

Summer 8-2008

Identifying Preschool Students in Need of Early Intervention

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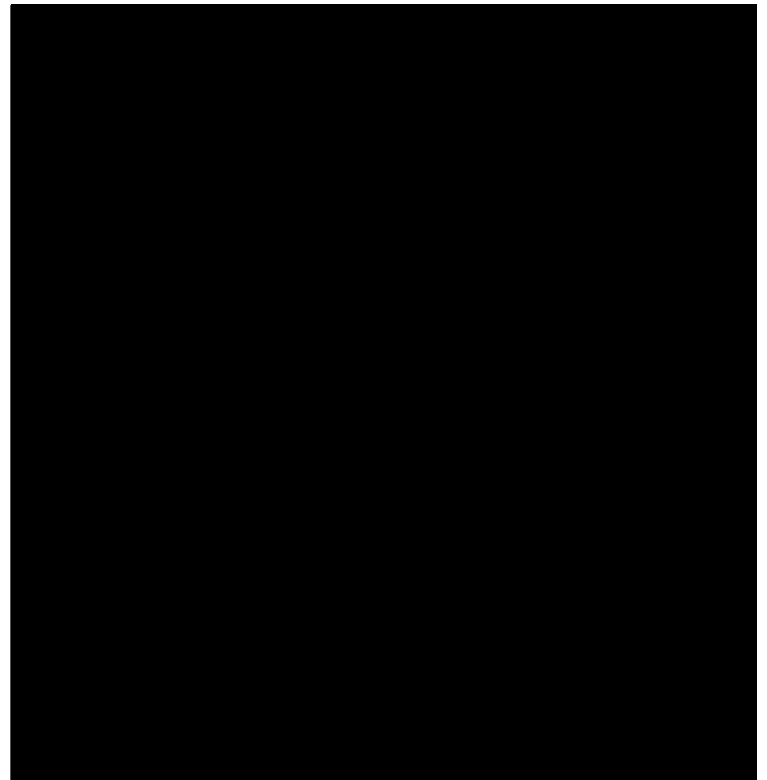
IDENTIFYING PRESCHOOL STUDENTS IN NEED OF EARLY
INTERVENTION

by

Cassie Delso Wells

A Dissertation
Submitted to the Graduate Studies Office
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Approved:



August 2008

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The University of Southern Mississippi

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ABSTRACT

IDENTIFYING PRESCHOOL STUDENTS IN NEED OF EARLY INTERVENTION

by Cassie Delso Wells

August 2008

The purpose of this study was to investigate a screening instrument targeting identification of preschool students in need of early intervention in order to determine the screening instrument's predictive validity. This study specifically examined the relationship between student scores on the *DIAL-3* and student achievement in reading at the end of first grade. All participants in the study were residing on Alaska's North Slope and the majority were Alaska Natives. The remote geographic location of the North Slope along with the ancient traditions of the Iñupiat Eskimos, including the Inupiaq language that is still spoken among the residents of the North Slope, strongly influence the background experiences of the vast majority of the participants in this study.

The findings of this study support research that states young children at risk for reading failure can be identified while emergent reading skills are developing before formal reading instruction has even begun (Adams, 1990; Blachman, 1984; Foorman, 2003; Foorman et al., 1997; Scanlon & Vellutino, 1997; Share, 1984; Snow et al., 1998). The findings further support research indicating that emergent literacy skills developed by children during their early years of life lay the ground work for and can accurately predict future reading achievement (Adams, 1990; Snow et al, 1998; Whitehurst & Lonigan, 1998).

The study found that there was a statistically significant relationship between scores on the *DIAL-3* and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II*. The *DIAL-3* was administered to students between the ages of three and five upon entering a preschool program. The *TerraNova II* was administered to students at the end of first grade. The study controlled for students who received special education services. Approximately 6 percent of the variability in the *Terra Nova II* was contributed to the *DIAL-3* Language Area score while approximately 9 percent was contributed to the *DIAL-3* total score. The small proportion of variability explained by the *DIAL-3* Language Area score and total score indicate that while both are statistically significant predictors, neither is an extremely strong predictor of reading achievement at the end of first grade.

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CHAPTER I

INTRODUCTION

Background and Importance of the Study

Children who fail to develop basic reading skills by age nine are at risk of a lifetime of illiteracy (Rabinowitz, Wong, & Filby 2002). If an individual fails to develop literacy skills their chances for occupational success are extremely limited. Children who cannot read often become adults who are underemployed, unemployed, welfare recipients, or wards of the criminal justice system (Karoly, Kilburn, & Cannon, 2005; McGill-Franzen & Allington, 1991). A high-quality educational system that results in students who are proficient in reading impacts the prosperity of both individuals and our nation as a whole.

Research reveals that reading failure can be prevented in most children through early intervention (Agostin & Bain, 1997; Dickson & Bursuck, 1999; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Leppanen, Niemi, Aunola, & Nurmi, 2004; Phillips, Norris, Osmond, & Maynard, 2002; Torgesen, 2000; Torgesen, 2002; Torgesen et al., 1999). Experiences children have during their first years of life greatly influence future success (Karoly et al., 2005). A young child's brain exhibits enhanced sensitivity to certain types of learning. While learning is possible throughout an individual's lifetime the majority of periods of enhanced sensitivity occur during early childhood. Children are more likely to achieve their full potential if appropriate sensory input occurs during sensitive periods of development (Blakemore & Frith, 2005; Goswami, 2004; Goswami, 2006; Sousa, 1998; Wasserman, 2007). Consequently, attention is drawn to the importance of early intervention in an effort to provide the sensory input necessary to

take full advantage of these sensitive periods of development available early in a child's life.

The National Association for the Education of Young Children (NAEYC) endorses developmentally appropriate practices in early childhood education that promote a constructivist approach to learning and parallel current brain research (Rushton & Larkin, 2001). Effective early childhood education programs which utilize developmentally appropriate practices benefit not only the individual child attending the program, but also society as a whole. Research reveals that high quality early childhood programs produce benefits that include; reduced juvenile crime, reduced reliance on the welfare system, and increased earnings for the individual program participants who ultimately secure better jobs and earn higher incomes (Rand Study, 2006; Rolnick & Grunewald, 2003).

The impact of the first years in the life of a child relative to success in school and eventually as a contributing member of society has been noted by both the public and private sector. Research reveals that the best return on any given educational dollar is the return that stems from the dollar spent on early childhood education (Rolnick & Grunewald, 2003). In recent years, increased funding for early childhood education has been provided by local, state, and federal sources. In addition, the private sector has also been investing millions of dollars in early childhood education in recognition of the investment value of early childhood programs in relation to development of a future labor force and a base of consumers (Karoly et al., 2005).

Literacy is fundamental to education and training for academic and occupational success. A research study conducted by professors of reading at State University of New York at Albany revealed that a child's achievement at the end of first grade predicts who

will succeed and who will fail in life (McGill-Franzen & Allington, 1991). Literacy experiences begin during the first years of life as children acquire emergent literacy skills through their environment prior to formalized instruction in reading (Justice & Pullen, 2003). Emergent literacy skills developed in the preschool years lay the ground work for future reading achievement (Elder, 2005).

Students who do not make progress in reading and fall behind during the first three years of school rarely catch up with their peers (Baker, 2003; Germino-Hausken, 2005; West, Denton, & Germino-Hausken, 2000). Consequently, schools have a narrow window of opportunity to provide support to students to ensure reading achievement. A body of research offers proof that providing support to students through early intervention can prevent reading difficulties in most children (Agostin & Bain, 1997; Dickson & Bursuck, 1999; Foorman et al., 1998; Leppanen et al., 2004; Phillips et al., 2002; Torgesen, 2000; Torgesen, 2002, Torgesen et al., 1999).

Sound assessment which leads to identification of young children in need of early intervention before they fall behind their peers is a first step to prevention of reading failure. Research shows that young children at risk for reading failure can be identified while emergent reading skills are developing before formal reading instruction has even begun (Adams, 1990; Blachman, 1984; Foorman, 2003; Foorman et al., 1997; Scanlon & Vellutino, 1997; Share, 1984; Snow et al., 1998). Assessment of young children should be comprehensive in nature and include a variety of instruments and methods. Effective assessment is efficient and consistent and reveals strengths and weaknesses of both individuals and groups based on specific criteria (Rabinowitz et al., 2002).

Comprehensive early childhood assessment includes a variety of assessment methods and instruments. While no single instrument should be used as the sole basis for making educational decisions concerning preschool children, the process of early childhood assessment begins with screening (Haney, 2000; Paris & Hoffman, 2004; Wang, 2005). Screening is a brief assessment used to identify children who may be in need of additional assessment to facilitate early intervention in the form of special education services (NAEYC, 1992).

Screening of preschool students for purposes of early intervention creates the need for high quality assessment instruments. Without access to reliable screening instruments targeting identification of preschool students in need of early intervention, some young children may not receive services crucial for educational preparedness. Investigation of a screening instrument that can be utilized to identify preschool students in need of additional assessment to facilitate delivery of early intervention to prevent reading failure and mitigate the long term effects illiteracy has on both the individual and society is the main topic of this study.

Statement of the Problem

Screening activities are of no value unless they provide information that leads to provision of appropriate services for students. The ability of an instrument to reliably predict school outcomes is important in selecting a screening instrument (McLoughlin & Rausch, 1990). Screening instruments with high levels of inaccuracy could result in a waste of school resources or delay provision of needed services to students. A high quality screening instrument should identify all children in need of further assessment

without over-identifying children for further testing who are later found to have no significant problem.

Purpose of the Study

This research investigated a screening instrument targeting identification of preschool students in need of early intervention in order to determine the screening instrument's predictive validity. The study was accomplished by comparing the results of the *Developmental Indicators for the Assessment of Learning – Third Edition (DIAL-3)* administered to students upon entering a preschool program to subsequent reading achievement scores on *TerraNova, The Second Edition (TerraNova II)* administered at the end of first grade. The intent of the study was to determine if there was a statistically significant relationship between student scores on the *DIAL-3* and student achievement in reading at the end of first grade.

Research Questions

Research Question 1: Is there a statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services?

Research Question 2: Is there a statistically significant relationship between the Total Score from the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade

controlling for students who received early intervention in the form of special education services?

Hypotheses

Research Hypothesis: There will be a statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services.

Null Hypotheses: There will be no statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services.

Research Hypothesis: There will be a statistically significant relationship between the Total Score from the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services.

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Definitions

The study contains terms which may require definition for the reader:

Assessment. The term assessment refers to an ongoing process that includes a variety of methods and instruments that evaluate a student's progress over a period of time and in response to instruction. Effective and valid forms of assessment are selected based on the knowledge being assessed and the individual being assessed (Bodrova, Paynter, & Isaacs, 2000; Engel, 1990; National Association for The Education of Young Children & National Association of Early Childhood Specialists In State Departments of Education, 1992).

Developmental Indicators for the Assessment of Learning – Third Edition (DIAL-3). The *DIAL-3* is an individually administered screening instrument designed to identify young children's developmental needs. This instrument assesses children ages three years to six years eleven months. The *DIAL-3* consists of five screening areas including: motor, concepts, language, self-help development, and social development (Mardell-Czudnowski & Goldenberg, 1998).

Early Intervention Services. The term early intervention services for the purposes of this research is narrowly defined as special education services provided to students between the ages of three and five in accordance with an Individualized Education Program.

North Slope Borough School District (NSBSD). NSBSD is the northernmost school district in North America and covers 89,000 square miles. NSBSD is composed of eleven schools in eight villages. Air travel is the only means to access the isolated villages of the NSBSD on a year around basis. Since the year 2000 the ethnic make up of students of the NSBSD has consistently included more than 80% Alaska Natives (Alaska Department of Education and Early Development, 2007).

Screening. The term screening refers to a brief assessment used to identify students in need of further monitoring or evaluation (NAEYC, 1992).

TerraNova, The Second Edition (TerraNova II). The *TerraNova II* is a standardized, norm-referenced multiple-choice assessment designed to measure academic achievement.

Delimitations

Anticipated potential delimitations of the study included:

- (1) The scope of this study was limited to the students of the NSBSD.
- (2) The ethnic make up of students of the NSBSD has consistently included more than 80% Alaska Natives since the year 2000 (Alaska Department of Education and Early Development, 2007).
- (3) Early intervention services in the form of half day preschool programs are available to all three and four year old students residing in the NSBSD.
- (4) Early intervention for the purposes of this research is narrowly defined as special education services provided to students between the ages of three and five in accordance with an Individualized Education Program.

- (5) The research design of the study was intended to show the strength of a relationship. Caution should be used when reviewing the data and cause and effect should not be assumed.

Assumptions

1. Standardized procedures were followed during administration and scoring of the *DIAL-3* and *TerraNova II* assessments that produced the data to be included in this study. 2. The *DIAL-3* and *Terra Nova II* data targeted for this study was both complete and accurate. 3. Students who received early intervention in the form of special education were properly identified.

Justification

Early intervention delivered to young children at risk of school failure reduces the need for intensive interventions provided later in a student's career which prove to be less effective and more costly (Gamel-McCormick & Amsden, 2002; Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003). Providing early intervention to prevent reading failure is an effort to ensure that all students have the capacity to pursue challenging academic content and challenging academic achievement standards. Not only is this important for individual children at risk of school failure but also for society as a whole who would shoulder the burden of future illiterate adults who are underemployed, unemployed, welfare recipients, or wards of the criminal justice system (McGill-Franzen & Allington, 1991; Karoly et al., 2005).

Research shows that reading failure can be prevented in most individuals if early identification facilitates appropriate interventions (Agostin & Bain, 1997; Dickson & Bursuck, 1999; Foorman et al., 1998; Leppanen et al., 2004; Phillips et al., 2002;

Torgesen, 2000; Torgesen, 2002; Torgesen et al., 1999). Identification of preschool children in need of early intervention is a first step in prevention of reading failure. The long-term goal for this study is to identify a screening instrument that can be utilized to identify preschool children in need of additional assessment to facilitate delivery of early intervention to prevent reading failure and mitigate the long term effects illiteracy has on both the individual and society.

The results of this study will contribute to the limited research base currently available that examines the relationship between preschool screening instruments and future academic achievement. The results of this study will be valuable to school districts during the selection process of screening instruments utilized to identify students in need of early intervention services at the preschool level. Appropriate early identification of students leads to the efficient use of funds for intervention programs proven to produce both short- and long-term positive results. Early intervention can have long term positive outcomes including increased high school graduation rates, increased levels of income earnings as young adults, and decreased welfare program participation (Gamel-McCormick & Amsden, 2002; Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003).

CHAPTER II

LITERATURE REVIEW

Theoretical Framework

Jean Piaget proposed a cognitive-development theory which contributes to the understanding of cognitive development in children and is pertinent to early intervention and the development of reading ability. Piaget was one of the most influential researchers in the area of developmental psychology during the 20th century and his writings are a significant part of the foundation of the constructivist theory of learning and instruction. According to Piaget individuals understand information as it fits into their established view of the world. Piaget's observations lead to the conclusion that children develop cognitive processes in a sequence of stages. Piaget's theory includes four developmental stages: sensorimotor, preoperational, concrete operational, and formal operational (Campbell, 1976).

While each of the four stages of cognitive development is associated with an age span, Piaget theorized that the age span varies for each child. The sensorimotor stage is generally associated with children zero to two years of age. A child's knowledge of the world begins to develop during this stage based on physical interactions. Early in this stage, prior to language development, intelligent action is demonstrated through motor activity. At approximately 7 months of age a child demonstrates memory through object permanence. Object permanence occurs when a child recognizes that an object exists outside of their perceptual field. Language begins to develop as a child moves from the sensorimotor stage to the preoperational stage. Teaching a child in the sensorimotor

stage should include activities geared to involve the sensorimotor system (Campbell, 1976; Gruber & Voneche, 1977; Rathus, 2005).

The preoperational stage is associated with children two to seven years of age. Intelligence in this stage is demonstrated through maturation of language, utilization of symbols, and development of memory and imagination. A child in this stage is able to think about things and events that aren't immediately present; however, they are oriented to the present and have difficulty conceptualizing time. Children in this stage do not comprehend reversible operations or concepts of conservation. This stage is characterized by egocentric thinking. A child in the preoperational stage takes in information, changes it to fit their own ideas, and assumes that others see situations from their viewpoint. Teaching a child in this stage should include activities that provide opportunities for the child to take an active role in learning while always being mindful of the child's underdeveloped sense of time and egocentric thinking (Campbell, 1976; Gruber & Voneche, 1977; Inhelder & Piaget, 1958; Rathus, 2005).

The concrete operational stage is associated with children 7 to 11 years of age. Intelligence in this stage is demonstrated through logical and systematic thinking in relation to concrete objects. Children grasp the concept of conservation and reversible systems when dealing with concrete objects. There are seven types of conservation characterized in the concrete operational stage including: number, length, liquid, mass, weight, area, and volume. Operational thinking develops and egocentric thought diminishes during this stage. Teaching a child in the concrete operational stage should include opportunities for the child to ask questions, mentally manipulate information and

use their own words to explain their understanding of new concepts (Campbell, 1976; Gruber, & Voneche, 1977; Inhelder & Piaget, 1958; Rathus, 2005).

The formal operational stage is the final stage of cognitive development and is associated with children 11 to 15 years of age. A return to egocentric thought is characteristic early in this stage and intelligence is demonstrated through development of abstract concepts. Children in the formal operational stage begin to reason hypothetically. Teaching a child in the formal operational stage no longer requires concrete objects. Children in this stage are capable of hypothetical and deductive reasoning which allows teaching activities that include asking the child to view situations from a variety of different perspectives (Campbell, 1976; Gruber, & Voneche, 1977; Inhelder & Piaget, 1958; Rathus, 2005).

According to Piaget, children progress through different cognitive stages utilizing the complementary processes of assimilation and accommodation. Through assimilation and accommodation children develop an awareness of the outside world and internalize that awareness. Assimilation entails responding to and interpreting events based on an existing cognitive structure. Children assimilate new information by incorporating the new information into an existing structure without altering that structure. Accommodation involves changing an existing cognitive structure when responding to and interpreting events. Assimilation and accommodation occur simultaneously. Children adapt to their environment and learn through assimilation and accommodation as they progress through each of the four stages of cognitive development (Campbell, 1976; Gruber & Voneche, 1977; Inhelder & Piaget, 1958; Rathus, 2005). Employing Piaget's theory in education compels teachers to assess individual differences to

determine a child's current cognitive stage and, subsequently, target instructional practices appropriate for the cognitive stage of development. Awareness of and sensitivity to a child's cognitive developmental stage is essential to creating an effective learning environment. Piaget's theory promotes the use of discovery learning through presentation of developmentally appropriate activities that challenge a child's ability without presenting material or information that is too difficult for the child to comprehend.

Implications of Early Childhood Education

Prior to entry into kindergarten, children progress through various developmental milestones that have implications for "cognitive functioning; behavioral, social, and self-regulatory capacities; and physical health." Subsequent development and "future success in school and beyond" is impacted by these early years (Karoly et al., 2005, p. 123). There is a growing understanding that the experiences young children have in the first years of life influence how their brains will be organized as adults and reinforces the importance of this critical period of growth and change (Blakemore & Frith, 2005; Goswami, 2004; Shonkoff & Phillips, 2000; Shore, 1997; Wasserman, 2007).

While genetics play a role in each individual's intelligence, research shows that the brain is not static and an individual's intellectual capabilities are not fixed at birth as a result of genetics (Shore, 1997). The development of intelligence is dependent upon both heredity and environmental factors (Blakemore & Frith, 2005; Goswami, 2004). Heredity appears to establish upper and lower limits of intellectual development while an individual's experiences during the early years of life influence where, within those limits, an individual ultimately evolves (Kotulak, 1996).

Brain growth occurs quickly during the first years of life. Neurologists have found that 90 percent of total growth of the human brain occurs by the age of 3 (Purves, 1994). Recent research indicates that rapid growth in brain development extends through age 12 or 13 (Blakemore & Frith, 2005). This growth is the result of the development of connections between neurons called synapses. Synapses are formed as children experience their environment via sensory input (Blakemore & Frith, 2005; Goswami, 2004; Shonkoff & Phillips, 2000; Shore, 1997; Wasserman, 2007). Language and communication are areas of particular importance for strengthening synapses between neurons during early brain development (Blakemore & Frith, 2005).

During early stages of development the brain forms many more new synapses than it will need. This process is referred to as synaptogenesis. This period is followed by synaptic pruning. During synaptic pruning the connections or synapses that are utilized frequently are strengthened and the synapses used less frequently are eliminated. Which connections survive and which connections die is influenced by genetics and environmental factors experienced during the early years of life (Blakemore & Frith, 2005; Goswami, 2004). The general pattern of brain development includes “bursts of synaptogenesis, peaks of density, and then synapse rearrangement and stabilization” (Goswami, 2004, p. 176).

Brain research reveals that there are periods of enhanced sensitivity to certain types of learning. These sensitive periods represent times when the brain is most receptive. Appropriate sensory input during particular stages of development appears to result in maximization of learning. The majority of these sensitive periods relative to language, sensory, and motor brain regions occur in the first few years of life. Recent

research suggests that an additional sensitive period occurs after puberty in relation to the frontal cortex used for planning and reasoning. While plasticity of the brain allows significant new connections to form throughout an individual's lifetime the ability of the brain to benefit from specialized input changes and learning becomes more difficult. As a result individuals are less likely to achieve full potential if appropriate sensory input does not occur during sensitive periods of development (Blakemore & Frith, 2005; Goswami, 2004; Goswami, 2006; Sousa, 1998; Wasserman, 2007).

The position statement of NAEYC concerning developmentally appropriate practices for children birth through age 8 presents two main objectives, provide "guidance to program personnel seeking accreditation by NAEYC's National Academy of Early Childhood Programs" and "counter persistent beliefs in the prevailing traditional approach to early childhood education" (Bredekamp & Copple, 1997, p. v). Originally NAEYC's emphasis was on a teacher-centered didactic approach to learning. NAEYC has revised its approach to developmentally appropriate practices and now supports a philosophy more in line with a constructivist approach. NAEYC supports environments that are "designed to gain the learner's attention, foster meaningful connections with prior understanding, and maximize both short- and long-term memory through patterns and active problem solving." The developmentally appropriate practices currently supported by NAEYC parallel current brain research (Rushton & Larkin, 2001, p. 1).

NAEYC defines developmentally appropriate early childhood programs as programs that contribute to children's development. NAEYC articulates four goals for developmentally appropriate programs in early childhood education based on skills children will need as adults given the rapid changes occurring in today's global society.

The first of the four goals includes development of communication skills to facilitate the ability to resolve differences of opinion and work together as members of a team. The second goal focuses on development of the ability to analyze situations, problem solve, and make reasonable judgments. The third goal involves development of skills to access information through a variety of methods. The fourth and final goal includes development of the ability to continue to learn and adapt to changing conditions (Bredekamp & Copple, 1997).

NAEYC identifies three types of information or knowledge utilized to make decisions concerning developmentally appropriate practices in early childhood programs. Developmentally appropriate practices are based on current knowledge concerning child development and learning, current knowledge about individual strengths, interests, and needs of children, and current knowledge of the social and cultural milieu in which children live. In addition, NAEYC emphasizes that the information referenced above is constantly changing and influencing decisions regarding developmentally appropriate practices in early childhood programs (Bredekamp & Copple, 1997).

The current knowledge base of information concerning child development and learning is extensive. NAEYC articulates a set of 12 principles to inform and guide decisions in relation to developmentally appropriate practices in early childhood programs. The following principals are generated from a broad-based review of literature:

1. A child's development in the physical, social, emotional, and cognitive domain is closely related. Development in any one of the domains can influence development in the others. Developmentally appropriate practices in early childhood programs support

curriculum that develops conceptual understanding across all domains (Bredekamp & Copple, 1997).

2. A child's development occurs in a predictable progression of skills which build upon each other during the first 9 years of life. Developmentally appropriate practices in early childhood programs support curriculum that aligns with the predictable progression of skills and provides an environment with learning activities that promote growth in physical, emotional, social, language, and cognitive domains based on a child's current level of development (Bredekamp & Copple, 1997).

3. A child's development occurs in a series of stages. Due to individual differences the chronological age span associated with each of the stages varies. Not only does development progress at varying rates among children but also development within the physical, emotional, social, cognitive, and language domains varies within the individual child. Developmentally appropriate practices in early childhood programs support curriculum that recognizes individual differences in development and provide an environment with learning activities adaptable to meet individual needs (Bredekamp & Copple, 1997).

4. A child's development is influenced by experiences early in life. Research indicates that if an experience occurs only occasionally early in life it may have a minimal effect, while an experience that occurs frequently early in life can have a more dramatic and lasting effect. Depending upon whether the experience is positive or negative development can be greatly influenced. In addition, experiences provided early in life during sensitive developmental periods when the brain is most receptive to particular types of sensory input result in maximization of learning and development.

Developmentally appropriate practices in early childhood programs support curriculum that provides an environment with frequent opportunities for children to engage in positive learning experiences during sensitive developmental periods (Bredekamp & Copple, 1997).

5. A child's development progresses from behavioral knowledge to symbolic knowledge. As young children progress through developmental stages their knowledge base becomes more complex and internalized. Developmentally appropriate practices in early childhood programs support curriculum that provide opportunities for children to increase their behavioral knowledge through a variety of activities geared toward the developmental level of the individual child (Bredekamp & Copple, 1997).

6. A child's development is impacted by multiple social and cultural factors. Family, educational setting, community, and society are interrelated and impact the development of a child. Social contexts not only influence child development but also impact the ways in which children demonstrate developmental achievements.

Developmentally appropriate practices in early childhood programs support curriculum that maintains high expectations for all children, acknowledges cultural influences, and recognizes a variety of ways that children demonstrate developmental achievements (Bredekamp & Copple, 1997).

7. A child's development is facilitated through active engagement in hands on experiences in a social setting. Developmentally appropriate practices in early childhood programs support curriculum that embraces constructivist theories that provide opportunities for children to actively engage in constructing their own understanding based upon experiences. Programs that provide opportunities for young children to learn

through observation and participation in activities which include both adults and peers provide the combination of physical and social experience which facilitates progression through the various stages of development (Bredekamp & Copple, 1997).

8. A child's development and learning is the result of both environmental and hereditary factors. While a child's genetic makeup is thought to set upper and lower limits of learning potential, environmental factors influence where within those limits a child ultimately progresses. Developmentally appropriate practices in early childhood programs support curriculum that provide a rich physical and social learning environment with opportunities for a child to maximize their individual potential (Bredekamp & Copple, 1997).

9. A child's development is facilitated and reflected through play. Play is an interactive method for children to develop cognitively, motorically, linguistically, socially, and emotionally. Through play children explore and understand their world while acquiring and practicing new skills. Observation of children's play provides adults the opportunity to observe individual levels of development. Observation of children's play also provides opportunities for adults to facilitate the development of new strategies through extension and elaboration. Developmentally appropriate practices in early childhood programs support curriculum that employs child-initiated and teacher-supported interactive play to facilitate development (Bredekamp & Copple, 1997).

10. A child's development is facilitated when a child experiences frequent success along with opportunities to engage in challenging activities. A delicate balance exists between providing learning opportunities that allow children to practice newly acquired skills and experience success while also providing opportunities that challenge a child to

try new skills just beyond their current levels of development. Children should be supported in their efforts to participate in challenging activities to avoid experiencing frustration. Developmentally appropriate practices in early childhood programs support curriculum that meets the individual needs of children related to developmental levels and provides a learning environment with opportunities for a child to experience frequent success while also engaging in challenging activities. Closely monitoring individual developmental levels facilitates matching appropriate challenging learning activities while avoiding student frustration (Bredekamp & Copple, 1997).

11. A child's development is demonstrated through a variety of modalities. As unique individuals children have preferred modes of learning. Developmentally appropriate practices in early childhood programs support curriculum that provides an environment with opportunities for children to experience learning through a variety of different modalities. Supervision of activities is utilized to encourage students to make the most of their strengths while practicing skills that enhance all modes of learning (Bredekamp & Copple, 1997).

12. A child's development is impacted by environmental conditions related to basic physical and psychological needs. Learning and development are significantly impacted in children who experience conditions in which their basic physical and psychological needs for safety and security are not met. Basic physical and psychological needs for adequate health, safety, and nutrition must be addressed prior to the expectation that children actively participate in learning activities. In addition, development is impacted by a child's ability to establish and maintain positive and consistent relationships. Developmentally appropriate practices in early childhood

programs first meet children's physical, social, and emotional needs. This includes provisions for adequate health, safety, and nutrition along with opportunities to establish and maintain positive and consistent relationships (Bredekamp & Copple, 1997).

While program effects may vary based on program design, population served, and context of program delivery, effective early childhood education programs have been proven to produce both short- and long-term benefits (Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003). Research reveals that high quality early childhood education programs can benefit both the children who participate in the programs and society as a whole. Individual children benefit based on program results that reduce the number of students who fail and must repeat a grade in school, keep students out of expensive special education programs, and increase high school graduation rates. In addition to benefits reaped by the individual, society benefits based on program results that ultimately reduce juvenile crime, reduce reliance on the welfare system, and increase the earnings of the individual participants who eventually get better jobs and earn higher incomes (Rand Study, 2006; Rolnick & Grunewald, 2003).

In recent years, both the public and the private sector have become cognizant of the impact of the first years in the life of a child relative to success in school and eventually as a contributing member of society. Localities and states have increased resources available to early childhood initiatives. These increases have complemented funding by the federal government (Karoly et al., 2005). Research reveals that the best return on any given educational dollar is the return that stems from the dollar spent on early childhood education. According to Rolnick and Grunewald "Studies find that well-

focused investment in early childhood development yield high public as well as private returns” (Rolnick & Grunewald, 2003, p. 1).

In addition to public support, the private sector has become increasingly involved in funding early childhood education. The *PNC Grow Up Great* initiative is a ten-year, \$100-million program launched in September 2003 by the PNC Financial Services Group, Inc. to improve school readiness for children from birth to age five. This is one example of private businesses recognizing the investment value of early childhood programs in relation to development of a future labor force and a base of consumers (Karoly et al., 2005).

The constructivist theory of Piaget goes hand in hand with current brain research. Both indicate that children progress through developmental stages that are impacted by their environment (Rushton & Larkin, 2001; Wasserman, 2007). Research studies substantiate that high quality early childhood education programs provided during sensitive developmental periods when the brain is most receptive to particular types of sensory input result in maximization of learning (Blakemore & Frith, 2005; Goswami, 2004; Goswami, 2006). In a constructivist brain-based early childhood program that employs developmentally appropriate practices supported by NAEYC opportunities meaningful to children are made available so young children can explore and actively engage in learning (Rushton, Eitelgeorge, & Zickafoose, 2003). Effective early childhood education programs have been proven to produce short- and long-term benefits for the children who participate in the programs and society as a whole (Rand Study, 2006; Rolnick & Grunewald, 2003). Early childhood education is a good investment of public and private funds (Karoly et al., 2005).

The Impact of Literacy on the Individual and Society

Literacy is fundamental to education and training for future career related skills. If an individual lacks literacy skills their chances for academic and occupational success are limited. Research reveals that children who cannot read often become adults who are underemployed, unemployed, welfare recipients, or wards of the criminal justice system (Károly et al., 2005; McGill-Franzen & Allington, 1991).

Reading failure results in undesirable outcomes not only for the individual but also for society as a whole. Government costs resulting from reading failure are increased due to special education programs, social welfare programs, and higher rates of crime and delinquency. In addition government revenues are negatively impacted as a result of periods of unemployment and underemployment during the lifetime of an illiterate individual (Károly et al., 2005).

In 1991 Anne McGill-Franzen and Richard Allington, professors of reading at State University of New York at Albany, studied federally funded intervention programs targeting children in the United States who were low-achieving readers. Their research revealed that “by the end of first grade children’s achievement predicts with alarming accuracy who will succeed and who will fail in life.” Their research highlighted that adult illiteracy was once again a national concern in the United States (McGill-Franzen & Allington, 1991, p. 86).

Literacy experiences begin during the first years of life through activities such as listening to stories, reciting nursery rhymes, singing songs, and drawing or scribbling on paper. As young children watch adults in their environment participate in a variety of activities such as reading for specific information or pleasure, writing lists or notes, and

working on computers they begin to understand that print carries a message and reading and writing have a purpose. Skills and knowledge children acquire in their environment prior to formalized instruction in reading are often referred to as emergent literacy skills (Justice & Pullen, 2003).

Emergent literacy skills developed in the preschool years are greatly influenced by environment. Consequently the level of individual skill children possess when entering elementary school is varied. Students who begin school with fewer skills and less exposure to prior knowledge are more likely to experience reading difficulties (Snow, Burns & Griffin, 1998; West, Denton & Germino-Hausken, 2000). Emergent literacy skills of preschool children lay the ground work for and can accurately predict future reading achievement (Elder, 2005).

Typically students who struggle with reading when they begin school continue to struggle with reading throughout their school career and into adulthood (Adams, 1990; Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Stanovich, 1986; Torgesen & Burgess, 1998). A lifetime of illiteracy can be predicted if a student fails to develop basic reading skills by age nine. Research shows that reading instruction is best achieved via comprehensive programs that provide instruction directly and systematically (Lyon, 2007). If a student does not receive adequate reading instruction early in their school career or fails to respond to instruction and subsequently lacks the ability to read on grade level, all other academic disciplines are impacted. Students must learn to read at a proficient level in primary grades so they can apply the skill of reading in order to assimilate information in other subject areas as they progress in their school careers (Rabinowitz et al., 2002).

Early Intervention to Prevent Reading Failure

The No Child Left Behind Act of 2001 mandates that school systems which receive federal funds create effective learning environments to prepare all children for academic achievement. Increased accountability, rigorous testing, and implementation of research-based instructional practices are some of the methods employed to create these effective learning environments (Cotton, 2005). A focus on accountability, enhanced individual student performance, and overall school achievement often places improved literacy as a top priority.

The recent focus on education of children from birth to age eight includes highlighting the importance of preschool experiences and the goal that all children are able to read by the end of third grade (Germino-Hausken, 2005; West et al., 2000). Research shows that future success in reading can be predicted by knowledge and skills developed by children during their early years of life (Adams, 1990; Snow et al., 1998; Whitehurst & Lonigan, 1998). Children who fail to develop emergent literacy skills and struggle with reading at the beginning of school typically continue to struggle with reading throughout their school career and into adulthood (Adams, 1990; Francis et al., 1996; Stanovich, 1986; Torgesen & Burgess, 1998).

While a certain percentage of students will experience success in school, almost regardless of the instruction, others students will require targeted instruction that addresses individual needs in order to be successful (Rabinowitz et al., 2002). The No Child Left Behind Act of 2001 emphasizes reading achievement in early grades. Schools have a narrow window of opportunity to provide support to students to ensure reading achievement. Research supported by the National Institute of Child Health and Human

Development and the Department of Education's Office of Educational Research and Improvement indicates that a lifetime of illiteracy can be predicted if a student fails to develop basic reading skills by age nine (Rabinowitz et al., 2002). Students who do not make progress in reading and fall behind during the first three years of school rarely catch up with their peers (Baker, 2003; Germino-Hausken, 2005; West et al., 2000).

Empirical evidence supports the concept that reading failure can be prevented. A growing body of evidence offers proof that reading difficulties in most children can be prevented through early intervention (Agostin & Bain, 1997; Dickson & Bursuck, 1999; (Foorman et al., 1998; Leppanen et al., 2004; Phillips et al., 2002; Torgesen, 2000; Torgesen, 2002, Torgesen et al., 1999). Early assessment and intervention are proven methods to identify and address individual student needs to increase student achievement in reading (Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Juliebö, Malicky, & Norman, 1998; Rabinowitz et al., 2002; Reynolds & Temple, 1998). Research shows that young children at risk for reading failure can be identified while emergent reading skills are developing before formal reading instruction has even begun (Adams, 1990; Blachman, 1984; Foorman, 2003; Foorman et al., 1997; Scanlon & Vellutino, 1997; Share, 1984; Snow et al., 1998).

Early identification facilitates early intervention. Sufficient early intervention efforts provided when the probability of prevention of reading failure is the highest is the most cost effective in the long run (Berninger et al., 2002). The National Research Council's report *Neurons to Neighborhoods* (Shonkoff & Phillips, 2000) and RAND's *Investing in Our Children: What We Know and Don't Know About the Costs and Benefits of Early Childhood Interventions* (Karoly, 1998) both indicate that early intervention

programs can produce positive results in both short- and long-term academic achievement. Early intervention can have long term positive outcomes including increased high school graduation rates, increased levels of income earnings as young adults, and decreased welfare program participation (Gamel-McCormick & Amsden, 2002; Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003).

While there is a vast amount of brain research currently available “much of the research is not yet ready for implications to be drawn” (Blakemore and Frith 2005, p. 460). However, brain research has established findings relevant to early intervention during sensitive periods (Goswami, 2004; Goswami, 2006; Sousa, 1998; Wasserman, 2007). It is important that young children be exposed to a child-oriented environment that includes sensory input, language, and communication necessary for brain development. Brain research shows, intervention in the form of high quality early childhood education programs can provide the stimulation young children need to generate and maintain synapses among neurons that build the cortex of the brain. While teaching and learning apply to all ages, flexibility of the brain referred to as plasticity is greatest during the early years of life (Blakemore & Frith, 2005).

Prevention of reading problems before they develop is a topic of interest (Quatroche, 1999). Current research indicates that students who participate in preschool experiences exhibit increased student achievement (Karoly et al., 2005; Rosenthal, Rathburn, & West, 2005). Consequently, preschool programs often are used in an effort to prevent reading problems and boost achievement. Student participation in preschool programs can increase the level of individual skill a student possesses when entering school. Students who begin school with fewer skills and less exposure to prior

knowledge are more likely to experience reading difficulties (Snow, Burns & Griffin, 1998). Increased levels of individual skills contribute to the degree of success a student experiences in his or her early school career (West et al., 2000).

Early intervention can be especially beneficial for young children at risk of school failure. Differential treatment of children at risk of school failure is a first step to intervention. Children threatened by socioeconomic disadvantages, family disruption, or diagnosed disability may not have access to the child-oriented environment necessary for optimal brain development. Early intervention provided during the first years of life can provide the sensory stimulation necessary to help a child's brain generate and maintain synapses (Blakemore & Frith, 2005; Goswami, 2004; Goswami, 2006; Public Sector Consultants, 2006; Sousa, 1998; Wasserman, 2007). Sensory stimulation provided via early intervention is a means of enabling at risk children to enter school with the skills necessary to succeed.

In 2002 the Center for Disabilities Studies published *Investing in Better Outcomes: The Delaware Early Childhood Longitudinal Study*. This longitudinal study followed two groups of students over four years and reports the outcome of children enrolled in two different types of early intervention programs. One program targeted young children with disabilities while the other targeted young children living in poverty. Students who were identified with disabilities and received early intervention in the form of special education services prior to kindergarten had significantly better outcomes than students who were not identified as having a disability until they began kindergarten or later. Better outcomes for these students included higher test scores and grades than their peers. Students living in poverty at the beginning of their kindergarten year who received

early intervention services prior to kindergarten had significantly higher test scores and grades than their peers (Gamel-McCormick & Amsden, 2002).

The Delaware Early Childhood Longitudinal Study is just one example of the research that supports the effectiveness of early intervention targeting young children living in poverty or young children identified as in need of special education. Identifying child at risk of school failure due to poverty is fairly straight forward once poverty is operationally defined. Identifying young children in need of special education is a much more difficult task.

Optimally high quality early childhood education programs would be available to at risk students to provide child-oriented environments effective at diminishing the need for expensive special education programs. However, all young children at risk of school failure do not currently have access to early childhood education programs. Because early intervention in the form of special education services is most effective if children are identified and served prior to kindergarten the task of early identification is vital for the future of these individual children (Gamel-McCormick & Amsden, 2002).

The Individuals with Disabilities Education Improvement Act of 2004 (IDEA 04) guarantees a free and appropriate public education to all children ages 3 through 21. To qualify for special education services a child must demonstrate a physical or mental disability as defined in the federal law. In addition, the disability must adversely affect the educational performance of the child and the child must be in need of special education (U.S. Department of Education, 2007).

IDEA 04 defines 14 physical or mental disabilities that provide the framework for categories of special education. These 14 categories include: autism, deafness, deaf-

blindness, early childhood developmental delay, emotional disturbance, hearing impairment, specific learning disability, mental retardation, multiple disabilities, orthopedic impairments, other health impairments, speech or language impairments, traumatic brain injury, and visual impairment. A student must meet the criteria for one or more of the 14 categories as defined in the federal law to qualify for special education services (U.S. Department of Education, 2007).

Identification is the first phase in establishing that a child has a disability and requires special education. Identification is the process of appropriately identifying children who need to be evaluated. Evaluation is the second phase which includes a comprehensive assessment. Information from the assessment must be sufficiently comprehensive to determine if the student meets the eligibility criteria for special education and to develop an individualized program to meet the student's needs (U.S. Department of Education, 2007).

The data collected during a comprehensive assessment is considered by an educational team that includes the child's parent or guardian. The team is charged with determining if the child has a physical or mental disability that meets the criteria for one or more of the 14 special education categories as defined in federal law. If so, the team must then determine if the disability adversely affects the educational performance of the child and if the child is in need of special education (U.S. Department of Education, 2007).

Early Childhood Assessment

Assessment is a vital piece of the preschool experience. According to a position statement of the National Association for the Education of Young Children and the

National Association of Early Childhood Specialists in State Departments of Education, assessment in early childhood education serves three main purposes. The primary purpose is for planning instruction and communicating with parents. The two additional purposes include program evaluation and identification of children in need of specialized services (NAEYC, 1992).

Federal law provides the opportunity for all children ages three through 21 to access a free appropriate public education. Early developmental screening can be utilized to identify young children in need of early intervention before they fall behind their peers (Haney, 2000). In addition, developmental screening supplemented by comprehensive assessment that accurately determines a student's skill level can drive effective instruction which can ultimately lead to increased student achievement (Teale, 1988).

Comprehensive assessment of preschool students for purposes of early intervention must be "systematic, efficient, and consistent" (Rabinowitz et al., 2002, p. 5). Effective assessment reveals strengths and weaknesses of both individuals and groups based on specific criteria. Choosing the appropriate instrument and approach based on the intended purpose is critical to glean useful data. When selecting an evaluation instrument a choice must be made between an individually administered assessment or a group administered assessment. An individually administered assessment generally yields much "richer" information than a group administered assessment; however, individually administered instruments tend to be "time-consuming, expensive, and more subject to variation in administration, scoring, and interpretation" (Rabinowitz et al., 2002, p. 3). Group administered assessments are typically the choice for school accountability or program evaluation while individually administered assessments are

generally the choice for diagnosis of individual students' learning needs (Rabinowitz et al., 2002). Group administered assessment has a history of questionable validity with children under the age of eight further impacting the preference for comprehensive assessment during early childhood to take the form of individual assessment (Goodwin & Goodwin, 1997).

Comprehensive early childhood assessment should include a variety of assessment methods and instruments. No single instrument should be used as the sole basis for making educational decisions especially concerning preschool children (Paris & Hoffman, 2004; Wang, 2005). Assessment of young children presents unique challenges because a child's development occurs in a series of stages. Not only does development progress at varying rates among children but also development within the physical, emotional, social, cognitive, and language domains varies within the individual child. Comprehensive early childhood assessment involves ongoing observational assessment of each of the developmental domains. Appropriate assessment is an ongoing process that evaluates student performance and developmental levels over a period of time and in response to instruction. Children learn in a variety of ways and multiple approaches to assessment are necessary to provide an accurate picture of student progress. Effective and valid forms of assessment must be selected based on the knowledge being assessed and the individual being assessed (Bodrova et al., 2000).

Assessment to identify children with special needs to ensure that they receive appropriate interventions and/or services involves both screening and comprehensive diagnostic evaluation. Screening is a brief assessment used to identify children who may be in need of special education services. Ongoing monitoring is essential for students

identified during screening to determine if additional intensive assessment is warranted. If ongoing monitoring of a student leads parents, teachers or other professionals to believe that a child may have a disability, a comprehensive diagnostic evaluation is in order (NAEYC, 1992).

Early childhood education screening programs generally include activities to assess fine and gross motor skills, concept development, communication, social skills, and adaptive skills. A parent interview or questionnaire can be utilized to gain additional information concerning the child's medical history, general health, and parent concerns. Results of a screening should be used to identify students who may be in need of a comprehensive assessment. Results of a screening should never keep a child out of school or delay their entrance to preschool programs. Results of a screening should not be used as the sole basis for making a decision concerning placement in special education (NAEYC, 1992).

The *DIAL-3* is one example of a developmental screening instrument designed to identify young children who may be in need of special education services as determined by additional comprehensive educational evaluation. The *DIAL-3* is an individually administered screening instrument paired with a parent questionnaire designed to be utilized together to identify a young child's developmental needs. This instrument assesses children ages three years to six years eleven months. The *DIAL-3* consists of five screening areas including: Motor, Concepts, Language, Self-Help Development, and Social Development (Mardell-Czudnowski & Goldenberg, 1998).

The *DIAL-3* measures motoric, conceptual, and language behaviors demonstrated during a 30-minute direct assessment. A behavior rating scale completed by the

professionals who administer the direct assessment provides a measure of psychosocial behavior exhibited by the child during the screening. Normed scores for self-help and social skills are calculated based on responses recorded on the Parent Questionnaire by a primary caregiver (Mardell-Czudnowski & Goldenberg, 1998).

The *DIAL-3* direct assessment of performance areas measures demonstration of developmental skills that relate directly to each area being assessed. The Motor, Concepts, and Language areas each contain tasks which make up between six and seven scored items. Skills assessed in the Motor area are pertinent to learning to write, skills assessed in the Concepts area are pertinent to learning arithmetic, and skills assessed in the Language area are pertinent to learning to read. The rating scale of psychosocial behavior observed during the screening is utilized to indicate if the child may be in need of additional assessment related to behavior exhibited during the performance items (Mardell-Czudnowski & Goldenberg, 1998).

In addition to developmental skills demonstrated and behaviors observed during direct assessment, the *DIAL-3* measures a child's self-help and social development based on responses recorded on the Parent Questionnaire by a primary caregiver. The Parent Questionnaire presents 15 questions pertinent to a child's self-help development and 20 questions pertinent to a child's social development. The Parent Questionnaire gathers information from individuals who observe and interact with the child in their natural environment. This information provides a more comprehensive picture and adds validity to the assessment that cannot be achieved during a 30 minute direct screening session. The Parent Questionnaire provides an opportunity for primary caregivers to share

information concerning medical history, family background, and general concerns about development (Mardell-Czudnowski & Goldenberg, 1998).

The Motor, Concepts, and Language subtest of the *DIAL-3* combine to yield a total scale score. The Self-Help Developmental and Social Developmental areas which are not included in the total scale score are assessed via the questionnaire completed by a primary caregiver. A child's scores from the *DIAL-3* are reported to parents as "OK" or "Potential Delay" based on cutoff scores selected by the agency administering the *DIAL-3*. The authors recommend that children who obtain a score identified as having a potential delay warrant referral for additional assessment (Mardell-Czudnowski & Goldenberg, 1998).

The *DIAL-3* screens the five developmental areas mandated in IDEA 04 for a child to qualify for the special education category of Early Childhood Developmental Delays. The term developmental delay is defined as a condition which represents a significant delay in a child's process of development. Developmental delay does not include conditions in which a child is temporarily lagging behind their peers in development. Nor does developmental delay include children who are only slightly behind their peers in development. The presence of a developmental delay is an indication that a child's process of development is significantly affected. A child with a developmental delay who does not receive special intervention is likely to experience impaired educational performance by the time they reach kindergarten (Mardell-Czudnowski & Goldenberg, 1998).

The category Early Childhood Developmental Delay as defined by IDEA 04 considers eligibility for special education in relation to five developmental areas. The five

areas consist of cognitive development, physical development, speech or language development, social or emotional development, and self-help skills. Physical development includes both fine and gross motor skills. Speech or language development includes expressive and receptive language, articulation, fluency, and voice. To qualify as a child demonstrating an early childhood developmental delay a child must be functioning at least two standard deviations below the national norm, or be 25% delayed in age equivalency in at least one of the five areas, or function at least 1.7 standard deviations below the mean, or be 20% delayed in age equivalency in two or more of the five areas (U.S. Department of Education, 2007).

In the event that screening and ongoing monitoring of a student leads to a comprehensive diagnostic evaluation to determine eligibility for special education services, formal assessment must conform to all regulations contained in IDEA 04 (NAEYC, 1992). The data collected during the assessment must be considered by an educational team that includes the child's parent or guardian. The team must determine if the child has a physical or mental disability that meets the criteria for one or more of the 14 special education categories as defined in federal law which includes the category of early childhood developmental delay. If so, the team must then determine if the disability adversely affects the educational performance of the child and if the child is in need of special education (U.S. Department of Education, 2007).

Summary

According to the constructivist theory of Piaget, children progress through different stages of cognitive development as they adapt to their environment and learn through assimilation and accommodation (Campbell, 1976; Gruber & Voneche, 1977;

Inhelder & Piaget, 1958). Piaget's theory is pertinent to early intervention and the development of reading ability. Employing Piaget's theory in education compels teachers to determine a child's current cognitive stage and utilize instructional practices appropriate for the cognitive stage of development. The constructivist theory has influenced early childhood education and developmentally appropriate practices as defined by NAEYC (Rushton & Larkin, 2001).

Research reveals that the experiences children have during the first years of life greatly influence their future success (Károly et al., 2005). Preschool years are a period of rapid brain development. Brain growth is the result of the development of connections between neurons called synapses. Synapses are formed as children experience their environment via sensory input. A young child's brain forms many more synapses than it will need. Synapses that are used frequently are strengthened and synapses used less frequently are eliminated. Consequently, environmental factors experienced during the early years of life impact brain development (Blakemore & Frith, 2005; Goswami, 2004; Shonkoff & Phillips, 2000; Shore, 1997; Wasserman, 2007). Brain research reveals that there are periods of enhanced sensitivity to certain types of learning. Appropriate sensory input during particular stages of brain development appears to result in maximization of learning. While learning is possible throughout an individual's lifetime the majority of periods of enhanced sensitivity occur during childhood (Blakemore & Frith, 2005; Goswami, 2004; Goswami, 2006; Sousa, 1998; Wasserman, 2007).

NAEYC endorses developmentally appropriate practices in early childhood education that promote a constructivist approach to learning and parallel current brain research (Rushton & Larkin, 2001). NAEYC articulates four goals for developmentally

appropriate early childhood programs based on skills children will need as adults. The four goals include development of communication skills and problem solving skills along with development of the ability to access information and adapt to changing conditions (Bredekamp & Copple, 1997). NAEYC proposes that information to be used to make decisions concerning developmentally appropriate practices in early childhood programs should include current knowledge of child development and learning along with specific knowledge about the population being served. In addition, NAEYC emphasizes that the two sources of information listed above are constantly changing and those changes should influence decisions regarding developmentally appropriate practices in early childhood programs (Bredekamp & Copple, 1997). NAEYC articulates a set of 12 principles to inform and guide decisions in relation to developmentally appropriate practices in early childhood programs generated from a broad-based review of literature (Bredekamp & Copple, 1997).

Children who fail to develop basic reading skills by age nine are at risk of a lifetime of illiteracy (Rabinowitz et al., 2002). However, reading failure can be prevented in most children through early intervention (Agostin & Bain, 1997; Dickson & Bursuck, 1999; Foorman et al., 1998; Leppanen et al., 2004; Phillips et al., 2002; Torgesen, 2000; Torgesen, 2002; Torgesen et al., 1999). Early intervention can be especially beneficial for young children at risk of school failure. Early intervention is cost effective (Berninger et al., 2002) and produces both short- and long-term benefits for the individual and society as a whole (Shonkoff & Phillips, 2000; Karoly, 1998; Gamel-McCormick & Amsden, 2002; Karoly et al., 2005; Rolnick & Grunewald, 2003).

High quality early childhood education programs are one approach to early intervention and have been proven to produce short- and long-term benefits. Benefits are based on program results that reduced the number of students who fail and are required to repeat a grade in school, keep students out of special education programs, increase high school graduation rates, reduce juvenile crime, reduce reliance on the welfare system, and increase the earnings of participants who eventually get better jobs and earn higher incomes (Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003). Effective early childhood intervention programs that have significant and meaningful effects on children and their families have the potential for the “dollar benefits associated with the favorable effects to exceed program costs” (Karoly et al., 2005, p. 132).

A first step to identification of preschool children in need of early intervention in an attempt to prevent reading failure, and the long term negative effects illiteracy has on both individuals and society is early childhood assessment. Assessment is a vital piece of the preschool experience. Assessment of young children should be comprehensive in nature and include a variety of instruments and methods. Effective assessment reveals strengths and weaknesses of both individuals and groups based on specific criteria (Haney, 2000; Paris & Hoffman, 2004; Wang, 2005).

While no single instrument should be used as the sole basis for making educational decisions concerning preschool children, the process of early childhood assessment begins with screening. Screening is a brief assessment used to identify children who may be in need of a comprehensive diagnostic evaluation to determine eligibility for special education services (NAEYC, 1992). Choosing the appropriate instrument and approach to screening based on the intended purpose is critical to glean useful data. Without

access to reliable assessment screening instruments targeting identification of preschool students in need of early intervention, some young children may not receive services crucial for educational preparedness.

CHAPTER III

METHODOLOGY

Introduction

Investigation of an assessment instrument targeting identification of preschool students in need of early intervention was the main focus of this proposed research. This longitudinal study was accomplished by comparing the results of the *Developmental Indicators for the Assessment of Learning – Third Edition* (DIAL-3) administered to students upon entering a preschool program to subsequent reading achievement scores on the *TerraNova II* administered at the end of first grade. The intent of this study was to determine if there was a statistically significant relationship between student scores on the *DIAL-3* and student achievement in reading at the end of first grade.

This chapter will discuss the following: (a) research design, (b) setting, (c) participants, (d) instrumentation, (e) procedures for collecting data for the research, and (f) data analysis.

Research Design

The research design was correlational and composed of two variables. Examination of the relationship between the variables was used to explain or predict an outcome. The key quantitative independent variable was students' scores on the *DIAL-3*. The key quantitative dependent variable was students' reading achievement scores on the *TerraNova II*. Demographic data including gender, ethnicity and socio-economic status of each participant was also collected.

DIAL-3 data was obtained from the NSBSD Special Education Department. *TerraNova II* data was obtained from the NSBSD Student Information System. Students

included in the study who received special education services were designated for purposes of data evaluation.

Setting

The population included in the study was students of the NSBSD. Located on Alaska's North Slope, NSBSD is the northernmost school district in North America and covers 89,000 square miles. NSBSD is composed of eleven schools in eight villages. On an annual basis the North Slope has the coldest climate in Alaska. Temperatures normally range between 60 degrees Fahrenheit in the summer when the sun stays above the horizon for 84 days and minus 40 degrees Fahrenheit in winter when the sun stays below the horizon for 67 days. Air travel is the only means to access the isolated villages of the NSBSD on a year around basis. Barrow, a village located in the NSBSD, has one of the largest Eskimo populations in the world (North Slope Borough School District, 2007). Since the year 2000 the ethnic make up of students of the NSBSD has consistently included more than 80% Alaska Natives (Alaska Department of Education and Early Development, 2007).

Formal education was introduced to the residents of the North Slope in the late 1880's by the Bureau of Indian Affairs (BIA). The BIA offered education to the children of the North Slope in their home village through the elementary grades. Following the eighth grade students who desired to go to high school had to travel to boarding schools located hundreds, or even thousands of miles from their home. Residents of the North Slope took local control of the education of their children in 1972 when the NSBSD was formed. Currently students residing in all eight villages of the North Slope can access

public education from preschool through the twelfth grade in their home village (Hopson, 1975).

Participants

During the 2001-02 school year over 200 preschool students at each of the elementary schools of the NSBSD were screened utilizing the *DIAL-3*. Each student who was enrolled in the NSBSD and subsequently participated in *TerraNova II* testing at the end of their first grade year was targeted for inclusion in this study. Students with retrospective data available from both instruments were included in the study.

Instrumentation

This study utilized retrospective data collected from two types of instrumentation. The first instrument was the *DIAL-3*. The second instrument was the *TerraNova II*. Students who completed the *DIAL-3* prior to entering their kindergarten year and subsequently completed the *TerraNova II* at the end of their first grade year were participants in this study.

DIAL-3

The *DIAL-3* is an individually administered screening instrument designed to identify young children's developmental needs. This instrument assesses children ages three years to six years eleven months. The *DIAL-3* consists of five screening areas including: motor, concepts, language, self-help development, and social development (Mardell-Czudnowski & Goldenberg, 1998).

The first three areas listed above require that children demonstrate fine and gross motor skills, language skills, and awareness of cognitive concepts. In addition, a rating scale of psychosocial behavior observed during the screening is utilized to indicate if the

child may be in need of additional assessment related to behavior exhibited during the performance items. These three subtest areas combine to yield a total scale score. The self-help developmental and social developmental areas which are not included in the total scale score are assessed in the form of a questionnaire completed by the parent. A child's scores from the *DIAL-3* are reported to parents as "OK" or potential delay based on cutoff scores selected by the agency administering the *DIAL-3*. The authors recommend that children who obtain a score identified as a potential delay warrant referral for additional assessment (Mardell-Czudnowski & Goldenberg, 1998).

Cronbach's coefficient alpha was used to determine the reliability of the *DIAL-3*. The median reliability was 0.66 for motor, 0.84 for concepts, 0.77 for language, and 0.87 for the total score. While the reliability study included both male (54%) and female (46%) subjects, diversity of race and ethnicity was low when compared to the White representation (91.8%). In addition, 63% of subjects included in the reliability study came from homes comprised of parents who had one or more years of college or technical school training (Mardell-Czudnowski & Goldenberg, 1998).

The validity study for the *DIAL-3* included 1,560 subjects. The normative scores for each child in the validity studies were converted from percentile scores to standard scores with a mean of 100 and a standard deviation of 15. The motor, concepts, and language areas of the *DIAL-3* have intercorrelations of 0.41, 0.50, and 0.65 (Mardell-Czudnowski & Goldenberg, 1998).

TerraNova II

The *TerraNova, Second Edition*, is a standardized, norm-referenced multiple-choice assessment designed to measure academic achievement. The *TerraNova II*

national standardization occurred in the fall of 1999 and spring of 2000. The American Psychological Association (APA), American Educational Research Association (AERA), and National Council on Measurement in Education (NCME) cite the purpose of the *TerraNova* as being to “provide achievement scores that validate most types of educational decision making” (American Education Research Association, 1999, p. 253). The *TerraNova* is designed to be a reliable and valid measure for students attending primary grades and is recognized as such by the APA, AERA, and NCME.

Procedures

Prior to collecting any data, the researcher applied to the University of Southern Mississippi Institutional Research Board (IRB) for approval of the proposed study. Following receipt of approval from IRB, *DIAL-3* data collected during the 2001-02 school year was obtained from the NSBSD Special Education Department. Data utilized in this study was the result of individual administration of the *DIAL-3* by trained school personnel. Training conducted by a certified school psychologist included review of the *DIAL-3* Training Video along with a question and answer session. The training video provides a visual presentation of a typical screening situation and demonstration of correct administration and scoring of *DIAL-3* items. Completed *DIAL-3* test protocols were forwarded to a certified school psychologist for review. Computer scoring of the *DIAL-3* provided individual student reports which were returned to the respective school sites for follow-up based on results.

Data from the *TerraNova II* subsequently administered to students at the end of first grade was obtained from the NSBSD Student Information System. Data utilized in this study was the result of administration of the *TerraNova II* by certified school

personnel in accordance with procedures prescribed by the test manufacturer. *TerraNova II* test protocols were computer scored off-site by trained personnel and test results for each student were returned to the respective school sites.

An Excel spreadsheet was used to compile data from the *DIAL-3* and *TerraNova II*. Students who completed the *DIAL-3* prior to entering their kindergarten year and subsequently completed the *TerraNova II* at the end of their first grade year were participants in this study. Participants were assigned a code to maintain confidentiality. Data concerning gender, ethnicity, socio-economic status, and participation in special education programs was gathered from the NSBSD Student Information System and noted for each participant.

Data Analysis

Descriptive statistics were used to analyze the data collected. Measures of central tendency and variability of the scores on each assessment were interpreted. Multiple linear regression was used to test the hypothesis. Level of significance was set at .05. A Pearson Correlation Coefficient for the *DIAL-3* total score and subtest score in language along with the *TerraNova II* reading composite score was calculated while holding constant participation in special education. The employment of this inferential technique provided the researcher an opportunity to describe how accurately a student's scores on the *DIAL-3* administered upon entering a preschool program predicted subsequent reading achievement at the end of first grade as measured by *TerraNova II* scores.

CHAPTER IV

RESULTS

Introduction

This chapter presents an analysis of the data collected during the study to compare the results of the *Developmental Indicators for the Assessment of Learning – Third Edition* (DIAL-3) administered to students upon entering a preschool program to subsequent reading achievement scores on the *TerraNova II* administered at the end of first grade. The retrospective data utilized in the study was collected from two types of instrumentation. The first instrument was the *DIAL-3*. The second instrument was the *TerraNova II*. Students enrolled in the NSBSD during the 2001-02 school year who completed the *DIAL-3* prior to entering their kindergarten year and subsequently completed the *TerraNova II* at the end of their first grade year were included in the study. The data collected was compiled and analyzed, and the results are presented throughout this chapter.

Student Population

Scores for 137 students are included in the study. The frequencies and percentages of demographic variables are listed in Table 1. The percentage of males and females included in the study is evenly distributed. The vast majority of individuals included in the study are Alaska Native. A small percentage of students included in the study received special education services. Likewise, a small percentage of students included in the study received free or reduced lunch.

Table 1

Frequencies and Percentages of Demographic Variables

Variable	Frequency	Percentage
Gender		
Male	80	58.4
Female	57	41.6
Ethnicity		
Alaska Native	122	89.1
Asian/Pacific Islander	8	5.8
Caucasian	6	4.4
Black	1	.7
Special Education		
Did not participate in program	115	83.9
Participated in program	22	16.1
Socio-economic Status		
No Free or Reduced Lunch	110	80.3
Free or Reduced Lunch	27	19.7

Statistical Findings

The mean and standard deviation of the percentile rank achieved on the *DIAL-3* total score and subtest score in language along with the *TerraNova II* reading composite score are listed in Table 2. The mean percentile rank achieved by participants on the *DIAL-3* language subtest is considered low. The mean percentile rank achieved by

students on the *DIAL-3* total was slightly better than that achieved on the Language subtest but is also considered low. The percentile rank achieved by students on the *TerraNova II* reading composite is considered average.

Table 2

Mean DIAL-3 and TerraNova II Scores (N=137)

Variable	Mean	Standard Deviation
<i>DIAL-3</i> language subtest percentile rank	31.89	26.53
<i>DIAL-3</i> total percentile rank	42.96	28.79
<i>TerraNova II</i> reading composite percentile rank	52.45	27.63

The following research question is the first of two to be answered by this study:

Is there a statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services?

Multiple linear regression was utilized to answer the question. Level of significance was set at .05. A Pearson Correlation Coefficient for the *DIAL-3* subtest score in language was calculated while holding constant participation in special education. The results of the analysis are shown in Table 3.

There was a statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five

upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services ($F(1,134) = 9.567, p = .002$) $R^2 = .055$. Table 3 contains the regression coefficients. Approximately 6 percent of variability in the *Terra Nova II* was contributed to the *DIAL-3* subtest score in language. Both participation in special education and the *DIAL-3* subtest score in language are predictive of reading achievement. Participation in special education is a negative predictor and stronger than the *DIAL-3* subtest score in language which is a positive predictor of reading achievement.

Table 3

Predictability of Special Education and DIAL-3 Language Score on TerraNova II Scores

Variable	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	SE	Beta	t	
Constant	47.530	3.927		12.102	.000
Special Education	-22.827	6.268	-.304	-3.642	.000
<i>DIAL-3</i> language subtest score	.269	.087	.259	3.093	.002

The following research question is the second of two to be answered by this study: Is there a statistically significant relationship between the Total Score from the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services?

Multiple linear regression was utilized to answer the question. Level of significance was set at .05. A Pearson Correlation Coefficient for the *DIAL-3* total score was calculated while holding constant participation in special education. The results of the analysis are shown in Table 4.

There was a statistically significant relationship between the total score on the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received early intervention in the form of special education services ($F(1,134) = 16.21, p = <.001$) $R^2 = .090$. Table 4 contains the regression coefficients. Approximately 9 percent of variability in the *Terra Nova II* was contributed to the *DIAL-3* total score. Both participation in special education and the *DIAL-3* total score are predictive of reading achievement. The *DIAL-3* total score is a positive predictor and stronger than participation in special education which is a negative predictor of reading achievement.

Table 4

Predictability of Special Education and DIAL-3 Total Score on TerraNova II Scores

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
Constant	41.614	4.515		9.218	.000
Special Education	-19.177	6.268	-.256	-3.051	.003
<i>DIAL-3</i> total score	.324	.080	.338	4.027	.000

CHAPTER V

DISCUSSION

Conclusions

The purpose of this study was to investigate a screening instrument targeting identification of preschool students in need of early intervention in order to determine the screening instrument's predictive validity. This study specifically examined the relationship between student scores on the *DIAL-3* and student achievement in reading at the end of first grade. The findings of this study support the research in the literature review that stated that young children at risk for reading failure can be identified while emergent reading skills are developing before formal reading instruction has even begun (Adams, 1990; Blachman, 1984; Foorman, 2003; Foorman et al., 1997; Scanlon & Vellutino, 1997; Share, 1984; Snow et al., 1998). The findings further support research indicating that emergent literacy skills developed by children during their early years of life lay the ground work for and can accurately predict future reading achievement (Adams, 1990; Snow et al., 1998; Whitehurst & Lonigan, 1998).

The study found that there was a statistically significant relationship between the score on the Language Area of the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received special education services. Student participation in special education programs was also found to be a predictor of reading achievement at the end of first grade. Participation in special education programs was found to be more predictive than the score on the Language Area of the *DIAL-3*. The

proportion of variability explained by the score on the Language Area of the *DIAL-3* was extremely small with approximately 6 percent of the variability in the Terra Nova II contributed to the *DIAL-3* Language Area score.

The study also found that there was a statistically significant relationship between the total score on the *DIAL-3* administered to students between the ages of three and five upon entering a preschool program and subsequent reading achievement as measured by the Reading Composite score of the *TerraNova II* administered at the end of first grade controlling for students who received special education services. While the total score on the *DIAL-3* was found to be a stronger predictor of reading achievement at the end of first grade than the *DIAL-3* Language Area score or participation in special education programs, the proportion of variability explained is extremely small. Only 9 percent of the variability in the Terra Nova II was contributed to the *DIAL-3* total score.

The study included a unique population that must be considered when speculating about outcomes. The vast majority of participants in the study were Alaska Natives. The ancient traditions of the Iñupiat Eskimos, including the Inupiaq language that is still spoken among the residents of the North Slope, strongly influence the background experiences of the vast majority of the participants in this study.

All participants in the study were residing in the NSBSD. Located on Alaska's North Slope, NSBSD is the northernmost school district in North America, and covers 89,000 square miles. Alaska's North Slope is an isolated geographic area with a unique climate. In summer, the sun stays above the horizon for 84 days, and in the winter it disappears for 67 days. Temperatures range between a comfortable 60 degrees Fahrenheit and a chilling minus 40 degrees Fahrenheit. NSBSD is composed of eleven

schools in eight villages. Air travel is the only means to access the isolated villages of the NSBSD on a year around basis. The harshness of the environment, remoteness of the communities, and expense associated with travel outside of the North Slope limit the variety of experiences of the participants in this study.

Optimally, high quality early childhood education programs would be available to all preschool children. While this is currently not the case across the nation, the NSBSD has made the commitment to make early childhood education programs available to all children beginning at age three. All children between the ages of three and five residing within the NSBSD are eligible to take advantage of a half-day early childhood program.

The study reveals that the percentile rank achieved by participants on both the *DIAL-3* language subtest and the *DIAL-3* total score is considered low. These low scores could be attributed to the influence of the Inupiaq language on the vast majority of the participants in this study. Issues associated with an English language learner population could contribute to the low scores. These low scores could also be the result of the limited variety of background experiences of the study participants or the unique challenges associated with the assessment of very young children.

As opposed to the *DIAL-3* percentile rank scores, which are considered low, the subsequent percentile rank scores achieved by participants on the *TerraNova II* reading composite is considered average. These average scores could be the result of participants accessing early childhood education programs through the NSBSD. The early childhood education programs available to all preschool children residing on the North Slope could be considered a form of early intervention and could contribute to the average scores seen on the *TerraNova II*.

It was anticipated that the *DIAL-3* would be a strong predictor of reading achievement at the end of first grade. The study revealed that while both the *DIAL-3* Language Area score and the *DIAL-3* total score were both statistically significant predictors, neither was an extremely strong predictor of reading achievement at the end of first grade among the population included in the study. The small proportion of variability explained by the *DIAL-3* Language Area score and the *DIAL-3* total score could be the result of English language learner issues, the limited variety of background experiences of the study participants, or perhaps the fact that all participants in the study had access to early childhood education programs through the NSBSD.

Limitations

Limitations of the study included:

- (1) The scope of this study was limited to the students of the NSBSD.
- (2) The ethnic make up of students of the NSBSD has consistently included more than 80% Alaska Natives since the year 2000 (Alaska Department of Education and Early Development 2007).
- (3) Half day preschool programs were available to all three and four year old students residing in the NSBSD.
- (4) Early intervention for the purposes of this research was narrowly defined as special education services provided to students between the ages of three and five in accordance with an Individualized Education Program.
- (5) The research design of the study was intended to show the strength of a relationship. Caution should be used when reviewing the data and cause and effect should not be assumed.

Recommendations for Future Research

Current research shows that reading failure can be prevented in most individuals if early identification facilitates appropriate interventions (Agostin & Bain, 1997; Dickson & Bursuck, 1999; Foorman et al., 1998; Leppanen et al., 2004; Phillips et al., 2002; Torgesen, 2000; Torgesen, 2002; Torgesen et al., 1999). Screening of preschool students for purposes of early intervention creates the need for high quality assessment instruments. Without access to reliable screening instruments targeting identification of preschool students in need of early intervention, some young children may not receive services crucial for educational preparedness.

Screening activities are of no value unless they provide information that leads to provision of appropriate services for students. The ability of an instrument to reliably predict school outcomes is important in selecting a screening instrument (McLoughlin & Rausch, 1990). Screening instruments with high levels of inaccuracy could result in a waste of school resources or delay provision of needed services to students. A high quality screening instrument should identify all children in need of further assessment without over-identifying children for further testing who are later found to have no significant problem.

This study contributes to the limited research base currently available that examines the relationship between preschool screening instruments and future academic achievement. While the results of this study indicate that there was a statistically significant relationship between the *DIAL-3* and subsequent reading achievement as measured by the *TerraNova II*, the small proportion of variability explained by the *DIAL-*

3 suggest that further investigation be done. The following recommendations for future research based on the results of this study include:

- (1) Replicate study with a group of participants with an ethnic makeup more representative of national norms.
- (2) Replicate study in an environment where all participants do not have access to early childhood education programs beginning at age three.
- (3) Replicate study controlling for students identified as English language learners.
- (4) Replicate study investigating the impact of participation in early childhood programs including consideration of individual participant rate of early childhood program attendance.
- (5) Investigate the relationship between the *DIAL-3* and subsequent reading achievement as measured by curriculum based measures.

Recommendations for Policy and Practice

Early intervention delivered to young children at risk of school failure reduces the need for intensive interventions provided later in a student's career, which prove to be less effective and more costly (Gamel-McCormick & Amsden, 2002; Karoly, et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003). Providing early intervention to prevent reading failure is an effort to ensure that all students have the capacity to pursue challenging academic content and challenging academic achievement standards. Not only is this important for individual children at risk of school failure but also for society as a whole who would shoulder the burden of future illiterate adults who are underemployed, unemployed, welfare recipients, or wards of the criminal justice system (McGill-Franzen & Allington, 1991; Karoly et al., 2005).

Early intervention is proven to produce both short- and long-term positive results including increased high school graduation rates, increased levels of income earnings as young adults, and decreased welfare program participation (Gamel-McCormick & Amsden, 2002; Karoly et al., 2005; Rand Study, 2006; Rolnick & Grunewald, 2003). School districts will find this study of value during the selection process of preschool screening instruments utilized to identify students in need of early intervention services at the preschool level. The results of this study indicate that utilization of the *DIAL-3* as part of a preschool screening process can contribute to the efficient use of funds for early intervention programs.

While the results of this study indicate that there was a statistically significant relationship between the *DIAL-3* and subsequent reading achievement as measured by the *TerraNova II*, the small proportion of variability explained by the *DIAL-3* suggest that the *DIAL-3* should not be the sole source utilized to identify preschool students in need of early intervention services. The following recommendations for policy and practice based on the results of this study include:

- (1) School districts should utilize a comprehensive early childhood assessment program which includes a variety of assessment methods and instruments.
- (2) As part of a comprehensive early childhood assessment program, school districts should utilize a screening process to identify preschool children in need of additional assessment to facilitate delivery of early intervention.
- (3) No single instrument should be used as the sole basis for making educational decisions concerning preschool children.
- (4) Given the limited research base currently available that examines the relationship

between preschool screening instruments and future academic achievement, the *DIAL-3* should be considered by school districts as a viable option when selecting a preschool screening instrument.

APPENDIX



 THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

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**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
 NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **28021303**PROJECT TITLE: **Identifying Preschool Students in Need of Early Intervention**PROPOSED PROJECT DATES: **12/13/07 to 08/31/08**PROJECT TYPE: **Dissertation or Thesis**PRINCIPAL INVESTIGATORS: **Cassie Delso Wells**COLLEGE/DIVISION: **College of Education & Psychology**DEPARTMENT: **Educational Leadership & Research**FUNDING AGENCY: **N/A**HSPRC COMMITTEE ACTION: **Expedited Review Approval**PERIOD OF APPROVAL: **03/18/08 to 03/17/09**

Lawrence A. Hosman

 Lawrence A. Hosman, Ph.D.
 HSPRC Chair

3-24-08

Date

REFERENCES

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: The MIT Press.
- Agostin, T., & Bain, S. (1997). Predicting early school success with developmental and social skills screeners. *Psychology in the Schools, 34*(3), 219-228.
- Alaska Department of Education and Early Development. *District enrollment totals by ethnicity for all Alaskan public school districts*. Retrieved September 2, 2007, from <http://www.eed.state.ak.us/stats/>
- American Educational Research Association (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.
- Baker, B. (2003). *Early literacy: An examination of the principal behaviors that impact reading achievement*. Unpublished doctoral dissertation, University of North Texas, Denton, TX.
- Berninger, V. W., Abbott, R. D., Vermeulen, K., Ogier, S., Brooksher, R., Zook, D., et al. (2002). Comparison of faster and slower responders to early intervention in reading: Differentiating features of their language profiles. *Learning Disability Quarterly, 25*, 59-76.
- Blachman, B. A. (1984). Relationship of rapid naming ability and language analysis skills to kindergarten and first-grade reading achievement. *Journal of Educational Psychology, 76*, 610-622.

- Blakemore, S., & Frith, U. (2005). The learning brain: Lessons for education. *Developmental Science*, 8, 459-465.
- Bodrova, E., Paynter, D. E., & Isaacs, S. (2000, October). Mid-Continent Research for Education and Learning policy brief.
- Bredenkamp, S., & Copple, C. (1997). *Developmentally appropriate practices in early childhood programs* (Rev. ed.). Washington, DC: National Association for the Education of Young Children.
- Campbell, S. F. (Ed.). (1976). *Piaget sampler: An introduction to Jean Piaget through his own words*. New York: John Wiley & Sons.
- Cotton, P. B. (2005). *Kindergarten readiness as a predictor of reading at grade level by the end of third grade for children at risk*. Unpublished doctoral dissertation, Union University, Jackson, TN.
- Dickson, S., & Bursuck, W. (1999). Implementation of a model for preventing reading failure: A report from the field. *Learning Disabilities Research and Practice*, 14, 191-202.
- Elder, B. N. (2005). *Early predictors of emergent and conventional literacy skills: A longitudinal investigation*. Unpublished doctoral dissertation, University of California.
- Engel, B. (1990). An approach to evaluation in reading and writing. In C. Kamii (Ed.), *Achievement testing in early childhood education: Games grown-ups play* (pp. 119-134). Washington, DC: National Association for the Education of Young Children.

- Foorman, B. R. (Ed.). (2003). *Preventing and remediating reading difficulties: Bringing science to scale*. Baltimore: York.
- Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk-children. *Journal of Educational Psychology, 90*, 37-55.
- Foorman, B. R., Francis, D. J., Shaywitz, S. E., Shaywitz, B. A., & Fletcher, J. M. (1997). The case for early reading intervention. In B. Blachman (Ed.), *Foundations of reading acquisition and dyslexia: Implications for early intervention* (pp. 243-264). Mahwah, NJ: Lawrence Erlbaum Associates.
- Francis, D. J., Shaywitz, S. E., Stuebing, K. K., Shaywitz, B. A., & Fletcher, J. M. (1996). Developmental lag versus deficit models of reading disability: A longitudinal, individual growth curves analysis. *Journal of Educational Psychology, 88*, 3-17.
- Gamel-McCormick, M., & Amsden, D. (2002). *Investing in better outcomes: The Delaware early childhood longitudinal study*. (PS030930). Newark, DE: Center for Disabilities Studies, University of Delaware. Retrieved July 4, 2006, from ERIC database.
- Germينو-Hausken, E. (2005, December 7). *Early childhood longitudinal study kindergarten class of 1998-99 project summary*. Washington, DC: National Center for Education Statistics. Retrieved June 27, 2006, from <http://nces.ed.gov/ecls/Kindergarten.asp>

- Goodwin, W., & Goodwin, L. (1997). Using standardized measures for evaluating young children's learning. In B. Spodek & O. Saracho (Eds.), *Issues in early childhood educational assessment and evaluation*. New York: Teachers College Press.
- Goswami, U. (2004). Neuroscience, education, and special education. *British Journal of Special Education, 31*, 175-183.
- Goswami, U. (2006). Neuroscience and education: from research to practice? *Advance online Publication, 17*, 406-413.
- Gruber, H. E., & Voneche, J. J. (Eds.). (1977). *The essential Piaget*. New York: Basic Books.
- Haney, M. L. (2000). *Predicting reading achievement of kindergarten students based upon prereading skills and variables involving language and reading development in the home*. Unpublished doctoral dissertation, Georgia State University.
- Hopson, E. (1975). *Mayor's address on education delivered on TV in Barrow, Alaska on December 19, 1975*. Retrieved September 2, 2007, from <http://www.ebenhopson.com/archives/Education.html>
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Juliebö, M., Malicky, G. V., & Norman, C. (1998). Metacognition of young readers in an early intervention programme. *Journal of Research in Reading, 21*, 24-35.
- Justice, L. M., & Pullen, P. C. (2003). Promising interventions for promoting emergent literacy skills: Three evidence-based approaches. *Topics in Early Childhood Special Education, 23*, 99-113.

- Karoly, L. A. (1998). *Investing in our children: What we know and don't know about the costs and benefits of early childhood interventions*. Santa Monica, CA: Rand.
- Karoly, L. A., Kilburn, M. R., & Cannon, J. S. (2005). *Early childhood interventions*. Santa Monica, CA: Rand.
- Kotulak, R. (1996). *Inside the Brain: Revolutionary discoveries of how the mind works*. Kansa City, MO: Andrews McMeel Publishing.
- Leppanen, U., Niemi, P., Aunola, K., & Nurmi, J. (2004). Development of reading skills among preschool and primary school pupils. *Reading Research Quarterly*, 39, 72-93.
- Lyon, R. G. (2007). Reading First history. *Education Week*, 26(18), 31.
- Mardell-Czudnowski, C., & Goldenberg, D. S. (1998). *Developmental Indicators for the Assessment of Learning* (3rd ed.). Circle Pines, MN: American Guidance Services.
- McGill-Franzen, A., & Allington, R. L. (1991). Every child's right: Literacy. *Reading Teacher*, 45(2), 86-90.
- McLoughlin, C. S., & Rausch, E. (1990). Best practices in kindergarten screening. In *Best practices in school psychology-II*. Washington DC: National Association of School Psychologist.

- National Association for the Education of Young Children, & National Association of Early Childhood Specialists in State Departments of Education (1992). Guidelines for appropriate curriculum content and assessment in programs serving children ages 3 through 8. In S. Bredekamp & T. Rosegrant (Eds.), *Reaching potentials: Appropriate curriculum and assessment for young children volume 1* (pp. 9-27). Washington, DC: National Association for the Education of Young Children.
- North Slope Borough School District. *Where is the North Slope Borough?* Retrieved September 2, 2007, from <http://www.nsbds.org/site/index.cfm/1,1,28,html>
- Paris, S., & Hoffman, J. (2004). Reading assessments in kindergarten through third grade: Findings from the Center for the Improvement of Early Reading Achievement. *The Elementary School Journal*, 105(2), 199-217.
- Phillips, L., Norris, S., Osmond, W., & Maynard, A. (2002). Relative reading achievement: A longitudinal study of 187 children from first through sixth grade. *Journal of Educational Psychology*, 94, 3-13.
- Public Sector Consultants (2006). *Early childhood the pathway to success for our children, our families, and our community*. Retrieved February 1, 2007 from http://www.welbornfoundation.net/WBF_NewsandPubs.htm
- Purves, D. (1994). *Neural Activity and the Growth of the Brain*. New York: Cambridge University Press.
- Quatroche, D. J. (1999). Helping the underachiever in reading. *ERIC Digest*. Retrieved, from ERIC database (ED 434331).

- Rabinowitz, S., Wong, J., & Filby, N. (2002). *Understanding young readers: The role of early literacy assessment*. (CS51108). Washington, DC: Office of Educational Research and Improvement. Retrieved July 4, 2006, from ERIC database.
- Rand study says early childhood intervention programs save money and benefit children, families and society. (2006, January 12). Rand Corporation. Retrieved July 5, 2006, from <http://www.rand.org/news/press.06/01.12.html>
- Rathus, S. A. (2005). *Psychology concepts and connections* (9th ed.). Belmont, CA: Thompson Wadsworth.
- Reynolds, A. J. & Temple, J. A. (1998). Extended early childhood intervention and school achievement: Age thirteen findings from the Chicago Longitudinal Study. *Child Development, 69*, 231-246.
- Rolnick, A., & Grunewald, R. (2003, March). *Early Childhood Development: Economic Development with a High Public Return*. Retrieved June 21, 2007, from Federal Reserve Bank of Minneapolis Web Site:
<http://minneapolisfed.org/pubs/fedgaz/03-03/earlychild.cfm>
- Rosenthal, E., Rathburn, A., & West, J. (2005). Regional differences in kindergartners' early education experiences (NCES 2005-099) [Electronic version]. *Education Statistics Quarterly, 7*.
- Rushton, S., & Larkin, E. (2001). Shaping the learning environment: Connecting developmentally appropriate practices to brain research. *Early Childhood Education Journal, 29*, 25-33.

- Rushton, S., Eitelgeorge, J., & Zickafoose, R. (2003). Connecting Brian Cambourne's conditions of learning theory to brain/mind principles: Implications for early childhood educators. *Early Childhood Education Journal, 31*, 11-21.
- Scanlon, D. M., & Vellutino, F. R. (1997). A comparison of the instructional backgrounds and cognitive profiles of poor, average, and good readers who were initially identified as at risk for reading failure. *Scientific Studies of Reading, 1*, 191-215.
- Share, D. L. (1984). Sources of individual differences in reading acquisition. *Educational Psychology, 76*, 1309-1324.
- Shonkoff, J. P. & Phillips, D. (2000). *From neurons to neighborhoods: The science of early child development*. Washington, DC: National Academic Press.
- Shore, R. (1997). *Rethinking the brain: New insights into early development*. New York: Families and Work Institute.
- Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academic Press.
- Sousa, D. A. (1998). Is the fuss about brain research justified? *Education Week, 18*(16), 52-53.
- Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360-406.
- Teale, W. H. (1988). Developmentally appropriate assessment of reading and writing in the early childhood classroom. *The Elementary School Journal, 89*(2), 173-184.

- Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research and Practices, 15*, 55-64.
- Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40*, 7-26.
- Torgesen, J. K., & Burgess, S. R. (1998). Word recognition in beginning reading. In J. L. Metsala & L. Ehri (Eds.), *Consistency of reading-related phonological processes throughout early childhood: Evidence from longitudinal-correlation and instructional studies*. (pp. 161-188). Mahwah, NJ: Lawrence Erlbaum.
- Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., & Garvin, C. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology, 91*, 570-593.
- U.S. Department Of Education. (2007). *Building the legacy: IDEA 2004*. Retrieved June 1, 2007, from Department of Education Web Site:
<http://www.ed.gov/policy/speced/guid/idea/idea2004.html>
- Wang, Q. (2005). *Predicting Chinese children's reading development from kindergarten to second grade*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.
- Wasserman, L. H. (2007). The correlation between brain development, language acquisition, and cognition. *Early Childhood Education Journal, 34*, 415-418.

West, J., Denton, K., & Germino-Hausken, E. (2000, February 17). *America's kindergartners* (NCES 2000-070). Washington, DC: National Center for Education Statistics. Retrieved June 27, 2006, from <http://nces.ed.gov>

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69*, 848-872.