AN ANALYSIS OF CLASSROOM ENVIRONMENT AND CHILD

OUTCOMES ACROSS THREE MODELS OF EARLY

CHILDHOOD INTERVENTION

by

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ABSTRACT

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This research study presents a comparative analysis to examine classroom environments and child developmental outcomes across three early intervention models that serve children living in low-income families. Two long standing early intervention programs, Head Start and state-mandated Prekindergarten, are used as comparison groups to compare classroom environment and child outcomes with a collaboration known as Ready Start, a combination program serving children with a half day of Prekindergarten and a half day of Head Start. The Ready Start program is designed to combine the strengths of both programs to best serve the needs of children from low-income families.

The study sample was drawn from existing data from a longitudinal study begun in the 2001–2002 school year. The population from which the sample came was children enrolled in a Head Start program for four-year-olds and children enrolled in the

Prekindergarten program of a large urban school district, which included children in the Ready Start program.

Analysis of Variance (ANOVA) was used to compare supportive environments using scale score means from the Assessment Profile for Early Childhood Programs, Research Edition II, describing the learning environment, scheduling, curriculum, interacting and individualizing practices.

The results of the ANOVA found Ready Start with highest means among the programs on each scale assessing the classroom environment with the exception of non-significant differences between Ready Start and Head Start on the Scheduling and Individualizing scales.

Multivariate Analysis of Covariance (MANCOVA) was used to compare child outcome data across programs, controlling for the initial differences of groups. Posttest scores from the Preschool Language Scale-3 and the Developing Skills Checklist operationalize child outcomes. Pretest scores from both assessments serve as covariates. For the two subscales of the PLS-3 and the five scales of the DSC, Ready Start scores met or exceeded the scores for the comparison groups. Implications for future research and social work practice are addressed.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Mounting research has indicated that early education intervention can improve outcomes for low-income children (Barnett, Young, & Schweinhart, 1998; Gomby, Larner, Stevenson, Lewit, & Behrman, 1995; Reynolds, Temple, Robertson & Mann, 2001; Schweinhart & Weikart, 1997; Yoshikawa, 1995). These findings come with a qualification that high quality programs produce better child outcomes.

A large-scale longitudinal study examining 1,000 early education classrooms observed across four states, suggested, "Seven in ten centers are providing mediocre care which may compromise children's ability to enter school ready to learn" (Cost, Quality, & Outcomes Study, 1995, p. 1).

The two largest early education intervention programs are Head Start, which is federally funded, and prekindergarten (Pre-K) which is funded primarily by the states. The third program model, Ready Start, is a locally designed collaboration of Head Start and Pre-K, designed to provide economically disadvantaged children with the strengths of both programs. All three programs serve children deemed at risk of school failure due to economic disadvantage and all have "school readiness" as a primary goal.

For the purposes of this study, early childhood intervention is defined as a publicly funded preschool program with a focus on school readiness, which primarily serves four-year-old economically disadvantaged children in schools or center-based settings. These

programs have also been termed compensatory early education programs. "Intervention is an effort to redirect the anticipated trajectory of development" (Sigel, 2004, p. 49). The main goal of early childhood intervention is to minimize the risks associated with economic disadvantage.

According to Howes, Phillips, and Whitebrook (1992), quality early education can be delineated by two classes of variables—structural and process. Structural variables are those that are more readily regulated (e.g., group size, child-to-adult ratios, and teacher education). Process variables include the learning environment, instruction and activities provided, as well as teacher-child interaction. Process variables are best measured by observation and compared against established professional standards. Studying process variables requires increased resources of time, training, observers with professional expertise, and thus more expense, than the collection of data on structural variables. The combination of these variables describes the young child's classroom environment.

From a social work perspective, what are termed as "quality classrooms and quality teaching practices" are best viewed from an ecological framework, which focus on "supportive environments" for young children. While structural and process variables are examined, this study incorporates the macro levels representing the effects of poverty and social policy, the mezzo level of classroom environment, and the micro level of child characteristics.

This study offers a unique opportunity to examine the child developmental outcomes of three publicly funded programs in the context of supportive classroom environments. It is not often that data are available drawing from the same standardized child assessments across three different program models allowing for comparability of outcomes. Typically, child

assessment data for preschool children are designed specifically for the program model such as the Success Ticket for Head Start and the locally designed Prekindergarten Report Card, which provide valuable information for instructional purposes, but offer different formats, different domains measured and different collection procedures across programs.

This study presents a comparative analysis to examine the classroom environments (employing both structural and process variables) and child developmental outcomes across three program models that serve children living in low-income families. The study seeks to answer the following questions:

1. What is the quality of the classroom environments provided by the three different program models, as determined by recognized measures?

2. What are the child developmental outcomes for each model as determined by two standardized instruments?

3. Do the cognitive test scores of children in the new Ready Start collaborative program (target group) meet or exceed those made by children in the Head Start and Prekindergarten programs (comparison groups)?

This study offers important information on the quality of classroom environment and child outcomes for low-income children considered to be at risk for school failure. The study employs a quasi-experimental design, using reliable and valid standardized measures to compare classroom environments and child outcomes across three program models that provide early education to children living in poverty or near poverty level. Chapter 2 details the context for such programs.

CHAPTER II

CHILDREN IN POVERTY

When Head Start began in 1965, the child poverty rate was 20.7%. In 2005, 17% of American children lived in poverty and 21% lived in low income families, defined as family income below 200% of the federal poverty level (National Center for Children in Poverty, 2005). According to data from the National Center for Children in Poverty (NCCP), Columbia School of Public Health, released March 2005:

1. 20% or 4.6 million young children (under the age of six) lived in poverty, up from 4 million in 2002.

2. 42% of U.S. children under the age of six (9.6 million children) lived in low-income families with incomes below 200% of the poverty line.

The poverty estimates in this NCCP report were derived from the U.S. Census Bureau, Current Population Surveys, Annual Social and Economic Supplement, March 2004. In 2005, the official poverty guideline is $16,090 for a family of three (U.S. Department of Health & Human Services, 2005). The NCCP report indicates that despite the reduction of child poverty in the late 1990s, young child poverty remains high. According to the National Center for Children in Poverty (2005),

> after a decade of decline, the proportion of children under age 6 living in low-income families is rising again. Between 2000 and 2003, the proportion of children of all ages who were poor increased by 10%. During the same period, the proportion of children under age 6 who were poor increased by 11%. (p. 1)

In Texas the numbers are higher. In the year 2002 (the most recent data available) of the Texas children ages 0-5, there were 441,531 or 24.8% who were living below the poverty line (U.S. Census Bureau, 2005). This represents a higher percentage of children living in poverty in Texas in the year 2002 than the national percentage of children in poverty in 1965 when Head Start began.

In a search for answers for the high rate of child poverty, the obvious explanation is that children depend on adults for their economic well-being. Poor children live with adults who are poor, which may translate into fewer resources and more stress for the family. The National Research Council and Institute of Medicine (2000) reports:

> Children's early development depends on the health and well-being of their parents. Yet the daily experiences of a significant number of young children are burdened by untreated mental health problems in their families, recurrent exposure to family violence, and the psychological fallout from living in a demoralized and violent neighborhood. (p. 7)

In addressing causes for child poverty, David Betson and Robert Michael (1997) suggest examining issues underlying adult poverty such as "economic and demographic forces and factors affecting individual earning capacity" (p. 28). With regard to economic and demographic forces, Betson and Michael cite increasing inequality of earnings among workers, resulting in lower wages for less-educated workers, as a cause of higher poverty rates. According to these authors, personal factors that affect earnings include education, age and race.

Poverty is distributed unequally. Certain groups are disproportionately represented, such as racial and ethnic minority groups, large families, single-parent families, and families with parents who are high school dropouts (Corcoran & Chaudry, 1997; U.S. Census Bureau,

2004). Poverty rates for children are higher than for adults for two reasons: (1) "Poor families with children have fewer adults than nonpoor families with children" and (2) "poor families with children have more children on average (2.24 per family) as compared to nonpoor families with children (1.79 per family)" (Betson & Michael, 1997, p. 31).

According to the NCCP (2005) report, the national percentages by ethnicity for children under age six living in low income families are: 65% of Latino children, 64% of African American children and 29% of white young children. While whites comprise the largest group of children from low-income families (3.8 million), Latino (3.1 million) and African American (2.1 million) children are disproportionately represented.

The timing and duration of poverty have substantial effects on child outcomes. The following section examines the impact of poverty on the lives of children.

<u>The Impact of Child Poverty</u>

Jeanne Brooks-Gunn and Greg Duncan (1997) examined the effects of poverty on child outcomes by compiling information from several large national cross-sectional surveys. Key findings include:

1. Compared with nonpoor children, poor children in the United States experience diminished physical health (p. 57).

2. Stunting (low height for age), a measure of nutritional status, is more prevalent among poor than nonpoor children (p. 60).

3. Health problems associated with exposure to lead can include stunted growth, hearing loss, impaired blood production, as well as decreased IQ scores. The primary source of lead for young children is deteriorating lead-based house paint. Blood levels of lead are found to be highest among one-to-five-year-old blacks from low-income families in large central cities (p. 61).

4. Children living below the poverty threshold are 1.3 times as likely as nonpoor children to experience developmental delays and learning disabilities (p. 61).

5. Children who lived in persistently poor families (defined in this study as poor over a four-year span) had scores six to nine points lower than children who were never poor (p. 64).

6. Living in neighborhoods with high concentrations of poor people is associated with less provision of learning experiences in the homes of preschoolers (p. 66).

7. The timing of poverty is also important, although this conclusion is based on only a small number of studies. Low income during the preschool and early school years exhibits the strongest correlation with low rates of high school completion, as compared with low income during the childhood and adolescent years (p. 68).

8. A study on the quantity of language interaction between parent and child in low-income households with young children revealed that a child from a professional family would hear 11 million words per year as compared to a child in a low-income family who would hear just 3 million words per year. The follow-up studies at age 9 suggested that the differences in language experience were strongly linked to sizeable differences in child outcomes. (Hart & Risley, 1995)

The factors described above put children from low-income families at risk of beginning formal schooling with distinct disadvantages not generally attributed to their nonpoor peers. The National Research Council and Institute of Medicine (2000) writes, "Circumstances characterized by multiple, interrelated, and cumulative risk factors impose particularly heavy developmental burdens during early childhood and are most likely to incur substantial costs to both the individual and society in the future" (p. 7).

These findings suggest that attention to early childhood interventions may be critical in reducing the impact of low income on children's lives. (Brooks-Gunn & Duncan, 1997). The cumulative effect of child poverty can also be counted in terms of the high cost to society. With regard to the risk-laden developmental trajectory, demographic and census data indicate that impoverished groups show higher levels of chronic unemployment, juvenile delinquency, poor health and nutrition, and teen pregnancy placing considerable strain on available community resources (Sigel, 2004).

Recent work in the neurosciences has targeted early childhood as an important period in brain development, spawning questions about reallocation of funds and resources to this age group (Shore, 1997). Appendix A provides an overview of Texas allocations for education by age group.

The following section provides the current sociological backdrop.

The Social Policy Context and Response

Most state governments have attempted to expand access to early childhood education intervention programs by providing state-funded preschool arrangements for children from low-income families. As of this writing, Georgia, New York and Oklahoma have initiatives to open Pre-K to all 4-year-olds, regardless of income (Committee for Economic Development, 2002). The legitimate need for universal access to quality childcare and education as called for in *Preschool for All: Investing in a Productive and Just Society* (Committee for Economic Development, 2002), must not divert attention and resources from the needs of children living in impoverished families that require comprehensive health and nutritional services in addition to educational and childcare services. The access to quality preschool for all children is a worthy goal, when the additional needs of low-income children are kept in the equation.

The preschool model, with the inclusion of Head Start and state-funded Prekindergarten, was designed as a part-day program. Over the last 50 years, there has been a dramatic increase of mothers in the labor force, necessitating the need for longer hours of child care. From 1947 to 2002, the percent of mothers in the work force with children under the age of six rose from 12% in 1947 to 64% in 2002 (U.S. House of Representatives

Committee on Ways and Means, 2004). "The number of female-headed families with children almost tripled, increasing from 3.4 million families in 1970 to 9.9 million in 2003." (U.S. House of Representatives Committee on Ways and Means, 2004, p. 93).

Today most low-income mothers need full day childcare or childcare for non-traditional working hours. Legislative changes, designed to reform the welfare system, bear examining to determine the effects these changes produce in the lives of children from low-income families and the early education they receive.

<p style="text-align:center">United States Welfare Reform</p>

The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) ignited change to the United States welfare system. The redesigning of programs requires low-income families to move from welfare assistance to employment. Within limitations, the states are given authority to determine the scope and nature of their welfare programs, including the life-time limits of cash assistance, exemptions from work requirements for parents with infants, training, and child care services available to those making the transition from welfare to work (Zaslow & Emig, 1997). The changes in state policy and practice, made as a result of federal welfare reform, have a direct impact on the lives of children in poverty, as their parents move from welfare to employment with the resulting need for longer hours of childcare and care for nonstandard working hours.

An overwhelming array of early childhood programs run on parallel tracks—part-day programs focusing on socialization skills and school readiness, and full-day child care aimed at meeting parental needs for employment. The need for an integrated early childhood infrastructure is clearly evident. The National Research Council and Institute of Medicine

(2000) conclude, "Early childhood policies and practices are highly fragmented, with complex and confusing points of entry that are particularly problematic for underserved segments of the population and those with special needs" (p 11).

Changes in the welfare system have precipitated the need for early childhood intervention programs to collaborate with community childcare programs or find other resources to fulfill the need for full-day programs. The Ready Start program is a collaboration combining the Head Start program with the prekindergarten program of a large urban independent school district (ISD). Both federal and state monies are utilized to provide a full-day program.

Chapter 3 describes each of these three publicly-funded programs.

CHAPTER III

THREE PUBLICLY-FUNDED PROGRAM MODELS

<u>Head Start</u>

In 1964, as part of the War on Poverty, Congress enacted the Economic Opportunity Act (EOA). As part of the EOA, Head Start was created to address the needs of young children living in poverty by providing education, comprehensive social services and social opportunities. Head Start began as a summer program in 1965 serving 561,359 children in 11,068 centers in over 1,000 communities (Cahan, 1989). The initial summer program of 1965 had a budget of $96,400,000 (Administration for Children and Families, 2002). For FY 2001, nationally Head Start enrolled 905,235 children in 18,735 centers operating with an overall budget of $6,200,000,000 (Administration for Children and Families, 2002). In the same year, Texas had the second largest enrollment and allocation for Head Start with only California exceeding it. The Texas Head Start enrollment for FY 2001 was 67,572 children with a budget allocation of $452,153,000 (Administration for Children and Families, 2005).

The local Head Start program in this study operates a full day comprehensive preschool program with the option of wrap-around childcare available from 6:30 A.M. to 6:00 P.M. year round. Preschool age children of families with incomes at or below the federal poverty line are eligible for Head Start. The program defines social competence as:

> the child's everyday effectiveness in dealing with his or her present environment and later responsibilities in school and life. For the five-year-old child coming to the end of the preschool period and entering school, an important life challenge and key test of the

11

child's social competence at this stage is whether he or she has acquired the skills, understandings, and behvaviors that help insure successful functioning in this new environment, what is often called school readiness. (Administration on Children, Youth and Families, 1998, p. 2)

The term "school readiness" indicates short-term outcomes, such as skills to prepare children to be successful in kindergarten. There is no one set of preschool standards that delineate exactly what skills comprise school readiness. The following five objectives support the goal of social competence or school readiness:

- Enhance children's growth and development

- Strengthen families as the primary nurturers of their children

- Provide children with educational, health and nutritional services

- Link children and families to needed community services

- Ensure well-managed programs that involve parents in the decision making

According to the Head Start Program Performance Measures (Administration on Children, Youth and Families, 1998, p. 5) the first two performance measures under the objective "Enhance children's growth and development" are as follows:

1, Head Start children will demonstrate improved emergent literacy, numeracy, and language skills.

2. Head Start children will demonstrate improved cognitive skills.

These two performance outcomes are central to this study. The other three objectives listed above are the processes used by Head Start to produce the outcomes to "Enhance children's growth and development" and "Strengthen families as the primary nurturers of children" (Harrell, 1997, p. 2). Head Start subscribes to a "whole child" philosophy that speaks to the interrelatedness of social, cognitive and emotional development; mental and physical health;

and nutrition (Administration on Children, Youth and Families, 2001). The agency with ultimate jurisdiction over Head Start is the Department of Health and Human Services rather than the Department of Education. This lead agency provides a social services approach rather than a purely educational orientation.

The philosophy of instruction could be described as child-centered or child-initiated, as described later in the review of the Marcon (1999) study. There is no prescribed curriculum for Head Start programs. Program Performance Standards outline the mandatory regulations for program implementation, with guidance and related information provided to implement the standards. The Head Start Program Performance Standards, Sections 1304.1 through 1304.21, can be found on the web. Also included is the expanded information and guidance for Performance Standards 1304.20–1304.21 that cover curriculum standards and health services (Administration on Children and Families, 2005). The Head Start Centers reported using the Research Based Circle Program for the primary curriculum model for 2001-2002 (Child Care Associates, 2002).

Table 1 outlines an overview of services provided to children and families of the Head Start enrollees. The source of table 1 is the Head Start Program Information Report (PIR) for the 2001-2002 program year. The table is not all inclusive of every service the agency provides. The PIR reports information in aggregate form describing the overall Head Start Program with 2,710 children from under one year of age to five years and over. The PIR reports 1,316 four-year-old children enrolled in Head Start for the 2001-2002 program year. Children enrolled in the Ready Start program are included in all services, since they are enrolled in both Prekindergarten and Head Start. Table 1 describes the entire population of Head Start children included in this study.

For the program year 2001-2002, the timeframe for data drawn for this study, Head Start reported that 1,722 children entered without health insurance. By the end of the enrollment year, every child had some form of health insurance. At enrollment, the total number of children with an ongoing source of continuous accessible medical care was zero. By the end of the enrollment year, all 2,710 children had a source of ongoing medical care. Age appropriate, up-to-date immunizations increased from 806 to 1,819 over the program year.

Head Start and Early Head Start combined, served 2,540 families over the program year. Of the families served, 2,470 participated in the family goal setting process that resulted in individualized family partnership agreements for each family.

The number of families that received the listed services through the 2001-2002 Head Start program are as follows: Emergency/crisis intervention, 128; Housing assistance, 67; Transportation assistance, 56; Mental health services, 53; English as a Second Language training, 90; Adult education, 57; Job training, 30; Substance abuse prevention treatment, 30; Child abuse and neglect services, 30; Domestic violence services, 59; Child support assistance, 62; Health education, 360; Assistance to families of incarcerated individuals, 21; Parenting education, 392; Assistance to homeless families, 9. The Head Start program does not provide all services in-house, but in many cases, provides linkages to existing community programs and services. For a complete list of services provided through the Head Start Program refer to the PIR for the 2001-2002 Program Year (Child Care Associates, 2002). Head Start has a strong social services component to provide supportive services to children of low-income families. The theoretical base of Head Start recognizes that for children from poverty level families to be ready for the demands of formal schooling, the basic needs of the

Table 1. Head Start Services Profile: Program Year 2001–2002

Service Characteristics	N
Total actual enrollment children under 1 year - 5 years and older	2,710
Enrolled 4-year-olds	1,316
Total number of children without health insurance	
At enrollment	1,722
At end of enrollment year	0
Total number of children with an ongoing source of continuous accessible medical care	
At enrollment	0
At end of enrollment year	2,710
Total number of children determined by a health care professional to be up-to-date on all immunizations appropriate for their age	
At enrollment	806
At end of enrollment year	1,819
Total number of Head Start or Early Head Start families served	2,540
Number of families participating in a family goal setting process that results in an individualized family partnership agreement	2,470
Number of families receiving the following services:	
Emergency/crisis intervention	128
Housing assistance (subsidies, utilities, repairs)	67
Transportation assistance	56
Mental health services	53
English as a second language training	90
Adult education	57
Job training	30
Substance abuse prevention treatment	30
Child abuse and neglect services	30
Domestic violence services	59
Child support assistance	62
Health education	360
Assistance to families of incarcerated individuals	21
Parenting education	392
Total number of homeless families served	9
Total number of homeless families who acquired housing	6

Source: Head Start Program Information Report for the 2001-2002 Program Year.

child and the child's family must be met. The strength of Head Start lies in addressing needs in this arena.

Head Start employs teachers with Child Development Associate (CDA) credentials, but most without college degrees. Average salaries for Head Start teachers for the 2001-2002 program year were $17,514 for CDA credential and $22,651 for a Bachelor's degree in Early Childhood Education or related degree (Child Care Associates, 2002). The same school year, Prekindergarten teachers' average salary was $41,695 according to the Texas Education Agency website. The difference in average salary could account for the difficulty of Head Start to recruit and retain teachers with college degrees. Head Start has begun addressing the teacher education issue in the ensuing years since the data for this study were collected.

The responses by the State of Texas and ISD on behalf of children from low-income families are chronicled in the next section along with a program description.

<div align="center">Texas Prekindergarten</div>

The 1985 legislation authorizing the creation of prekindergarten programs in Texas became effective for the 1985-1986 school year. The intent of the Texas Legislature was to "break the debilitating effects of school failure by building a solid foundation of school success among high-risk four-year-olds" (Gallagher, Clayton, & Heinemeier, 2001, p.42). Eligibility requirements are:

- unable to speak and comprehend the English language
- educationally disadvantaged, defined as eligible for the national free or reduced priced lunch program
- homeless, defined as:

○   an individual who lacks a regular, fixed, or adequate nighttime residence

○   an individual who has a primary residence that is:

†   a supervised public or private shelter designed to provide temporary living accommodations (including welfare hotels, congregate shelters, and transitional housing for the mentally ill)

†   an institution that provides a temporary residence for individuals intended to be institutionalized

†   a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings (Texas Education Agency, 2002).

The ISD has offered Prekindergarten (Pre-K) for eligible four-year-olds since 1986. The goal of Pre-K is to promote school readiness and emergent literacy outcomes for young children. The program focuses on meeting the educational needs of all eligible students, including those with special needs. In 2001/2002 the program enrolled 3,790 students in full-day Pre-K (Texas Education Agency, 2002). Over 50% of the children speak Spanish as their home language, bilingual or English as a Second Language (ESL) classes serve these children. Over 90% of the students are considered economically disadvantaged as evidenced by eligibility for free/reduced lunch. The Pre-K program is housed in the public schools and in 2002 employed 163 certified teachers with an equal number of instructional assistants. Great emphasis is focused on early literacy development and readiness for formal schooling. A direct instruction, or academically directed approach describes the program. There is no state mandated curriculum for Texas Prekindergarten. A copy of the state recommended *Prekindergarten Curriculum Guidelines* is provided in appendix B. The expectation is that

Pre-K teachers will use the *Prekindergarten Curriculum Guidelines* as the framework for planning instruction. The ISD utilizes a number of commercial curricula including *Open Court, Reading Mastery, Breakthrough to Literacy* and *Esperanza* to follow the Prekindergarten Curriculum Guidelines. The focus on early literacy skills development facilitated by college-educated teachers is the strength of this program.

<u>Ready Start</u>

Both Head Start and Texas Prekindergarten were originally designed to be half-day programs (3 hours), but the need for full day and extended care hours has spawned an array of creative funding streams and collaborations. One such collaboration was created by the ISD Prekindergarten Program and the local Head Start program. The collaboration known as, Ready Start, began in the fall of 2001 and served an additional 700 children over the previous capacity of both programs for the 2001-2002 school year. Table 2 provides a comparison of characteristics of the three program models.

Ready Start is envisioned as the intersection of the best practices of both Head Start and Pre-K. The goal of Ready Start is to provide the benefits of a professional certified teacher with a program that focuses on readiness skills, ISD Pre-K, while providing the medical, nutritional and social service aspects of the Head Start program, designed to specifically meet the needs of children from low-income families. Classrooms are housed in the public schools and children spend half the day in a Pre-K classroom and half the day in an adjacent Head Start classroom. Children must meet the eligibility requirements of both programs.

Table 2. Comparison of Programs

Characteristic	Pre-K	Ready Start Pre-K and Head Start Collaboration	Head Start
Jurisdiction	Texas Education Agency Local School Districts.	ISD has jurisdiction over all Pre-K staff and Head Start over the Head Start staff. The campus principal is supposed to be the "acting supervisor" of the Head Start staff.	U.S. Department of Health and Human Services, Administration of Children and Families, Administration of Children Youth and Families, the Head Start Bureau.
Funding Sources	Texas Education Agency—Foundation Funds, Cycle 5 Prekindergarten Expansion Grant, and Local District Funds	Head Start materials and staff funded with Head Start monies and Pre-K materials and staff funded with TEA funds. No cross-over of funds, but some cross over of services, such as staff development offerings.	Grants are awarded by the Administration of Children and Families Regional Offices to local agencies for operating Head Start at the community level.
Basic Role	Designed to develop skills necessary for success in the regular public school curriculum, including language, math and social skills.	Designed to combine the "best practices" of both settings to provide an all-encompassing program that focuses on cognitive development, school readiness and social/emotional development, as well as medical, dental, mental health and nutrition services, and parent involvement.	Designed to increase the school readiness of young children in low-income families by providing services in education; medical, dental, and mental health; nutrition; `and parent involvement.

Table 2—*Continued*.

Eligibility Criteria	1.Unable to speak and comprehend the English language, OR,	Must meet Pre-K eligibility and meet Head Start eligibility also—there is some latitude by Head Start in enforcement of their eligibility—they can serve a 10% overall enrollment that is over the income guidelines	Family income must be below the poverty line or family must be receiving public assistance; i.e. SSI or TANF.
	2. Educationally disadvantaged (eligible to receive the national free or reduced price lunch program), OR		Also enrolls 10% as students with disabilities.
	3. Homeless (as defined by 42 U.S.C. Section 11302).		Income guidelines for 2001 eligibility—Gross annual family income before deductions for a family of three, up to $14,630.
	Income eligibility guidelines for National School Lunch Program 2001-2002—Gross annual family income for a family of three: up to $19,019 for free lunch; up to $27,066 for reduced price lunch.		
Curriculum	No state-mandated curriculum. The Texas Education Agency provides "Prekindergarten Curriculum Guidelines".	Pre-K teachers use the district's Pre-K curriculum for their portion of the day, and Head Start uses Head Start activities for their part of the day.	Head Start Program Performance Standards **NOTE--** Not a curriculum—curriculum is mandated but no curriculum is prescribed.
Children Admitted	Children must be 4 years old by September 1. NOTE: TEA allows (but does not require) districts to serve three-year olds.	Children must be 4 years old by September 1.	Children must be 4 years old by September 1. NOTE: Head Start serves some threes in its centers.
Number of Children (local program)	Approx. 3,000	Approx. 700	Approx. 1,316

Students are enrolled in both Head Start and Pre-K so that services from both programs can be assessed. The teachers from both programs coordinate schedules and plan jointly. The approach to instruction provides exposure to both academically-directed (Pre-K) and child-directed (Head Start) philosophies of instruction, with a half day devoted to each.

The concept of Ready Start recognizes that the school district provides expertise in education with certified early childhood teachers and the setting that eases the transition to formal education. At the same time, there is recognition that Head Start provides expertise and resources necessary to meet the needs of children from low-income families. The combination appears to be an answer to meeting the needs of the "whole child" with the best available resources.

The Ready Start program is the target group of this study with Prekindergarten and Head Start serving as comparison groups.

CHAPTER IV

RESEARCH AND POLICY IN EARLY EDUCATION

The research literature on early care and education follows two streams: research in child care settings and research conducted in preschool settings. In the past, the child care focus would be on determining the elements of safe and nurturing environments provided for children while their parents participated in the workforce. Much of the research on "quality" has been done in child care settings (Kontos, Howes, Shinn, & Galinsky, 1995; NICHD Early Child Care Research Network, 1999; Phillips, Howes & Whitebrook, 1992; Phillipsen, Burchinal, Howes, & Cryer, 1997; Tietze, Cryer, Bairrao, Palacios, & Wetzel, 1996). Quality early education can be delineated by two classes of variables, structural and process. Structural variables are those that are more readily regulated such as group size, child to adult ratios, and teacher education. Process variables include the learning environment, instruction and activities provided, as well as teacher-child interaction (Howes, Phillips, & Whitebrook, 1992).

Preschool settings have been studied to determine the elements of an enriched environment that include various models of learning and socialization. Much of the preschool research examines part-day programs that provide enrichment for young children rather than custodial care for the children of working parents. Frede (1995) provides a meta-analysis of this research. As the need for child care has increased, there has been a move toward insuring the blending of developmentally appropriate school readiness skills in environments of safe,

nurturing child care. Federally-funded Head Start and state-funded Texas Prekindergarten both began as part-day preschool programs. The early childhood intervention studies follow the preschool stream of research. This study rests on the confluence of the two streams of research, the quality studies from child care and the child outcome studies from preschool research.

The research on preschool programs suggests positive outcomes attributed to quality programs. (Barnett, 1995; Campbell & Ramey, 1994; Miller & Bizzell, 1984; Weikart, Bond, & McNeil, 1978; Yoshakawa, 1995). In his review of 36 studies of both model projects and public programs, Barnett (1995) concludes:

> Results indicate that early childhood programs can produce large short-term benefits for children on intelligence quotient (IQ) and sizable long-term effects on school achievement, grade retention, placement in special education and social adjustment. Not all programs produce these benefits, perhaps because of differences in quality and funding across programs. (p.25)

The salient question becomes, what is a quality classroom environment for preschool children? The next section describes the background and theoretical base for quality preschool environments.

<div align="center">

Theoretical Background for Supportive Quality
Environments for Young Children

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The earliest pedagogic theoreticians influencing early childhood education are found in Comenius, Locke, Rousseau, and Pestalozzi. The common threads among their theories on early childhood included "the child's spontaneous play, its curiosity, talent for mimicry, and the need for activity in the child's education" (Singer, 1992, p. 35). These men stressed the importance of observing and studying the behavior of children, as children construct new knowledge through play.

In 1986 the National Association for the Education of Young Children (NAEYC), the nation's largest early childhood education professional organization, published a position statement on developmentally appropriate practice. This statement provided a standard for quality in early childhood programs. The revised version adopted in 1996 provides a definition of early childhood programs:

> An early childhood program is any group program in a center, school, or other facility that serves children from birth through age 8. Early childhood programs include child care centers, family child care homes, private and public preschools, kindergartens, and primary grade schools. (Bredekamp & Copple, 1997, p. 3)

The NAEYC statement provides principles for quality practice drawn from theory and empirically based studies. The following principles are linked with their theoretical origins.

The age/stage theories of Piaget (1952) and Erikson (1963) are evident in the principle, "Development occurs in a relatively orderly sequence, with later abilities, skills, and knowledge building on those already acquired" (Bredekamp & Copple, 1997, p. 10).

The ecological model of developmental psychologist, Urie Bronfenbrenner (1979, 1989), is the foundation of the principle, "Development and learning occur in and are influenced by multiple social and cultural contexts" (p. 12). This is an important theoretical underpinning for early education that seeks to serve the needs of low-income children. While the child is an active participant in his or her own development, family, neighborhood, community and broader society all have an impact on the developing child. Part of the current ecological system is a high rate of child poverty. Recognition of the social and environmental contexts that shape children's development is a contribution made by Bronfenbrenner's theoretical model.

Several theories provide the basis for the principle, "Children are active learners, drawing on direct physical and social experience as well as culturally transmitted knowledge to construct their own understandings of the world around them" (Bredekamp & Copple, 1997, p. 13). Piaget's cognitive theory is evidenced in this principle by the acknowledgement of the child's active involvement in learning through experiences with the physical world. Morrison (1998) describes Piaget's theory as a constructivist view of development: "Children literally construct their knowledge of the world and their level of cognitive functioning" (p. 124).

Montessori's (1909, 1964) theoretical concepts of auto-education and the prepared environment are the prerequisites to providing an environment that supports active learning.

The sociocultural theoretical framework which includes work by Vygotsky (1978) focuses on social interaction as a means of supporting development. Vygotsky's theory of the "zone of proximal development" stresses the importance of the child's interactions with adults and more competent peers on the child's developmental achievement.

Gardner's theory of multiple intelligences (1983) is evident in the principle, "Children demonstrate different modes of knowing and learning and different ways of representing what they know" (p. 15). This is an important theoretical concept, not only for enhancing the cognitive development of children, but in appreciating the worth and contributions of children whose abilities are not adequately represented by our current standardized tests.

Finally, and importantly, is the principle, "Children develop and learn best in the context of a community where they are safe and valued, their physical needs are met, and they feel psychologically secure" (p. 15). The conceptualization of this principle is from the work of Maslow (1954) in his theory of motivation known as the hierarchy of needs. The

hierarchy describes the provision of the basic essentials of life as the minimum requirement for self-actualization. This is the theoretical basis for the provision of comprehensive health and social services to children in early childhood intervention settings.

The preceding listing of theories and principles supporting early childhood program practice is by no means comprehensive or exhaustive. The intent is to provide a background to the theoretical framework that under girds current professional principles for quality early childhood classroom environments. The following section describes the research on quality in classroom environments for young children.

<u>Research on Quality Classroom Environments</u>

The overarching theory for early childhood education programs is found in the sociocultural perspective. Young children learn language from the people in their environment. The central features of quality in the classroom, experienced directly by children, revolve around the teacher and the environment created. According to the National Research Council (2001, p. 7), "Social competence and school achievement are influenced by the quality of early teacher-child relationships, and by teachers' attentiveness to how the child approaches learning." A study by Arnett (1989) found that teachers with more education (college degree) are more sensitive in their interactions with children than teachers with less education and training. Specifically, teachers with degrees in early childhood show the most effectiveness (National Research Council, 2001). According to Kontos and Wilcox-Herzog (1997), in their review of the literature on teacher interactions with children, concluded, "Quality in the early childhood programs is, in large part, a function of the interactions that take place between the adults and the children in those programs" (p. 11). Quality interactions are described as warm, sensitive and responsive. A description of

appropriate interactions to facilitate children's learning appears in the work of Landry (2005):

- Sensitivity to a child's level of understanding

- Responses contingent on a child's signals

- An ability to maintain and build on a child's focus

- Rich oral language input

- Avoiding excessive restrictions on behavior

- Providing choices and adapting to a child's changing needs.

By vigilantly observing and evaluating children's needs and happiness in their environment and by providing responsible and responsive care, a teacher establishes a warm and caring environment that helps the child feel comfortable and facilitates the learning process. (p. 42)

A warm, sensitive and responsive adult is necessary, but not sufficient to create an environment for young children's optimal development. Specialized knowledge is needed to meet the individual needs of children while planning for small groups and whole classrooms of children. In the two well known experimental studies producing positive long-term outcomes for children in early childhood intervention, the High/Scope Perry Preschool Project (Weikart, Bond & McNeil, 1978; Schweinhart, Barnes, Weikart, Barnett & Epstein, 1993; Barnett, Young, & Schweinhart, 1998) and the Carolina Abecedarian Project (Campbell & Ramey, 1994; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002), both programs employed only teachers with at least an undergraduate degree and many with master degrees in early childhood development or education. These two experimental studies are a major part of the foundation for the research suggesting long-term positive outcomes for children from low-income families who receive concentrated early intervention.

Regulation of teacher-child ratios and group sizes stems from the rationale that teachers can provide more responsive and sensitive interactions when there are fewer children. Howes, Smith, and Galinsky (1995), in their study examining the effects of child care regulation, found that teachers' interactions were more responsive with fewer children per teacher and with smaller groups. The NAEYC recommends a ratio of 1 teacher per 10 children in a group size of 20, in classrooms for three- and four-year-olds. Smaller group sizes and lower teacher–child ratios are optimal (National Association for the Education of Young Children, 1998).

The Head Start program predated the NAEYC written statement for developmentally appropriate practice in early education. The practice wisdom gained from the Head Start program has been a force in establishing the knowledge base for intervention programs (Zigler & Styfco, 2004).

<div align="center">
Research on Early Childhood Intervention
Cognitive Outcomes
</div>

The efficacy of Head Start, with regard to cognitive child outcomes, has been controversial from the earliest days of the program. The well-known Westinghouse Report (Cicirelli, 1969) looked at children's tested intelligence (IQ) and concluded that benefits were temporary, fading out as children moved through elementary school. Other studies found similar fade-out effects for Head Start children concerning IQ (Lazar, Darlington, Murray, Royce & Snipper, 1982; McKey, Condelli, Ganson, Barrett, McConkey, & Plantz, 1985), but found lasting gains in the areas of actual school performance. The reaction of Head Start was to move away from emphasizing intelligence test scores and academic skills and to focus on social and emotional skills needed upon formal school entry (Ramey &

Ramey, 2004). School readiness became a national focus following the National Education Summit in 1989. Of the list of six goals for American education, goal 1 stated, "All children in America will start school ready to learn" (National Education Goals Panel, 1999). A consequence of the National Education Goals and later the Government Performance and Results Act was a shift from monitoring inputs into education to an emphasis on measuring results and providing accountability for higher levels of student performance. This shift in policy focus to accountability for outcomes trickled down to the Head Start program. In 1997 the United States General Accounting Office published a report to the Chairman, Committee on the Budget, House of Representatives, entitled, *Head Start: Research Provides Little Information on the Impact of the Current Program*. The stated intent of the report was to review available research studies that legitimately described the impact of the program. The impact was defined as "differences in outcomes caused by Head Start participation" (p. 1). Over 600 documents and citations were screened to meet the criteria for impact studies. The search yielded 22 viable studies, none of which used a nationally representative sample. The report stated that most of the Head Start research literature was in the form of case studies, along with program descriptions, anecdotal reports and position papers. The authors of the GAO report concluded, "Although an extensive body of literature exists on Head Start, only a small part of this literature is program impact research. This body of research is inadequate for use in drawing conclusions about the impact of the national program in any area in which Head Start provides services such as school readiness or health-related services" (United States General Accounting Office, 1997, p. 2).

Of the 22 manuscripts meeting the criteria of an impact study, only three studies compared Head Start with another type of preschool program. One such study, Hunt (1987),

compared the academic achievement of second grade students from low-income families living in *Newport News*. Standardized test scores and grade retention were studied among a sample of 74 former Head Start students, 92 former First Step preschool students and 92 students with no previous preschool experience. The posttest only design yielded no statistical difference among the three groups on achievement test scores. The grade retention results were inconclusive. The lack of a pretest disallowed control for preexisting differences among the children studied. Another study, Currie and Thomas (1995) examined cognitive and health outcomes among groups comprised of Head Start students, children with no preschool experience and students with other preschool experience. Data came from a national sample of 5,000 children included in the National Longitudinal Survey of Youth and Child-Mother data set. The study was a posttest only design with no random assignment to groups. The study found increased positive effects on test scores for children in the Head Start group, compared to the other groups. The study found greater access to preventive health care for white and African American children who attended Head Start. Again, the lack of a pretest weakened the design. According to Currie (2000, p. 12), "There has never been a large-scale, randomized trial of a typical Head Start program."

A political and policy climate of increasing demand for accountability for program outcomes was the stage for the launch of the 1997 Head Start national longitudinal study, FACES, Family and Child Experiences Survey. The goal of the FACES study is to examine the quality and effects of Head Start (McKey, Tarullo, & Doan, 1999). A nationally representative sample of 3,200 children in 40 programs was studied in the first wave of the FACES project. In 2000 and 2003 cohorts were added, following children from program entry to the end of kindergarten. The study incorporated Program Performance Measures, a

framework used to measure annually and over longer periods the effectiveness and quality of Head Start programs (Administration for Children and Families, 2003). The FACES study provides valuable information on program strengths and weaknesses and child performance outcomes across the Head Start program year. Comparisons are made by using nationally normed tests and by comparing FACES results with the results of other large national studies. A General Accounting Office (GOA) report, *Head Start: Challenges in Monitoring Program Quality and Demonstrating Results*, acknowledged the strides made in assessing outcomes for Head Start, but clearly called for a national randomized study to be conducted to provide a definitive assessment of the program's overall impact (United States General Accounting Office, 1998).

In response to the GOA report, Congress mandated the Head Start Impact Study as part of the 1998 reauthorization of Head Start. The study is the first randomized, nationally representative study of Head Start. The longitudinal study follows 5,000 three- and four-year-olds randomly assigned to Head Start or to a control group. Begun in the fall of 2002, the impact study follows the children through kindergarten or first grade. The final report is scheduled for 2006.

The Texas Prekindergarten program has one published statewide evaluation initiated by the Texas Education Agency. The five-year longitudinal study was begun in 1989. The study included gathering information on program characteristics and parent perceptions through a statewide survey of districts and school campuses. In-depth program implementation information was examined through a case study of 10 schools offering prekindergarten. As part of the case studies, participating staff self-examined the developmental appropriateness of their classroom practices. The final component included a

comparison of 2,000 children participating in prekindergarten in the 1989-1990 school year with 600 eligible children who did not experience Pre-K. The outcome variables were math and reading scores on the 3rd grade Texas Assessment of Academic Skills (TAAS) test. The study concluded that in 1992, Texas Prekindergarten classroom environments resembled elementary classrooms. Through attention to training, by 1994, classrooms improved the provision of appropriate environments by fostering learning through play and exploration. The longitudinal comparison of third grade TAAS Normal Curve Equivalent (NCE) scores showed that children with prekindergarten experience scored two points higher on both math and reading than did those children eligible for Pre-K who did not attend (Texas Education Agency, 1995). This study did not include random assignment to groups, nor did it include a pretest to control for the initial comparability of groups. To date, there is no statewide experimental study of Texas Prekindergarten.

What is currently known from randomized trials about early childhood intervention programs comes from a few model programs. Two of the most rigorous and influential studies on the long-term effects of early childhood intervention on children from low-income families are the High/Scope Perry Preschool Project (Weikart, Bond & McNeil, 1978; Schweinhart, Barnes, Weikart, Barnett & Epstein, 1993; Barnett, Young, & Schweinhart, 1998) and the Carolina Abecedarian Project (Campbell & Ramey, 1994; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Both projects employed random assignment and followed the study sample over two decades with very little attrition. Both studies found long- term benefits for the treatment groups that received the early interventions. One of these studies is described more fully in the following section.

The Abecedarian Project incorporates the learning model approach with full day education of children from low-income families. The project was begun in 1972 with an experimental design, using random assignment to place 111 infants from low-income families to either an intervention group (57 infants) consisting of high quality child care or to a control group (54 infants). The intervention group received full day, high quality childcare from infancy through age five. Each child had an individualized program of educational activities in the form of games that addressed social, emotional, and cognitive development, with a particular emphasis on language. The control group received care given or arranged by relatives and was provided referrals to appropriate social service agencies as needed. The two groups were initially comparable on infant mental and motor tests. From the age of 18 months through the completion of the program, children in the intervention group scored significantly higher on cognitive functioning than the control group (Ramey & Campbell, 1984). The effect sizes in the primary grades were large for reading and large to moderate for math. Results from a follow-up study of this same sample (104 currently, 53 from the intervention group and 51 from the control group) found that at age 21, 35% of the intervention group had either graduated from or were attending a four-year college or university, compared to 14% of the control group who had done so (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Employment rates were higher, with 65% of the intervention group employed and 50% of the control group employed (Carolina Abecedarian Project, 1999). This landmark study, one of the few employing an experimental design, points to the benefits of quality, developmentally appropriate education for low-income children. The question becomes, "Can these results be attributed to widespread,

poorly funded, locally administered programs?" (Frede, 1995, p. 115). The following study

provides a picture of the reality of American early care and education.

The Cost, Quality and Child Outcomes Study (1995) did not focus on low-income

families, but found that across the economic stratas

> childcare at most centers in the United States is poor to mediocre, with almost half of the
> infant and toddler rooms having poor quality. Only one in seven centers provides a level
> of quality that promotes healthy development. Childcare in one in eight centers threatens
> health and safety. Seven in ten centers are providing mediocre care, which may
> compromise children's ability to enter school ready to learn. Infants and toddlers fare
> worse. Forty percent of the infant and toddler rooms were observed to endanger
> children's health and safety. Only one in 12 infant and toddler rooms are providing
> developmentally appropriate care. (p. 1)

This was a longitudinal study with just under 1,000 classrooms observed across four states.

This study included classrooms from programs such as public prekindergarten and Head

Start, as well as independent childcare settings. The sample was predominantly white, (81%

infant/toddler, 71% preschool), children with married parents (78% infant/toddler, 70%

preschool), and families with an average income of over $55,000.

Since early education intervention programs are administered at the local level, there

exists a wide range of variability in program implementation. There is a need for quality

issues to be examined at the local level rather than relying on large-scale studies to capture

this important information. Further, there is a need to begin matching child characteristics

with characteristics of learning environments that have demonstrated the best child outcomes.

Recognizing the need for information to match preschool programs and child

characteristics of children at risk of school failure, a study by Marcon (1999) analyzed the

differential impact of three models of preschool on the developmental outcomes of inner-city

children. The models were differentiated by a cluster analysis of teacher responses to the

Pre-K Survey of Beliefs and Practices. The study compared the child outcomes of three different instructional approaches. The sample consisted of 721 four-year-olds randomly selected from these models and evaluated using the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1985) as the outcome measure. The study used a sequential design with three cohorts to provide replicability of results.

The three models were identified as child-initiated (CI), academically directed (AD), and middle-of-the-road (M), based on the teacher's responses to the survey of teaching beliefs and practices.

The child-initiated model was composed of teachers who "facilitated learning by allowing children to actively direct the focus of their learning" (Marcon, 1999, p. 361). This model based on Piagetian theory purports the role of the teacher as facilitator by arranging the environment for children to plan and select their own learning activities and providing a wide range of experiences. In contrast, the academically-directed model represented teachers who "preferred more direct instruction and teacher-directed learning experiences for preschoolers" (Marcon, 1999, p. 361). The instruction approach was described as scripted, sequenced, and focused on academic instruction with frequent practice in language, reading and math. The middle-of-the-road model represented teachers who endorsed a combination approach.

The results of the study suggest that the models did not produce significant differences in the overall adaptive scores of the children, but variations were found in the sub domains of development as measured by the Vineland. The child initiated model produced higher scores in personal and interpersonal skills, expressive and receptive language and gross motor skills. The academically directed model demonstrated higher scores in written

language and in leisure and play skills. The middle of the road model was found to be the least effective of the three and appeared to be particularly detrimental to the young boys in the study in all areas, with the exception of play and leisure skills and gross motor development. African American children appeared to benefit most from the child initiated model. In this study, girls outperformed boys across all models.

Interpreting these results should be viewed in the context of the study limitations. No pretest data was available to measure the initial comparability of groups. This field study, employing a correlational design, reflects typical educational practices where children attend their neighborhood school and are not randomly assigned to program models, precluding a more rigorous experimental design. The outcome measures used in the study were all based on teacher ratings, which could be influenced by differing expectations, practices, and biases associated with teacher beliefs and the differing theories supporting each of the models. It is of interest to note that the only quality indicators were structural variables including: class size, adult/child ratio, classroom square footage per child, and teacher experience. This study is of particular importance as one of the few that directly compares models in the context of child outcomes to provide policymakers with preliminary evidence of what works with whom.

Utilizing the categories described by Marcon (1999) the Head Start program resembles the child-initiated approach to learning, the Pre-K program the academically-directed approach and the Ready Start program a combination of the two programs rather than a middle-of-the-road or eclectic approach. As previously described, the Ready Start program provides half the day with a certified teacher in an academically-directed setting and half the day in a child-initiated setting that includes screenings and access to medical, dental,

nutritional, and mental health services. Home visits are a part of the Head Start component of Ready Start.

This study adds to the knowledge base by providing a comparison of child cognitive outcomes and classroom environments across these three local programs. The study provides pretest scores to establish the initial comparability of groups, as well as posttest scores. The child outcome measures are standardized instruments with established reliability and validity, administered individually to each child by a trained independent third party, rather than relying solely on teacher report. The quality of the classroom environment is measured by an assessment based on classroom observation, teacher report, and examination of documents. The premise of supportive environments as the focal point of quality early childhood education is based on the recognized developmental needs of young children.

Despite the availability of published professional standards for quality early childhood environments, conformity to these standards remains voluntary. Head Start mandates conformity to the Head Start Performance Standards, but the more in depth Performance Measures are not a requirement for all local programs. Current welfare reform increases the demand for accessible early education for children of low-income families (representing the need for parents to work). Provision of quality supportive environments for the children involved must be a priority.

Past research has shown that quality early education can have a sizable impact on child outcomes, long and short term, for economically disadvantaged children. The National Association for the Education of Young Children (NAEYC) provides a framework for best practices that describe a quality environment for young children. The instrument used to measure classroom environment in this study, the Assessment Profile for Early Childhood

Programs, Research Edition II, was cross-referenced with the National Association for the Education of Young Children Accreditation Criteria (Abbott-Shim, Neel, & Sibley, 2001), producing a 100% match of criteria between the two measures.

What is needed now is to determine to what degree our local programs are providing a high quality, supportive environment for economically disadvantaged children in the context of child outcomes.

Two long standing early intervention programs, Head Start and Pre-K, are used as comparison groups to compare classroom environment and child outcomes with an innovative collaboration known as Ready Start, a combination program serving children with a half day of Pre-K and a half day of Head Start. The Ready Start program is of interest because the local Pre-K and Head Start have joined together to bridge a gap in serving the needs of children from low-income families. The strength of Head Start is a strong social services component to provide supportive services to children of low-income families. The theoretical base of Head Start recognizes that for children from poverty level families to be ready for the demands of formal schooling, the basic needs of the child and the child's family must be met. The strength of Pre-K is a focus on early literacy skill development facilitated by college-educated teachers.

The concept of Ready Start recognizes that the school district provides expertise in education with certified teachers and the setting that eases the transition to formal education. At the same time, there is recognition that Head Start provides expertise and resources necessary to meet the medical and social service needs of children from low-income families. If Ready Start favorably compares in classroom environment and child outcomes to Pre-K

and Head Start, then the combination appears to be an answer to more fully meeting the needs of children from low income families with the best available resources.

The first two exploratory research questions assess these issues:

1. What is the quality of the classroom environments provided by the three different program models, as determined by recognized measures?

2. What are the child developmental outcomes for each model as determined by two standardized instruments?

3. Do the cognitive test scores made by children in the new Ready Start collaborative program (target group) meet or exceed those made by the children in the Head Start and Prekindergarten programs (comparison groups)?"

Based on the third research question, the following hypotheses are tested:

Hypothesis 1: The Ready Start program will demonstrate higher scores on classroom environment quality, since the design is based on the strengths of both Prekindergarten and Head Start (comparison groups).

Hypothesis 2: Standardized test scores of Ready Start children will meet or exceed those of Prekindergarten and Head Start children (comparison groups).

Chapter 5 outlines the methods for the study that examines the classroom environment quality and child outcomes across three publicly funded early education programs targeted for children from low-income families.

CHAPTER V

METHODOLOGY

Design

The study design reflects typical educational practices where children are not randomly assigned to program models, precluding a more rigorous experimental design. This study is a quasi-experimental, pre and posttest comparison of groups design. The programs and not curricula models are used for comparisons.

Classroom observation data analysis using Analysis of Variance (ANOVA) allows for the comparing of supportive environments using scale score means from the Assessment Profile for Early Childhood Programs, Research Edition II. The independent variable is Program (Ready Start, Prekindergarten, and Head Start).

Multivariate Analysis of Covariance (MANCOVA) is used to compare child outcome data across programs, controlling for the initial differences of groups. The design facilitates the comparison of groups based on child cognitive test scores. The pretest establishes the initial comparability of groups.

The independent variables used in this part of the study consist of program groups (Ready Start, Prekindergarten, and Head Start), gender and ethnicity. The dependent variables consist of posttest scores from the Preschool Language Scale-3 and the Developing Skills Checklist. Pretest scores from both assessments serve as covariates. Child level data is the unit of analysis.

Sample

The study sample was drawn from existing data from a longitudinal study begun in the 2001–2002 school year by Dr. Charles Mindel to follow Ready Start children and Prekindergarten through the third grade. The population from which the sample was drawn was children enrolled in the Head Start program for four-year-olds and children enrolled in the ISD Prekindergarten program that included children in the Ready Start program. The selection was made to represent the various curricula in the programs, a comparison of which was the focus of the original study. A random sample of 10 children was included from each of the classrooms selected for the original study. The separate data sets for Pre-K and Head Start classroom environments were gathered by the author.

The sample is composed of 495 children in 64 classrooms including 27 Pre-K, 14 Ready Start (a combination of 14 Pre-K and 14 Head Start classrooms) and 9 Head Start classrooms located in centers. Scores for all 495 children are utilized in the analysis of classroom observation scores. Table 3 describes the sample by ethnicity and gender at pretest. Missing posttest scores for 15 children (Ready Start =7; PRE-K=8) account for the decrease in sample size at posttest.

The overall sample consisted of 255 males and 240 females, all four years old by September 1, 2001. Hispanic children accounted for 50% or more of the students in each program (Ready Start, 60%; Prekindergarten, 56%; Head Start , 50%). African American children represented the next highest percent (Ready Start, 28%; Prekindergarten, 37%; Head Start , 35%). Percent of Caucasian children was Ready Start, 10%; Prekindergarten, 5%; Head Start, 13%. Asian children were 2% of each of the programs. Scores for all 495 children are utilized in the analysis of classroom observation scores.

Table 3. Child Sample by Gender and Ethnicity at Pretest

| Program | N | Gender | | Ethnicity | % |
		Male	Female		
Ready Start	109	59	50	Hispanic	60
				African American	28
				Caucasian	10
				Asian	2
Pre-K	309	159	150	Hispanic	56
				African American	37
				Caucasian	5
				Asian	2
Head Start	77	37	40	Hispanic	50
				African American	35
				Caucasian	13
				Asian	2
Totals	495	255	240	Hispanic	56
				African American	35
				Caucasian	7
				Asian	2

Observations of the classroom environments for children who were selected for developmental assessments were made in April–May 2002. Classroom observations were collected by trained observers under the auspices of both the ISD and local Head Start.

The 64 teachers observed as part of the Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II) included 27 Pre-K, 14 Ready Start (a combination of 14 Pre-K and 14 Head Start classrooms) and 9 Head Start classrooms located in centers. Table 4 describes the number and ethnicity of the teachers observed.

In this study sample of teachers, the Pre-K had 61% Caucasian teachers; Ready Start Pre-K had 43% Caucasian, 36 % African American; Ready Start Head Start had 71% African American; and Head Start had 78% African American teachers. As shown in the table above, across all programs, 50% or more children are Hispanic. Every classroom had at

Table 4. Teacher Ethnicity Across Programs

Characteristics	PRE-K		HEAD START	
	PRE-K	Ready Start PRE-K	Ready Start HEAD START	HEAD START
Teacher N=64	27	14	14	9
		%		
Ethnicity				
Hispanic	11	21	22	11
African American	28	36	71	78
Caucasian	61	43	7	11
Asian	0	0	0	0

least one teacher assistant, many of whom are Hispanic. The APRE-II did not include direct observation of classroom assistants.

Measures

Two standardized measures were used to operationalize child outcomes. The Preschool Language Scale-3 (PLS-3) and the Developing Skills Checklist (DSC). Both measures were administered individually to children in the fall of 2001 (pretest) and again in the spring of 2002 (posttest). The Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II) was used to examine the classroom environment. Observations of the classroom environments for children who were selected for developmental assessments were made in April–May 2002. Classroom observations were collected by trained observers under the auspices of both the ISD and Head Start. The measures for the study have been widely used and exhibit good reliability and validity as described below.

<u>The Preschool Language Scale-3</u>

The PLS-3 is a norm referenced and standardized measure used to assess expressive and receptive language skills in children two weeks through six years, 11 months of age (Zimmerman, Steiner, & Pond, 1992). The assessment is appropriate for young children since children are assessed individually in a quiet room, the administration time is no longer than 20 to 30 minutes, and manipulatives and color picture stimuli are used specifically targeted for the developmental needs of preschoolers.

The PLS-3 has two standardized subscales, expressive communication, and auditory comprehension. Indicators are used to assess precursors to language comprehension such as focused attention and attentiveness to sound. The expressive communication subscale includes items measuring vocal development, social communication, integrative thinking skills (logical expressive communication) and the structure and semantics of expressive language including vocabulary. The auditory comprehension subscale measures attention, semantics, structure and integrative thinking skills. The PLS-3 yields scores for both subscales and a total language score.

Internal consistency reliability coefficients for the Total Language Score ranged from 0.85 to 0.94 for this age group. Test-retest reliability coefficients for the Total Language Score ranged from 0.91 to 0.94 for this age group. Concurrent validity of the PLS has been studied using the following language focused instruments: Test of Early Language Development; Receptive-Expressive Emergent Language Scale; Peabody Picture Vocabulary Test and the Clinical Evaluation of Language Fundamentals-Revised (CELF-R). PLS exhibits strong correlations with these measures of language development. The PLS-3 provides standard scores, percentile ranks, and age equivalents.

<u>Developing Skills Checklist</u>

The DSC (Developing Skills Checklist, 1990) is a child friendly, individually administered, standardized assessment measuring behaviors and skills that children typically develop between prekindergarten and kindergarten. The checklist is composed of scales measuring mathematical concepts, memory, auditory skills, print concepts and writing skills.

The Developing Skills Checklist is designed as a norm-referenced as well as criterion-referenced test. The standardization and norming studies included 7,000 prekindergarten and kindergarten children from diverse geographic areas, ethnic backgrounds, and socioeconomic levels. The national sample included children from public, private and parochial school settings. The content validity and performance standards of the test were established by a staff of child development specialists and early childhood specialists. Scores reported for the DSC are national stanines, national percentile ranks, and normal curve equivalents

<u>Assessment Profile for Early Childhood Programs,</u>
<u>Research Edition II</u>

The Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II) (Abbott-Shim & Sibley, 1998) is an observational instrument used to measure early childhood classroom learning environments. The 60-item measure yields five scale scores: Learning Environment, Scheduling, Curriculum, Interacting, and Individualizing. The items are scored as "Yes," observed, or "No," not observed, or not observed to occur consistently. Items reflect observable, concrete characteristics with specific criteria to be observed. The APRE-II requires three methods of data collection: Observation, for interactions and classroom physical characteristics; Report, based on teacher interviews; and Review of documents, including portfolios, lesson plans, and written schedules. The APRE-II requires

approximately one hour of observation time. The APRE-II is a revised version of the original Assessment Profile for Early Childhood Programs (Abbott-Shim & Sibley, 1987) that contained 147 items across six scales. The norming and calibration sample came from the National Transition Demonstration Head Start/Public School Study and the Georgia State University Head Start Quality Research Study. The sample included 2,820 early childhood classrooms including Head Start and kindergarten classrooms across 31 states.

Instrument reliability coefficients were calculated for the five scales using three methods: Cronbach's alpha (Learning Environment=0.85, Scheduling=0.91, Curriculum=0.80, Interacting=0.82, Individualizin=0.80); Spearman-Brown Corrected Split-half (Learning Environment=0.83, Scheduling=0.92, Curriculum=0.77, Interacting=0.78, Individualizing=0.77); and Item Response Theory (Learning Environment=0.89, Scheduling=0.96, Curriculum=0.80, Interacting=0.83, Individualizing=0.90).

Content validity was established through a comprehensive review of the early childhood literature and review by a wide range of early childhood professionals. For content validity the Assessment Profile was cross-referenced with the National Association for the Education of Young Children Accreditation Criteria (Abbott-Shim, Neel, & Sibley, 2001). This cross-referencing produced 100% match of criteria between the two measures. Criterion related studies (Abbott-Shim, 1991; Wilkes, 1989) have shown significant correlation with the widely used Early Childhood Environment Rating Scales (ECERS) (Harms & Clifford, 1980). Scores for the APRE-II are reported as five scale scores with 50 as the average score and a standard deviation of 10.

<u>Informed Consent</u>

In the fall of 2001, signed and dated informed consent forms were collected from parents through the ISD Research and Evaluation and through Head Start.

<u>Protection of Participants</u>

Each child was tested twice, with the pretests in the fall and the same tests administered in the spring. Children were individually tested in a quiet room by trained professionals from Texas Behavioral Associates, a psychological testing service. If children became uncomfortable, they were returned to the classroom to be tested at a later time. Child level data was de-identified and identification numbers assigned to protect the confidentiality of the individual students.

Identification numbers were assigned for each classroom and the teacher's name and school name removed in order to provide confidentiality for the teachers. Observers were blind to the sample of children who were previously individually assessed in each classroom.

<u>Data Collection</u>

In order to observe 64 classrooms on 40 campuses, each campus was located on a city map and the whole city divided into quadrants so that campuses could be grouped geographically. A letter was sent to each principal explaining the prekindergarten assessment and asking that the appropriate teachers be notified. Schedules were faxed to principals five days prior to the visit in order to verify the time and date. Observation assignments for data collectors were made bi-weekly in order to accommodate the rescheduling needs of the schools and centers. The Head Start office notified Center Directors of the time and date of observations.

Observers for APRE-II had research backgrounds as well as formal training in early education. Prior to data collection, training was held to discuss criteria and terminology of the instrument to insure clarity of terms. Two mornings of practice observations were scheduled to achieve 85% agreement among the data collectors. During the month of data collection 10 of the 64 classrooms were observed by two data collectors to perform interrater reliability checks (Mean=0.90; Range=0.83 to 0.95).

Trained evaluators observed from one to two hours in all 64 classrooms. Classrooms were selected on the availability of individual student data collected within each of the three programs. The observations were conducted using the *Assessment Profile for Early Childhood Programs: Research Edition II* (Abbott-Shim & Sibley, 1998) (APRE-II). The 60 item measure yields five scale scores: Learning Environment, Scheduling, Curriculum, Interacting, and Individualizing. The items are scored as "Yes," observed, or "No," not observed, or not observed to occur consistently. The following five APRE-II scales assessed dimensions of the environment in each classroom:

Learning Environment. The presence or absence of specific materials related to conceptual areas (e.g., language, math, science, fine motor), the accessibility of materials to the children and the overall arrangement of the classroom.

Scheduling. Availability of written lesson plans, teacher's advanced preparation, variety of activities and group composition (i.e., individual, small group, whole group activities).

Curriculum. Teaching methods and the modification of instruction.

Interacting. Teacher responsiveness to children, positive interactions initiated by the teacher, and classroom management.

Individualizing. Availability of child developmental assessments, use of child assessments for planning individualized learning experiences, procedures for referral for special needs, planned individual parent conferences.

Each scale assessed an aspect the classroom environment with specific criteria, describing expected materials and concrete observable behaviors. The APRE-II was normed on a national data bank of public early childhood classrooms. The APRE-II provides a method of comparison of the classroom environment to other programs nationally. The APRE-II yields a mean score of 50 and a standard deviation of 10.

For this study, rather than report APRE-II scores for the Ready Start Pre-K portion of the day and the Ready Start Head Start portion of the day, the scores were combined to produce one set of Ready Start scale scores. This decision was made in order to capture the classroom environment from the child's vantage point. The APRE-II consists of dichotomous scales that rate the presence or absence of each indicator. Ready Start Pre-K and Ready Start Head Start classes were observed and rated separately. Since child data is the unit of analysis, each child in Ready Start would have two sets of scale scores for classroom environment. To obtain one set of scale scores for each Ready Start child, the scores for both sessions were examined. If an indicator was present in *either* session, the item was marked "yes" for the combined score, since the indicator was present in the child's environment at some point in the day. The one exception was on the Interacting scale. Since from the literature, we know that teacher-child interactions are the key component in early education, both sessions had to score a "yes" on the indicator in order to score a "yes" on the combined score. For example, the indicator, "Teacher engages children in conversations," both the child's Ready Start Pre-K classroom and the Ready Start Head Start Classroom must score a "yes" for the combined

score to register a "yes." If either or both sessions have an observed teacher who does not interact with the children, then the combined score registers as "no." This exception on scoring was made acknowledging the importance of positive and frequent teacher-child interaction.

<center>Analysis</center>

This section describes the analyses used to test each of the following hypotheses:

Hypothesis 1: The Ready Start program will demonstrate higher scores on classroom environment quality, since the design is based on the strengths of both Prekindergarten and Head Start (comparison groups).

This hypothesis was tested by comparing the means of the three programs on each subscale of the Assessment Profile for Early Childhood Programs, Research Edition II (Abbott-Shim & Sibley, 1998) using analysis of variance (ANOVA).

Hypothesis 2: Hypothesis 2 states that standardized test scores of Ready Start children will meet or exceed those of Prekindergarten and Head Start children.

This hypothesis was tested by comparing estimated posttest means of the three programs on each scale of the Preschool Language Scale-3 (PLS-3) and the Developing Skills Checklist (DSC) using multivariate analysis of covariance (MANCOVA). Independent variables are Program (Ready Start, Pre-K, and Head Start), Ethnicity, and Gender. Pretest scores will serve as covariates that adjust for differences in program pretest means and control for the other independent variables.

CHAPTER VI

RESULTS

Chapter 6 presents the results of testing hypotheses 1 and 2. Descriptive analyses are used to compare the program groups on the structural variables of group sizes, teacher-child ratios, and teacher characteristics. Group sizes and teacher-child ratios are compared across programs and to the standards set by the National Association for the Education of Young Children (NAEYC). Scale scores of the Assessment Profile for Early Childhood Programs: Research Edition II (APRE-II) are analyzed using analysis of variance (ANOVA) to compare mean scale scores of program groups on classroom environment. The APRE-II scales are considered process variables measuring learning environment, scheduling, curriculum, teacher-child interaction, and individualizing.

The analyses for hypothesis 2 compare program groups on child outcome variables represented by the scale scores of the Preschool Language Scale-3 (PLS-3) and the Developing Skills Checklist (DSC). Multivariate analysis of covariance (MANCOVA) is used to compare child outcomes across programs, controlling for the initial differences of groups. Pretest scores on the PLS-3 and DSC serve as covariates; program groups, ethnicity and gender are the independent variables; and the PLS-3 and DSC scale scores serve as dependent variables.

Hypothesis 1

Hypothesis 1 states that the Ready Start program will demonstrate higher scores on classroom environment quality, since the design is based on the strengths of both Prekindergarten and Head Start (comparison groups).

To test this hypothesis, both structural and process variables are analyzed. Structural variables include group size (total number of children in a classroom), teacher-child ratio (number of children per teacher in the classroom), and teacher characteristics (education=college degree, CDA, certification; experience=number of years teaching). Process variables are operationalized by scale scores from the Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II). The scales include scores on learning environment, scheduling, curriculum, interacting and individualizing. The next section presents the results from the analysis of structural variables.

Group Size, Teacher–Child Ratio,
Teacher Characteristics

Table 5 describes the means of the group sizes and teacher-child ratios by program, presenting the minimum and maximum scores as well as the NAEYC recommended levels. For table 5 the Ready Start program is divided into the two program components, Ready Start classrooms with Pre-K teachers and the Ready Start classrooms taught by Head Start teachers. Both Ready Start components had means well below the NAEYC recommended levels of 1 teacher per 10 children for teacher-child ratio and 20 children per classroom for group size. Pre-K and Head Start had means below the NAEYC recommended levels on both variables as well. Small group sizes and low teacher–child ratios are optimal (National Association for the Education of Young Children, 1998).

Table 5. Observed Group Sizes and Teacher/child Ratios by Program

Program	Class N	Variables	Mean	SD	Min.	Max.	NAEYC Recommended Level
Ready Start (Pre-K)	14						
		Teacher-child ratio	8.29	1.53	4.5	10.0	10
Ready Start (Head Start)	14						
		Teacher-child ratio	8.43	0.96	6.0	9.5	10
		Observed group size	16.86	1.92	12.0	19.0	20
Pre-K	28						
		Teacher-child ratio	9.89	3.69	6.0	21.0	10
		Observed group size	17.63	2.80	12.0	23.0	20
Head Start	9						
		Teacher-child ratio	6.22	1.58	4.33	8.5	10
		Observed group size	15.22	1.48	13.0	17.0	20

Note: Ratios and group sizes are based on observation, not on enrollment data.

Head Start had the lowest mean teacher-child ratio with 1:6.22 and a mean group size of 15.22. The ratios and group sizes were based on actual observation and not on enrollment data. The three programs, Ready Start, Prekindergarten, and Head Start all had excellent means according to NAEYC standards, on these important structural variables. The third structural variable examined, teacher characteristics, included information on teacher education and experience. Table 6 presents teacher education and experience for this study sample with the Ready Start program divided into the two program components, Ready Start

Table 6. Teacher Education and Years of Experience

Characteristics	**PRE-K**		**HEAD START**	
	PRE-K	ReadyStart PRE-K	Ready Start HEAD START	HEAD START
Teacher N=64	27	14	14	9
	%			
Education				
Child Development Associates (CDA)	0	0	100	100
Bachelor Degrees	100	93	0	0
Master Degrees	10	7	0	0
Early Childhood Certification	25	7	NA	NA
Kindergarten Endorsement	32	29	NA	NA
Alternative Certification for Early Childhood	4	0	NA	NA
	Years			
Teaching Experience				
Mean	11.71	7.00	8.79	7.11
SD	11.73	10.38	4.35	6.90

classrooms with Pre-K teachers and the Ready Start classrooms taught by Head Start teachers.

Both Head Start and Ready Start (Head Start) provide programs with 100% of the teachers holding Child Development Associate (CDA) credentials. The CDA is awarded by the Council for Professional Recognition (2005) which oversees the Competency Standards for the one-year training program for early care and education professionals working in center-based, family child care or home visitor programs. There were no teachers in either Head Start program that held college degrees.

The Pre-K program provided teachers with 100% holding bachelor's degrees and 10% with master's degrees. The Ready Start (Pre-K) program provided teachers with 93% holding bachelor's degrees and 7% with master's degrees. The program means for years of teaching experience were 7 years and above, across all programs. The Pre-K teacher means were the highest (M=11.71) for years teaching experience.

<p style="text-align:center">Assessment Profile for Early Childhood
Programs, Research Edition II</p>

In addition to the preceding structural variables, process variables are measured by the Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II) to complete the analysis of classroom environment quality. Process variables include the learning environment, instruction and activities provided, as well as teacher-child interaction and strategies for individualizing.

One-way between-groups analysis of variance (ANOVA) is used to compare mean scale scores of the APRE-II across program models to explore differences in classroom environment. The unequal sample sizes among the program groups (Ready Start combined N=109; Pre-K N=309; Head Start N=77) necessitated the use of the Welch Statistic included in the Robust Tests of Equality of Means. In addition, the Levene Statistic revealed heterogeneity of variances on three of the five scales of the APRE-II. The Welch Test modifies the degrees of freedom to compensate for unequal sample sizes and unequal sample variances. The Welch Statistic revealed statistically significant differences at the $p<0.05$ level for the main effects in the APRE-II scale score means for the three program groups: Learning Environment Scale [$F_{(2,175)}=31.2$, $p=0.00$]; Scheduling Scale [$F_{(2,253)}=22.7$, $p=0.00$]; Curriculum Scale [$F_{(2,175)}=38.2$, $p=0.00$]; Interacting Scale [$F_{(2,166)}=89.6$, $p=0.00$];

Table 7. Assessment Profile for Early Childhood Programs,
Research Edition II

| | Scale Score Means by Program | | | |
		N	Mean	SD	p
Learning Environment Scale	Ready Start	109	62.67	4.71	
	Pre-K	309	58.62	4.49	<0.001
	Head Start	77	60.27	4.17	0.001
Scheduling Scale	Ready Start	109	55.91	2.20	
	Pre-K	309	52.87	7.73	<0.001
	Head Start	77	56.23	2.51	0.651
Curriculum Scale	Ready Start	109	54.79	4.91	
	Pre-K	309	52.81	4.06	0.001
	Head Start	77	49.64	3.51	<0.001
Interacting Scale	Ready Start	109	54.67	4.79	
	Pre-K	309	47.50	5.44	<0.001
	Head Start	77	46.79	7.18	<0.001
Individualizing Scale	Ready Start	109	54.70	4.70	
	Pre-K	309	49.28	6.75	<0.001
	Head Start	77	54.59	0.50	0.966

*$p<0.05$.

Individualizing Scale [$F_{(2,220)}=93.2$, $p=0.00$]. The test indicates that for each of the scales measuring classroom environment (Learning Environment, Scheduling, Curriculum, Interacting and Individualizing), there are statistically significant differences among the three program groups. To determine what kind of differences and where the differences are, post hoc tests are used.

Post-hoc comparisons using Games-Howell (where equal variances are not assumed) indicated that there were statistically significant differences in mean scores when comparing Ready Start to Pre-K and Head Start. The Ready Start group means were higher than Pre-K

and Head Start for each scale of the APRE-II with the exception of the Scheduling and Individualizing Scales. The differences between the mean scores of Ready Start (Scheduling M=55.91, SD=2.20; Individualizing M=54.70, SD=4.70) and Head Start (Scheduling M=56.23, SD=2.51; Individualizing M=54.59, SD=0.50) were not statistically significant. The differences between the mean scores of Ready Start and Pre-K were all statistically significant, with Ready Start presenting higher mean scores. Table 7 shows the complete results.

Summary of Results of Hypothesis 1

Hypothesis 1 states that the Ready Start program will demonstrate higher scores on classroom environment quality, since the design is based on the strengths of both Prekindergarten and Head Start (comparison groups).

To test this hypothesis, both structural and process variables were analyzed to describe and compare classroom environment quality. Structural variables include group size (total number of children in a classroom), teacher-child ratio (number of children per teacher in the classroom), and teacher education and experience (college degree, CDA, certification, number of years teaching). Process variables are operationalized by scale scores from the Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II). The scales include scores on learning environment, scheduling, curriculum, interacting and individualizing.

The analysis of structural variables revealed that compared to Pre-K and Head Start, the Ready Start Program had group sizes and teacher-child ratios higher than the Head Start Program and lower than the Pre-K. Lower scores are preferable, indicating fewer children in a classroom and fewer children per teacher. It should be noted that while there were

differences among the program groups on these two variables, *all three* program groups met professional standards set by the National Association for the Education of Young Children (NAEYC), which indicates excellence for each program on group sizes and teacher-child ratio. Head Start had the lowest teacher-child ratio (M=6.22) and group sizes (M=15.22).

The structural variable labeled, Teacher Characteristics, examined teacher education and teaching experience among the three program groups. Pre-K had the highest percent of teachers with college degrees (100%). Ready Start had 93% teachers with college degrees for half the day and the other half-day with Ready Start (Head Start) teachers without college degrees, but with 100% holding Child Development Associates (CDA) credentials. All three programs had group means of seven years' or more teaching experience. Pre-K had the highest group mean for teaching experience (M=11.71 years).

The classroom observation instrument, APRE-II, measured the process variables describing the classroom environment. Each scale is described as follows:

- Learning Environment – The presence or absence of specific materials related to conceptual areas (e.g., language, math, science, fine motor), the accessibility of materials to the children and the overall arrangement of the classroom.

- Scheduling – Availability of written lesson plans, teacher's advanced preparation, variety of activities and group composition (i.e., individual, small group, whole group activities).

- Curriculum – Teaching methods and the modification of instruction

- Interacting – Teacher responsiveness to children, positive interactions initiated by the teacher, and classroom management.

- Individualizing – Availability of child developmental assessments, use of child assessments for planning individualized learning experiences, procedures for referral for special needs, planned individual parent conferences.

Each classroom receives a mean score for each of the five scales. The results of the one-way between groups ANOVA and post hoc tests indicated that compared to Pre-K, the Ready Start program scored higher on all scales of the APRE-II with differences reaching statistical significance. Compared to Head Start, Ready Start scored higher on the Learning Environment, Curriculum and Interacting Scales. Differences on the Scheduling and Individualizing Scales did not reach statistical significance.

<p style="text-align:center"><u>Hypothesis 2</u></p>

Hypothesis 2 states that standardized test scores of Ready Start children will meet or exceed those of Prekindergarten and Head Start children. Multivariate Analysis of Covariance (MANCOVA) was used to test this hypothesis. The analyses compare program groups on child outcome variables represented by the scale scores of the Preschool Language Scale-3 (PLS-3) and the Developing Skills Checklist (DSC). For the PLS-3 the Total N=495 was reduced to 474 with the deletion of cases missing scores (Ready Start, -9; Pre-K, -12; Head Start, 0). For the DSC the Total N=495 was reduced to 469 with the deletion of cases missing scores (Ready Start, -9; Pre-K, -15; Head Start, -2). The small number of non-Hispanic and non-black children necessitated the collapse of the separate Caucasian and Asian categories to a single category labeled Caucasian and Other.

MANCOVA is used to compare child outcomes across programs, controlling for the initial differences of groups. Pretest scores on the PLS-3 and the DSC serve as covariates;

program groups, ethnicity and gender are the independent variables; and PLS-3 and DSC scale scores serve as dependent variables.

The PLS-3 has two standardized subscales, auditory comprehension and expressive communication. Indicators are used to assess precursors to language comprehension such as focused attention and attentiveness to sound. The auditory comprehension subscale measures attention, semantics, structure and integrative thinking skills. The expressive communication subscale includes items measuring vocal development, social communication, integrative thinking skills (logical expressive communication) and the structure and semantics of expressive language including vocabulary. Standard scores are used in the analyses of the PLS-3.

The Developing Skills Checklist (DSC) is an individually administered, standardized assessment measuring behaviors and skills that children typically develop between prekindergarten and kindergarten. The portion of the checklist used for this study is composed of scales measuring mathematical concepts, memory, auditory skills, print concepts and writing skills. Raw scores are entered into the analyses of the DSC, since the standard scores yield percentiles.

The following section presents the PLS-3 child outcome results by program.

Preschool Language Scale-3 (PLS-3)

A multivariate analysis of covariance was performed to investigate differences among programs in child outcomes on preschool language skills. Two dependent variables were used: standard scores on auditory comprehension and expressive communication subscales of the PLS-3. The independent variables were program, ethnicity and gender. Pretest scores on the PLS-3, gathered early in the school year, served as covariates. Multivariate tests showed

overall significant effects for Program, Roy's LR=.016, F(2,454)=3.652, p=.027; Ethnicity, Roy's LR=.015, F(2,454)=3.485, p=.031; and the Program and Ethnicity interaction, Roy's LR=.011, F(4,454)=2.732, p=.029.

In subsequent tables, pretest scores and standard deviations are presented for each program as well as actual posttest means and standard deviations. The estimated posttest scores and standard errors are calculated using MANCOVA, which adjusts for differences in program pretest means and controls for the other independent variables.

PLS-3 Auditory Comprehension Scale

The multivariate analysis of covariance summary statistics for the PLS-3 Auditory Scale are presented in table 8.

Table 8. Multivariate Analysis of Covariance Summary
Table for PLS-3 Auditory Scores

Independent Variable	SS	df	MS	F	p
Program	1332.163	2	666.082	3.226	0.041
Ethnicity	1304.537	2	652.268	3.159	0.043
Gender	985.224	1	985.224	4.771	0.029
Program*Ethnicity	1691.964	4	422.991	2.048	0.087
Program*Gender	911.407	2	455.703	2.207	0.111
Program*Ethnicity*Gender	889.051	4	222.263	1.076	0.368
Error	93748.282	454	206.494		
Total	3868486.000	474			

*General Linear Model (MANCOVA) (p<.05) (Covariates: PLS-3 Auditory pretest, PLS-3 Expressive pretest)

The table shows statistically significant effects for Program, F(2,454)=3.226, p=0.041, Ethnicity F(2,454)=3.159, p=0.043, and Gender, F(1,454)=4.771, p=0.029. The interactions are non-significant.

Of primary interest is the indication of statistical significance among program groups. Table 9 shows the PLS-3 Auditory pretest scores, actual posttest scores, and the estimated posttest scores controlling for initial differences in pretest scores.

Table 9. PLS-3 Auditory Scale Means and Standard Deviations by Program*

| Program Posttest N | Pretest | | Posttest | | |
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	71.60	15.14	88.06	18.59	93.33
Pre-K (N=294)	71.23	12.74	88.91	17.48	89.16
Head Start (N=75)	75.56	16.07	88.30	16.43	85.90
Total (N=469)	71.99	13.91	88.63	17.52	

*General Linear Model (MANCOVA) (p<.05) (Covariates: PLS-3 Auditory pretest= 71.74, PLS-3 Expressive pretest=70.20)

Post hoc tests revealed a statistically significant difference between Ready Start (M=93.33) and Head Start (M=85.90) on PLS-3 Auditory estimated posttest means. The test suggested non-significant differences between Ready Start (M=93.33) and Pre-K (M=89.16), as well as Pre-K (M=89.16) and Head Start (M=85.90) on estimated posttest means. This indicates that on average, Ready Start children scored as high as Pre-K children and exceeded the estimated posttest scores of Head Start children on the PLS-3 Auditory scale measuring auditory comprehension.

On further investigating the statistically significant effects of ethnicity on the PLS-3 Auditory estimated posttest scores, there was a statistically significant difference between Caucasian and Other estimated posttest scores (M=94.14) and Hispanic (M=87.58), and African American (M=86.68) scores across programs. There was no statistical difference between Hispanic and African American scores.

The significant between-subjects effect for gender was not further investigated since the overall Multivariate test was non-significant for gender.

PLS-3 Expressive Communication Scale

The multivariate analysis of covariance summary statistics for the PLS-3 Expressive Communication Scale are presented in table 10. The subscale showed statistical non-significance among program groups on all between-subjects tests for main effects and interaction effects. Table 11 shows the pretest, actual posttest, and estimated posttest mean scores.

Table 10. Multivariate Analysis of Covariance Summary
Table for PLS-3 Expressive Scores*

Independent Variable	SS	df	MS	F	p
Program	1172.192	2	586.096	2.110	0.122
Ethnicity	62.321	2	31.161	0.112	0.894
Gender	68.175	1	68.175	0.245	0.621
Program*Ethnicity	2085.650	4	521.412	1.877	0.113
Program*Gender	707.803	2	353.901	1.274	0.281
Program*Ethnicity*Gender	2065.607	4	516.402	1.859	0.117
Error	126099.557	454	277.752		
Total	3880406.000	474			

*General Linear Model (MANCOVA) (p<.05) (Covariates: PLS-3 Auditory pretest, PLS-3 Expressive pretest)

Although Ready Start estimated posttest scores are the highest (M=91.52), Pre-K (M=88.93), and Head Start (M=84.89), there is no significant statistical difference among groups. This indicates that on average, Ready Start children scored as high as Pre-K and Head Start on the PLS-3 Expressive subscale measuring expressive communication. Ethnicity showed no statistically significant effect on the subscale scores.

Table 11. PLS-3 Expressive Scale Means and Standard Deviations by Program*

Program Posttest N	Pretest		Posttest		
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	71.28	15.00	90.15	19.75	91.52
Pre-K (N=294)	69.22	14.96	87.42	20.33	88.93
Head Start (N=75)	74.51	17.66	88.77	19.93	84.89
Total (N=469)	70.50	15.50	88.22	20.14	

*General Linear Model (MANCOVA) (p<0.05) (Covariates: PLS-3 Auditory pretest= 71.74, PLS-3 Expressive pretest=70.20)

Developing Skills Checklist (DSC)

A multivariate analysis of covariance was performed to investigate differences among programs in child outcomes on preschool skills. Five dependent variables were used: raw scores on mathematical concepts, memory, auditory skills, print concepts and writing subscales of the DSC. The independent variables were program, ethnicity and gender. Pretest scores on the DSC, gathered early in the school year, serve as covariates. Multivariate tests showed overall significant effects for Program, Roy's LR=0.134, $F(5,443)=11.895$, p=0.000; Ethnicity, Roy's LR=0.037, $F(5,443)=0.037$, p=0.006; Gender, Roy's LR=0.055, $F(5,442)=4.827$, p=0.000; and the Program and Ethnicity interaction, Roy's LR=0.047, $F(5,445)=4.176$, p=0.001.

Tables are presented comparing each set of scale means of the DSC across programs. Pretest scores and standard deviations are presented for each program as well as actual posttest means and standard deviations. The estimated posttest scores are calculated using MANCOVA, which adjusts for differences in program pretest means and controls for the

other independent variables. The estimated posttest means are the scores of interest. The next sections present results from each of the scales of the DSC.

<u>DSC Mathematical Concepts Scale</u>

The multivariate analysis of covariance summary statistics for DSC Mathematical Concepts are presented in table 12. The table shows statistically significant effects for Program, $F(2,446)=15.872$, $p<0.001$, Gender, $F(1,446)=0.878$, $p<0.001$, and a Program and Ethnicity interaction effect, $F(4,446)=2.828$, $p=0.024$. The other main effect and interactions are non-significant.

Table 12. Multivariate Analysis of Covariance Summary Table
for DSC Math Scores

Independent Variable	SS	df	MS	F	p
Program	811.201	2	405.601	15.872	<0.001
Ethnicity	121.803	2	60.902	2.383	0.093
Gender	0.607	1	0.607	0.878	<0.001
Program*Ethnicity	289.049	4	72.262	2.828	0.024
Program*Gender	28.640	2	14.320	0.560	0.571
Ethnicity*Gender	5.757	2	2.879	0.113	0.893
Program*Ethnicity*Gender	96.844	4	24.211	0.947	0.436
Error	11397.148	446	25.554		
Total	245731.000	469			

*General Linear Model (MANCOVA) (p<0.05) (Covariates: DSC Math pretest, DSC Memory pretest, DSC Auditory pretest, DSC Print pretest, DSC Writing pretest)

To explore the differences suggested by the significant program effects, table 13 presents pretest, actual posttest, and estimated posttest scores on the DSC Math Scale by program. The estimated posttest means are calculated in MANCOVA to control for the initial differences in pretest scores.

Table 13. DSC Math Scale Means and Standard Deviations by Program*

Program Posttest N	Pretest		Posttest		
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	12.15	6.85	21.99	6.71	24.67
Pre-K (N=294)	15.53	7.78	22.75	6.40	21.80
Head Start (N=75)	12.39	7.94	17.89	8.04	18.91
Total (N=469)	14.30	7.76	21.81	6.95	

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest mean= 14.22, DSC Memory pretest=5.39, DSC Auditory pretest=6.20, DSC Print pretest=7.61, DSC Writing pretest=4.60)

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=24.67) and Pre-K (M=21.80), and Ready Start (M=24.67) and Head Start (M=18.91) with Ready Start scoring higher on both comparisons. The Pre-K (M=21.80) and Head Start (M=18.91) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children exceeded the scores of Pre-K and Head Start children on the DSC Math Scale measuring mathematical concepts.

Further investigation of the significant effect for gender using pairwise comparisons showed no significant differences in overall scores between males and females for the DSC Math Scale.

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=16.71) and Pre-K (M=12.08), and Ready Start (M=16.71) and Head Start (M=9.14) with Ready Start scoring higher on both comparisons. The Pre-K (M=12.08) and Head Start (M=9.14) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children exceeded the scores of Pre-K and Head Start children on the DSC Memory Scale.

Table 14. Multivariate Analysis of Covariance Summary Table
for DSC Memory Scores

Independent Variable	SS	df	MS	F	p
Program	1361.941	2	680.970	18.542	<0.001
Ethnicity	165.118	2	82.559	2.248	0.107
Gender	53.917	1	53.917	1.468	0.226
Program*Ethnicity	420.253	4	105.063	2.861	0.023
Program*Gender	9.757	2	4.878	0.133	0.876
Ethnicity*Gender	5.115	2	2.557	0.070	0.933
Program*Ethnicity*Gender	30.167	4	7.542	0.205	0.935
Error	16379.863	446	36.726		
Total	98671.000	469			

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest, DSC Memory pretest, DSC Auditory pretest, DSC Print pretest, DSC Writing pretest)

The multivariate analysis of covariance summary statistics for the DSC Memory Scale are presented in table 14. The table shows a statistically significant Program effect, $F_{(2,446)}=18.54$, $p<0.001$, and a Program and Ethnicity interaction effect, $F_{(4,446)}=2.86$, $p=0.02$. The other main effects and interactions are non-significant.

Table 15. DSC Memory Scale Means and Standard Deviations by Program*

	Pretest		Posttest		
Program Posttest N	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	3.95	3.59	13.37	6.99	16.71
Pre-K (N=294)	6.29	5.51	13.10	7.53	12.08
Head Start (N=75)	4.53	4.64	8.11	7.34	9.14
Total (N=469)	5.50	5.12	12.36	7.61	

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest mean= 14.22, DSC Memory pretest=5.39, DSC Auditory pretest=6.20, DSC Print pretest=7.61, DSC Writing pretest=4.60)

To explore the differences suggested by the significant program effects, table 15 presents pretest, actual posttest, and estimated posttest scores on the DSC Memory Scale by program. The estimated posttest means are calculated in MANCOVA to control for the initial differences in pretest scores.

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=16.71) and Pre-K (M=12.08), and Ready Start (M=16.71) and Head Start (M=9.14) with Ready Start scoring higher on both comparisons. The Pre-K (M=12.08) and Head Start (M=9.14) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children exceeded the scores of Pre-K and Head Start children on the DSC Memory Scale.

Of particular interest is the statistically significant interaction effect between program and ethnicity. For the DSC Memory Scale estimated posttest means by ethnicity within programs, in the Ready Start program, Caucasian and Other category of children scored the highest (M=22.40) among ethnicities, with the overall Ready Start score (M=16.71). In the Pre-K program, African American children scored highest (M=12.63) among ethnicities with the overall Pre-K score (M=12.08). In the Head Start program, African American children scored highest (M=9.67) among ethnicities with the overall Head Start score (M=9.14).

For the DSC Memory Scale estimated posttest means by ethnicity across programs: Among Caucasian and Other category of children scores were highest in the Ready Start program (M=22.40); Among Hispanic children scores were highest in the Ready Start program (M=14.32); and among African American children scores were highest in the Ready Start program (M=13.41). With these within and among program comparisons comes a

suggestion of what programs work well with whom as interpreted on the DSC Memory Scale.

DSC Auditory Scale

The multivariate analysis of covariance summary statistics for the DSC Auditory Scale are presented in table 16. The table shows statistically significant main effects for Program, $F (2,446)=5.390$, $p=0.005$, and Ethnicity, $F(2,446)=5.225$, $p=0.006$. The other main effects and interactions are non-significant.

Table 16. Multivariate Analysis of Covariance Summary Table
for DSC Auditory Scores

Independent Variable	SS	df	MS	F	p
Program	147.650	2	73.825	5.390	0.005
Ethnicity	143.132	2	71.566	5.225	0.006
Gender	9.492	1	9.492	0.693	0.406
Program*Ethnicity	68.729	4	17.182	1.254	0.287
Program*Gender	5.050	2	2.525	0.184	0.832
Ethnicity*Gender	39.243	2	19.621	1.432	0.240
Program*Ethnicity*Gender	29.471	4	7.368	0.538	0.708
Error	6109.265	446	13.698		
Total	48515.000	469			

*General Linear Model (MANCOVA) (p<0.05) (Covariates: DSC Math pretest, DSC Memory pretest, DSC Auditory pretest, DSC Print pretest, DSC Writing pretest)

To explore the differences suggested by the significant program effects, table 17 presents pretest, actual posttest, and estimated posttest scores on the DSC Auditory Scale by program. The estimated posttest means are calculated in MANCOVA to control for the initial differences in pretest scores.

Table 17. DSC Auditory Scale Means and Standard Deviations by Program*

Program Posttest N	Pretest		Posttest		
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	5.52	4.35	8.72	4.49	9.90
Pre-K (N=294)	6.75	4.16	9.77	4.26	9.66
Head Start (N=75)	5.65	4.69	7.41	4.37	7.90
Total (N=469)	6.31	4.32	9.17	4.40	

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest mean= 14.22, DSC Memory pretest=5.39, DSC Auditory pretest=6.20, DSC Print pretest=7.61, DSC Writing pretest=4.60)

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=9.90) and Head Start (M=7.90) with Ready Start scoring higher. There was no statistical difference between the Ready Start estimated mean (M=9.90) and Pre-K (M=9.66). Head Start (M=7.90) and Pre-K (M=9.66) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children scored as high as Pre-K children and exceeded the scores of Head Start children on the DSC Auditory scale.

On further investigating the statistically significant effects of ethnicity on the overall DSC Auditory estimated posttest scores, there was a statistically significant difference between Hispanic (M=8.30) and African American (M=9.74) scores. Differences between Caucasian and Other estimated posttest scores (M=9.42) and Hispanic (M=8.30) and African American (9.74) scores were non-significant. This finding suggests that for the DSC Auditory scale, on average, African American children scored the highest across programs.

DSC Print Scale

The multivariate analysis of covariance summary statistics for the DSC Print Scale is presented in table 18. The table shows a statistically significant Program effect, $F(2,446)=18.207$, $p<0.001$, and a Program and Ethnicity interaction effect, $F(4,446)=4.506$, $p=0.001$. The other main effects and interactions are non-significant.

Table 18. Multivariate Analysis of Covariance Summary Table
for DSC Print Scores

Independent Variable	SS	df	MS	F	p
Program	376.839	2	188.419	18.207	<0.001
Ethnicity	0.948	2	0.474	0.046	0.955
Gender	8.165	1	8.165	0.789	0.375
Program*Ethnicity	186.532	4	46.633	4.506	0.001
Program*Gender	9.044	2	4.522	0.437	0.646
Ethnicity*Gender	5.014	2	2.507	0.242	0.785
Program*Ethnicity*Gender	14.458	4	3.615	0.349	0.845
Error	4615.532	446	10.349		
Total	76479.000	469			

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest, DSC Memory pretest, DSC Auditory pretest, DSC Print pretest, DSC Writing pretest)

To explore the differences suggested by the significant program effects, table 19 presents pretest, actual posttest, and estimated posttest scores on the DSC Print Scale by program. The estimated posttest means are calculated in MANCOVA to control for the initial differences in pretest scores.

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=14.16) and Pre-K (M=11.69), and Ready Start (M=14.16) and Head Start (M=10.17) with Ready Start scoring higher on both comparisons. Pre-K (M=11.69) and

Table 19. DSC Print Scale Means and Standard Deviations by Program*

Program Posttest N	Pretest		Posttest		
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	7.19	3.15	12.55	3.76	14.16
Pre-K (N=294)	7.91	3.21	12.47	4.06	11.69
Head Start (N=75)	7.04	3.62	9.91	4.34	10.17
Total (N=469)	7.62	3.29	12.08	4.15	

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest mean= 14.22, DSC Memory pretest=5.39, DSC Auditory pretest=6.20, DSC Print pretest=7.61, DSC Writing pretest=4.60)

Head Start (M=10.17) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children exceeded the scores of Pre-K and Head Start children on the DSC Print Scale.

Of particular interest is the statistically significant interaction effect between program and ethnicity. For the DSC Print Scale estimated posttest means by ethnicity within programs, in the Ready Start program, Caucasian and Other category of children scored the highest (M=16.78) among ethnicities, with the overall Ready Start score (M=14.16). In the Pre-K program, African American children scored highest (M=12.31) among ethnicities with the overall Pre-K score (M=11.69). In the Head Start program, African American children scored highest (M=11.47) among ethnicities with the overall Head Start score (M=10.17).

For the DSC Print Scale estimated posttest means by ethnicity across programs: Among Caucasian and other category of children scores were highest in the Ready Start program (M=16.78); Among Hispanic children scores were highest in the Ready Start program (M=13.48); and among African American children scores were highest in the Pre-K

program (M=12.31). With these within and among program comparisons comes a suggestion

of what programs work well with whom as interpreted on the DSC Print Scale.

DSC Writing Skills Scores

The multivariate analysis of covariance summary statistics for the DSC Writing Scale

is presented in table 20. The table shows statistically significant effects for Program,

$F(2,446)=22.154$, $p<.001$, Gender, $F(1,446)=14.141$, $p<0.001$, and an Ethnicity and Gender

interaction effect, $F(2,446)=5.461$, $p=0.005$. The other main effects and interactions are non-

significant.

Table 20. Multivariate Analysis of Covariance Summary Table
for DSC Writing Scores*

Independent Variable	SS	df	MS	F	p
Program	552.308	2	276.154	22.154	<0.001
Ethnicity	21.745	2	10.872	0.872	0.419
Gender	176.269	1	176.269	14.141	<0.001
Program*Ethnicity	85.026	4	21.256	1.705	0.148
Program*Gender	7.572	2	3.786	0.304	0.738
Ethnicity*Gender	136.132	2	68.066	5.461	0.005
Program*Ethnicity*Gender	30.643	4	7.661	0.615	0.652
Error	5559.453	446			
Total	76479.000	469			

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest, DSC
Memory pretest, DSC Auditory pretest, DSC Print pretest, DSC Writing pretest)

To explore the differences suggested by the significant Program effects, table 21

presents pretest, actual posttest, and estimated posttest scores on the DSC Writing Scale by

program. The estimated posttest means are calculated in MANCOVA to control for the initial

differences in pretest scores.

Post hoc comparisons revealed a statistically significant difference between Ready Start (M=10.38) and Head Start (M=6.63) with Ready Start scoring higher. There was no

Table 21. DSC Writing Scale Means and Standard Deviations by Program*

Program Posttest N	Pretest		Posttest		
	Mean	SD	Actual Mean	SD	Estimated Mean
Ready Start (N=100)	3.88	2.68	9.12	4.08	10.38
Pre-K (N=294)	4.95	2.87	10.24	3.51	10.08
Head Start (N=75)	4.53	3.23	6.60	4.39	6.63
Total (N=469)	4.65	2.92	9.42	4.00	

*General Linear Model (MANCOVA) (p<.05) (Covariates: DSC Math pretest mean= 14.22, DSC Memory pretest=5.39, DSC Auditory pretest=6.20, DSC Print pretest=7.61, DSC Writing pretest=4.60)

statistical difference between the Ready Start estimated mean (M=10.38) and Pre-K (M=10.08). Head Start (M=6.63) and Pre-K (M=10.08) estimated scores showed statistically significant differences as well. This suggests that on average, Ready Start children scored as high as Pre-K children and exceeded the Head Start children on the DSC Writing scale.

Upon further investigation, the significant effect for gender revealed that for the DSC Writing Scale, estimated mean scores for females (M=10.03) were significantly higher than scores for males (M=8.03). The DSC Writing Scale is the only scale tested to show statistically significant differences between females and males.

Of interest is the statistically significant interaction effect between ethnicity and gender. For the DSC Writing Scale overall estimated posttest means, Caucasian and other, females showed the highest mean (M=12.13) and Caucasian and other males showed the lowest mean (M=7.07). Hispanic females (M=9.15) scored higher than Hispanic males

(M=8.59). African American females (M=8.82) scored higher than African American males (M=8.42).

<div align="center">Summary of Results of Hypothesis 2</div>

Hypothesis 2 states that standardized test scores of Ready Start children will meet or exceed those of Pre-K and Head Start children. The MANCOVA results statistically supported this hypothesis. For the two subscales of the PLS-3 and the five scales of the DSC, Ready Start scores did meet or exceed the scores for the comparison groups on the posttest means controlling for pretest scores. For the total of 7 scales, there were statistically significant differences between Ready Start and Pre-K on estimated means of DSC Math, DSC Memory and DSC Print scales, with Ready Start presenting higher scores. The other four scales showed Ready Start with higher scores, but not high enough to show statistical significance.

For the total of 7 scales, there were statistically significant differences between Ready Start and Head Start on estimated means of PLS-3 Auditory Comprehension, DSC Math, DSC Memory, DSC Auditory, DSC Print and DSC Writing scales, with Ready Start presenting higher scores. The PLS-3 Expressive Communication scale showed Ready Start with a higher score, but with no statistically significant difference. The scores for the PLS-3 are presented as standard scores. The scores on the DSC are the raw scores, so that the magnitude of the scores between the PLS-3 and DSC are not comparable.

CHAPTER VII

DISCUSSION

The present research study provides a comparative analysis to examine the classroom environments (employing both structural and process variables) and child developmental outcomes across three program models that serve children living in low-income families. In the literature, it is rare to find early intervention studies comparing classroom environments, as well as comparing the same standardized child assessments across three different program models, allowing for comparability of outcomes. The results should be of interest to early educators and policy makers in developing and enhancing early childhood programs to meet the needs of children from low-income families. Chapter 7 explores the findings of this study in the following sections: (1) summarizing the findings within each hypothesis, (2) presenting limitations of this study, (3) considering implications for social work, and (4) suggesting areas for future research.

<u>Summary of Findings</u>

Two long standing early intervention programs, Head Start and Pre-K, are used as comparison groups to compare classroom environment and child outcomes with an innovative collaboration known as Ready Start, a combination program serving children with a half day of Pre-K and a half day of Head Start. The Ready Start program is of interest because Pre-K and Head Start have joined together to bridge a gap in serving the needs of children from low-income families. The strength of Head Start is a strong social

76

services component to provide supportive services to children of low-income families. The theoretical base of Head Start recognizes that for children from poverty level families to be ready for the demands of formal schooling, the basic needs of the child and the child's family must be met. The strength of Pre-K is a focus on early literacy skill development facilitated by college-educated teachers.

The concept of Ready Start recognizes that the school district provides expertise in education with certified teachers and the setting that eases the transition to formal education. At the same time, there is recognition that Head Start provides expertise and resources necessary to meet the medical and social service needs of children from low-income families. If Ready Start favorably compares in classroom environment and child outcomes to Pre-K and Head Start, then the combination appears to be an answer to fully meeting the needs of children from low income families with the best available resources.

<div align="center">Comparison of Classroom Environments
by Program</div>

The first hypothesis involved the comparison of classroom environments across program models. It was hypothesized that the Ready Start program would demonstrate higher scores on classroom environment quality, since the design is based on the strengths of both Pre-K and Head Start (comparison groups).

This hypothesis was not completely supported.

For the structural variables, group size and teacher-child ratio, all three programs were well within the NAEYC published standards indicating excellence on these variables for each program. Head Start had the lowest means on these variables, where lower scores are optimal.

For teacher education, Pre-K children had college-educated teachers for the full program day, while Ready Start children had college educated teachers for half the day and CDA credentialed teachers (none with college degrees) for half the day. Head Start children had CDA credentialed teachers (none with college degrees) for the full program day. College education, preferably in early childhood specializations, is optimal.

The means for teacher experience were over seven years for each program, with Pre-K teachers averaging the most years experience (M=11.71). For structural variables, Ready Start did not *exceed* the other programs, but compared well to NAEYC professional standards.

The results of the ANOVA run on the scales of the Assessment Profile for Early Childhood Programs, Research Edition II (APRE-II), found Ready Start with highest means among the programs on each scale assessing the classroom environment with the exception of non-significant differences between Ready Start and Head Start on the Scheduling and Individualizing scales.

Of particular interest are the mean scores on the Interacting scale, considering the importance expressed in the early childhood literature on teacher-child interactions. Scale scores on the APRE-II can be compared to a national sample utilizing a mean score of 50 and standard deviation of 10. All three programs scored within 1 point of the mean or above the mean on all scales except Interacting. The Interacting scale means were as follows: Ready Start (M=54.67), Pre-K (M=47.50), and Head Start (M=46.79). Although the scores are within half a standard deviation from the mean, the two lower scores suggest the need for more teacher training in the area of interacting.

To summarize the results of the testing of hypothesis 1, comparing classroom environments, Ready Start did not exceed the means of Pre-K and Head Start on every structural and process variable. Pre-K had teachers with the most education and years of teaching experience. Head Start had the lowest group sizes and teacher-child ratios, where lower scores are optimal. Ready Start had the highest scores on Learning Environment, Curriculum and Interacting scales, with the mean differences on Scheduling and Individualizing statistically non-significant.

Each of these variables has shown to be an important part of quality supportive environments (Arnett, 1989; National Research Council, 2001; Kontos & Wilcox-Herzog, 1997; Landry, 2005). Perhaps most controversial, is the call by the National Research Council (2001) to require the teachers of young children to have a college degree with specialized course work in early childhood education and development. "In addition, all early childhood teachers should have some course work focused on creating inclusive classrooms for children with special needs and children who are culturally and linguistically diverse." (p. 276)

In reality, we are far from that goal. There is no national infrastructure to finance or implement such requirements across programs, but there are proposed changes on the horizon. Prekindergarten teachers are required to have college degrees and average salaries are commensurate with all other teaching faculty, averaging over $40,000 a year (Texas Education Agency, 2002). Head Start teachers with CDA credentials earned $17, 514 and BA degrees averaged $22,651 (Child Care Associates, 2002). It is little wonder that teachers with degrees would seek teaching opportunities with the school district.

Currently, (S.1107) "Head Start Improvements for School Readiness Act" is in the U.S. Senate Health, Education, Labor and Pensions Committee. Included in this bill is the requirement that by 2011, 50% of teachers in each Head Start center must have a BA degree or if state prekindergarten teacher requirements are higher, must meet teacher requirements for state prekindergarten programs. These are worthy goals, but with the requirements must come adequate funding to make these changes a reality. Funding must be made available to compensate Head Start teachers holding degrees, salaries commensurate with prekindergarten teachers.

The analyses comparing classroom environments provide information on the degree these programs are providing high quality, supportive environments. Overall, these three programs had structural and process scores that compare very well with NAEYC professional standards.

Comparison of Child Outcomes by Program

The second hypothesis involved the comparison of child outcomes across program models. It was hypothesized that the standardized test scores of Ready Start children would meet or exceed those of Pre-K and Head Start. The data supported this hypothesis as reported in the summary of the Results section.

The analyses of child outcome data suggest that Ready Start children score at least as well as Pre-K and Head Start children and in some areas, better. The importance of this finding is that Ready Start favorably compares in classroom environment and child outcomes to Pre-K and Head Start.

Ready Start provides the strong social services component of Head Start to provide supportive services to children of low-income families, recognizing that for children from

poverty level families to be ready for the demands of formal schooling, the basic needs of the child and the child's family must be met. With this, Ready Start combines the strength of Pre-K that provides expertise in education with certified teachers (for half the day) and the setting that eases the transition to formal education.

The Ready Start program is a positive example of collaborative efforts between two programs with separate funding, separate requirements and regulations, and separate governance coming together to more fully meet the needs of children from low income families with the best available resources, at least for the present.

Goals for the future should include a national infrastructure that replaces the patchwork of programs and policies for early education and intervention. School readiness should be operationalized across programs, since there is no one set of standards that comprise school readiness. As universal access to prekindergarten becomes a reality, the supportive services needed for children from low-income families must not be ignored.

<div align="center">Limitations of the Study</div>

As with all studies, several limitations pervade this research project. A more powerful study would have included an experimental design with random assignment of children to program models. Without random assignment, the study is open to internal threats to validity. The use of pretest scores as covariates in the child outcome variables control for the initial cognitive differences in the program groups, which add strength to a quasi-experimental design. It does not, however, control for individual differences in family and neighborhood environments, parental education or motivation that may effect cognitive development over the year. The absence of this data and the lack of random assignment to groups does not allow for causal inference.

This study assessed cognitive domains of development and excluded other areas important to child development, such as social-emotional and physical domains. A more complete picture of child outcomes would have included these domains.

The sample for this study draws from a population consisting of children enrolled in publicly funded early intervention programs in a large city in Texas. It would be inadvisable to generalize the findings beyond the study population.

<div align="center">Implications for Social Work</div>

The origins of early childhood education interventions predate the Head Start initiative of the 1960s. In Emily Cahan's work, *Past Caring: A History of U.S. Preschool Care and Education for the Poor, 1890-1965*, the infant school movement dating back to the Industrial Revolution, demonstrates "the strength of beliefs in the promise of education as a means of compensating for or rising out of poverty" (Cahan, 1989, p. 9). In the United States, as early as 1828, "The hope was to eradicate poverty with aid from the Infant Schools in three generations" (Cahan, 1989, p. 11). Public support for early education and care has waxed and waned over two centuries, generally with periods of support being tied to pressing economic and social needs.

In the past, social workers have had a part in the evolution of compensatory early education, sometimes in the role of supporter and sometimes in the role of detractor. In the infancy of the social work profession, Jane Addams sponsored a day nursery program at Hull House for 16 years. Early in the 20th century social caseworkers were integrated into day nursery programs as a part of the provision of assistance to the poor. Despite the fact that the social work profession is not sufficiently involved in current early childhood education intervention programs, such as prekindergarten and Head Start (Frankel, 1997), the

profession's emphasis on person -in-environment is a logical fit with an interest in the provision of quality supportive environments for young children from economically disadvantaged families. Frankel (1997) points out that "clearly the families served by Head Start are indistinguishable from the populations served by the social work profession" (p. 173). State-funded prekindergarten programs serve children from families with similar characteristics.

Social workers have the potential to be leaders in advocating for the needs of children and their families. The knowledge base of the profession provides expertise that should influence the formation of public policy. The profession recognizes that all children have needs that must be met if they are to develop and learn at their best. One issue that should be of concern is the high rate of poverty among American children. Young children are the poorest members of this society with over 1 in 5 living at or below the federal poverty guidelines (National Center for Children in Poverty, 1999, 2005).

Though Americans are fond of reciting that children are our future, effective effort is lacking in creating and supporting policies that ensure that future. Rickel and Becker (1997) suggest:

> The solutions lie in the convergence of the multiple systems serving children and families, including the legislative, judicial, executive, direct services and research endeavors. All of these primary systems must work together to provide optimal ways to promote competence and health in our children. (p. 176)

In this quote, social workers are not mentioned directly, but their presence may be inferred in the direct services and research categories. The call for multidisciplinary problem solving warrants the input and support of social workers for the benefit of children.

The social work profession is poised in a unique and important position. Expertise in working with low-income children and families provides an avenue for information that policy makers need to make informed decisions. No time is more urgent than the present. Decisions are still being made about funding that directly effect low-income children. As of this writing, additional funding for Head Start is being debated in Congress. The states have broad latitude in program design and control funding for expanded prekindergarten programs. Not just more early education, but quality early education is an important issue to be addressed.

Recent work in the neurosciences has targeted early childhood as a critical period in brain development, spawning questions about reallocation of funds and resources to this age group (Shore, 1997). This is a critical period for input from the social work profession on the types of programs that would be beneficial to this age group. Social workers can advocate for programs that combine fully trained and educated faculty with health and social services designed to address the needs of young children from low income families.

<u>Suggestions for Future Research</u>

An important future study would be a cost analysis of the three program models to determine the feasibility of expanding the Ready Start model to serve more children from low income families with certified teachers and needed medical and social services.

To gain information for the purpose of program evaluation, the raw scores from the APRE-II could be analyzed and compared across the three programs to tease out specific differences in classroom environment and teacher practices. The analysis would also provide the individual programs with information on specific strengths and weaknesses to target for teacher training purposes.

Conclusion

The knowledge base of the social work profession supports involvement in the issues of child poverty and educational environments tailored to the needs of young children. Abraham Maslow's Hierarchy of Needs describes the provision of the basic essentials of life as the minimum requirement for self-actualization. The work of Uri Bronfenbrenner (1979, 1989) emphasizes the ecological systems that surround individuals that have notable effects on development. Part of the system is a high rate of child poverty. Part of the solution can be a targeted response by the social work profession to advocate for the needs of vulnerable children in the context of the provision of quality supportive educational environments that have been shown to produce the best child outcomes. This study offers important information on quality classroom environments and child outcomes, based on standardized measures, of three program models that provide early education to children living in low-income families.

APPENDIX A

EARLY LEARNING LEFT OUT

TEXAS

Brain Growth and Public Investments by Child Age

Brain Growth
Public Investment
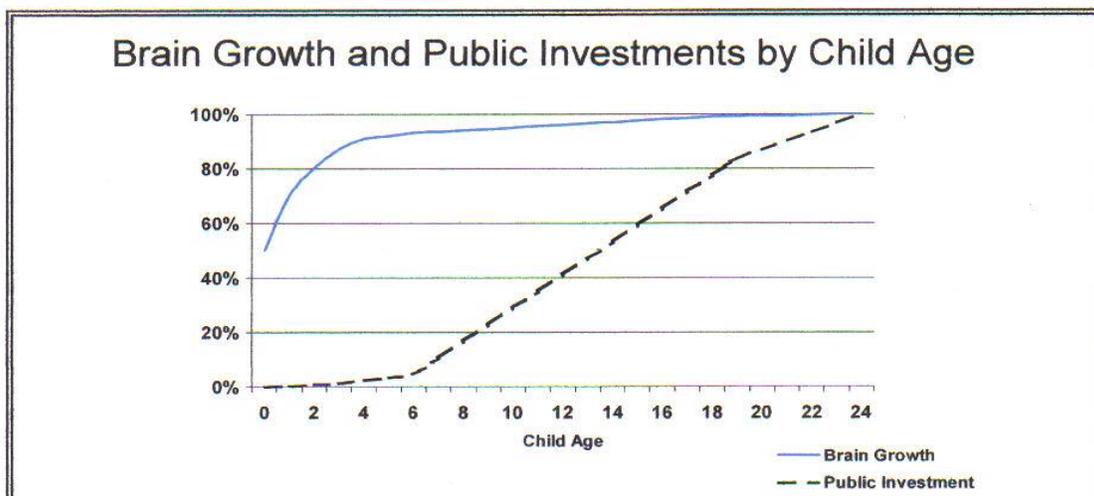
Total and Per Child Spending by Child Age

	total in millions of dollars			2003	per child spending in dollars		
Child Age	State and Local	Federal	Total	Number of Children	Per Child State and Local	Per Child Federal	Per Child Total
Infants and Toddlers (0-2)	$60.37	$437.19	$497.56	1,069,442	$56.45	$408.80	$465.26
Preschoolers (3-5)	$463.85	$821.96	$1285.80	1,050,523	$441.54	$782.43	$1,223.97
School-aged Children (6-18)	$27,505.58	$2,866.22	$30,371.80	4,404,757	$6,249.56	$650.71	$6,895.23
College-aged Youth (19-23)	$4,348.24	$1,939.25	$6,287.49	1,665,150	$2,611.32	$1,164.61	$3,775.93

Characteristics of Young Children and Families with Young Children (2000 Census)

	Total	Both/Only Parent Working	% Parents Working		% in Poverty	% <185% of Poverty
Children 0-5 with Two Parents	1,335,137	623,934	46.7%	Families with Child 0-4	20.7%	43.7%
Children 0-5 with One Parent	492,732	104,919	76.9%	Families with Child 5-17 Only	8.9%	22.2%
All Children 0-5	1,827,869	974,015	53.3%			

Early Childhood Services Information

2003 Mean Wage Rates	Hourly	Annual		# of Children	% of Age Population
All Jobs	$16.54	$34,390	Infants and Toddlers Enrolled in Part C Early Intervention as % of 0-2 year-olds	20,235	1.8%
Child Care Workers	$7.14	$14,860			
Pre-school Teachers	$10.71	$22,270			
Child Care Subsidy Eligibility Cut-Off for family of three		$38,052 (85% of median income)	Children Enrolled in Early Head Start as % of 0-2 year-olds	4,384	0.4%
Weekly Subsidy Payment for Pre-Schooler		$95.00	Children Enrolled in Head Start, State Pre-Kindergarten, or Special Education Pre-School as % of 3-4 year-olds	241,493	36.1%

For every $1.00 invested in a school-aged child…
62.4¢ is invested in a college-aged youth (19-23), but only
21.5¢ is invested in a pre-school aged child (3-5), and only
6.7¢ is invested in an infant or toddler (birth to 2)

Texas 2003 State Expenditures

Health and Human Services 25.4%

Corrections/Public Safety 11.2%

Other 5.4%

Early Learning 1.7%

Public Education (K-12) 39.7%

Higher Learning 16.6%

State spending on early learning is 1.7% of total general fund expenditures.

0–5 year-olds make up 9.3% of the total state population.

Texas per Child Investment by Age

☐ State and Local
☐ Federal

$465.26 — Infants and Toddlers (0-2)

$1,223.97 — Pre-schoolers (3-5)

$6,895.23 — School-age Children (6-18)

$3,775.93 — College-age Youth (19-23)

FY 2003 spending is not indicative of the current funding levels in Texas. General Revenue appropriations for 2004–05 were $1.8 billion lower than 2002-03 spending; and if estimates of "current services" and population and inflation-driven growth are factored in, state spending was cut by at least $7.5 billion for 2004–05. While state revenue has increased slightly, the state budget for 2006–07 currently under consideration in the Texas Legislature does not restore many of the cuts to children's services that were made during the 2003 legislative session.

Texas data was compiled for Early Learning Left Out by Texans Care For Children.

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Texans Care For Children

APPENDIX B

PREKINDERGARTEN CURRICULUM GUIDELINES

Prekindergarten
Curriculum Guidelines

Questions concerning this document may be directed to the Division of Curriculum and Professional Development at (512) 463-9581 or http://www.tea.state.tx.us.

Texas Education Agency

December 1999

CONTENTS

PREKINDERGARTEN
CURRICULUM GUIDELINES

Research confirms the value of early education for young children. Prekindergarten programs that support effective teaching practices have been shown to lead to important growth in children's intellectual and social development, which is critical to their future academic success. Quality programs that provide challenging but achievable curriculum engage children in thinking, reasoning, and communicating with others. With teacher direction and guidance, children respond to the challenge and acquire important skills and concepts.

The purpose of this document is to help educators make informed decisions about curriculum content for prekindergarten children. The guidelines are based on knowledge of theory and research about how children develop and learn; they reflect the growing consensus among early childhood professional organizations that a greater emphasis be placed on young children's conceptual learning, acquisition of basic skills, and participation in meaningful and relevant learning experiences. The guidelines also delineate the content that children are to learn and what they should be able to achieve. Finally, the guidelines provide a means to align the prekindergarten programs with the Texas Essential Knowledge and Skills (TEKS).

The guidelines describe specific goals for prekindergarten children in each content area. The intent of this organizational design is to ensure that all three- and four-year-old children have the opportunity to strive towards these goals. Due to age differences and previous experiences, however, children will have a great diversity of knowledge. Some children, regardless of their age level, will be at the beginning of the learning continuum, while others will be further along. Children with disabilities may need accommodations and modifications of the guidelines in order to benefit from them. For children whose first language is not English, the student's native language serves as a foundation for knowledge acquisition. Students in a prekindergarten English as a Second Language (ESL) program should receive instruction in a manner they can understand and that is commensurate with their proficiency level in English. Children's current strengths and skills should serve as the starting point for new experiences and instruction rather than become a limitation. To use these guidelines to the best advantage and to extend the learning of skills and concepts, teachers must build on children's existing competencies.

These guidelines are important tools to help teachers define and implement a comprehensive curriculum. Such a curriculum helps to build connections between subject matter disciplines by organizing the large amounts of information children must learn into a set of meaningful concepts. Using concepts from the guidelines, teachers can work across disciplines to provide many opportunities for children to achieve knowledge and skills.

This document presents the commissioner's guidelines for prekindergarten curriculum. Because there is no state-required prekindergarten curriculum, use of these guidelines is

voluntary. Texas Education Code § 29.153 contains statutory requirements concerning prekindergarten.

Prekindergarten Guidelines

Language and Early Literacy

During the prekindergarten years, children's experiences with communication and literacy begin to form the basis for their later school success. Given adequate opportunities to interact with responsive adults and peers in language and print-rich environments, young children develop vocabulary, extended language skills, and knowledge of the world around them. They develop listening comprehension and phonological awareness; understanding of the everyday functions of print; motivation to read; appreciation for literary forms; and print awareness and letter knowledge. They learn what books are and how to use them. Understanding the value of literacy as a means of communication, as well as coming to enjoy reading, are accomplishments typical of the future good reader. These language and literacy accomplishments are best achieved through activities that are integrated across different developmental areas: cognitive development, fine and gross motor development, and social and emotional development. It is important to consider native language, augmentative communication, and sensory impairments in accomplishing these guidelines.

Prekindergarten educators should provide opportunities to promote language and literacy learning in children who speak a language other than English. Except where specified, the following guidelines outline language and literacy accomplishments for three- and four-year-old children in their native language. For students whose first language is other than English, the native language serves as the foundation for English language acquisition. Specific guidelines for the language and literacy development of prekindergarten children whose home language is not English in English-only settings appear below in each domain.

Language and Early Literacy Development

(1) Listening Comprehension

Prekindergarten-aged children are able to comprehend what they hear in conversations and in stories read aloud with increasing accuracy, though three-year-old children may respond in single words or brief phrases to some questions, especially "why," "how," and "when" questions. Children demonstrate understanding through their questions, comments, and actions. Prekindergarten children in English as Second Language (ESL) settings listen purposefully to English-speaking teachers and peers to gather information about their new language.

The child:

- listens with increasing attention
- listens for different purposes (e.g., to learn what happened in a story, to receive instructions, to converse with an adult or a peer)
- understands and follows simple oral directions
- enjoys listening to and responding to books
- listens to and engages in several exchanges of conversations with others
- listens to tapes and records, and shows understanding through gestures, actions, and/or language
- listens purposefully to English-speaking teachers and peers to gather information and shows some understanding of the new language being spoken by others (ESL).

(2) Speech Production and Speech Discrimination

Young children must learn to vocalize, pronounce, and discriminate the sounds and words of language. Although most children in prekindergarten can accurately perceive the difference between similar-sounding words, they continue to acquire new sounds and may mispronounce words quite often in their own speech. The ability to produce certain speech sounds such as /s/ and /r/ improves with age. Just as infants and toddlers develop control over the sounds of their first language, young children in ESL settings gradually learn to pronounce the sounds of the English language.

The child:

- perceives differences between similar sounding words (e.g., "coat" and "goat," "three" and "free," [Spanish] "juego" and "fuego")
- produces speech sounds with increasing ease and accuracy
- experiments with new language sounds
- experiments with and demonstrates growing understanding of the sounds and intonation of the English language (ESL).

(3) Vocabulary

Prekindergarten children experience rapid growth in their understanding of words and word meanings. Vocabulary knowledge reflects children's previous experiences and growing knowledge of the world around them and is one of the most important predictors of later reading achievement. As children learn through experiences, they develop concepts, acquire new words, and increasingly refine their understanding of words they already know.

The child:

- shows a steady increase in listening and speaking vocabulary
- uses new vocabulary in everyday communication
- refines and extends understanding of known words
- attempts to communicate more than current vocabulary will allow, borrowing and extending words to create meaning
- links new learning experiences and vocabulary to what is already known about a topic
- increases listening vocabulary and begins to develop a vocabulary of object names and common phrases in English (ESL).

(4) Verbal Expression

Effective communication requires that children use their knowledge of vocabulary, grammar, and sense of audience to convey meaning. Three- and four-year-old children become increasingly adept at using language to express their needs and interests, to play and pretend, and to share ideas. Children's use of invented words and the overgeneralization of language rules (for example, saying "foots" instead of "feet" or [Spanish]"yo no cabo" instead of "yo no quepo") is a normal part of language acquisition. Second language learners in English-only prekindergarten settings may communicate nonverbally (e.g., through gestures) before they begin to produce words and phrases in English. The ESL accomplishments noted below represent a developmental sequence for second-language acquisition in young children.

The child:

- uses language for a variety of purposes (e.g., expressing needs and interests)
- uses sentences of increasing length (three or more words) and grammatical complexity in everyday speech
- uses language to express common routines and familiar scripts
- tells a simple personal narrative, focusing on favorite or most memorable parts
- asks questions and makes comments related to the current topic of discussion
- begins to engage in conversation and follows conversational rules (e.g., staying on topic and taking turns)
- begins to retell the sequence of a story
- engages in various forms of nonverbal communication with those who do not speak his/her home language (ESL)
- uses single words and simple phrases to communicate meaning in social situations (ESL)
- attempts to use new vocabulary and grammar in speech (ESL).

(5) Phonological Awareness

Phonological awareness is an auditory skill that involves an understanding of the sounds of spoken words. It includes recognizing and producing rhymes, dividing words into syllables, and identifying words that have the same beginning, middle, or ending sounds. Phonological awareness represents a crucial step toward understanding that letters or groups of letters can represent phonemes or sounds (i.e., the alphabetic principle). This understanding is highly predictive of success in beginning reading. Some basic proficiency in English may be prerequisite to the development of phonological awareness in English for second-language learners.

The child:

- becomes increasingly sensitive to the sounds of spoken words
- begins to identify rhymes and rhyming sounds in familiar words, participates in rhyming games, and repeats rhyming songs and poems
- begins to attend to the beginning sounds in familiar words by identifying that the pronunciations of several words all begin the same way (e.g., "dog," "dark," and "dusty," [Spanish] "casa," "coche," and "cuna")
- begins to break words into syllables or claps along with each syllable in a phrase
- begins to create and invent words by substituting one sound for another (e.g., bubblegum/gugglebum, [Spanish] calabaza/balacaza).

(6) Print and Book Awareness

Through their daily experiences with reading and writing, prekindergarten children learn basic concepts about print and how it works. They learn that print carries meaning and can be used for different purposes. They begin to differentiate writing from other graphic symbols and recognize some of the common features of print (for example, that writing moves from left to right on a page and is divided into words).

The child:

- understands that reading and writing are ways to obtain information and knowledge, generate and communicate thoughts and ideas, and solve problems
- understands that print carries a message by recognizing labels, signs, and other print forms in the environment
- understands that letters are different from numbers
- understands that illustrations carry meaning but cannot be read
- understands that a book has a title and an author
- begins to understand that print runs from left to right and top to bottom
- begins to understand some basic print conventions (e.g., the concept that letters are grouped to form words and that words are separated by spaces)
- begins to recognize the association between spoken and written words by following the print as it is read aloud

- understands that different text forms are used for different functions (e.g., lists for shopping, recipes for cooking, newspapers for learning about current events, letters and messages for interpersonal communication).

(7) Letter Knowledge and Early Word Recognition

Letter knowledge is an essential component of learning to read and write. Knowing how letters function in writing and how these letters connect to the sounds children hear in words is crucial to children's success in reading. Combined with phonological awareness, letter knowledge is the key to children's understanding of the alphabetic principle. Children will use this sound/letter connection to begin to identify printed words.

The child:

- begins to associate the names of letters with their shapes
- identifies 10 or more printed alphabet letters
- begins to notice beginning letters in familiar words
- begins to make some letter/sound matches
- begins to identify some high-frequency words (age 4).

(8) Motivation to Read

Prekindergarten children benefit from classroom environments that associate reading with pleasure and enjoyment as well as learning and skill development. These early experiences will come to define their assumptions and expectations about becoming literate and influence their motivation to work toward learning to read and write.

The child:

- demonstrates an interest in books and reading through body language and facial expressions
- enjoys listening to and discussing storybooks and information books read aloud
- frequently requests the re-reading of books
- attempts to read and write independently
- shares books and engages in pretend-reading with other children
- enjoys visiting the library.

(9) Developing Knowledge of Literary Forms

Exposure to storybooks and information books helps prekindergarten children become familiar with the language of books and story forms. Children develop concepts of story structure and knowledge about informational text structures, which influences how they understand, interpret, and link what they already know to new information.

The child:

- recognizes favorite books by their cover
- selects books to read based on personal criteria

- understands that books and other print resources (e.g., magazines, computer-based texts) are handled in specific ways
- becomes increasingly familiar with narrative form and its elements by identifying characters and predicting events, plot, and the resolution of a story
- begins to predict what will happen next in a story
- imitates the special language in storybooks and story dialogue, and uses it in retellings and dramatic play [(such as "Once upon a time...")]
- asks questions and makes comments about the information and events from books
- connects information and events in books to real-life experiences
- begins to retell some sequences of events in stories
- shows appreciation of repetitive language patterns.

(10) Written Expression

Prekindergarten-aged children generate hypotheses about how written language works and begin to explore the uses of writing for themselves. They also begin to ask adults to write signs and letters for them. Through these early writing experiences, young children develop initial understandings about the forms, features, and functions of written language. Over time, children's writing attempts more closely approximate conventional writing.

The child:

- attempts to write messages as part of playful activity
- uses known letters and approximations of letters to represent written language (especially meaningful words like his/her name and phrases such as "I love you" or [Spanish] " Te quiero")
- attempts to connect the sounds in a word with its letter forms
- understands that writing is used to communicate ideas and information
- attempts to use a variety of forms of writing (e.g., lists, messages, stories)
- begins to dictate words, phrases, and sentences to an adult recording on paper (e.g., "letter writing," "storywriting").

Prekindergarten Guidelines

Mathematics

Mathematics learning builds on children's curiosity and enthusiasm, and challenges children to explore ideas about patterns and relationships, order and predictability, and logic and meaning. Consequently, quality instruction occurs in environments that are rich in language, encourage children's thinking, and nurture children's explorations and ideas. These ideas include the concepts of number pattern, measurement, shape, space, and classification.

(1) Number and Operations

Understanding the concept of number is fundamental to mathematics. Children come to school with rich and varied informal knowledge of number. A major goal is to build on this informal base toward more thorough understanding and skills. Children move from beginning to develop basic counting techniques in prekindergarten to later understanding number size, relationships, and operations.

The child:

- arranges sets of concrete objects in one-to-one correspondence
- counts by ones to 10 or higher
- counts concrete objects to five or higher
- begins to compare the numbers of concrete objects using language (e.g., "same" or "equal," "one more," "more than," or "less than")
- begins to name "how many" are in a group of up to three (or more) objects without counting (e.g., recognizing two or three crayons in a box)
- recognizes and describes the concept of zero (meaning there are none)
- begins to demonstrate part of and whole with real objects (e.g., an orange)
- begins to identify first and last in a series
- combines, separates, and names "how many" concrete objects.

(2) Patterns

Recognizing patterns and relationships among objects is an important component in children's intellectual development. Children learn to organize their world by recognizing patterns and gradually begin to use patterns as a strategy for problem-solving, forming generalizations, and developing the concepts of number, operation, shape, and space. Pattern recognition is the first step in the development of algebraic thinking.

The child:

- imitates pattern sounds and physical movements (e.g., clap, stomp, clap, stomp,...)
- recognizes and reproduces simple patterns of concrete objects (e.g., a string of beads that are yellow, blue, blue, yellow, blue, blue)
- begins to recognize patterns in their environment (e.g., day follows night, repeated phrases in storybooks, patterns in carpeting or clothing)
- begins to predict what comes next when patterns are extended.

(3) Geometry and Spatial Sense

Geometry helps children systematically represent and describe their world. Children learn to name and recognize the properties of various shapes and figures, to use words that indicate direction, and to use spatial reasoning to analyze and solve problems.

The child:

- begins to recognize, describe, and name shapes (e.g., circles, triangles, rectangles—including squares)
- begins to use words that indicate where things are in space (e.g., "beside," "inside," "behind," "above," "below")
- begins to recognize when a shape's position or orientation has changed
- begins to investigate and predict the results of putting together two or more shapes
- puts together puzzles of increasing complexity.

(4) Measurement

Measurement is one of the most widely used applications of mathematics. Early learning experiences with measurement should focus on direct comparisons of objects. Children make decisions about size by looking, touching, and comparing objects directly while building language to express the size relationships.

The child:

- covers an area with shapes (e.g., tiles)
- fills a shape with solids or liquids (e.g., ice cubes, water)
- begins to make size comparisons between objects (e.g., taller than, smaller than)
- begins to use tools to imitate measuring
- begins to categorize time intervals and uses language associated with time in everyday situations (e.g., "in the morning," "after snack")
- begins to order two or three objects by size (seriation) (e.g., largest to smallest) (age 4).

(5) Classification and Data Collection

Children use sorting to organize their world. As children recognize similarities and differences, they begin to recognize patterns that lead them to form generalizations. As they begin to use language to describe similarities and differences, they begin sharing their ideas and their mathematical thinking. Children can be actively involved in collecting, sorting, organizing, and communicating information.

The child:

- matches objects that are alike
- describes similarities and differences between objects
- sorts objects into groups by an attribute and begins to explain how the grouping was done
- participates in creating and using real and pictorial graphs.

Prekindergarten Guidelines

Science

Young children are natural scientists. They are eager to discover all they can about the world in which they live. In prekindergarten, children participate in simple investigations that help them begin to develop the skills of asking questions, gathering information, communicating findings, and making informed decisions. Using their own senses and common tools, such as a hand lens, students make observations and collect information. Through these processes, prekindergarten children learn about their world.

Children enter the prekindergarten classroom with many conceptions about the natural and constructed world-ideas that they have gained from prior experiences. Meaningful science learning experiences help children investigate those pre-existing ideas while building a foundation for additional knowledge. These meaningful experiences increase children's understanding of the natural world, living things, cycles, change, and patterns—concepts that organize the learning of science.

(1) Science Processes

Children use the processes of science to develop an understanding about their world. They use their senses to gather information, make tentative statements about events and relationships, and begin to test observations, draw conclusions, and form generalizations. Children learn by participating in a simple investigation (for example, adding water to a dried-up sponge), and then thinking about it, and finally discussing what happened. This inquiry approach enables students to build understanding over time.

The child:

- begins to demonstrate safe practices and appropriate use of materials
- asks questions about objects, events, and organisms
- shows an interest in investigating unfamiliar objects, organisms, and phenomena
- uses one or more senses to observe and learn about objects, events, and organisms
- describes observations
- begins to perform simple investigations
- gathers information using simple tools such as a magnifying lens and an eyedropper
- explores by manipulating materials with simple equipment, (e.g., pouring from a cup, and using a spoon to pick up sand or water)
- uses simple measuring devices to learn about objects and organisms
- compares objects and organisms and identifies similarities and differences
- sorts objects and organisms into groups and begins to describe how groups were organized
- begins to offer explanations, using his or her own words

- predicts what will happen next based on previous experience
- solves simple design problems (e.g., making a box into a little house for a storybook character, toy, or pet)
- participates in creating and using simple data charts
- shares observations and findings with others through pictures, discussions, or dramatizations.

(2) Science Concepts

As prekindergarten children learn science skills, they develop concepts about the natural and constructed environment. They identify components of the natural world including rocks, soil, and water. Children observe and describe changes, and they name organisms and describe basic needs of living things. Prekindergarten children observe cycles (for example, wet and dry) and structures (such as fences or buildings) and describe simple patterns that help predict what will happen next. They compare and sort objects and organisms based on observable differences and similarities. The children begin using what they know to solve problems, such as where to hang a wet cloth so it will dry quickly. The prekindergarten children can also develop an awareness that investigations help them learn about the natural world, that certain questions can be answered by investigations, and that those answers can change as new observations are made.

The child:

- observes and describes properties of rocks, soil, and water
- describes properties of objects and characteristics of living things
- begins to observe changes in size, color, position, weather, and sound
- identifies animals and plants as living things
- groups organisms and objects as living or nonliving and begins to identify things people have built
- begins to recognize that living things have similar needs for water, food, and air
- begins to identify what things are made of (e.g., distinguishing a metal spoon from a plastic spoon)
- uses patterns (such as growth and day following night to predict what happens next)
- identifies similarities and differences among objects and organisms
- begins to use scientific words and phrases to describe objects, events, and living things.

Prekindergarten Guidelines

Social Studies

Social studies concentrate on the nature of people and their world, the heritage of the past, and contemporary living and culture. The social studies are both integral to young children's lives and of great interest to them. Driven by a desire to know and achieve mastery over self and their environment, children are eager to gain understanding of the many aspects of their cultural and environmental world. Through social studies, children begin to develop the self-understanding that will serve as a foundation for learning about others and the world around them.

Although all aspects of education have the goal of preparing children to become contributing members of society, social studies are particularly well suited to foster the skills and attitudes necessary for participation in a democracy. Skills such as problem-solving, decision-making, and working independently and with others in a classroom prepare children to become fully functioning citizens.

(1) Individual, Culture, and Community

All children live in some type of group or social organization. Prekindergarten children must learn the skills of communicating, sharing, cooperating, and participating with others. These individual skills are necessary for all groups to function successfully and fairly. The better children are able to understand others, the more they will feel a sense of community and connection with other people and with their world.

The child:

- shares ideas and takes turns listening and speaking
- cooperates with others in a joint activity
- identifies and follows classroom rules
- participates in classroom jobs and contributes to the classroom community
- identifies similarities among people like himself/herself and classmates as well as among himself/herself and people from other cultures
- begins to examine a situation from another person's perspective.

(2) History

Prekindergarten children are aware of time and begin to organize their lives around it. Three- and four-year-old children learn to depend on events and routines that occur in a regular and predictable order. They begin to understand past events and how these events relate to present and future activities, demonstrating evidence of their growing understanding of time, change, and continuity.

The child:

- identifies common events and routines (e.g., snack time, storytime)
- begins to categorize time intervals using words (e.g., "today," "tomorrow," "next time")
- recognizes changes in the environment over time (e.g., growth, seasonal changes)
- connects past events to current events (e.g., linking yesterday's activity with what will happen today)
- begins to understand cause-and-effect relationships (e.g., if one goes outside in the rain, one will get wet).

(3) Geography

Geographic thinking for young children begins with the concepts of location and direction. Children use directions to locate their relative position in space and to locate their home and school in their community. They learn to recognize common features in their immediate environment and begin to represent them symbolically through drawings and constructions.

The child:

- identifies common features in the home and school environment (e.g., the library, the playground)
- creates simple representations of home, school, or community through drawings or block constructions
- begins to use words to indicate relative location (e.g., "front," "back," "near," "far")
- identifies common features of the local landscape (e.g., houses, buildings, streets).

(4) Economics

In prekindergarten, children learn about the world of work in their community. They explore the roles and relationships of consumers and producers, and become aware that people produce services as well as goods. Children learn that their community benefits from many different people working in many different ways.

The child:

- understands the basic human needs of all people for food, clothing, and shelter
- understands the roles, responsibilities, and services provided by community workers
- becomes aware of what it means to be a consumer.

Prekindergarten Guidelines

Fine Arts

Young children express their ideas, thoughts, and feelings using a variety of symbols. Through their art, music, and dramatic play, children actively engage in representing what they know and how they think, using problem-solving strategies to express ideas in different forms. The fine arts enhance children's ability to interpret symbols and are associated with growth in all areas of development, including academic learning.

(1) Art

Children explore a wide variety of materials and make discoveries about color, shape, and texture through art experiences. They learn to express what they know and begin to recognize how others express themselves through art. They also begin to gain control of fine-motor muscles and practice hand-eye coordination.

The child:

- uses a variety of materials (e.g., crayons, paint, clay, markers) to create original work
- uses different colors, surface textures, and shapes to create form and meaning
- begins to use art as a form of self-expression
- shares ideas about personal artwork
- begins to show interest in the artwork of others.

(2) Music

Three- and four-year-old children express themselves through singing and movement, and by playing simple instruments. Like art, music is a form of experiencing, learning, and communicating with others. Children learn to experiment with music concepts, volume, tempo, and sound. They begin to appreciate different types of music.

The child:

- participates in classroom music activities
- begins to sing a variety of simple songs
- begins to play classroom instruments
- begins to respond to music of various tempos through movement
- begins to distinguish among the sounds of several common instruments.

(3) Dramatic Play

Creative drama in prekindergarten involves young children in expressive and spontaneous productions. Children demonstrate their unique interpretation to music, songs, and stories through movement and dramatic experiences. These experiences contribute to children's ability to communicate more effectively and engage in cooperative activity with others.

The child:

- expresses feelings through movement
- begins to create or recreate stories, moods, or experiences through dramatic representations
- begins to engage in dramatic play with others.

Prekindergarten Guidelines

Health and Safety

Young children learn health-promoting habits and routines in prekindergarten. In these early years, they develop basic concepts, attitudes, and skills about nutrition, safety, hygiene, and physical activity that contribute to their well being. Children's experiences with their health and discovery of ways to improve it enhance their desire and ability to make wise decisions for healthy living in the future.

(1) Health

Health education includes personal hygiene and nutrition education. Children learn that regular hygiene routines and good nutrition are important to their health.

The child:

- becomes aware of routine healthy behaviors (e.g., brushing teeth)
- begins to follow health-promoting routines (e.g., washing hands)
- begins to understand the need for exercise and rest
- refines use of eating utensils
- begins to recognize and select healthy foods
- prepares simple healthy snacks.

(2) Safety

Prekindergarten children acquire everyday routines and procedures to remain safe and avoid injury. They learn about fire, traffic, environmental and personal safety, and what to do in emergency situations.

The child:

- recognizes the danger of fire and learns to treat fire with caution
- responds appropriately during a fire drill
- knows how to seek help in an emergency
- knows how to cross a street safely
- recognizes the symbol for poison
- knows never to eat substances that are not food
- recognizes the danger of poisonous substances, including drugs
- knows not to talk to, accept rides from, or take treats from strangers
- knows how to get help from a parent and/or trusted adult when made to feel uncomfortable or unsafe by another person/adult
- knows never to take medicine unless it is administered by an adult

- knows about safe behavior around bodies of water (e.g., pools, lakes).

Prekindergarten Guidelines

Personal and Social Development

Prekindergarten children develop personal and social skills that enable them to function well within the social setting of the classroom. Children develop a sense of who they are and their capabilities, and establish positive relationships with others, which enables them to effectively participate in class and community and accomplish meaningful tasks.

(1) Personal Development

Children develop a sense of self in prekindergarten. They begin to show initiative in learning and begin to take greater responsibility for their own behavior. They learn to channel their energies in ways that promote effective learning experiences.

The child:

- develops a sense of personal space
- expresses interests and self-direction in learning
- begins to show self-control by following classroom rules
- begins to be responsible for individual behavior and actions
- begins to show greater ability to control intense feelings (e.g., anger).

(2) Social Development

Children develop interpersonal and social skills for communicating with others. They learn alternatives for resolving conflicts and communicating their needs and feelings verbally, and they begin to develop and maintain productive relationships with other children.

The child:

- begins to share and cooperate with others in group activities
- respects other people's space and personal belongings
- begins to develop friendships with others
- begins to express thoughts, feelings, and ideas through language as well as through gestures and actions
- responds to the suggestions of others.

Prekindergarten Guidelines

Physical Development

Movement is at the center of young children's lives. Prekindergarten children participate in experiences that foster fundamental motor and movement skills, such as walking and running, which are necessary for participation in games and sports throughout life. They begin to develop gross motor skills that involve throwing, catching, and kicking, and fine motor skills that involve greater precision and accuracy of movement.

(1) Physical Movement

Children explore their physical space and understand how their bodies function in space through active movement experiences. They become more skillful and expressive in their movement from one point in space to another through running, jumping, hopping, and skipping movements.

The child:

- explores moving in space
- shows an awareness of name, location, and relationship of body parts
- moves within a space of defined boundaries, changing body configuration to accommodate the space
- becomes more able to move from one space to another in different ways (e.g., running, jumping, hopping, skipping)
- becomes more able to move in place (e.g., axial movements such as reaching, twisting, turning, and bending)
- begins to move in rhythm
- begins to participate in group games involving movement (e.g., Duck, Duck, Goose).

(2) Gross-Motor Development

Gross-motor development requires thought and deliberate movement. Three- and four-year-old children develop greater control of gross-motor manipulative movements that involve giving force to objects and receiving force from objects. Throwing, catching, bouncing, and kicking are fundamental gross-motor manipulative skills.

The child:

- begins to throw or kick an object in a particular direction
- begins to play catch with a bean bag or a large ball
- bounces a large ball and catches it
- begins to coordinate arms and legs (e.g., swinging, stretching).

(3) Fine-Motor Development

Fine-motor manipulative movements involve object-handling activities that emphasize motor control, precision, and accuracy of movement. Using a computer mouse, cutting with scissors, and drawing are the foundational skills needed for the demands of handwriting and other small-motor skills in later school years.

The child:

- begins to develop pincer control in picking up objects (e.g., weaving, touching small objects)
- begins to practice self-help skills (e.g., zipping, buttoning)
- begins to hold writing tools with fingers instead of with a fist
- begins to manipulate play objects that have fine parts
- begins to use scissors.

Prekindergarten Guidelines

Technology Applications

Young children have much to gain from use of technology. In prekindergarten, they expand their ability to acquire information, solve problems, and communicate with others. Regular access and exposure to computers and related technology can enhance this learning. Children use engaging, age-appropriate, and challenging software, and technology to extend their knowledge and to enrich their learning of curriculum content and concepts. These technologies serve as important learning tools and are integrated throughout the instructional program.

Children learn the basic functions of the computer and related technologies. They develop techniques for handling and controlling various input devices, and become increasingly confident and independent users of age-appropriate software programs.

The child:

- starts, uses, and exits software programs
- uses a variety of input devices, such as mouse, keyboard, voice/sound recorder, or touch screen
- begins to use technical terminology, such as "mouse," "keyboard," "printer," "CD-ROM"
- follows basic oral or pictorial cues for operating programs successfully
- enjoys listening to and interacting with storybooks and information texts (e.g., multimedia encyclopedia) in electronic forms
- uses a variety of software packages with audio, video, and graphics to enhance learning experiences (e.g., improving vocabulary, increasing phonological awareness).

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