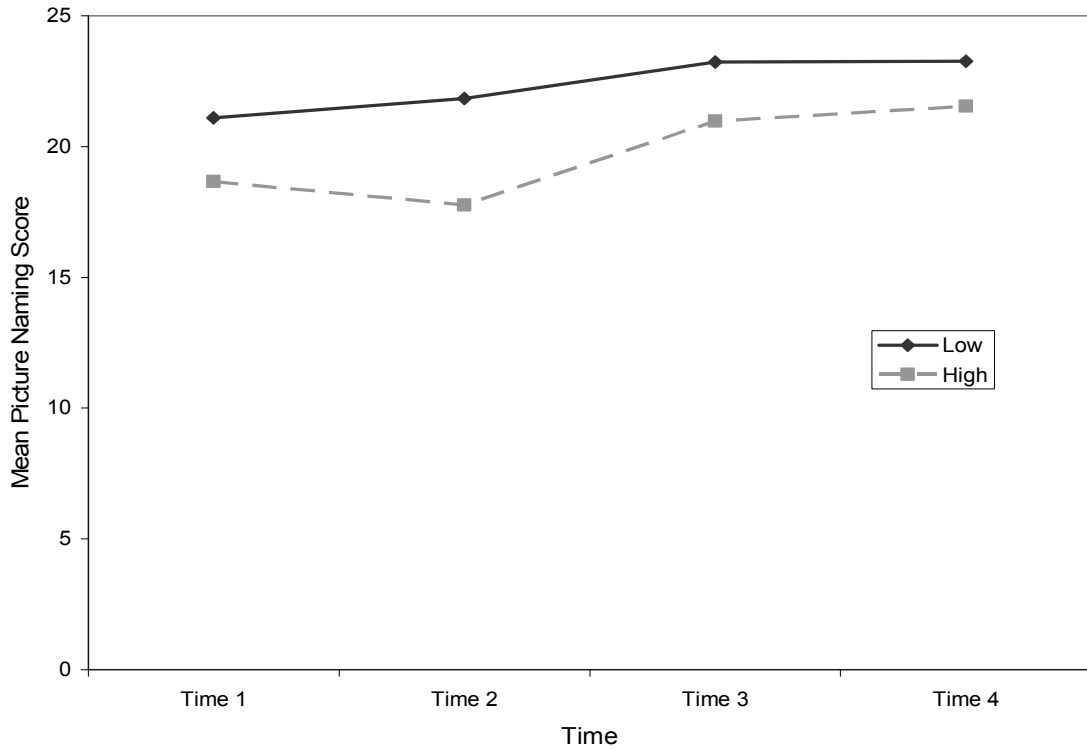


Figure 1. Behavior and Picture Naming Scores.

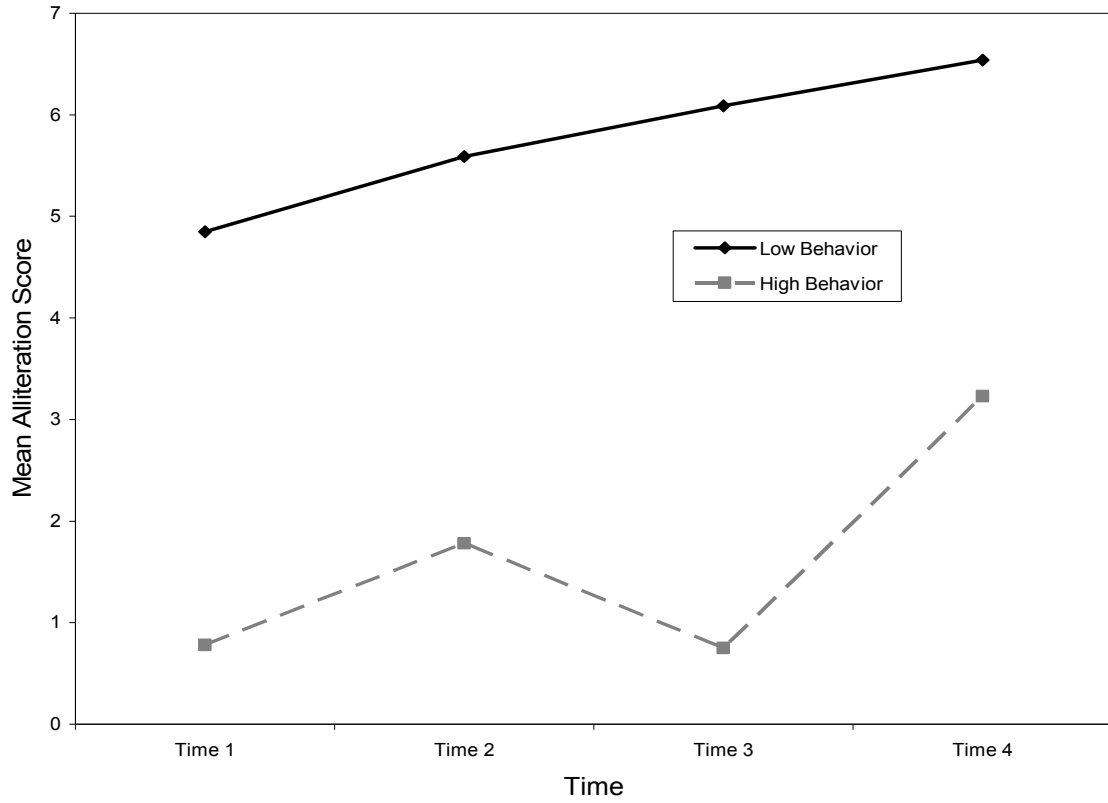


Figure 2. Behavior and Alliteration Scores.

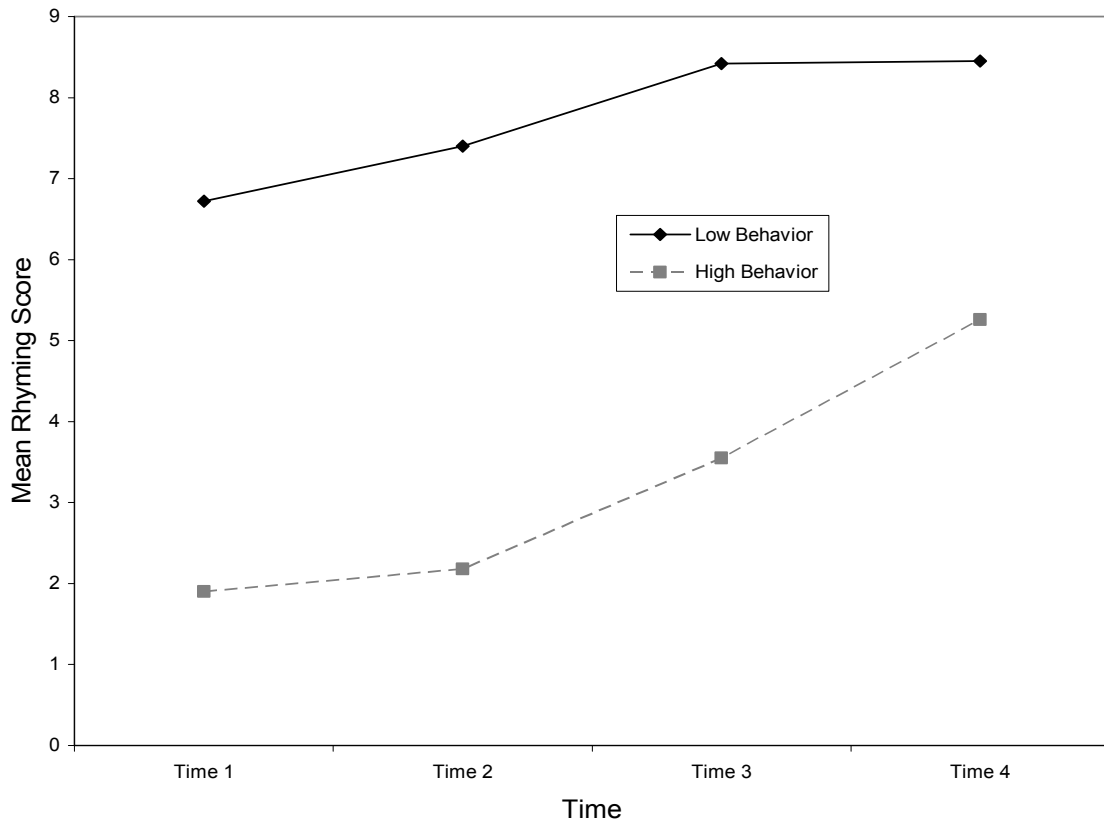


Figure 3. Behavior and Rhyming Scores.

Linear graphs depicting the relationship between race and behavior on literacy development, as measured by the three IGDI subtests, also were constructed (Figures 4 through 6) due to the tendency of the variables to covary. To explain further, research suggests that culturally and linguistically diverse students exhibit more externalizing behaviors (Sbarra and Pianta, 2001; Epstein, March, Conners, and Jackson, 1998; MacMillan et al., 1996) and have lower performance on reading achievement (Diamond and Onwuegbuzie, 2001) than non-diverse students. Overall, the graphs indicate that White students have higher scores, regardless of behavior status. It is important to note, however,

that the number of students in each group varies with forty-one White students and 19 non-White students in the low behavior groups, along with nine and two students respectively in the high behavior groups. While discrepancies are noted, it is critical to explore these relationships while controlling for each variable to ensure the appropriate conclusions are made regarding their relationship to early literacy. A more complex analysis was conducted and will be discussed later in the chapter.

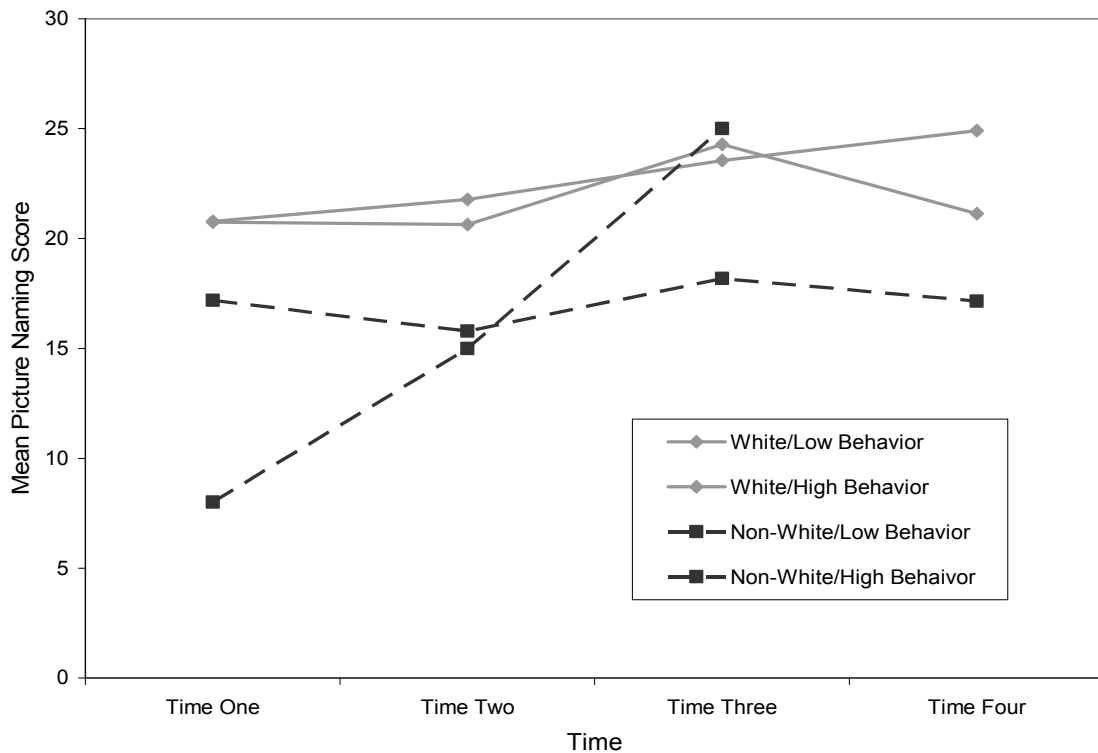


Figure 4. Relationship between Behavior and Race on Picture Naming Scores.

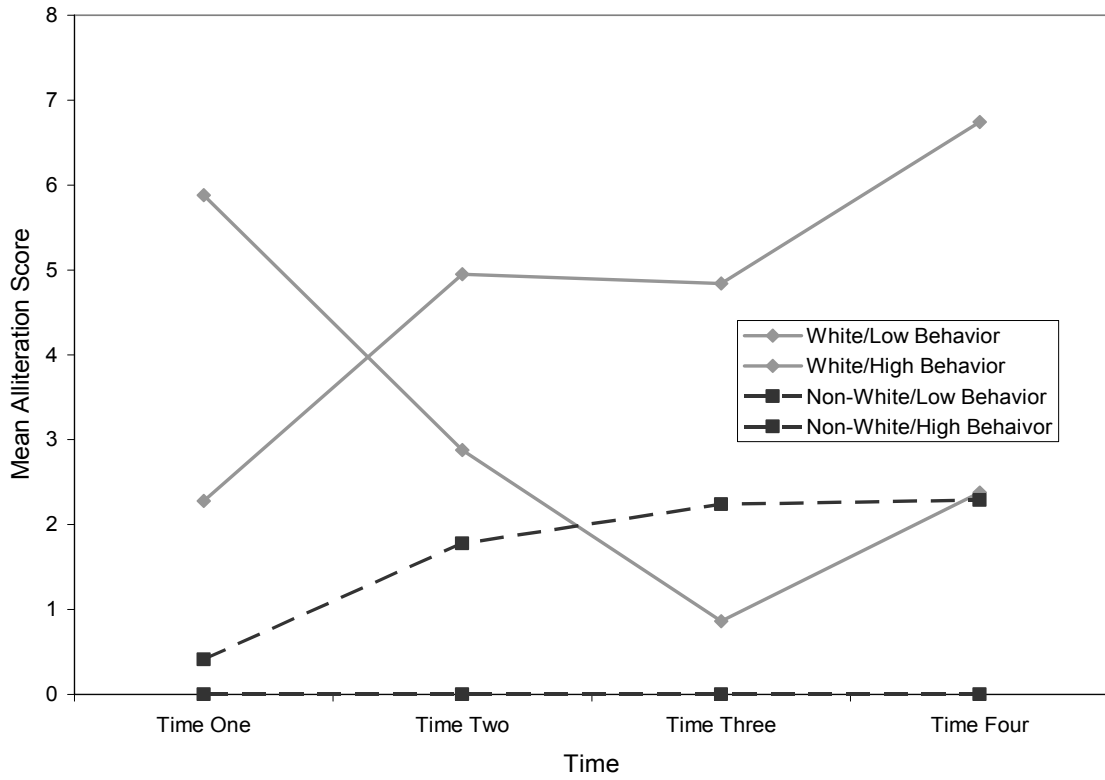


Figure 5. Relationship between Behavior and Race on Alliteration Scores.

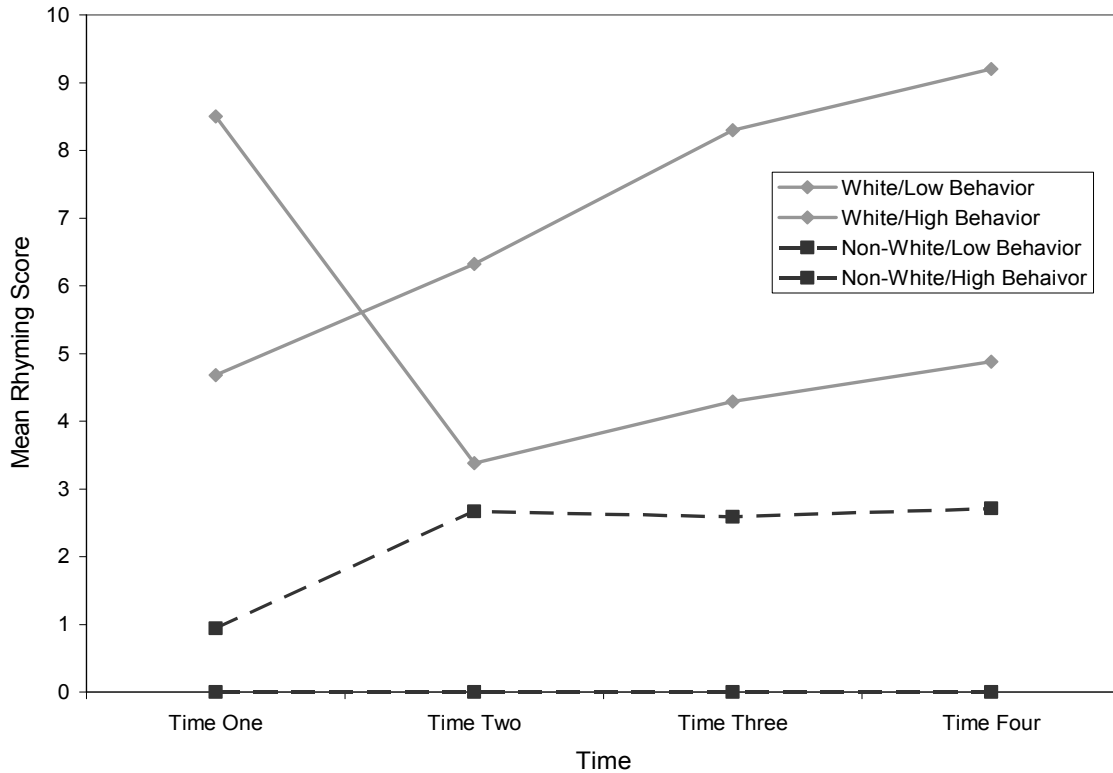


Figure 6. Relationship between Behavior and Race on Rhyming Scores.

Correlations between the continuous predictor variables and the outcome variable were conducted (Tables 13 through 16). Results are reported based on each data time point.

Time One. Picture Naming was negatively and significantly correlated with attendance ($r = -.28, p < .05$). This suggests that Picture Naming scores decreased as number of days absent increased. No other correlations to Picture Naming were revealed at time one. Alliteration was positively and significantly correlated to home SES ($r = .38, p < .01$), site SES ($r = .43, p < .001$), teacher experience ($r = .25, p < .05$), class size ($r = .28, p < .05$), and within-child protective factors ($r = .46, p < .01$). A significant negative correlation ($r = -.40, p < .001$) was found between Alliteration and Behavior. The third subtest, Rhyming, was

positively and significantly correlated with home SES ($r=.37$, $p<.01$) site SES ($r=.38$, $p<.001$), teacher experience ($r=.25$, $p<.05$), class size ($r=.26$, $p<.05$), and within-child protective factors ($r=.39$, $p<.01$). Results revealed a significant negative correlation between Rhyming and the predictor variables of Behavior ($r=-.35$, $p<.01$) and the ELOC posttest ($r=-.27$, $p<.05$).

Time Two. Picture Naming was positively and significantly correlated with home SES ($r=.37$, $p<.01$), site SES ($r=.32$, $p<.01$), teacher experience ($r=.40$, $p<.001$), class size ($r=.39$, $p<.001$), and within-child protective factors ($r=.31$, $p<.05$) at time two. There was a negative correlation ($r=-.35$, $p<.01$) to attendance. Alliteration was positively and significantly correlated to home SES ($r=.48$, $p<.001$), site SES ($r=.45$, $p<.001$), class size ($r=.29$, $p<.05$), and within-child protective factors ($r=.37$, $p<.01$). There was a negative correlation ($r=-.37$, $p<.01$) to Behavior and the ELOC pretest ($r=-.26$, $p<.05$). Rhyming was positively and significantly correlated to home SES ($r=.44$, $p<.001$), site SES ($r=.39$, $p<.001$), teacher experience ($r=.32$, $p<.01$), class size ($r=.33$, $p<.01$), within-child protective factors ($r=.41$, $p<.001$), and the ELOC posttest ($r=.28$, $p<.05$). In addition, Rhyming was negatively correlated ($r=-.39$, $p<.001$) with behavior.

Time Three. The results for time three do not reveal significant correlations between Picture Naming and the other predictor variables. However, Alliteration was found to be positively correlated with home SES ($r=.34$, $p<.01$), site SES ($r=.45$, $p<.001$), class size ($r=.23$, $p<.05$), and within-child protective factors ($r=.39$, $p<.01$). A negative correlation ($r=-.42$, $p<.001$) was found between Alliteration and Behavior as well as the ELOC pretest ($r=-.33$,

$p < .01$). Positive correlations were revealed between Rhyming and home SES ($r = .32$, $p < .01$), site SES ($r = .48$, $p < .001$), class size ($r = .44$, $p < .001$), and within-child protective factors ($r = .42$, $p < .001$). The correlation between Rhyming and Behavior was negative ($r = -.35$, $p < .01$), along with the ELOC pretest ($r = -.31$, $p < .01$).

Time Four. As with time two, the finding revealed a significantly positive correlation between Picture Naming and home SES ($r = .34$, $p < .01$), site SES ($r = .28$, $p < .05$), teacher experience ($r = .40$, $p < .001$), class size ($r = .26$, $p < .05$). A negative relationship with attendance was found to be significant ($r = -.35$, $p < .001$). Alliteration was positively and significantly correlated to site SES ($r = .38$, $p < .001$), teacher experience ($r = .26$, $p < .05$), class size ($r = .37$, $p < .01$) and within-child protective factors ($r = .57$, $p < .01$). Alliteration was negatively and significantly correlated to the Behavior score ($r = -.32$, $p < .01$). Finally, Rhyming was positively and significantly correlated with home SES ($r = .38$, $p < .01$), site SES ($r = .40$, $p < .001$), teacher experience ($r = .37$, $p < .01$), class size ($r = .46$, $p < .001$), and within-child protective factors ($r = .35$, $p < .01$).

Hierarchical Linear Modeling

Hierarchical Linear Modeling (HLM) was utilized to examine nested relationships within various levels using SPSS. The nested data structure consisted of three levels that were explored to ascertain their contribution to early literacy development. Level one addressed the differences in literacy development of preschool children over time as measured by scores on the IGDl.

Table 13.

Correlations between Predictors and Literacy Outcomes at Time One.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------------------|--------|---------|---------|---------|---------|--------|---------|---------|--------|-----|--------|
| 1 Picture naming | | | | | | | | | | | |
| 2 Alliteration | .43 ** | | | | | | | | | | |
| 3 Rhyming | .35 ** | .62 ** | | | | | | | | | |
| 4 DECA Behavior | -.12 | -.40 ** | -.35 ** | | | | | | | | |
| 5 DECA Protective | .14 | .46 ** | .39 ** | -.82 ** | | | | | | | |
| 6 Home SES | .20 | .38 ** | .37 ** | -.48 ** | .47 ** | | | | | | |
| 7 Attendance | -.28 * | -.15 | -.19 | .28 * | -.35 ** | -.27 * | | | | | |
| 8 Site SES | .20 | .49 ** | .38 ** | -.46 ** | .41 ** | .58 ** | -.24 * | | | | |
| 9 Teacher Experience | .22 | .20 | .25 * | .12 | .32 ** | .53 ** | -.32 ** | .36 ** | | | |
| 10 Class size | .19 | .28 * | .26 * | .05 | .02 | .34 ** | -.02 | .54 ** | .59 * | | |
| 11 ELOC- Pretest | -.02 | .27 * | -.06 | .24 * | -.00 | -.09 | -.08 | -.36 ** | .54 ** | .05 | |
| 12 ELOC-Posttest | .10 | .19 | .25 | -.52 ** | .63 ** | .31 ** | -.33 ** | .46 ** | .49 ** | .07 | .45 ** |

Note: * $p \leq .05$; ** $p \leq .01$

Table 14.

Correlations between Predictors and Literacy Outcomes at Time Two.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------------------|---------|--------|---------|---------|---------|--------|---------|---------|--------|-----|--------|
| 1 Picture naming | | | | | | | | | | | |
| 2 Alliteration | .40 ** | | | | | | | | | | |
| 3 Rhyming | .49 ** | .65 | | | | | | | | | |
| 4 DECA Behavior | -.18 | -.32 | -.39 ** | | | | | | | | |
| 5 DECA Protective | .31 ** | .37 | .41 ** | -.82 ** | | | | | | | |
| 6 Home SES | .37 ** | .48 | .44 ** | -.48 ** | .47 ** | | | | | | |
| 7 Attendance | -.35 ** | -.20 | -.20 | .28 * | -.35 ** | -.27 * | | | | | |
| 8 Site SES | .32 ** | .45 | .39 ** | -.46 ** | .41 ** | .58 ** | -.24 * | | | | |
| 9 Teacher Experience | .40 ** | .14 | .32 ** | -.12 | .32 ** | .53 ** | -.32 ** | .36 ** | | | |
| 10 Class size | .39 ** | .29 | .33 ** | .05 | .02 | .34 ** | -.02 | .54 ** | .59 ** | | |
| 11 ELCO- Pretest | .11 | -.26 * | -.01 | .24 | -.00 | -.09 | -.08 | -.36 ** | .54 ** | .05 | |
| 12 ELOC-Posttest | .21 | .10 | .28 * | -.52 ** | .63 ** | .31 * | -.33 ** | .46 ** | .49 ** | .07 | .45 ** |

Note: * $p \leq .05$; ** $p \leq .01$

Table 15.

Correlations between Predictors and Literacy Outcomes at Time Three.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------------------|--------|---------|---------|---------|---------|--------|---------|---------|--------|-----|--------|
| 1 Picture naming | | | | | | | | | | | |
| 2 Alliteration | .36 ** | | | | | | | | | | |
| 3 Rhyming | .41 ** | .62 ** | | | | | | | | | |
| 4 DECA Behavior | -.06 | -.42 ** | -.35 ** | | | | | | | | |
| 5 DECA Protective | .21 | .39 ** | .42 ** | -.82 ** | | | | | | | |
| 6 Home SES | .18 | .34 ** | .32 ** | -.48 ** | .47 ** | | | | | | |
| 7 Attendance | -.12 | -.23 | -.08 | .28 * | -.35 ** | -.27 * | | | | | |
| 8 Site SES | .19 | .45 ** | .48 ** | -.46 ** | .41 ** | .58 ** | -.24 * | | | | |
| 9 Teacher Experience | .04 | .01 | .19 | -.12 | .32 ** | .53 ** | -.32 ** | .36 ** | | | |
| 10 Class size | .15 | .23 * | .44 ** | .05 | .02 | .34 ** | -.02 | .54 ** | .59 ** | | |
| 11 ELCO- Pretest | -.15 | -.33 ** | -.31 ** | .24 * | -.00 | -.09 | -.08 | -.36 ** | .54 ** | .05 | |
| 12 ELOC-Posttest | -.05 | .16 | .06 | -.52 ** | .63 ** | .31 * | -.33 ** | .46 ** | .49 ** | .07 | .45 ** |

Note: * $p \leq .05$; ** $p \leq .01$

Table 16.

Correlations between Predictors and Literacy Outcomes at Time Four.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------------------|--------|--------|--------|---------|---------|--------|---------|---------|--------|-----|--------|
| 1 Picture naming | | | | | | | | | | | |
| 2 Alliteration | .30 * | | | | | | | | | | |
| 3 Rhyming | .33 ** | .57 ** | | | | | | | | | |
| 4 DECA Behavior | -.11 | -.32 * | -.26 | | | | | | | | |
| 5 DECA Protective | .21 | .41 ** | .35 ** | -.82 ** | | | | | | | |
| 6 Home SES | .34 | .27 | .38 ** | -.48 ** | .47 ** | | | | | | |
| 7 Attendance | -.18 * | -.19 | -.09 | .28 * | -.35 ** | .27 * | | | | | |
| 8 Site SES | .28 * | .38 ** | .40 ** | -.46 ** | .41 ** | .58 ** | -.24 * | | | | |
| 9 Teacher Experience | .40 ** | .26 * | .37 ** | -.12 | .32 ** | .53 ** | -.32 ** | .36 ** | | | |
| 10 Class size | .26 * | .37 ** | .46 ** | .05 | .02 | .34 ** | .02 | .54 ** | .59 ** | | |
| 11 ELCO- Pretest | .11 | -.12 | -.06 | .24 * | -.00 | -.09 | -.08 | -.36 ** | .54 ** | .05 | |
| 12 ELOC-Posttest | .22 | .20 | .15 | -.52 ** | .63 ** | .31 * | -.33 ** | .46 ** | .49 ** | .07 | .45 ** |

Note: * $p \leq .05$; ** $p \leq .01$

Level two examined child variables that were identified as potentially affecting literacy development. These variables included the child participants' (1) age, (2) race, (3) gender, (4) home SES, (5) behavior and (6) attendance in school. Level three explored how the childcare site variables such as (1) class size, (2) years of teaching experience, (3) highest level of education earned by the preschool teachers, (4) site SES, and (5) classroom environment, influenced literacy development.

Intraclass Correlations. Variance estimates for the unconditional two level models were examined first (Table 17). Specifically, intraclass correlation coefficients (ICC's) were obtained to measure the proportion of the variance in outcome between and within persons. ICC values range from 0 to 1, indicating complete within person variability or complete between person variability respectively. For the current study, ICC's ranged from .53 to .69 for the two level models, suggesting that the majority of the variability is attributed to between person variables as opposed to within person variables for all three measures of literacy.

Table 17.

| <i>Intraclass Correlation Coefficients</i> | |
|--|-----|
| Dependent Measures | ICC |
| Two level unconditional model | |
| Picture Naming | .53 |
| Alliteration | .60 |
| Rhyming | .69 |

It was anticipated that individual differences in the level one model were impacted by time. That is, child participants were expected to demonstrate

growth in literacy scores across the four data points. Thus, the first analysis addressed research question number one: How does positive and negative classroom behavior contribute to the rate of literacy development on preschool children? The Picture Naming growth model findings indicate that for each unit increase in time, Picture Naming growth increased, on average, by .87 points. The Alliteration and Rhyming growth models yielded findings that indicate a growth increase of .66 on average for Alliteration and .69 points for Rhyming. Table 18 depicts the within-child differences at level one for each subtest.

Table 18.

| <i>Linear Model of Literacy Growth</i> | | |
|--|-------------------|---------------|
| Outcome Variables | Average Intercept | Average Slope |
| Picture Naming | | |
| Mean Score | 21.30 | |
| Time | | .87 |
| Alliteration | | |
| Mean Score | 3.55 | |
| Time | | .66 |
| Rhyming | | |
| Mean Score | 5.37 | |
| Time | | .69 |

In addition, a random sample of child participants was taken to illustrate the relationship between time and growth on scores from the Picture Naming, Alliteration and Rhyming subtests (Figures 7 through 9). While growth in literacy development over time was supported, the variance in the rate of growth remains in question. This will be addressed later in this chapter.

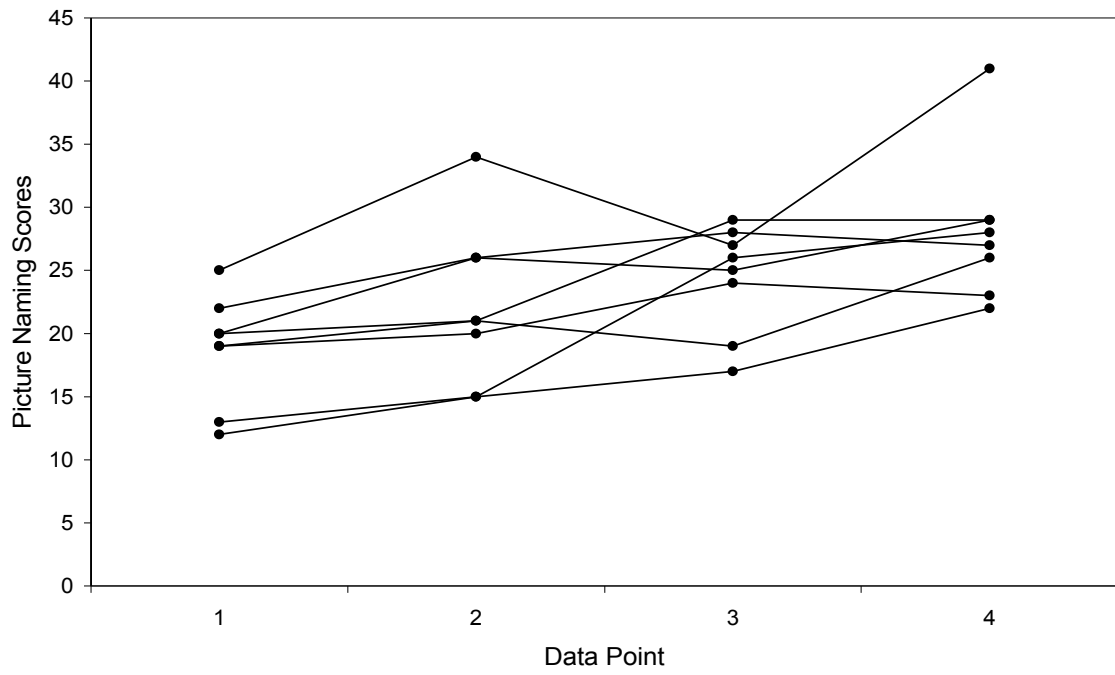


Figure 7. Growth Over Time for a Random Selection of Student Participants on the Picture Naming Subtest.

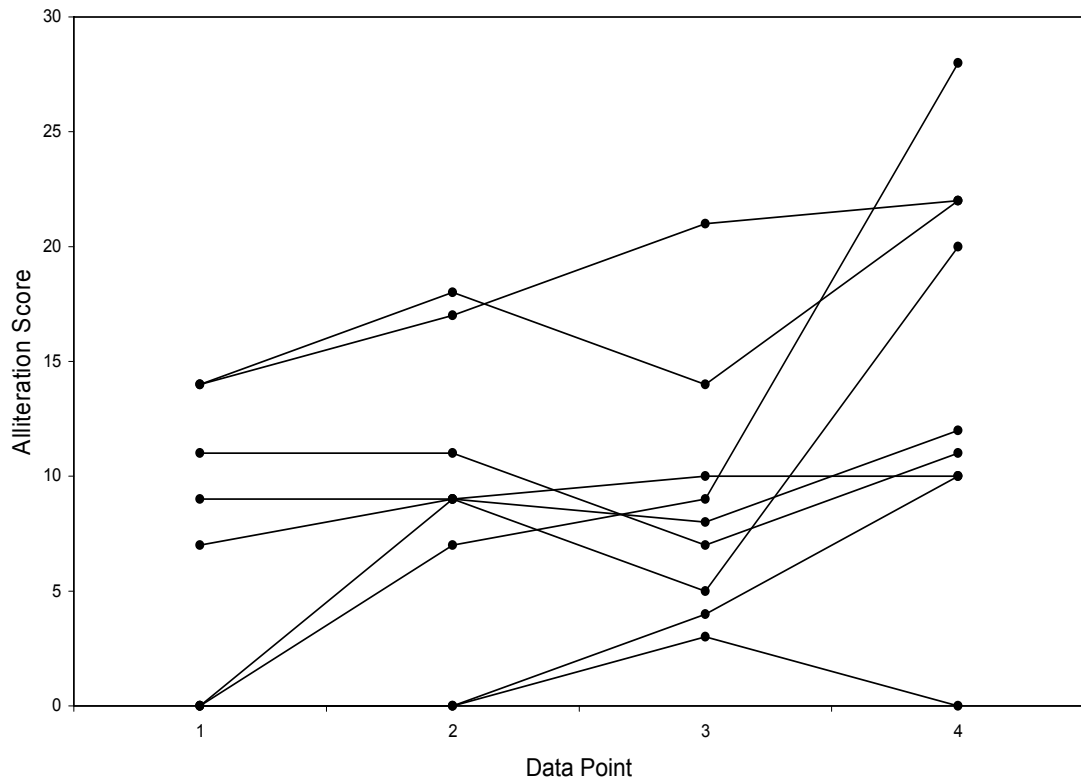


Figure 8. Growth Over Time for a Random Selection of Student Participants on the Alliteration subtest.

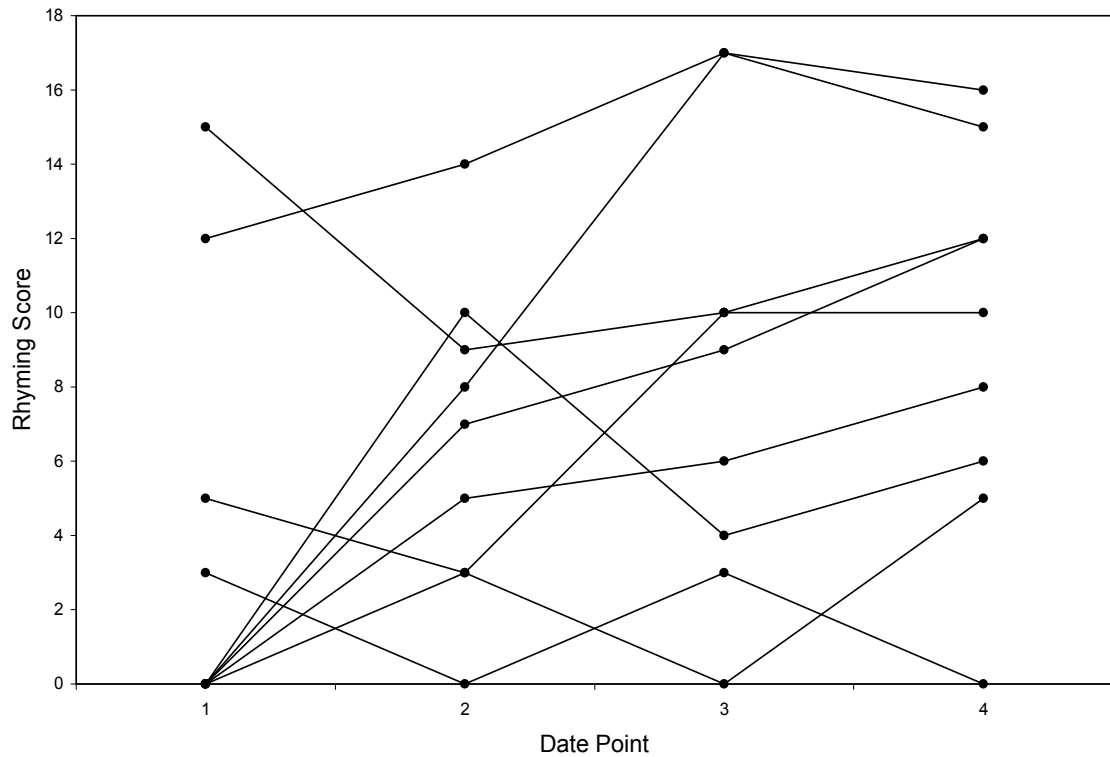


Figure 9. Growth Over Time for a Random Selection of Student Participants on the Rhyming subtest.

Next, six level two variables investigating child characteristics were entered into the HLM model. These included age, gender, race, attendance, home socioeconomic status (SES), and behavior are summarized in Table 19 for each of the three outcome variables. The analysis at this level addressed the second research question: What factors (i.e., gender, race, SES, teacher experience, classroom environment, class size) contribute to the rate and levels of literacy development for children identified with typical or challenging behaviors? Overall, the majority of the student level variables failed to significantly predict literacy scores and slopes for the three subtests. Findings did, however, reveal significant relationships pertaining to Picture Naming scores

and race and attendance. Specifically, it was noted that White students had significantly higher Picture Naming scores than non-White students. In addition, the scores of White students increased more across time in comparison to scores of non-White students. The second finding revealed a significant and negative relationship between attendance and Picture Naming scores. That is, the more often students were absent, the lower their Picture Naming scores were. In examining scores over time, results suggest that preschool students' Picture Naming and Rhyming scores increased significantly across time, a finding that was not evident with Alliteration scores. Also worth noting is the lack of significant relationship between the behavior variable and literacy development for each subtest.

Table 19.

Linear Model of Literacy Growth including Child Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Picture Naming | | | |
| <i>Intercept</i> | 20.76 | .62 | .000 |
| Age | .03 | 1.44 | .984 |
| Gender ^a | -1.85 | 1.20 | .132 |
| Race ^b | -4.02 * | 1.56 | .013 |
| Attendance | -.28 ** | .10 | .010 |
| Home SES | .00 | .00 | .289 |
| DECA - Behavior | .00 | .08 | .978 |
| Time | .71 * | .29 | .016 |
| Age * Time | -.53 | .66 | .426 |
| Gender * Time | -.24 | .56 | .671 |
| Race * Time | -1.90 * | .74 | .014 |
| Attendance * Time | -.02 | .05 | .707 |
| Home SES * Time | 4.80 | 5.55 | .392 |
| DECA-Behavior * Time | .03 | .04 | .392 |

Note: * $p \leq .05$; ** $p \leq .01$, ^aGender (0=Male, 1=Female), ^bRace (0=White, 1=Non-White)

Table 19 (Cont).

Linear Model of Literacy Growth including Child Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| <i>Alliteration</i> | | | |
| <i>Intercept</i> | 3.24 | .52 | .000 |
| Age | -.17 | 1.22 | .891 |
| Gender | .54 | 1.02 | .599 |
| Race | -1.45 | 1.32 | .279 |
| Attendance | -.13 | .09 | .147 |
| Home SES | .00 | .00 | .080 |
| DECA - Behavior | -.11 | .07 | .097 |
| Time | .35 | .24 | .161 |
| Age * Time | .73 | .57 | .206 |
| Gender * Time | -.27 | .48 | .580 |
| Race * Time | .01 | .62 | .986 |
| Attendance * Time | -.03 | .04 | .491 |
| Home SES * Time | -3.36 | 4.72 | .480 |
| DECA-Behavior * Time | -.04 | .03 | .185 |
| <i>Rhyming</i> | | | |
| <i>Intercept</i> | 5.11 | .63 | .000 |
| Age | 1.35 | 1.47 | .364 |
| Gender | 2.07 | 1.24 | .101 |
| Race | -2.52 | 1.59 | .120 |
| Attendance | -.04 | .10 | .724 |
| Home SES | .00 | .00 | .071 |
| DECA – Behavior | -.10 | .08 | .209 |
| Time | .83 ** | .29 | .007 |
| Age * Time | .42 | .68 | .536 |
| Gender * Time | -.69 | .57 | .235 |
| Race * Time | -.66 | .75 | .386 |
| Attendance * Time | -.01 | .05 | .786 |
| Home SES * Time | 4.28 | 5.69 | .940 |
| DECA-Behavior * Time | -.01 | .04 | .859 |

Note: * $p \leq .05$; ** $p \leq .01$, ^aGender (0=Male, 1=Female), ^bRace (0=White, 1=Non-White)

The variances of scores from Picture Naming, Alliteration, and Rhyming within each of the four assessment periods were different (Table 20). That is, the mean scores for each subtest varied significantly across students. Additionally, the slopes for Alliteration and Rhyming varied significantly across students, but

not for Picture Naming. Finally, the change in mean Rhyming score covaried significantly with the change in Rhyming slope. Significant findings of covariance were not found for Picture Naming or Alliteration.

Table 20.

Linear Model of Literacy Growth including Child Characteristics: Variance Estimates

| Outcome Variables Parameter | Estimate for Random Effects | Standard Error | p-value |
|--------------------------------|--------------------------------|-------------------|---------|
| Picture Naming | | | |
| <i>Within Students</i> | | | |
| Time One | 4.68 | 4.63 | .312 |
| Time Two | 24.23 ** | 5.53 | .000 |
| Time Three | 11.34 ** | 3.53 | .001 |
| Time Four | 12.88 * | 6.06 | .033 |
| <i>Between Students</i> | | | |
| Mean Score | 15.61 ** | 4.01 | .000 |
| Time Slope | 1.99 | 1.23 | .106 |
| Mean Score x Time Slope | 2.17 | 1.54 | .160 |
| Alliteration | | | |
| <i>Within Students</i> | | | |
| Time One | 2.40 | 2.57 | .351 |
| Time Two | 6.92 ** | 1.92 | .000 |
| Time Three | 5.01 ** | 1.80 | .005 |
| Time Four | 10.79 ** | 4.21 | .010 |
| <i>Between Students</i> | | | |
| Mean Score | 11.92 ** | 2.93 | .000 |
| Time Slope | 1.68 * | .76 | .028 |
| Mean Score x Time Slope | 1.99 | 1.14 | .082 |
| Rhyming | | | |
| <i>Within Students</i> | | | |
| Time One | 8.03 ** | 3.00 | .007 |
| Time Two | 7.58 ** | 2.05 | .000 |
| Time Three | 6.98 ** | 2.26 | .002 |
| Time Four | 11.37 * | 4.51 | .012 |
| <i>Between Students</i> | | | |
| Mean Score | 17.50 ** | 4.14 | .000 |
| Time Slope | 2.02 * | .99 | .041 |
| Mean Score x Time Slope | 3.61 * | 1.48 | .015 |

Note: * $p \leq .05$; ** $p \leq .01$

Next, the four variables that examined classroom characteristics were entered into the HLM, creating the third level of the model (Table 21). Initial attempts at running the third level model resulted in non-convergence. A series of modifications were made to simplify the variance structure. Specifically, the initial proposed structure was as follows:

Level One:

$$Y_{ti} = \pi_{0i} + \pi_{1i} a_{ti} + e_{ti}$$

Level Two:

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{behavior}) + \beta_{02}(\text{gender}) + \beta_{03}(\text{race}) + \beta_{04}(\text{attendance}) + \beta_{05}(\text{home SES}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{behavior}) + \beta_{12}(\text{gender}) + \beta_{13}(\text{race}) + \beta_{14}(\text{attendance}) + \beta_{15}(\text{home SES}) + r_{1i}$$

Level 3:

$$\beta_{00} = G_{000} + G_{001}(\text{school SES}) + G_{002}(\text{class size}) + G_{003}(\text{teacher experience}) + G_{004}(\text{teacher education}) + G_{005}(\text{classroom environment}) + u_{00}$$

$$\beta_{10} = G_{100} + G_{101}(\text{school SES}) + G_{102}(\text{class size}) + G_{103}(\text{teacher experience}) + G_{104}(\text{teacher education}) + G_{105}(\text{classroom environment}) + u_{10}$$

It was simplified to:

Level One:

$$Y_{ti} = \pi_{0i} + \pi_{1i} a_{ti} + e_{ti}$$

Level Two:

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{behavior}) + \beta_{02} (\text{gender}) + \beta_{03} (\text{race}) + \beta_{04} (\text{attendance}) + \beta_{05} (\text{home SES}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{behavior}) + \beta_{12} (\text{gender}) + \beta_{13} (\text{race}) + \beta_{14} (\text{attendance}) + \beta_{15} (\text{home SES}) + r_{1i}$$

Level Three:

$$\beta_{00} = G_{000} + G_{001} (\text{school SES}) + G_{002} (\text{class size}) + G_{003} (\text{teacher experience}) + G_{004} (\text{teacher education}) + G_{005} (\text{classroom environment})$$

$$\beta_{10} = G_{100} + G_{101} (\text{school SES}) + G_{102} (\text{class size}) + G_{103} (\text{teacher experience}) + G_{104} (\text{teacher education}) + G_{105} (\text{classroom environment})$$

Although the model was conceptualized as a 3-level model, the removal of the error term at level three reduced it to a 2-level structure. In addition, a common variance was assumed for each measurement occasion, leading to a single variance estimate at level one. The model was further simplified by merging two variables into one. That is, the SPSS output revealed that the variable representing the posttest of the ELOC was considered redundant, and therefore did not add any additional information to the analysis. As such, the average scores between the pre- and post-tests were used as a way to collapse ELOC1 and ELOC2 into one variable. The relationship between the classroom environment and literacy was the concept of interest as opposed to the change in environment, making the collapse in variables logical. Although convergence was achieved, findings were non-significant for almost all predictors. The exception was a marginal relationship ($p=.056$) between level of teacher education and Alliteration scores. Thus, the higher the level of education the

teacher attained, the higher the Alliteration score. Additionally, there was a significant negative relationship between the Picture Naming slope and class size. The findings indicate that scores increase as the number of students in a class decrease.

Table 21.

Linear Model of Literacy Growth including Child and Classroom Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Picture Naming | | | |
| <i>Intercept</i> | 33.35 *** | 8.55 | .000 |
| Site SES | -5.70 | .00 | .807 |
| Teacher Experience | .12 | .38 | .764 |
| Teacher Education | -.53 | 2.64 | .842 |
| Class Size | .48 | .56 | .402 |
| Class Environment | -.35 | .22 | .124 |
| Site SES * Time | -.00 | .00 | .325 |
| Teacher Experience * Time | .31 | .19 | .105 |
| Teacher Education * Time | -.49 | 1.37 | .721 |
| Class Size * Time | -.55 * | .27 | .050 |
| Class Environment * Time | .15 | .11 | .174 |
| Alliteration | | | |
| <i>Intercept</i> | 1.41 | 6.88 | .838 |
| Site SES | .00 | .00 | .236 |
| Teacher Experience | .04 | .31 | .886 |
| Teacher Education | 4.13 | 2.11 | .056 |
| Class Size | -.36 | .45 | .427 |
| Class Environment | .07 | .18 | .708 |
| Site SES * Time | -1.09 | .00 | .919 |
| Teacher Experience * Time | -.14 | .17 | .411 |
| Teacher Education * Time | 1.98 | 1.25 | .121 |
| Class Size * Time | -.01 | .25 | .963 |
| Class Environment * Time | .06 | .10 | .532 |
| Rhyming | | | |
| <i>Intercept</i> | 6.32 | 8.11 | .440 |
| Site SES | .00 | .00 | .416 |
| Teacher Experience | .04 | .36 | .923 |
| Teacher Education | 4.32 | 2.48 | .088 |
| Class Size | -.04 | .53 | .941 |
| Class Environment | -.02 | .21 | .942 |

Note: * $p \leq .05$, *** $p \leq .001$

Table 21 (continued).

Linear Model of Literacy Growth including Child and Classroom Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Site SES * Time | -.00 | .00 | .180 |
| Teacher Experience * Time | .16 | .19 | .408 |
| Teacher Education * Time | .29 | 1.36 | .832 |
| Class Size * Time | -.03 | .27 | .921 |
| Class Environment * Time | .07 | .12 | .530 |

Note: * $p \leq .05$, *** $p \leq .001$

Variance estimates for the third level also were calculated (Table 22). The mean score for each subtest varied significantly across students. Additionally, the slope for the Picture Naming, Alliteration and Rhyming subtests varied significantly across students.

Table 22.

*Linear Model of Literacy Growth including Child and Classroom Characteristics:
Variance Estimates*

| Outcome Variables Parameter | Estimate for Random Effects | Standard Error | p-value |
|--------------------------------|--------------------------------|-------------------|---------|
| Picture Naming | | | |
| <i>Within Students</i> | 15.51 *** | 2.32 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 13.41 *** | 2.32 | .000 |
| Time Slope | .35 ** | 3.93 | .001 |
| Alliteration | | | |
| <i>Within Students</i> | 6.02 *** | .88 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 9.77 *** | 2.51 | .000 |
| Time Slope | 1.84 * | .74 | .011 |
| Rhyming | | | |
| <i>Within Students</i> | 8.20 *** | 1.21 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 13.68 *** | 3.50 | .000 |
| Time Slope | 1.94 * | .93 | .037 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

The next analysis addressed literacy development in children with challenging behaviors with and without the presence of within-child protective

factors (Table 23). Research question number three (What differences are there between literacy development in children with challenging behaviors who have high scores measuring within-child protective factors in comparison to children with challenging behaviors who have low scores measuring within-child protective factors?) was the focal point in this analysis. Picture Naming, Alliteration and Rhyming scores did not increase significantly over time. Several significant findings were noted pertaining to the predictor variables and will be reported based on the individual IGD1 subtests

Picture Naming. Results revealed significantly higher Picture Naming scores for White students ($M=22.97$, $SD=6$) as compared to their non-White peers ($M=17.63$, $SD=6.63$). In addition, a significant and negative relationship was found between Picture Naming scores and attendance. That is, as absences increased, the Picture Naming score decreased, suggesting that the more often students were absent, the lower their Picture Naming scores were. Further, behavior had a significant relationship with the Picture Naming slope. That is, children who had high scores on the DECA behavior scale demonstrated an increase in Picture Naming score over time, whereas children who had low

Table 23.

Linear Model of Literacy Growth including Child Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Picture Naming | | | |
| Intercept | 20.36 | .87 | .000 |
| Age | .01 | 1.58 | .997 |
| Gender | -1.85 | 1.21 | .135 |
| Race | -3.35 * | 1.64 | .047 |
| Attendance | -.25 * | .11 | .023 |

Note: * $p \leq .05$; ** $p \leq .01$

Table 23 (continued).

Linear Model of Literacy Growth including Child Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Home SES | .00 | .00 | .323 |
| DECA – Behavior | .12 | .12 | .330 |
| DECA – Protective | .18 | .13 | .195 |
| Behavior x Protective | -.00 | .01 | .810 |
| Time | .51 | .39 | .197 |
| Age * Time | -.52 | .69 | .456 |
| Gender * Time | -.26 | .53 | .626 |
| Race * Time | -1.32 | .74 | .081 |
| Attendance * Time | .01 | .05 | .916 |
| Home SES * Time | 3.73 | 5.29 | .485 |
| DECA-Behavior * Time | .14 * | .05 | .013 |
| DECA – Protective* Time | .16 * | .06 | .011 |
| Behavior x Protective * Time | -.00 | .00 | .975 |
| Alliteration | | | |
| <i>Intercept</i> | 1.56 | .65 | .021 |
| Age | -1.76 | 1.19 | .147 |
| Gender | .84 | .91 | .365 |
| Race | -.93 | 1.23 | .450 |
| Attendance | -.11 | .08 | .162 |
| Home SES | .00 * | 9.09 | .021 |
| DECA – Behavior | -.04 | .09 | .640 |
| DECA – Protective | .15 | .10 | .139 |
| Behavior x Protective | -.02 ** | .01 | .002 |
| Time | .04 | .35 | .902 |
| Age * Time | .41 | .63 | .512 |
| Gender * Time | -.29 | .48 | .546 |
| Race * Time | .01 | .66 | .992 |
| Attendance * Time | -.04 | .04 | .398 |
| Home SES * Time | -3.08 | 4.81 | .526 |
| DECA-Behavior * Time | -.04 | .05 | .391 |
| DECA – Protective * Time | .00 | .05 | .941 |
| Behavior x Protective * Time | -.00 | .00 | .251 |
| Rhyming | | | |
| <i>Intercept</i> | 3.73 | .83 | .000 |
| Age | .18 | 1.53 | .905 |
| Gender | 2.33 * | 1.17 | .053 |
| Race | -1.75 | 1.57 | .271 |
| Attendance | .00 | .10 | .992 |
| Home SES | .00 * | .00 | .036 |
| DECA – Behavior | .02 | .12 | .856 |

Note: * $p \leq .05$; ** $p \leq .01$

Table 23 (continued).

Linear Model of Literacy Growth including Child Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| DECA – Protective | .23 | .13 | .086 |
| Behavior x Protective | -.02 | .01 | .072 |
| Time | .82 | .43 | .061 |
| Age * Time | .46 | .76 | .554 |
| Gender * Time | -.71 | .59 | .237 |
| Race * Time | -.63 | .81 | .439 |
| Attendance * Time | -.01 | .05 | .837 |
| Home SES * Time | 3.91 | 5.88 | .947 |
| DECA-Behavior * Time | .01 | .06 | .923 |
| DECA – Protective * Time | .02 | .07 | .776 |
| Behavior x Protective * Time | .00 | .01 | .899 |

Note: * $p \leq .05$; ** $p \leq .01$

scores on the behavior scale had Picture Naming scores that were similar across time. No significant relationships were found between behavior and Alliteration or Rhyming. Lastly, the DECA within-child protective factors also had a significant relationship with the Picture Naming Slope. Students who were rated as having high within-child protective factors had Picture Naming scores that increased over time; however, those children who were rated as having low within-child protective factors had Picture Naming scores that did not increase as much over time. The sample of students was split into two groups using the median DECA protective factors score, yielding a low and high within-child protective factors group.

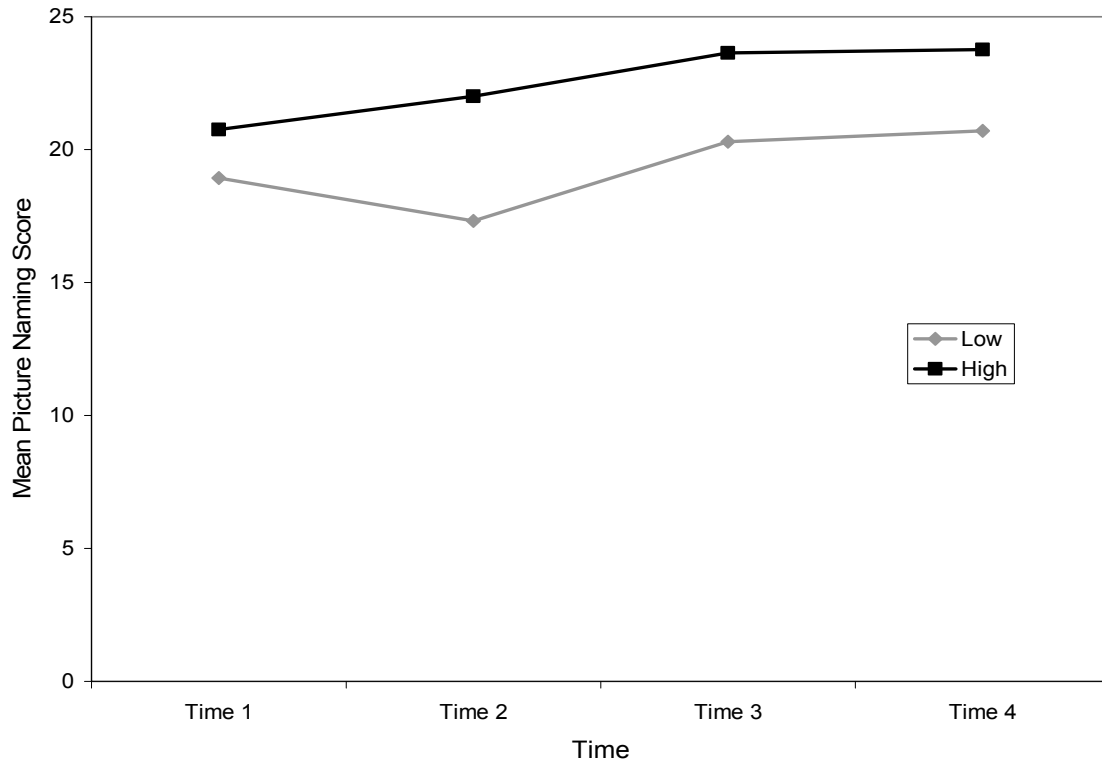


Figure 10. Relationship between Within-Child Protective Factors and the Picture Naming Slope.

Alliteration. Results pertaining to the Alliteration subtest revealed a significant and positive relationship with Home SES. That is, the higher the Home SES of the student, the higher their Alliteration score ($p \leq .02$). In addition, behavior moderated the relationship between within-child protective factors and Alliteration scores. As shown in Figure 11, when children were rated as having behavior issues, within-child protective factors did not have much of a relationship with the mean Alliteration score. However, when children were rated as not having behavior issues, within-child protective factors had a positive relationship with the mean score of the subtest. It is important to note that the mean Alliteration scores were higher for those children with high ratings for

within-child protective factors regardless of behavior ratings as compared to those children who were ranked with low within-child protective factors.

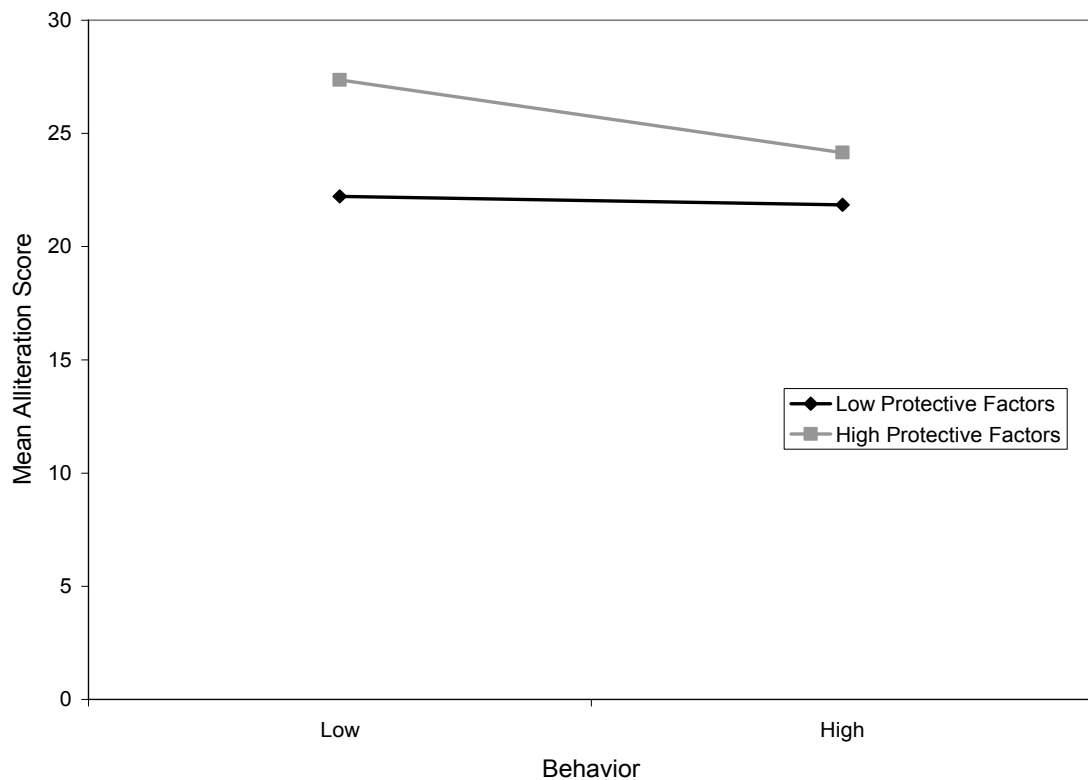


Figure 11. The Moderating Effect of Within-Child Protective Factors on the Relationship between Behavior and Alliteration.

Rhyming. Gender and Home SES were found as having a significant relationship with Rhyming scores over time. Specifically, girls ($M=7.02$, $SD=6.90$) had higher scores than boys ($M=4.03$, $SD=5.37$, $p<.05$). Further, a significant and positive relationship was noted with Home SES, suggesting that the higher the Home SES of the student, the higher their Rhyming score ($p\leq.04$).

The variances of scores from Picture Naming, Alliteration, and Rhyming within each of the four assessment periods are presented (Table 24). Findings indicate that the variance of scores were different within each assessment

period. That is, the mean score varied significantly across students. The slopes for the Alliteration and Rhyming subtests varied significantly across students, a trend not noted for Picture Naming. Lastly, the change in mean Rhyming score covaried significantly with the change in Rhyming slope. Significant covariance parameters were not found for Picture Naming or Alliteration.

Table 24.

Linear Model of Literacy Growth including Child Characteristics: Variance Estimates

| Outcome Variables Parameter | Estimate for Random Effects | Standard Error | p-value |
|--------------------------------|--------------------------------|-------------------|---------|
| <i>Picture Naming</i> | | | |
| <i>Within Students</i> | | | |
| Time One | 3.72 | 4.62 | .421 |
| Time Two | 24.56 *** | 5.58 | .000 |
| Time Three | 10.68 *** | 3.29 | .001 |
| Time Four | 14.51 * | 6.02 | .016 |
| <i>Between Students</i> | | | |
| Mean Score | 15.88 *** | 4.13 | .000 |
| Time Slope | 1.70 | 1.17 | .148 |
| Mean Score x Time Slope | 1.60 | 1.51 | .290 |
| <i>Alliteration</i> | | | |
| <i>Within Students</i> | | | |
| Time One | 3.04 | 2.60 | .243 |
| Time Two | 6.43 *** | 1.83 | .000 |
| Time Three | 5.40 ** | 1.88 | .004 |
| Time Four | 10.60 * | 4.34 | .015 |
| <i>Between Students</i> | | | |
| Mean Score | 8.93 *** | 2.39 | .000 |
| Time Slope | 1.64 * | .79 | .039 |
| Mean Score x Time Slope | 1.70 | 1.04 | .102 |
| <i>Rhyming</i> | | | |
| <i>Within Students</i> | | | |
| Time One | 8.02 ** | 2.97 | .007 |
| Time Two | 7.67 *** | 2.04 | .000 |
| Time Three | 6.98 ** | 2.28 | .002 |
| Time Four | 11.15 * | 4.56 | .015 |
| <i>Between Students</i> | | | |
| Mean Score | 15.34 *** | 3.77 | .000 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

Table 24 (continued).

Linear Model of Literacy Growth including Child Characteristics: Variance Estimates

| Outcome Variables Parameter | Estimate for Random Effects | Standard Error | p-value |
|--------------------------------|--------------------------------|-------------------|---------|
| Time Slope | 2.27 * | 1.05 | .031 |
| Mean Score x Time Slope | 3.77 * | 1.48 | .011 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

Next, the five variables that examined classroom characteristics were entered into the HLM, creating the final level of the model (Table 25). As with the previous research question, initial attempts at running the third level model resulted in non-convergence. The same procedure was followed to obtain convergence. Findings were non-significant for all predictors with the exception of two. Class size and environment had a significant relationship with Picture Naming scores. More specifically, as the number of students within a classroom increase, the scores on the Picture Naming subtest decrease. Additionally, as the scores on the ELOC (measure of classroom environment) increase, scores on the Picture Naming subtest increase.

Table 25.

Linear Model of Literacy Growth including Child and Classroom Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| <i>Picture Naming</i> | | | |
| <i>Intercept</i> | 46.96 | 8.89 | .000 |
| Site SES | 3.27 | .00 | .881 |
| Teacher Experience | -.21 | .37 | .577 |
| Teacher Education | -2.58 | 2.55 | .318 |
| Class Size | 1.28 * | .57 | .031 |
| Class Environment | .74 ** | .24 | .003 |
| Site SES * Time | -.00 | .00 | .324 |
| Teacher Experience * Time | .22 | .20 | .259 |
| Teacher Education * Time | -1.58 | 1.47 | .291 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

Table 25 (continued).

Linear Model of Literacy Growth including Child and Classroom Characteristics

| Outcome Variables Predictor | Parameters for Fixed Effects | Standard Error | p-value |
|--------------------------------|---------------------------------|-------------------|---------|
| Picture Naming | | | |
| Class Size * Time | -.22 | .31 | .480 |
| Class Environment * Time | .02 | .13 | .853 |
| Alliteration | | | |
| <i>Intercept</i> | 5.79 | 7.19 | .425 |
| Site SES | .00 | .00 | .126 |
| Teacher Experience | -.13 | .30 | .667 |
| Teacher Education | 2.73 | 2.05 | .189 |
| Class Size | -.02 | .46 | .960 |
| Classroom Environment | -.09 | .19 | .638 |
| Site SES * Time | -4.79 | .00 | .964 |
| Teacher Experience * Time | -.15 | .18 | .392 |
| Teacher Education * Time | 2.14 | 1.34 | .116 |
| Class Size * Time | -.06 | .29 | .844 |
| Class Environment * Time | .08 | .12 | .482 |
| Rhyming | | | |
| <i>Intercept</i> | 14.01 | 8.82 | .120 |
| Site SES | .00 | .00 | .268 |
| Teacher Experience | -.17 | .37 | .636 |
| Teacher Education | 2.89 | 2.51 | .257 |
| Class Size | .44 | .57 | .441 |
| Classroom Environment | -.25 | .23 | .298 |
| Site SES * Time | -.00 | .00 | .172 |
| Teacher Experience * Time | .18 | .20 | .367 |
| Teacher Education * Time | .36 | 1.48 | .811 |
| Class Size * Time | -.04 | .32 | .909 |
| Class Environment * Time | .07 | .13 | .576 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

Variance parameters for the third level of the model also were obtained (Table 26). Findings reveal that variances in scores were different between students for each subtest at each assessment period. That is, the mean score varied significantly across students. The slopes for the Alliteration and Rhyming subtests varied significantly across students, a trend not noted for Picture Naming.

Table 26.

*Linear Model of Literacy Growth including Child and Classroom Characteristics:
Variance Estimates*

| Outcome Variables Parameter | Estimate for Random Effects | Standard Error | p-value |
|--------------------------------|--------------------------------|-------------------|---------|
| Picture Naming | | | |
| <i>Within Students</i> | 15.23 *** | 2.27 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 10.88 *** | 3.52 | .001 |
| Time Slope | .43 | 1.05 | .686 |
| Alliteration | | | |
| <i>Within Students</i> | 6.05 *** | .89 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 8.21 *** | 2.23 | .000 |
| Time Slope | 1.91 * | .78 | .014 |
| Rhyming | | | |
| <i>Within Students</i> | 8.19 *** | 1.21 | .000 |
| <i>Between Students</i> | | | |
| Mean Score | 12.72 *** | 3.38 | .000 |
| Time Slope | 2.13 * | .99 | .031 |

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$

Summary

In conclusion, few predictors emerged in this study as having a significant relationship with literacy development in preschool children. In the first analysis, race and attendance were the significant predictors noted in relation to Picture Naming scores. In addition, a significant amount of variance was noted between students for the mean scores of all three areas of literacy development. Notable variance between students regarding slope was evident for Alliteration and Rhyming only. The third level of the analysis addressed site characteristics in relation to literacy development in preschool children. Findings were insignificant for all predictors, except Teacher Education for the Alliteration subtest. The average score of each subtest varied significantly between students at the third level. Change in slope across students varied for Alliteration and Rhyming.

For the second HLM analysis, the level-two child characteristics of age and attendance were significant predictors for Picture Naming. Significant predictors for Alliteration were Home SES and the behavior/within-child protective factors interaction. The child characteristic of Home SES also was a significant predictor related to Rhyming along with gender. A significant amount of variance was revealed between students for Picture Naming, Alliteration, and Rhyming. Significant variance surrounding the slopes across students was evident for Alliteration and Rhyming. Classroom variables were explored at the third level of the analysis. Class size and environment were noted as having a positive and significant relationship with expressive language scores as measured by the Picture Naming subtest. Variances in scores suggest a significant difference in means for all subtests across students, while slopes for the Alliteration and Rhyming subtests were noted as varying significantly.

CHAPTER FIVE

DISCUSSION

The purpose of this study was: (1) to examine the relationship between early literacy development in preschool children as it relates to challenging behavior, and (2) to explore the role of within-child protective factors in early literacy for children rated with and without challenging behaviors. The current chapter will provide a synopsis of the results and will discuss the findings in response to the three research questions and in the context of existing research. Implications of this study, limitations and suggestions for future research will be addressed.

Responses to Research Questions

Research Question #1: How does positive and negative classroom behavior contribute to the rate of literacy development in preschool children?

Minimal support was documented for this hypothesis. That is, a relationship between behavior and literacy development was found for the Picture Naming subtest only. This research question was designed to explore the differences in early literacy development among preschool children who had elevated scores on a teacher completed behavior rating scale as compared to their peers who did not have elevated scores. It was hypothesized that children who had high ratings of behavior would have lower scores measuring early literacy skills than those children who had ratings indicating typical behaviors. A review of two HLM

analyses revealed that scores on the DECA Behavior Scale had a significant relationship with the Picture Naming slope only. Picture Naming scores of students who had high DECA Behavior ratings increased over time but the Picture Naming scores of students who had lower DECA Behavior ratings remained relatively unchanged over time. This finding conflicts with previous research linking behavior to achievement (Al Otaiba & Fuchs, 2002; Nelson, Benner, & Gonzalez, 2003). In this study behavior was assessed at Time One only. Therefore it is not known if the behavior of the children who initially had higher ratings on the DECA improved from time one to time four. It could be hypothesized that being enrolled in preschool provided these children with a structured environment that aided in curbing their negative behaviors. If this were the case, then an increase in skill development over time might be expected. Conversely, it could be posited that behavior scores increased as a result of an improvement in the children's expressive language, a skill that is measured through Picture Naming.

No other relationship was found between literacy and behavior. Although significant relationships were not found for Alliteration and Rhyming using the HLM analysis, arithmetic differences were found between the high score and low score behavior groups based on descriptive statistics of their average scores on all three subtests across the four points in time. The children with the higher scores on the behavior scale consistently had lower literacy scores, thus revealing a trend that was predicted. This generates the question of whether or not the relationship would have been significant if the sample size was larger.

Further, only 11 of the 71 students for which behavior scores were obtained had scores above sixty (a score above 60 is considered a clinical sign of behavioral issues). Overall, these findings elicit additional questions regarding the contribution of positive and negative classroom behaviors on the rate of literacy development.

Research Question #2: What factors contribute to the rate and levels of literacy development for children identified with typical or challenging behaviors?

The two factors explored in this question include child (e.g., gender, race, age) and classroom (e.g., teacher experience, class size) characteristics. Child characteristics comprised level two of the HLM analyses. Results indicated that race and attendance have a significant relationship with expressive language skills. Specifically, White students obtained higher scores and had a greater slope on the Picture Naming subtest of the IGDI as compared to Non-White students. The support for race as a significant predictor of early literacy development is consistent with research affirming that culturally and linguistically diverse students attain significantly lower performance levels on measures of reading achievement (Diamond and Onwuegbuzie, 2001; Meece and Kurtz-Costes, 2001). Attendance also was related to the growth of expressive language in preschool children. As the number of days absent increased, the score on the Picture Naming subtest decreased. This finding aligns with previous research (Easton & Englehard, 1982; Moonie et al., 2008; Gottfried, 2009) conducted with the school-aged population. Although absenteeism and achievement in preschool has not been widely explored, the link appears to be

logical. To expand, academic engaged time is the amount of time a child is attending to the curriculum. Therefore, the level of learning is related to the amount of time the child spends actively engaged in the academic environment (Shapiro, E. S. & Heick, P., 2004). Gilliam and Shahar (2006) explored the rates and predictors of preschool expulsion and suspension in Massachusetts. Results indicate that expulsion rates were 13 times higher than the national K-12 rate. Expulsion is similar to absenteeism in that they are both examples of loss of academic engaged time. It is not surprising, therefore, that attendance and expressive language have a significant relationship during these early years.

The sole child characteristic that was identified as a significant predictor of phonemic awareness, as measured by both Alliteration and Rhyming subtests, was Home SES. The relationship was positive, suggesting that the higher the median income for the neighborhood in which the child resides, the higher the score on the two subtests. This is consistent with research that explored the link between SES and academic achievement (Nichols, Rupley, Rickelman and Algozzine, 2004; Orr, 2003; Stipek, 2001). The age of the preschool population is a pivotal age in which this link becomes more apparent (Sattler, 1990). Gender was identified as the second child characteristic that resulted in a significant predictor of phonemic awareness. This relationship was present for the Rhyming subtest only and indicated higher performance levels for girls as compared to boys. Previous research (Diamond and Onwuegbuzie, 2001) supports this finding.

Despite the significant relationship for race, gender and attendance, with expressive language as measured through the Picture Naming subtest, the majority of the predictors (age, gender, race, attendance, and behavior) at level two yielded non-significant findings for the Alliteration and Rhyming subtests. A potential explanation for this lack of significant relationship relates to the variation in skill requirements necessary for the child to successfully complete the tasks of the three subtests. Similarly, the difficulty level, varies within the three subtests (Alliteration and Rhyming are more complex than Picture Naming), making equal comparisons impossible. Expressive language begins at birth, with the newborn using sounds to indicate pain or pleasure. This skill develops over time to include gestures, babbling, single words, and sentences, all with the intent of conveying wants/needs or to express meaning to others. While expressive language skills continue to be refined as children get older, these skills are already present at entry into preschool. In contrast, phonemic awareness typically emerges during the course of the preschool years (Lonigan, Burgess, Anthony, & Barker, 1998; Whitehurst & Lonigan, 1998) and therefore may not be present in some children in the beginning of their preschool experience. While the analysis did not reveal a significant finding, the mean Alliteration and Rhyming scores increased throughout the four assessment windows. Since the skill level required for each subtest differs, it elicits thought about the rate of skill development in phonemic awareness throughout the academic year, and whether progress-monitoring extending to the end of the year would tap into a significant finding. In other words, if phonemic awareness is a skill that is

acquired during the preschool years, then a significant relationship is more likely to be found if skill assessment is conducted throughout the year as opposed to the beginning months of the school year.

Classroom characteristics were explored at the third level of the HLM models, where child factors were controlled. Class size appears to play a role in the growth of expressive language skills in preschool children. Specifically, scores on the Picture Naming subtest increased as the number of children enrolled within a classroom decreased. This is supported by previous research examining the relationship between class size and achievement (Blatchford et al., 2003; Nye, Hedges, and Konstantopoulos, 1999). Further results highlighted a marginal relationship ($p=.056$) between level of education attained by the teacher and Alliteration scores. This relationship is supported by previous research (Darling-Hammond, 1999; the National Center for Educational Research, 2000) that demonstrated the relationship between levels of teacher education and student academic achievement. While these studies indicate a positive and significant relationship between the two variables, teacher certification as well as a major in the field were more powerful predictors of reading achievement, even when student SES and language status were accounted for (Darling-Hammond, 1999). It is, therefore, not surprising that the results from the current study revealed only a marginal relationship. Qualitative data regarding type of certification and major were not available for this archival research; however, the use of such data in future studies may be valuable.

There was no empirical support linking the remaining third level variables (e.g., site SES, teacher education, teacher experience, class size, class environment) to literacy development. The small sample size at level three (N=8 classrooms), may have contributed to the insignificant findings at this level. More specifically, it is hypothesized that sample size resulted in non-convergence during the initial attempt at running the analysis. With eight classrooms and the initial six predictor variables, the model was too complex. Although two of the variables (Early Literacy Observation Checklist – ELOC1 and ELOC2) were collapsed into one allowing for convergence, the number of predictors at the second level essentially utilized the majority of the accounted variance, leaving little variance for the five predictors at level three. This resulted in the need to remove the level three error terms. It is believed that a larger sample size (i.e., more classrooms) would have prevented these issues from occurring.

Question #3: What differences are there between literacy development in children with challenging behavior who have high scores measuring within-child protective factors in comparison to children with challenging behaviors who have low scores measuring within-child protective factors?

An HLM analysis was constructed to address the link between behavior and within-child protective factors. The findings suggest that within-child protective factors had a positive and significant relationship with Alliteration scores for those children who did not have challenging behaviors. Interestingly, the Alliteration scores of children with challenging behaviors were not related to level of within-child protective factors. Overall, within-child high protective factors

were associated with high scores measuring phonemic awareness in comparison to low within-child protective factors, regardless of the presence of behavioral issues. The dialogue around this research question generates thought about the potentially strong influence of behavior on achievement. That is, are challenging behaviors more powerful than within-child protective factors? Based on the current study, within-child protective factors are influential to those children who do not have challenging behaviors. Combining the finding of the current study with previous research supporting the link between behavior and achievement (Nelson, Benner, & Gonzalez, 2003; Al Otaiba & Fuchs, 2002; Torgesen, 2000) provides a strong foundation for prevention and early intervention at the preschool level.

Summary

Results from this study provided valuable information regarding the factors contributing to literacy development in preschool children. Previous research has focused on examining such factors only with school-aged children. In general, support was found for some variables (race, attendance, gender, home SES, class size, teacher education, classroom environment, behavior, within-child protective factors) thus providing support that child and classroom factors are related to literacy development prior to the elementary school years.

Implications for the Profession of School Psychology

The findings from this study can benefit practitioners and researchers who collaborate with early childhood educators. First, it was documented that several factors (e.g., child, classroom) influencing achievement in elementary and

secondary education also contribute towards the development of early literacy skills in children three to five years of age. Second, behavioral issues and the presence of within-child protective factors play a role in literacy development in the preschool setting. Therefore, support exists for providing early intervention in the preschool settings, with a focus on academic skill development as well as prosocial skills. The need for early intervention in this area is further supported by Carter et al (2010) who reported that approximately one in five children met the criteria for behavioral issues during the transition to formal schooling. Sociodemographic and psychosocial factors such as persistent poverty beginning in early childhood, limited parental education, and low family expressiveness were explored and found to be significantly associated with mental health issues in the preschool population. Therefore, screening and early intervention by practitioners in the field during the preschool years is warranted to increase the chances of academic and social-emotional success in the transition to formal schooling.

Practitioners can help support early childhood educators in creating classroom environments that are literacy-rich and promote prosocial behaviors. Such support should include screening preschool children for early identification of problematic behaviors and/or deficits in literacy growth, focusing on academic engaged time and increasing language exposure. Additionally, including the family in the efforts to increase the skill level of the children should not be ignored. According to a longitudinal study conducted by Hart and Risley (1995), children's vocabulary size at age three were high correlated to language scores

in subsequent years. Notably, the size of the child's vocabulary varied significantly between low and high income families, thus providing support for parent training as another facet in a model of design for practitioners.

The use of the Preschool IGDI as an assessment tool to gauge early literacy skills and monitor progress has been supported in the current study. The use of this assessment tool provides practitioners with data to monitor the progress of skill development in early literacy, which can, in turn, assist in the identification of children who require additional resources/instruction in expressive language and phonemic awareness. Responses to intervention also can be monitored with this assessment tool, providing practitioners and early childhood educators with data to work towards the goal of kindergarten readiness. In summary, it has been noted through this and previous research that children acquire early literacy skills during the preschool years. Therefore, practitioners and educators are at a pivotal point to impact the trajectory of these children and provide them with the academic and behavioral competencies needed to succeed in school.

Additionally, the use of Hierarchical Linear Modeling as the statistical analysis to explore growth, as well as high rate of change in growth, proved to be valuable. School psychologists serving a scientist-practitioner role can benefit from utilizing this method as a means to ascertain the relationship of nested variables. Given that the school setting is nested by nature (children within a classroom, classrooms within a school, etc) HLM enables school psychologists to

better explore rates of learning, which will contribute towards the development of interventions and subsequent monitoring of the child's response to intervention..

Finally, the results of the study generate discussion pertaining to policy development as it relates to the quality of teachers and classrooms at the preschool level. According to Barnett (2004), the educational qualifications of preschool teachers are related to early learning and development; however, there are no consistent qualifications for teachers prior to the kindergarten level. Barnett (2004) reported that fewer than half of the preschool teachers held a bachelor's degree, with many teachers reporting high school as their highest level of education. The results of this study show that as teacher education and the richness of the literacy environment increase so do scores measuring phonemic awareness and expressive language respectively. It therefore strengthens the notion of requiring preschool teachers to have a college degree with specialized training in early childhood education. Periodic training and professional development for teachers in the preschool setting also should be considered as policy to ensure current certification as well as dissemination of Best Practice for teaching in the preschool classroom.

Limitations

The current study contributed both theoretically and practically to the existing research surrounding literacy development and behavior. Notwithstanding, there are several limitations to this study. First, teachers were selected based on a convenience sample. This prevented a random selection of study participants. Random selection allows for an equal chance of participation,

thus resulting in a distribution comparable to that of the population from which the sample is drawn. A typical shortcoming in research, convenience sampling often leads to the question of whether the characteristics of the teachers would differ under an alternative selection process.

Second, the use of single measure such as a behavior rating scale to identify behavior and within-child protective factors hinders the accuracy of the interpretation of those data. Ideally, data are best derived from multi-source (records review, interview, observations, testing), multi-informant (teacher, parent, child) conditions collected across multiple settings and points in time. In the current study, data on these variables were collected at one point in time, namely the beginning of the academic year. This generates questions including: (1) did the teacher have enough time to formulate an accurate picture of the child's behavior prior to completing the scale and (2) was the behavior maintained at the original level throughout the school year? That is, did any of the children who had high scores on the behavior scale improve over time or did any of the children who had low scores worsen over time? As cited by Gilliam and Shahar (2006), approximately 8% of all preschool children exhibit behavioral problems that are diagnosable, which are associated with future behavior issues, poor peer relationships, and decreased achievement in kindergarten. Given this statistic, it is questionable as to whether the current study under-identified behavioral issues in the student sample, further warranting additional research.

The data collected to measure protective factors in the preschool sample was limited to within-child factors (attachment, initiative, self-control) and did not

account for external factors including the home or community. The quality of the home environment is a powerful predictor of the outcome for children (Benard, 1991) and includes factors such as caring, support, and parental warmth. Further, researchers have posited that caregiving is the most powerful predictor of resiliency in children that lasts through childhood and adolescence (Demos, 1989; Werner & Smith, 1982; Rutter, 1979). The absence of data examining external protective factors can, therefore, be considered a shortcoming to this study.

Third, the socioeconomic status for the individual child was based on household zip code due to lack of family income data. Although the use of zip codes to determine socioeconomic status is supported for use when specific information is not available (Krieger, Williams & Moss, 1997; Krieger, 1992), family-specific data would result in a greater confidence in understanding the relationship between SES and early literacy.

The duration of the data collection phase is a fourth limitation. Although four data points were included in the study, the duration of data collection consisted of three months. Long-term progress monitoring extending to the end of the academic school year would provide valuable information to address the research questions interesting this study.

Finally, the number of participating schools in the study was small, affecting the analyses at the third level of both models. Although steps (setting the third level variables as a fixed effect, dropping the level-2 errors from the model and collapsing two similar variables into one) were taken to address this

issue, an increased sample size is recommended to ensure accurate parameter estimates.

Based on these limitations, the results should be interpreted with caution. Although significant findings were found linking child and classroom factors to early literacy development in preschool, additional research is warranted and encouraged.

Future Research

Despite the insightful results gleaned from the current study, additional questions have been generated, paving the way for future research in this area. First, and critical, is the following: would the extension of progress monitoring to the end of the school year yield additional significant relationships? To elaborate, the methodology of the current study excluded the last five months of the school year, preventing a comprehensive assessment of skill development in literacy for the preschool children. As discussed in a previous section, the skills assessed through the Alliteration and Rhyming subtests typically emerge over the course of the preschool year. Therefore, it makes sense to monitor progress for the length of the school year as opposed to limiting data collection to the first four months, when phonemic awareness is just beginning to emerge for many students.

Second, is behavior more influential than within-child protective factors? Results from the current study indicate that within-child protective factors are advantageous for literacy development in those children who demonstrate typical behaviors. However, within-child protective factors did not appear to have a

significant relationship with the children who had challenging behaviors based on the behavior rating scale. To explore this finding in depth, it is suggested that future research include a larger sample of children with challenging behaviors. In addition, it is suggested that future research utilize a more accurate method for obtaining data on behavior and protective factors. Methodological changes also are suggested for future exploration in this area. Such changes include overall sample size and variability. More specifically, obtaining a larger and randomly selected sample may have provided access to schools and teachers with greater variability in both child and teacher characteristics. As described in chapter three, the goal of the study was to access teachers who had limited experience in the classroom and with early literacy training in an effort to promote skill building and to provide resources. Therefore, the sample in the current study was restricted to teachers who were identified as needing skills and resources to aid in the literacy development of their preschool students from schools located in low SES areas of the county. The current area of research would benefit from the expansion of the sample to include high SES schools as well as teachers with higher qualifications (i.e., years of experience, years of education, certification) and skills in an effort to explore the differences in statistical results.

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APPENDICES

Appendix A: Application and Agreement Form for ELO Teacher Participation

HEADS UP! READING PLUS LITERACY PROJECT

SCHOLARSHIP APPLICATION

Applicant Name: _____

Day Phone: _____ **Evening Phone:** _____

Highest Level of Education: (Check one)

- | | | |
|---|---|--|
| <input type="checkbox"/> H.S Diploma | <input type="checkbox"/> G.E.D. | <input type="checkbox"/> Some College |
| <input type="checkbox"/> 2 Yr. College Degree | <input type="checkbox"/> 4 Yr. College Degree | <input type="checkbox"/> Advanced Degree |

Site Employer Name: _____

Work Address: _____

City: _____ **State:** _____ **Zip:** _____

Center Director (if applicable): _____

| | | |
|--|---|---|
| Type of Work Site: (Check one) | | |
| <input type="checkbox"/> Private Pre-K | <input type="checkbox"/> Family Child Care | <input type="checkbox"/> Child Care Center |
| <input type="checkbox"/> Head Start | <input type="checkbox"/> Private Kindergarten | <input type="checkbox"/> Pre-K ESE |
| | <input type="checkbox"/> Public Kindergarten | <input type="checkbox"/> Home Visitor Program |

Number of years you have worked in Early Childhood: _____

| | | | | | | |
|---|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|--|
| Age of Children you are currently working with: (Check all that apply) | | | | | | |
| <input type="checkbox"/> 0-1 | <input type="checkbox"/> 1-2 | <input type="checkbox"/> 2-3 | <input type="checkbox"/> 3-4 | <input type="checkbox"/> 4-5 | <input type="checkbox"/> 5-6 | |

Number of Children currently in your care: _____

Number of Children in your care whose first language is not English: _____

Please list any previous training in Early Childhood Literacy:

- 1) _____
- 2) _____
- 3) _____

Preferred Campus if selected: (Check one)

- | | | |
|-----------------------------------|---|--|
| <input type="checkbox"/> Seminole | <input type="checkbox"/> St. Pete/Gibbs | <input type="checkbox"/> No Preference |
|-----------------------------------|---|--|

I understand that: 1) If eligible, I will receive more information about the requirements of participation for me and my Director (if applicable); 2) If employed at a Child Care Center, **my Director must support my participation** in this project. 3) If selected, **there is no charge**, that **I must attend all 15 classes** and **these classes are for college credit**.

X _____ **X** _____
Applicant Signature Director Signature (if applicable)

Appendix A (Continued): Application and Agreement Form for ELO
Teacher Participation

Training Participant Contract

I agree to participate in the Pinellas Early Literacy Community Project Training and Coaching Program, and will fulfill the following obligations:

1. Obtain the support and commitment from my Center Director to participate in the program.
2. I will attend the Orientation Session and all 14 satellite training session. (Will be allowed to miss one session to allow for illness or family obligations.) Should I miss a session, I will view the videotape of the session.
3. I will implement the literacy idea, activities and strategies learned in eh training/coaching program in my classroom. After each session, I will develop a brief action plan detailing how I will implement the strategy discussed, and return to the next training session with the plan.
4. I agree to share the specific printed literacy activities provided at each training session with my Director and at least one other teacher. I will assist my fellow teacher in developing an action plan, and bring to the next training session.
5. I will distribute books and materials to the families of children in my classrooms.
6. I will hold at least one "literacy event" for families of children in my classroom.
7. I agree to work with the Literacy Coaches in my classroom, and participate in six coaching visits.
8. I agree to participate in the evaluation, by completing surveys, encouraging parents to complete their surveys and assisting the Evaluator in connecting with families for literacy surveys.
9. I agree to participate in the Literacy Learning Community Showcase, and to bring a display of activities, photographs and other visual materials of how they implemented literacy activities in their classrooms.

Signature of Applicant

Date

Signature of Director

Date

Appendix B. Demographic Information Sheet

| Center: _____ Address: _____ | | | | | | |
|--|------------|------------|---------------|-------------|----------------------|-------------------------|
| Center Director: _____ Phone Number: _____ | | | | | | |
| Child's Name: | DOB | Age | Gender | Race | Home Zip Code | Primary Language |
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |
| 6. | | | | | | |
| 7. | | | | | | |
| 8. | | | | | | |
| 9. | | | | | | |
| 10. | | | | | | |
| 11. | | | | | | |
| 12. | | | | | | |
| 13. | | | | | | |
| 14. | | | | | | |
| 15. | | | | | | |
| 16. | | | | | | |
| 17. | | | | | | |
| 18. | | | | | | |
| 19. | | | | | | |
| 20. | | | | | | |
| 21. | | | | | | |
| 22. | | | | | | |
| 23. | | | | | | |

Appendix C: Attendance Information Sheet

For each child, please record the number of days he/she **was absent** within the specified month. This form can be returned by using the self-addressed stamped envelope provided. Thank you again for your time and dedication to this project!

| <i>Child's Name</i> | Sept. | Oct. | Nov. | Dec. |
|---------------------|--------------|-------------|-------------|-------------|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |
| 11. | | | | |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
| 15. | | | | |
| 16. | | | | |
| 17. | | | | |
| 18. | | | | |
| 19. | | | | |
| 20. | | | | |
| 21. | | | | |
| 22. | | | | |
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |

Thank You!

Adult Informed Consent for Child Care Providers

Social and Behavioral Sciences
University of South Florida

Information for People Who Take Part in Research Studies

The following information is being presented to help you decide whether or not you want to take part in a minimal risk research study. Please read this carefully. If you do not understand anything, ask the person in charge of the study.

Title of Study: Evaluation of Pinellas Early Literacy Learning Community Project: Early Learning Opportunities (LCP: ELO)]

Principal Investigator: Kathleen Hague-Armstrong.

You are being asked to participate in the evaluation of LCP: ELO because you have applied to participate in the “Language Development In Young Children” course at St. Petersburg College.

General Information about this evaluation: This evaluation intends to document the implementation and impact of the LCP: ELO. The LCP: ELO is a unique comprehensive approach towards improving literacy, reading readiness, and social-emotional functioning of children ages 0-5. The project will be conducted in Pinellas County, Florida, and will provide opportunities for caregivers and teachers from publicly funded and private children's programs to increase their level of professional education, earn college credits, gain early literacy teaching skills, tools and materials for their classrooms, and promote healthy social-emotional development in the children they serve. In addition, parent educators with expertise in early childhood mental health will provide support to families to enhance the young child's social and behavioral development.

The evaluation goals include: (1) determine if LCP activities and objectives are implemented in a timely fashion; (2) determine if the home visiting component enhances family confidence and competence; (3) determine if the home visiting component enhances child social and emotional functioning; (4) determine if the classroom-teaching component increases knowledge and skills in child care providers; (5) determine if the mentoring and coaching of child care providers improve their confidence and competence in implementing early literacy strategies; (6) determine if children participating in LCP activities show improvement in the of language and literacy skills; (7) determine if children transitioning to kindergarten demonstrate kindergarten readiness skills; (8) determine if it is feasible to implement this collaborative model within the community; (9) and determine the cost of implementing this model.

Where the study will be done: Pinellas County early childhood centers, St. Petersburg College, Directions for Mental Health, Inc., and Florida Mental Health Institute at the University of South Florida.

Appendix D (continued): Teacher Consent Form

Plan of Study: The evaluation will be conducted within the natural context of your classroom and childcare center. If you consent to participate, you may be asked to participate in individual interviews and/or an audiotaped one-hour focus group, and to complete rating scales and simple data collection forms.

We will want to collect your information throughout the semester you are taking the “Language Development in Young Children” course in addition to the semester before (for those on the waiting list) and one-two semesters after the completion of the course. An evaluator will meet with you three times per semester for visits up to one hour and one half. These visits may be conducted during your regular meeting times with “Language Development in Young Children” or during your working hours.

Payment for Participation: There will be no additional payment for participation in the evaluation.

Benefits of Being a Part of this Research Study: By taking part in this evaluation, you will provide valuable information about the implementation and outcomes of the LCP: ELO project. This information will be used to modify and improve the current project.

Risks of Being a Part of this Research Study: There are no known risks to participating in this evaluation.

Confidentiality of Your Records: Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board may inspect the records from this research project.

The results of this evaluation may be published. However, the data obtained will be combined with data from other childcare providers in the publication. The published results will not include your name or any other information that would personally identify you in any way. A pseudonym will be used in place of your name on all documents related to the evaluation and all data will be stored in locked files. Data stored within data bases will be entered with the pseudonym and will be only accessible to the research team through the use of a password.

How many other people will take part? About 50 – 150 children care providers, 1500 children, and 50 families.

Volunteering to Be Part of this Research Study: Your decision to participate in this evaluation is completely voluntary. You are free to participate or to withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in the evaluation.

Questions and Contacts

- If you have any questions about this evaluation, please contact Kathleen Armstrong, Ph.D. at (813) 974-8530.

Appendix D (Continued): Teacher Consent Form

- If you have questions about your rights as a person who is taking part in an evaluation, you may contact the Division of Research Compliance of the University of South Florida at (813) 974-5638.

Consent to Take Part in This Research Study

By signing this form I agree that:

- I have fully read or have had read and explained to me this informed consent form describing this research project.
- I have had the opportunity to question one of the persons in charge of this research and have received satisfactory answers.
- I understand that I am being asked to participate in research. I understand the risks and benefits, and I freely give my consent to participate in the research project outlined in this form, under the conditions indicated in it.
- I have been given a signed copy of this informed consent form, which is mine to keep.

Signature of Participant

Printed Name of Participant

Date

Investigator Statement

I have carefully explained to the subject the nature of the above evaluation. I hereby certify that to the best of my knowledge the subject signing this consent form understands the nature, demands, risks, and benefits involved in participating in this evaluation.

Signature of Investigator
or authorized research
investigator designated by
the Principal Investigator

Printed Name of Investigator

Date

Investigator Statement:

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this evaluation. I further certify that a phone number has been provided in the event of additional questions.

Signature of Investigator

Printed Name of Investigator

Date

Appendix E. Parental Assent Form

Child Informed Assent

Social and Behavioral Sciences
University of South Florida

Information for People Who Take Part in Research Studies

The following information is being presented to help you decide whether or not you want your child to take part in a minimal risk research study. Please read this carefully. If you do not understand anything, please contact the person in charge of the study.

Title of Study: Pinellas Early Literacy Learning Community Project: Early Learning Opportunities (LCP: ELO)]

Principal Investigator: Kathleen Hague Armstrong.

Your child is being asked to participate because he/she is in a classroom whose teacher is attending the “Language Development In Young Children” course at St. Petersburg College.

General Information about the Research Study: This is an evaluation of the Pinellas Early Literacy Learning Community Project, which assesses the implementation of the “Language Development In Young Children” course activities and outcomes related to literacy development in children. The LCP: ELO is a unique comprehensive approach to improving literacy, reading readiness, and social-emotional functioning of children ages 0-5. The project will be conducted in Pinellas County, Florida, and will provide opportunities for caregivers and teachers from publicly funded and private children's programs to increase their level of professional education, earn college credits, gain early literacy teaching skills, tools and materials for their classrooms, and promote healthy social-emotional development in the children they serve. Parent educators with expertise in early childhood mental health are also available to support families and provide home-based training to enhance the young child's social and behavioral development.

The evaluation goals include: (1) determine if LCP activities and objectives are implemented in a timely fashion; (2) determine if the home visiting component enhances family confidence and competence; (3) determine if the home visiting component enhances child social and emotional functioning; (4) determine if the classroom-teaching component increases knowledge and skills in child care providers; (5) determine if the mentoring and coaching of child care providers improve their confidence and competence; (6) determine if children participating in LCP activities show improvement in the of language and literacy skills; (7) determine if children transitioning to kindergarten demonstrate readiness; (8) determine if it is feasible to implement this collaborative model within the community; (9) and determine the cost of implementing this model.

Where the study will be done: This is a collaboration of Pinellas County early childhood centers, St. Petersburg College, Directions for Mental Health, Inc., and Florida Mental Health Institute at the University of South Florida.

Appendix E (Continued): Parental Assent Form

Plan of Study: The study will be conducted within the natural context of the classroom and childcare center. If you give your child permission to participate, your child may be selected to complete several assessments that measure language and literacy skills, such as the Individual Growth and Developmental Indicators (IGDI; Carta, Greenwood, Walker, Kaminski, Good, McConnell & McEvoy), which involves naming items on flashcards. If your child is transitioning to kindergarten, he/she will be administered the ESI-R, which is a brief assessment that measures kindergarten readiness skills, such as drawing a line and naming objects, that is utilized on all children entering kindergarten in Pinellas County.

Additionally, with your consent, your child's teacher will complete the Devereux Early Childhood Assessment (LeBuffe & Naglieri, 1998), the Ages and Stages Communication Questionnaire (ASQ) and the Screening for Early Literacy Learning (SELL). These rating scales are designed to assess social/emotional functioning and communication skills in preschool children. If selected, your child also may be observed within his/her classroom setting using a preschool observation checklist that looks at academic and social behaviors.

Finally, upon your assent, your child may be photographed and videotaped to document his or her progress in the classroom. You can give permission for your child to receive the assessments and not the photographing or vice versa.

Payment for Participation: There will be no payment for participation.

Benefits of Being a Part of this Research Study: By taking part in this study, you will provide valuable information about the implementation and outcomes of the LCP: ELO project. This information will be used to modify and improve the current project to increase the early literacy skills of the children in the program.

Risks of Being a Part of this Research Study: There are no known risks to participating in this study.

Confidentiality of Your Records: Your privacy and evaluation records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board may inspect the records from this evaluation project.

The results of this study may be published. However, the data obtained will be combined with data from other childcare centers in the publication. The published results will not include your child's name or any other information that would personally identify your child in any way. A pseudonym will be used in place of your child's name on all documents related to the study and all data will be stored in locked files. Data stored within data bases will be entered with the pseudonym and will be only accessible to the research team through the use of a password.

How many other people will take part? About 50 – 150 child care providers and about 1500 children and families.

Appendix E (Continued): Parental Assent Form

Volunteering to Be Part of this Research Study: Your decision to allow your child to participate in this research study is completely voluntary. You are free to allow your child to participate in this research study or to withdraw at any time. There will be no penalty or loss of benefits you or your child are entitled to receive if you stop taking part in the study.

Questions and Contacts

If you have any questions about this research study, please contact Kathleen Armstrong, Ph.D. at (813) 974-8530. If you have questions about your rights as a person who is taking part in a research study, you may contact the Division of Research Compliance of the University of South Florida at (813) 974-5638.

Investigator Statement

I have carefully described this study to the parent regarding the nature of the above research study. I hereby certify that to the best of my knowledge that this form explains the nature, demands, risks, and benefits involved in participating in this study.

Signature of Investigator
Or authorized research
investigator designated by
the Principal Investigator

Printed Name of Investigator Date

Appendix E (Continued): Parental Assent Form

Consent to have child take part in this research study (please review options 1 and 2 below)

By signing this form I agree that:

- I have fully read or have had read and explained to me this informed consent form describing this research project.
- I have had the opportunity to question one of the persons in charge of this research and have received satisfactory answers.
- I understand the risks and benefits, and I freely give my assent for him/her to participate in the research project outlined in this form, under the conditions indicated in it.
- I have been given a signed copy of this informed consent form, which is mine to keep.

| OPTION #1: Permission for assessment and photographing/video-taping | |
|---|--|
| 1. | I give permission for (_____) to participate in this Child's name Study by receiving both the assessments mentioned in this form and to be photographed and video-taped. _____ Signature of Caregiver of Participant Printed Name of Caregiver Date |

If you do not wish to have your child participate in one or both components, please sign one of the three options below and return this form to your child's school or childcare center.

| OPTION #2: Permission for one component only or No Permission | |
|---|--|
| 1. | I give my child (_____) permission to participate in the Child's Name assessments but DO NOT give my child permission to be photographed or videotaped. _____ Signature of Parent Printed Name of Parent Date |
| 2. | I give my child (_____) permission to be photographed/ Child's Name video-taped but DO NOT give permission to participate in the assessments. _____ Signature of Parent Printed Name of Parent Date |

Appendix E (Continued): Parental Assent Form

| | | |
|---------------------|--|-------|
| 3. | I DO NOT wish to have my child (_____) participate in any. | |
| | Child's Name | |
| | part of this study | |
| _____ | _____ | _____ |
| Signature of Parent | Printed Name of Parent | Date |

Appendix F: Parental Information Letter

Learning Community Project

8823 115th Avenue, North, Largo, Florida 33773
Phone (727) 547-4566 Fax (727) 547-4599



Dear Parent/Guardian,

I have been selected to participate in a **Learning Community Project** designed to **increase literacy and school readiness** for young children in Pinellas County. Along with 3 college credits and free tuition, I will get resource books and materials for my classroom. A **literacy coach** will make regular visits to help me use what I am learning.

As a part of this project **all children in the classroom will be screened** using different tools, such as a measure of your child's literacy skills and his/her social and emotional development. Parent educators will be available to work with families of children showing signs of needing further screening, and if your child scores meets the criteria or the teacher has concerns, a referral will be made to the appropriate agency.

Thank you for supporting me to become better educated so I can provide high quality care for your child.

Sincerely,

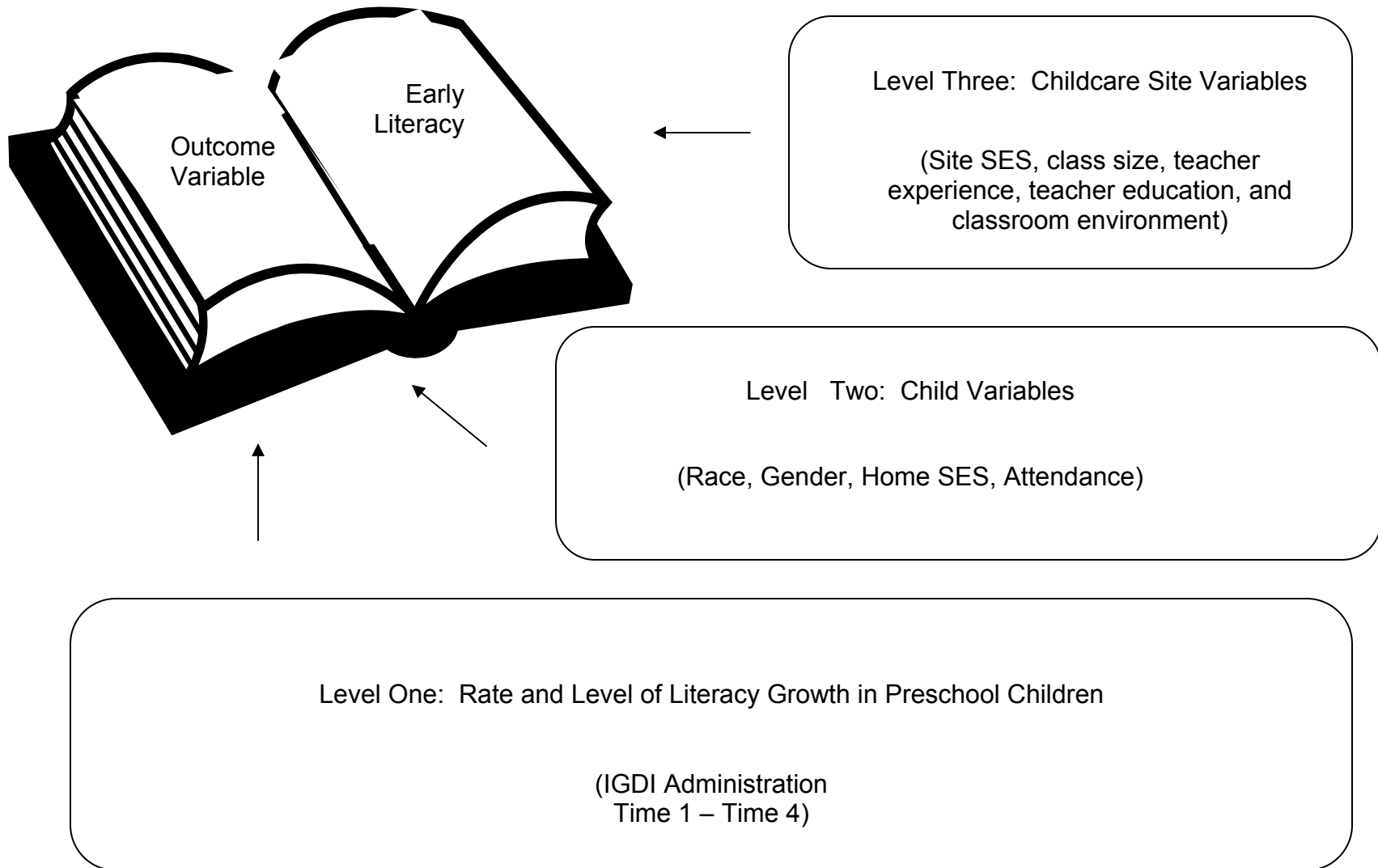
VERY IMPORTANT: FILL IN ALL INFORMATION BELOW!

Teacher Name _____
Center _____
Child's **Full** Name _____

Appendix G: IGDI Recording Form

| | | | Picture Naming 1 min | Alliteration 2 min | Rhyming 2 min |
|----------|------|--------------|----------------------|--------------------|-------------------|
| Data Pt. | Date | Student Name | Score (# correct) | Score (# correct) | Score (# correct) |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |

Appendix H. HLM Path Diagram



ABOUT THE AUTHOR

Melissa Farino Todd received her Bachelor of Arts Degree in Psychology in 1997 from the University of South Florida (USF). Her education continued at USF as she received her Masters of Arts and Education Specialist Degrees from the School Psychology program, in 1999 and 2003 respectively. She continued to work towards her doctorate while employed full time as a school psychologist in the Pinellas County School District, where she primarily served the Emotionally Handicapped/Severely Emotionally Disturbed (EH/SED) population. Additionally, Melissa was employed as a Program Evaluator at the Louis de la Parte Florida Mental Health Institute where she evaluated the outcomes of an early literacy and social development grant. Melissa also held a position at Tampa General Hospital in the Early Intervention Program, conducting developmental assessments of children birth through age three as well as providing social skills training to school aged children. Throughout her employment, Melissa was both nationally certified and state licensed.

Since 2005, Melissa has coauthored three publications and presented at numerous state and national conferences pertaining to early literacy and behavior. In 2008, Melissa and her colleagues were awarded an Honorable Mention for the Taylor and Francis Annual Award for Distinguished Journal of Early Childhood Teacher Education Article of the Year. Most recent, she has taken a sabbatical from her professional role to engage in the most important and rewarding position, raising her two daughters, Kaitlyn Rose and Olivia Rose Todd.