

ABSTRACT

Title of Document: AN INVESTIGATION OF THE
CHARACTERISTICS AND SCHOOL
READINESS OF CHILDREN WITH
DISABILITIES WHO ATTEND HEAD START
PROGRAMS

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The purpose of this study was to examine the characteristics and school readiness of children with disabilities who attend Head Start programs, as well as the characteristics of the programs they attend and the school districts in which they receive special education. In addition, a second purpose was to determine whether there are differences in these characteristics of children who attend Head Start programs and those who attend other early childhood education programs. I used data from the Pre-Elementary Education Longitudinal Study, a study of a nationally representative sample of preschool children with disabilities. I used a subsample of the data to compare the characteristics and school readiness of children with disabilities who attended Head Start to those who attended other early childhood education programs using chi-squares, analysis of variance, and ordinary least squares regression analyses.

The results suggest that there is no difference in the school readiness of children with disabilities who attended Head Start and those who attend programs in elementary schools. However, in comparison to children who attended other programs, children with developmental delays who attended Head Start had more advanced receptive language skills and those with other disabilities had less advanced pre-reading skills. Additionally, the results of this study show that there is some variation in the characteristics of children with disabilities who attend Head Start and those who attend other programs. Children who attended Head Start were more likely to be Black or Hispanic and from low socioeconomic families. They were also less likely to have disabilities other than speech impairments or developmental delays and, on average, received fewer special education services. Finally, children who attended Head Start were more likely to be from rural school districts and districts with higher rates of poverty. These findings indicate that children with disabilities who attend Head Start programs face additional risk factors that are associated with poor school readiness and emphasize the need to ensure that the programs provide services that are adequate to meet the needs of the diverse population they serve and to prepare those children for the onset of formal schooling.

AN INVESTIGATION OF THE CHARACTERISTICS AND SCHOOL
READINESS OF CHILDREN WITH DISABILITIES WHO ATTEND HEAD
START PROGRAMS

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Table of Contents

Acknowledgements.....	ii
Table of Contents.....	iii
List of Tables.....	viii
List of Abbreviations.....	x
Chapter I.....	1
Introduction.....	1
Children with Disabilities and ECE.....	1
Section 619 under Part B of the IDEA.....	2
The Head Start program.....	2
Characteristics of Children with Disabilities.....	4
Characteristics of Children with Disabilities in Head Start.....	6
School readiness.....	8
Purpose of the Study.....	11
Research Questions.....	12
Methodology.....	12
Significance of the Study.....	13
Chapter Summary.....	15
Definition of Key Terms.....	15
Chapter II.....	18
Review of the Literature.....	18
Federal Policies Affecting Young Children with Disabilities from Low-Income Families.....	18
The IDEA.....	19
Part B of the IDEA.....	19
Section 619 under Part B of the IDEA.....	20
The Head Start program and children with disabilities.....	20
The Head Start Program.....	21
Children with disabilities in the Head Start program.....	24
Disability service plans.....	28
Recruitment and enrollment.....	29
Screening and assessment.....	29
Development of IEPs.....	30
Transition.....	31
Summary of federal policies.....	32
Characteristics of Preschool Children with Disabilities and their Programs.....	32
Preschool children with disabilities and the services they receive.....	33
The characteristics of preschool children who receive IDEA services.....	33
The characteristics of special education services received by preschoolers with disabilities.....	34
The characteristics of the Head Start program and its participants.....	35
The characteristics of the Head Start participants.....	35
Characteristics of Head Start grantees and classrooms.....	37
The quality of Head Start programs.....	37

Summary of characteristics.	39
The Benefits of Preschool Programs for Children from Low-Income Families.....	40
The benefits of model preschool programs.	40
The Consortium for Longitudinal Studies.....	41
The Perry Preschool Program.....	42
The Carolina Abecedarian Program.	42
Benefits of model preschool programs.....	43
Critique of the studies.....	44
Federally commissioned evaluations of the Head Start program.....	45
The Westinghouse Report.	46
The Head Start Evaluation, Synthesis, and Utilization Project.....	47
The Head Start FACES.	49
The Head Start Impact Study.	50
Summary of the benefits of preschool programs.....	54
Empirical Research on the Impact of Head Start Programs	55
Search methods.....	55
Methodological review of the empirical research.	56
Purpose and research questions.....	57
Design and sample.....	58
Description of the analytic sample.....	60
Missing data.	61
Empirical design.	62
Variables and instrumentation.....	63
Data analysis.....	66
Synthesis of the findings on the impact of Head Start participation	68
Short-term effects of Head Start participation.	68
Academic achievement.	68
Social skills and behavior.	71
Health.....	72
Long-term effects of Head Start participation.....	73
Academic achievement and schooling.....	73
Health.....	75
Economic Success.....	75
Crime.....	76
Summary of the impact of Head Start	76
Chapter Summary	78
Chapter III.....	79
Methodology	79
PEELS Dataset.....	80
PEELS research design and sampling strategy.	81
LEA sample.....	81
Child sample.....	83
Wave 1 main sample and nonresponse sample.....	83
Supplemental sample.	84
Family recruitment.....	85

PEELS instrumentation.....	86
State Agency Questionnaire.....	86
LEA Questionnaire.....	87
Principal/Program Director Questionnaire.....	87
Teacher Questionnaire.....	88
Parent interviews.....	89
Direct child assessments.....	90
Spanish assessment.....	92
Alternate assessment.....	92
PEELS data cleaning and imputation.....	93
Variables.....	93
Preschool program.....	94
Child and family variables.....	96
Gender.....	97
Disability category.....	98
Race/ethnicity.....	99
Family income.....	99
Mother’s educational attainment.....	99
Age at time of assessment.....	100
Type of services received.....	101
Number of services received.....	101
Age of first special education services.....	102
LEA variables.....	102
Urbanicity.....	103
Geographic region.....	103
Poverty.....	103
District enrollment.....	103
District preschool special education enrollment.....	103
Program characteristics.....	104
Hours per week.....	104
Number of children with disabilities.....	104
Time in program.....	105
School-readiness variables.....	105
Receptive language skills.....	105
Early math skills.....	106
Pre-reading skills.....	107
Procedures.....	107
Complex samples.....	107
District stratification.....	109
Child stratification.....	109
The analytic sample and missing data.....	110
Analyses.....	112
Research Question 1.....	112
Research question 2.....	113
Research Question 3.....	115

Summary	117
Chapter IV	119
Non-Bias Analysis	119
Missing data analyses	120
Analytic sample one	120
Analytic sample two	121
Analytic sample three	122
Comparison of the three analytic samples and the baseline sample	122
Comparison to the national population	125
Summary	125
Research Question 1	126
Characteristics of children and their families	126
Services and programs	127
Characteristics of school districts	128
Research Question 2	129
Comparison of child and family characteristics	130
Comparison of services received	132
Comparison of program characteristics	134
Comparison of school district characteristics	135
Research Question 3	137
Chapter Summary	143
Chapter V	146
Discussion of Findings and Implication for Policy and Practice	146
School Readiness	147
Characteristics	149
Limitations of the Study and Implications for Future Research	155
Missing data	156
Sample weights	156
Program impacts	157
Multivariate analyses examining characteristics	159
Program characteristics	159
Chapter Summary	160
Tables	162
Appendix A	208
Child Assessments	208
ABAS-II	208
Vineland Adaptive Behavior Scales	209
PKBS-2	209
ARS	209
PreLas	210
PPVT-III-R	210
Leiter-R	211
IGDI	211
WJIII	212
Test of Early Math Skills	213

PIAT-R Reading Comprehension.	213
DIBELS.	213
References.....	215

List of Tables

- Table 1. Articles Included in the Review of the Empirical Literature: Description of the purpose
- Table 2. Articles Included in the Review of the Empirical Literature: Data Source and Analytic Sample
- Table 3. Articles Included in the Review of the Empirical Literature: Variables used in Analyses
- Table 4. Articles Included in the Review of the Empirical Literature: Findings
- Table 5. Age Cohorts I the PEELS Dataset
- Table 6. PEELS Data Collection Schedule
- Table 7. Response Rates for PEELS Data Collection
- Table 8. PEELS Indirect-Child Assessment Schedule
- Table 9. PEELS Direct-Child Assessment Schedule
- Table 10. Amount of Excluded and Missing Data
- Table 11. Comparison of Participants Excluded due to Missing Data and Analytic Sample 1
- Table 12. Comparison of Participants Excluded due to Missing Data and Analytic Sample 2
- Table 13. Comparison of Participants Excluded due to Missing Data and Analytic Sample 3
- Table 14. Comparison of the Characteristics of the Baseline Sample and the Analytic Samples
- Table 15. Comparison of the National Population of Children Age 3-5 Receiving Special Education Services and the Analytic Sample
- Table 16. Characteristics of Children with Disabilities who Attended Head Start Programs
- Table 17. Characteristics of the Services Received by Children with Disabilities who Attended Head Start Programs
- Table 18. Characteristics of Head Start Programs Attended by Children with Disabilities
- Table 19. Characteristics of the School Districts in Which Children with Disabilities who Attended Head Start Programs Received Special Education Services
- Table 20. Comparison of the Child and Family Characteristics of Children with Disabilities who Attended Head Start Programs and Those who Attended Other ECE Programs
- Table 21. Comparison of the Services Received by Children with Disabilities who Attended Head Start Programs and Those who Attended Other ECE Programs
- Table 22. Difference in the Group Means of Number of Services the Child Received
- Table 23. Comparison of the Characteristics of Head Start Programs and Other ECE Programs Attended by Children with Disabilities
- Table 24. Difference in the Group Means of the Number of Hours the Child Attended the Program per Week.
- Table 25. Comparison of the School District Characteristics of Children with Disabilities who Attended Head Start Programs, ECE Programs in Elementary Schools, and ECE Programs in Other Locations

- Table 26. Regression of Program Type on the Receptive Language Skills of Children with Disabilities
- Table 27. Regression of Program Type on the Early Math Skills of Children with Disabilities
- Table 28. Regression of Program Type on the Pre-Reading Skills of Children with Disabilities

List of Abbreviations

ABAS-II: Adaptive Behavior Assessment System, Second Edition

ACF: Administration for Children and Families

ACYF: Administration for Children, Youth, and Families

ANOVA: Analysis of Variance

ARS: Academic Rating Scale

CATI: Computer-assisted telephone interview

DIBELS: Dynamic Indicators of Basic Early Literacy Skills

ECE: Early Childhood Education

ECERS-R: Early Childhood Environment Rating Scale - Revised

ERIC: Education Resources Information Center

ETS: Educational Testing Service

FACES: Family and Children Experiences Survey

IDEA: Individuals with Disabilities Education Act

IEP: Individualized Education Program

IFSP: Individualized Family Service Plans

IGDI: Individual Growth and Development Indicators

LEA: Local education agency

Leiter-R: Leiter Revised

NAEYC: National Association for the Education of Young Children

NCSER: National Center for Special Education

NIEER: National Institute for Early Education Research

OLS: Ordinary least squares

OSEP: Office of Special Education Programs

PEELS: Pre-Elementary Education Longitudinal Study

PKBS-2: Preschool and Kindergarten Behavior Scales

PPVT: Peabody Picture Vocabulary Test

PPVT-III-R: Peabody Picture Vocabulary Test III-Revised

PreLAS: PreLanguage Assessment Scales

QED: Quality Education Data

RAPS: Resource Access Projects

SEA: State education agencies

SPSS: Statistical Package for the Social Sciences

TANF: Temporary Assistance for Needy Families

WJIII: Woodcock Johnson Test of Achievement-III

Chapter I

Introduction

There are just over 21 million children under the age of 5 living in the United States (U.S. Census Bureau, 2009a). For these children, there is no single preschool system; rather there is a wide array of programs that provide early childhood education (ECE) and childcare. These programs vary widely in terms of the organization, sponsorship, funding sources, relationship to public schools, government regulation, content, and the quality of the programs (National Research Council, 2001). Among the ECE programs available for preschool children are state-funded prekindergarten programs, Head Start programs, special education programs, and private preschool programs. In addition, many preschool-aged children stay at home or attend some form of childcare including both government and privately-funded childcare programs. In the 2007-2008 school year, 24% of 4-year-old children attended state prekindergarten programs, 11% attended Head Start programs, 4% attended special education programs, 43% attended other programs such as local public education programs and private childcare or preschool, and 18% did not attend any type of center-based programs (National Institute for Early Education Research [NIEER], 2008).

Children with Disabilities and ECE

Although preschool children with disabilities may attend any of the programs available to children without disabilities, there are two federal policies that provide preschool services to preschool children with disabilities: the Individuals with Disabilities Education Act (IDEA) and the federal Head Start program. Children with disabilities may receive preschool services through either or both of these programs.

Section 619 under Part B of the IDEA. Part B of the IDEA guarantees a free and appropriate public education for eligible children with disabilities from age 3 through 21. However, states are not required to provide special education to children age of 3 through 5 and 18 through 21 if requirement is inconsistent with the state law [IDEA, 20 U.S.C. § 1412(a)(1)]. In the 1986 reauthorization, Congress added Section 619, the Preschool Grants Program, in order to expand the quantity and quality of preschool services for children with disabilities (National Early Childhood Technical Assistance System, 1995). Section 619 under Part B provides grants to state education agencies (SEAs) in order to provide preschool special education services to children age 3 through 5. Currently every state provides special education services to children age 3 through 5 with disabilities (National Early Childhood Technical Assistance System, 1995).

IDEA requires that children with disabilities receive special education in the least restrictive environment that is appropriate for that individual child; therefore, to the maximum extent possible children with disabilities are to be educated with their peers without disabilities (Yell, 2006). For some young children the least restrictive environment is a preschool program with their typically developing peers, such as a Head Start program; however many other children attend ECE programs based in elementary schools, ECE programs in other locations such as private and community-based programs, or receive special education and related services in their home or a day care setting.

The Head Start program. The Head Start program is the longest running and largest comprehensive preschool program for children from low-income families. Since its inception in 1965, the program has served over 25 million children (Administration for

Children and Families [ACF], 2008). The goal of the Head Start program is to promote school readiness for children from low-income families by providing them with comprehensive services including educational, social, health, and nutritional services. The Head Start program provides grants to local agencies that provide comprehensive preschool education to children from low-income families (ACF, 2009a). Head Start grantees represent a diverse group of agencies, including community action agencies, school systems, private or public non-profit and for profit agencies, government agencies, and American Indian tribes (ACF, 2005a). These agencies typically provide center-based services in classrooms located in public schools, public housing, and other government owned spaces, as well as churches, synagogues, community centers and grantee-owned spaces (ACF, 2005a). In 2008, 1,604 grantees provided services to over 900,000 children in 49,400 classrooms nationwide (ACF, 2008).

The Head Start program primarily serves children from families with incomes below the poverty line. However, the Improving Head Start for School Readiness Act of 2007 (PL 110-134) allows up to 35% of each grantee's enrollment to consist of children from families whose incomes are up to 130% of the poverty line [Head Start Act, 42 U.S.C. § 9840(645)(b)]. An additional 10% of each grantee's enrollment may consist of children from families who do not meet the income requirements [Head Start Act, 42 U.S.C. § 9840(645)(b)]. In addition to the income requirements, the Head Start program regulations require that a minimum of 10% of each grantee's enrollment must be available to children with disabilities who are eligible for special education services under the IDEA (ACF, 2009).

The Improving Head Start for School Readiness Act (P.L 110-134) has several additional requirements regarding children with disabilities. First, each grantee is required to develop a disabilities service plan which provides a description of the strategies the program will use to meet the collective needs of the children with disabilities served within their program [45 CFR §1308.4(a)]. Second, Head Start grantees are required to actively recruit children with disabilities and are prohibited from denying a child placement in a program due to the child's disability [45 CFR §1308.5(a)]. Third, Head Start programs are required to complete health and developmental screenings for all children enrolled in the program [45 CFR §1308.6(a)(1)]. Programs are required to refer any child who is suspected of having a disability for a more complete assessment, often through the local education agency (LEA). Fourth, an Individualized Education Program (IEP) must be created for every child who is determined to have a disability (45 CFR §1308 appendix). The IEP specifies the services and programming that are appropriate for the individual child and that will be provided by the Head Start program in collaboration with the special education service providers. Finally, Head Start programs are required to assist children with disabilities and their families in their transition into the program and in their transition from the Head Start program to the public schools or any other placement [45 CFR §1308.21(a)]. These services are required by the Improving Head Start for School Readiness Act in addition to the services that are typically provided to all children within the program in order to provide individualized and comprehensive services to enhance the school readiness of children with disabilities in the Head Start program.

Characteristics of Children with Disabilities

In 2007, 710,371 children with disabilities ages 3 through 5 were provided special education through the IDEA (U.S. Department of Education, Office of Special Education Programs [OSEP], 2008). Overall, these children represent 5.7% of the total population of preschool children in the United States (U.S. Department of Education, OSEP, 2008).

Preschool children who receive special education services represent a diverse group of children. Of the children, approximately 62% are White, 19% are Hispanic, and 14% are Black (U.S. Department of Education, OSEP, 2008). Asian and American Indian/Alaskan Native children represent a much smaller proportion of the preschool children with disabilities (3% and 1%, respectively; U.S. Department of Education, OSEP, 2008). These percentages are comparable to the racial composition of the general population of children age 3 through 5 in the United States (U.S. Department of Education, 2006). In contrast, preschool children with disabilities are disproportionately male and a disproportionate number are from low-income families. In 2007, 69% of the preschool children who received special education services were male and over one-quarter were from families with incomes below the poverty line.

The majority of children age 3 through 5 who received special education services in 2007 had either speech or language impairments (46.2%) or developmental delays (38.0%; U.S. Department of Education, OSEP, 2008). Children with other disabilities represented a much smaller proportion of preschool children with disabilities. Children with autism represented 5.5% of the children with disabilities and no other disability category represented more than 1% of the overall population of preschool children with disabilities (U.S. Department of Education, OSEP, 2008).

Children with disabilities can receive special education services in a variety of settings. Of the preschool children who received special education services in 2007, 64.9% spent at least some time in an ECE program with their typically developing peers, 22.0% attended ECE programs specifically for children with disabilities located in public schools, and 2.9% attended special education ECE programs in separate schools (U.S. Department of Education, OSEP, 2008). Another, 10.2% of preschool children with disabilities received special education services in their home, in a residential facility, or at a service provider location. (U.S. Department of Education, OSEP, 2008).

Characteristics of Children with Disabilities in Head Start

Little is known about the characteristics of children with disabilities who attend Head Start programs despite the 38 years of the requirement for Head Start programs to reserve 10% of their enrollment for children with disabilities. The current data on children with disabilities in Head Start programs are limited to the number of children with disabilities enrolled in the program and the types of disabilities these children have. In 2005, 12.5% of all children enrolled in Head Start programs were reported to have a disability (ACF, 2005a). The majority of these children had speech or language impairments (61%) or developmental delays (21%). A much smaller percentage of the children with disabilities in Head Start programs had other disabilities including other health impairments (3%), serious emotional disturbance (3%), autism, learning disabilities or mental retardation (3%), and other or multiple conditions (9%; ACF, 2005a).

Beyond this information, little is known about the demographic characteristics of children with disabilities who attend Head Start programs, such as their race/ethnicity,

gender, and socioeconomic status. In addition, there is also almost no information on the characteristics of the Head Start programs that children with disabilities attend and the school districts in which they receive special education service. Furthermore, the characteristics of children with disabilities who attend Head Start programs have not been directly compared to the characteristics of children with disabilities who attend other ECE programs. Without this information, it is not clear whether there are systematic differences between children with disabilities who attend Head Start programs and those who attend other ECE programs. For example, it is unclear whether children with certain disabilities, children of particular racial/ethnic groups, or children from low-income families are more likely to attend Head Start programs rather than other ECE programs.

Although I was primarily interested in the characteristics and school readiness of children with disabilities who attended Head Start programs, I included children who attended ECE programs in elementary schools and children who attended ECE programs in other locations as comparison groups. I included children who attended these ECE programs as comparison groups because previous research has found that there is an association between children's academic skills and attendance at a center-based ECE program (Magnuson, Meyers, Ruhm, & Waldfogel, 2004). Therefore, I felt that children who attended some form of center-based ECE would be a more appropriate comparison group than those who attended child-care or received home-based services. Furthermore, I suspected that there may be differences in the characteristics of children who attended ECE programs in elementary schools versus those in other locations, due to factors such as fees and special education services available in the program; therefore, I decided to keep these two groups of children separate.

Data on the characteristics of children with disabilities who attend Head Start programs, as well as on how these children compare to children with disabilities who attend other ECE programs would increase the understanding of the implications of the Head Start enrollment requirements for children with disabilities and of how Head Start programs are utilized by children with disabilities. Information on the characteristics of the children with disabilities who attend Head Start programs is important for guiding policy and practice. Data on the types of disabilities that children in the Head Start program have, as well as the severity of their disabilities is important for understanding how Head Start teachers and other staff members should be trained in working with children with disabilities and how classroom policies, practice, and curriculum should be adapted to meet the specific needs of the children they serve. Furthermore, knowledge of whether the type of ECE program children attend (i.e., Head Start or other ECE programs) is associated with school district characteristics such as the urbanicity, district poverty, or district size has important policy implications. For example, it is possible that children in certain types of school districts (e.g., districts with high rates of poverty, rural districts, small districts, etc.) may have fewer choices in the type of ECE programs they attend and therefore, may be more likely to attend Head Start programs.

School readiness. There is a large body of research that examines the impact of Head Start programs. This research includes government mandated studies of the Head Start program as well as empirical studies published in peer reviewed journals. Since the inception of the Head Start program, the federal government has issued four major evaluations: The Westinghouse Report (Cicirelli, 1969), The Head Start Evaluation, Synthesis, and Utilization Project (Administration for Children, Youth, and Families

[ACYF], 1985), The Family and Children Experiences Survey (FACES; ACF 2003, 2006), and the Head Start Impact Study (ACF, 2005b).

The findings from these studies suggest that the program has small, positive, short-term effects on many domains of children's development including their academic achievement (Abbott-Shim, Lambert, & McCarty, 2003; ACF, 2003, 2005b; 2006; ACYF, 1985; Kreisman 2003; Lee, Brooks-Gunn, & Schnur, 1988; Lee, Brooks-Gunn, Schnur, & Liaw, 1990), social skills (Lee et al., 1990), behavior (Lee et al., 1988), socio-emotional development (ACYF, 1985), and health (Abbott-Shim et al.; ACYF, 1985). Additionally, researchers have found that the program has effects lasting into adolescence and adulthood. The long-term benefits associated with the Head Start program include increased academic achievement (Currie & Thomas, 1995, 1999) reduced rates of grade retention (Currie & Thomas, 1995, 1999), increased academic attainment (Garces, Thomas, & Currie, 2002; Ludwig & Miller, 2007), improved health (Currie & Thomas, 1995; Ludwig & Miller, 2007), and reduced rates of being booked or charged with a crime (Garces et al., 2002). However, these benefits were not distributed equally across individuals from various racial/ethnic groups. Researchers found that Head Start had no long-term effect on the academic achievement or grade retention of Black students (Currie & Thomas, 1995); yet the program had a significant effect on both the academic achievement and grade retention of White (Currie & Thomas, 1995) and Hispanic students (Currie & Thomas, 1999). Further research has found that the racial variations in the long-term effects of Head Start may be attributed to the quality of the schools children attend after attending a Head Start program (Currie & Thomas, 2000; Lee & Loeb, 1995).

Together, this body of literature suggests that Head Start has small, but positive effects on children's development, some of which last into adolescence and adulthood. However, despite the large number of children with disabilities who attend Head Start programs, research examining the impact of the program has almost exclusively been limited to the general population of children who attend the program. Initially, I planned to examine the impact of the Head Start program on children with disabilities by comparing the growth in the academic achievement of children with disabilities who attended Head Start over the course of the program year to that of children with disabilities who did not attend the program, but currently, data are not available that are sufficient to examine the program's impact.

The Pre-Elementary Education Longitudinal Study (PEELS) includes data on the on the preschool experiences of children with disabilities, including data on a subsample of children who attended Head Start programs. Of the data that is currently available, the PEELS is the best suited to examine children with disabilities who attend Head Start programs; however, PEELS includes data on three cohorts of children who were age 3, 4, and 5 at the start of the study. Consequently, of the children in the PEELS who attended Head Start programs, the dataset only includes assessment scores for a small number of children prior to attending the program. Using such a small sample size (i.e., less than 100 cases) would have limited both the external and internal validity of the study. The small sample size would likely not be representative of the national population, thus limiting the external validity of the study's findings. Furthermore, only including such a small sample size would cause the study to have low power to detect statistically significant findings. Therefore, I decided that rather than examining the program's

impact, I would examine the school readiness of children (i.e., their assessment scores after attending the program) which allowed me to include a larger number of children in the study.

Purpose of the Study

Because no study has directly examined the characteristics of children with disabilities who attend Head Start and the characteristics of these children have not been compared to the characteristics of children who attend other ECE programs and because such information help guide policy and practice, further research on this topic is warranted. The purpose of this study was to examine the characteristics and school readiness of children with disabilities who attend Head Start programs. First I examined the characteristics of children with disabilities who attended Head Start programs, as well as characteristics of the districts in which they received special education services and the programs they attended. Second, I compared the characteristics children with disabilities who attended Head Start programs to the characteristics of children with disabilities who attended other ECE programs. Finally, I examined whether there were differences in the school readiness of children with disabilities who attended Head Start programs and those who attended other ECE programs.

Using data from a nationally representative study of children age 3 through 5 with disabilities, I first examined the characteristics of children with disabilities who attended Head Start programs, as well as the characteristics of the programs they attended and the school districts from which they received special education services. Second, I compared the characteristics of these children to the characteristics of children with disabilities who attended other ECE programs. Third, I examined variations in the type preschool

programs children attended (i.e., Head Start, ECE in an elementary school or ECE in another location) by school district characteristics. Finally, I compared the school readiness of children with disabilities who attended the Head Start program and the school readiness of children with disabilities who attended other ECE programs.

Research Questions

I examined the following research questions:

Research Question 1: What are the characteristics of children with disabilities who attend Head Start programs, the school districts in which they receive special education services, and the programs they attend?

Research Question 2: Is there an association between the type of program children with disabilities attend and the characteristics of the children, the characteristics of school districts in which they receive special education services, and the characteristics of the programs they attend?

Research Question 3: Is there an association between the school readiness of children with disabilities and the type of preschool program they attend?

Methodology

To answer these research questions, I used data from the PEELS, a longitudinal study that followed a nationally representative sample of just over 3,000 children with disabilities age 3 through 5 for a period of six years. The study includes data describing the characteristics of the children and their families, their educational programs and services, and their transitions from preschool into elementary school programs. In this study, I used a subsample of the PEELS data which included children who only attended a center-based ECE program the year prior to entering kindergarten. For this subsample

of children, I described the characteristics of children and their families, the school districts in which they received special education services, the programs they attended, and their school readiness. In addition, I examined how these characteristics varied across Head Start programs, ECE programs located in elementary schools, and ECE programs in other locations. To examine differences in the characteristics of children, programs, and districts, I used chi-square statistics and one-way analysis of variance (ANOVA), depending on the scale of the variable. Finally, I used ordinary least squares (OLS) regression to examine the variation in children's school readiness across the three types of programs. A more detailed description of the methodology is included in Chapter III.

Significance of the Study

This study extends current knowledge regarding children with disabilities in the Head Start program in several ways. First, this study provides an overview of the characteristics of children with disabilities who attend Head Start programs and those who attend other center-based ECE programs. This increases the understanding of how Head Start programs are utilized by children with disabilities. The requirement for Head Start programs to reserve 10% of their enrollment for children with disabilities has been in effect for over 35 years; however little is known about the implications of this requirement. It remains unclear as to who this policy affects and how the Head Start program is utilized. In other words, who are the children with disabilities who Head Start programs enroll in order to fulfill this requirement? This study provides a descriptive profile of the children with disabilities who attend Head Start programs and describes systematic differences in the characteristics of children who attend Head Start and those

who attend other center-based ECE programs. In addition, this study identified whether the type of ECE programs children with disabilities attend is associated with school district characteristics. Together, this information on child and district characteristics increases the understanding of who is affected by the Head Start program's enrollment requirement for children with disabilities and the understanding of how counties utilize the program in the education of young children with disabilities. Furthermore an understanding of the characteristics of the children with disabilities who attend Head Start programs can help guide both policy and practice and ensure that Head Start programs are equipped to meet the specific needs of the children with disabilities who attend the program.

Finally, in this study I examined the school readiness of children with disabilities who attended Head Start programs. Given the requirement that 10% of each Head Start program's enrollment be reserved for children with disabilities, these children make up a substantial portion of the overall population of children who attend the program. However, very little is known about the impact that Head Start has on children with disabilities. Due to limitations in the data that I used in the study, I was not able to directly examine the impact of the program. Instead, I examined the school readiness of children with disabilities who attend the Head Start program in comparison to children with disabilities who attend other ECE programs, controlling for child and family characteristics. This information provides insight into whether children with disabilities who attend Head Start programs are adequately prepared for kindergarten, how these children fair in comparison to children who attend other ECE programs, and if the Head Start program is fulfilling its goal of preparing children for school. Furthermore, this

study provides preliminary insight into how the Head Start program is affecting children with disabilities. Overall, this study provides insight into children with disabilities in the Head Start program and increases the understanding of the implications of the Head Start program's enrollment requirements for children with disabilities.

Chapter Summary

A large number of children with disabilities attend Head Start programs due to the requirement that 10% of the program's enrollment must consist of children with disabilities. There is research that suggests that Head Start has small, positive effects on school readiness the children who attend the program, however; to date, no research has directly examined the school readiness of children with disabilities who attend Head Start programs. Furthermore, little is known about the characteristics of the children with disabilities who attend the program. The purpose of this study was to examine the characteristics and school readiness of children with disabilities who attend Head Start programs. I used a subsample of the PEELS data in order to compare the school readiness and characteristics of children with disabilities who attended Head Start programs to those who attend other ECE programs using a series of ANOVAs, chi-square statistics, and OLS regressions. This study provides insight into the implications of the Head Start program's enrollment requirements for children with disabilities.

Definition of Key Terms

Child with a disability: A child who receives special education services and has a disability specified in IDEA, including: autism, deaf-blindness, deafness, hearing impairment, mental retardation, multiple disabilities, orthopedic impairments, other

health impairments, emotional disturbance, specific learning disability, speech or language impairment, traumatic brain injury, visual impairment, or developmental delay.

Early Childhood Education (ECE): Educational services received prior to kindergarten. In the United States, children can receive ECE through a variety of programs including state funded prekindergarten, Head Start, special education programs, local public education programs, and privately funded programs.

Head Start program: A federally funded ECE program that provides comprehensive education and services to children from low-income families in order to enhance their school readiness.

Improving Head Start for School Readiness Act: The federal legislation that outlines the requirements for Head Start program.

Individualized Education Plan (IEP): A document required for all children receiving special education services, which directs all aspects of the student's special education by specifying the child's goals, educational placement, the special education and related services the child will receive, and the criteria established to measure the child's progress toward meeting his or her goals

Individuals with Disabilities Education Act (IDEA): The federal legislation the outlines the requirements for providing special education to students with disabilities.

Pre-Elementary Educational Longitudinal Study (PEELS): A longitudinal study of the preschool experiences of a nationally representative sample of children with disabilities age 3 through 5.

School Readiness: Children's competencies and skills at the start of formal schooling (i.e., kindergarten) that are important for later academic success (Snow, 2006).

Among these competencies are basic knowledge and skills such as pre-reading skills, pre-mathematics skills, language skills, and cognitive abilities, as well as other domains of development such as physical development, social and emotional competence, and attitudes toward learning (National Association for the Education of Young Children [NAEYC], 2009; Snow, 2006). Despite the wide range of indicators of school readiness, this study focuses on basic knowledge and skills.

Section 619 under Part B of the IDEA: A section within the IDEA which grants funding to the states in order to provide free and appropriate public education to all children ages 3 through 5 with disabilities.

Chapter II

Review of the Literature

The purpose of this study was to examine the experiences of children with disabilities in the Head Start program. Specifically, I examined characteristics of children with disabilities who attended Head Start programs, the characteristics of the school districts in which they receive services, and their school readiness. In this chapter, I first provide an overview of the federal policies affecting young children with disabilities from low-income families. Next, I describe the characteristics of preschool children who receive special education services and the children enrolled in Head Start programs, as well as the characteristics of the programs they attend. Then, I describe the benefits of preschool programs and the Head Start program. Finally, I review the empirical research that has examined the impact of Head Start on the development of children who attend the program.

Federal Policies Affecting Young Children with Disabilities from Low-Income Families

There are two key federal policies that provide preschool education to young children with disabilities from low-income families: the IDEA and the national Head Start program. The IDEA provides special education services to children and youth with disabilities ages 3 through 21 and guarantees them a free and appropriate public education in the least restrictive environment. The Head Start program provides comprehensive ECE and services to children from low-income families in order to enhance their school readiness. For young children with disabilities who are living in

poverty, these two programs often collaborate to provide special education services within Head Start programs.

The IDEA. In 1975, the Education for All Handicapped Children Act was passed into law, making an appropriate public education available to all students with disabilities at no cost to their parents. In subsequent reauthorizations of this law, it was renamed the IDEA. This law provides special education and related services to children and youth with disabilities from age 3 through 21, unless requiring special education for children age 3 through 5 and 18 through 21 is inconsistent with the state laws [IDEA, 20 U.S.C. § 1412(a)(1)]. Children and youth ages 3 through 21 are provided with services through Part B of the IDEA. In addition, Part C of the IDEA provides grants to states to provide services to infants and toddlers with disabilities from birth until their third birthday.

Part B of the IDEA. Part B of the IDEA provides special education and related services to children age 3 through 21 who are determined to be eligible by a multidisciplinary team. After an evaluation, the team determines if the student has one of the categories of disability covered by IDEA and if the disability has an adverse effect on the student's education (Yell, 2006). If the child meets both of these criteria, he or she is eligible for special education under IDEA. Section 619 under Part B of the IDEA provides states with grants to preschool special education and related services to children age 3 through 5.

Children who are determined to be eligible for IDEA services are entitled to a free and appropriate public education in the least restrictive environment. To ensure that children receive an appropriate education, a team consisting of educators, related service providers, the child's parents, and other individuals involved in the child's education and

development work together to develop an IEP. The IEP directs all aspects of the student's special education by specifying the child's goals, educational placement, the special education and related services the child will receive, and the criteria established to measure the child's progress toward meeting his or her goals (Yell, 2006). IDEA requires that the educational placement be determined by the student's IEP team and that the child must be placed in the least restrictive environment that is appropriate for that individual. This means that to the maximum extent appropriate, students with disabilities are to be educated with students without disabilities (Yell, 2006). For some young children with disabilities, the least restrictive environment is a Head Start program.

Section 619 under Part B of the IDEA. In the 1986 reauthorization of the IDEA, Congress added Section 619, the Preschool Grants Program (National Early Childhood Technical Assistance System, 1995), under Part B. This program was designed to expand the quantity and quality of preschool services for children with disabilities. Section 619 under Part B grants funding to the states to encourage them to provide free and appropriate public education to all children ages 3 through 5 with disabilities (National Early Childhood Technical Assistance System, 1995; Trohanis, 2008). The SEAs allocate these funds to the LEAs which use the funding to supplement the implementation of preschool special education programs for children with disabilities (National Early Childhood Technical Assistance System, 1995; U.S. General Accounting Office, 2002). The goal of these services is to ensure that children with disabilities enter school ready to learn (U.S. General Accounting Office, 2002).

The Head Start program and children with disabilities. Since its inception in 1965, the Head Start program has provided comprehensive preschool education to

children from low-income families. The goal of the program is to promote school readiness by enhancing children's cognitive development through the provision of educational, health, nutritional, social, and other services. The program provides grants to local public and private non-profit and for-profit agencies that provide comprehensive child development services to children and families living in poverty (ACF, 2009a). In this section, I provide an overview of the Head Start program and the program's provision of services to children with disabilities.

The Head Start Program. The Head Start program was established in 1964 as a part of the Economic Opportunity Act (Schwartz & Brand, 2001). In alignment with President Johnson's War on Poverty, the Economic Opportunity Act developed three programs aimed at transforming the lives of people living in poverty through self-help and education: the Job Corps, The Community Action Programs, and Volunteers in Service to America (Zigler, Styfco, & Gilman, 1993). The Community Action Programs were designed to assist local communities in establishing and administering their own antipoverty programs. Consequently, the administrative control and program resources were put in the control of the poor people; yet because control was put in the hands of poor communities, the program received a large amount of criticism (Zigler et al., 1993). In order to garner support for the program and to use part of a budget surplus, Project Head Start was established as a part of the Community Action Programs. The Head Start program began as a child development intervention designed to break the cycle of poverty and stimulate economic growth while attending to the nutrition, health, and development of young children living in poverty (Schwartz & Brand, 2001).

Sargent Shriver, the head of the Office of Economic Opportunity, appointed a planning committee of 14 experts to assist in the planning and development of the Head Start program (Zigler et al., 1993). The committee members consisted of experts in a variety of fields, including ECE, child development, intellectual disabilities, and pediatrics. This diversity contributed to Head Start becoming a comprehensive program that focused on much more than just education (Zigler et al., 1993). The committee recommended that the program be based on the “whole child” philosophy and target nutrition, physical and mental health, parental involvement, social services for the families, and preschool education (Zigler et al., 1993). Since the original recommendations of the planning committee, Head Start programs have continued to be driven by the “whole child” philosophy. Specifically, the planning committee recommended that the program contain five components: (a) an educational program to foster the development of children’s language skills, self-reliance, and self-esteem, (b) a health program to provide complete medical and dental examinations and immunizations, (c) a parental program that would include parents as nonprofessional teacher aides and teach parents skills such as child-rearing and English language, (d) a nutrition program that would provide at least one hot meal and one snack for children, as well as nutritional information for parents, and (e) social and psychological services (Condry, 1983). Today, the goals of the program have remained largely unchanged.

In addition to the recommendations regarding the focus of the Head Start program, the planning committee recommended that a small pilot program should be established, however, the Johnson administration demanded that the program start on the large-scale with at least 100,000 children (Zigler et al., 1993). The first summer the

program was offered, it enrolled 561,000 children age 3 to 5 (Schwartz & Brand, 2001) in over 13,000 centers across the nation (Condry, 1983). The program began as an eight week summer program, but as a result of the program's success and widespread support, in the fall of 1965 President Johnson announced that year-round centers would be established in addition to the summer programs (Condry, 1983). By 1967, 200,000 children were attending year-round programs (Condry, 1983) and this number has continued to increase drastically over time. In 2007, the program served over 900,000 children at an average cost of \$7,326 per child (ACF, 2008).

In 1969, control over the administration of the Head Start program was transferred from the Office of Economic Opportunity to the newly formed Office of Child Development in the Department of Health, Education, and Welfare (Schwartz & Brand, 2001; Zigler et al., 1993). Currently, the ACF in the Department of Health and Human Services (DHHS) has authority over the administration of Head Start programs.

Currently, the Head Start program provides grants to public and private non-profit and for-profit agencies that then provide comprehensive services to eligible children. Head Start programs typically provide center-based services in classrooms located in public schools, public housing, and other government owned spaces as well as churches, synagogues, community centers and grantee-owned spaces (ACF, 2005a). In addition, a small percentage of children participate in home-based Head Start services (ACF, 2008). Head Start programs primarily serve children living in families with incomes below the federal poverty line. However, the most recent reauthorization of the law, The Improving Head Start for School Readiness Act of 2007, allows programs to have up to 35% of their enrollment consist of families who have incomes up to 130% of the federal poverty line

and an additional 10% of the enrollment can be children from families who do not meet the income requirements [Head Start Act, 42 U.S.C. § 9840(645)(b)]. Despite these allowances for “over-income” children, Head Start programs are required to enroll children who have the greatest need. Therefore, children in families with incomes above the poverty line should be enrolled only if there is room in the program after enrolling all children from families living below the poverty line or if they have other risk factors. In addition, the law requires that Head Start agencies and delegate agencies set aside at least 10% of their total enrollment for children with disabilities.

Children with disabilities in the Head Start program. In the early years of the program, before any requirement to include children with disabilities and prior to the establishment of any formal guidelines, Head Start program service providers included children with disabilities but saw that more specialized services were needed for these children (Schwartz & Brand, 2001). Service providers implemented an array of strategies including hiring specialists such as speech-language pathologists, physical and occupational therapists, collaborating with local medical and special education providers, and establishing special education classrooms. These informal services to children with disabilities were continued until Congress passed the Economic Opportunity Act amendments of 1972 which specified that the Secretary of Health, Education, and Welfare was to ensure that 10% of Head Start enrollment be reserved for children with disabilities.

The goal of this mandate was to provide developmental experiences for children with disabilities with typically developing children in integrated settings (Jordan, 1973). Specifically, Head Start programs were to: (a) implement developmental screening for all

children in the program, (b) refer children who were identified through screening or observation as having a disability to licensed professionals to determine whether the child meets diagnostic criteria, (c) develop individualized programs that included goals and services that would be provided in addition to the provision of services expected for all children, (d) form collaborations with local community organizations and school districts to obtain related services at as low of a cost as possible, (e) identify specialized consultants who could be hired when necessary to meet the needs of children with disabilities, and (f) designate a disabilities services coordinator to oversee the screening, assessment, evaluations and provision of services to children with disabilities (Schwartz & Brand, 2001). In 1976, the Head Start Bureau and the Office of Education's Bureau of Education for the Handicapped jointly provided funding for a technical assistance support program called the Resource Access Projects (RAPS; Schwartz & Brand, 2001; Zigler & Muenchow, 1992). The RAPS provided training and technical assistance to Head Start programs and teachers through conferences, training sessions, developing training resources, technical assistance, and sharing of resources and information (Schwartz & Brand, 2001; Zigler & Muenchow, 1992).

Providing services to children with disabilities in Head Start programs did not come without a cost. The Head Start Bureau acknowledged the increased costs and allocated additional funding to Head Start budgets (Schwartz & Brand, 2001). The additional funds were allotted for the direct services provided to children with disabilities, to expand and improve the services already provided, and to provide training opportunities for staff. The implementation of the Education for All Handicapped Children Act in 1975 helped to reduce the fiscal burden on Head Start programs. After

this act was passed, LEA and special education programs began to “share” placements with Head Start programs and provide direct support for children with disabilities in Head Start programs (Schwartz & Brand, 2001). This support was strengthened in 1986, when the Education for All Handicapped Children Act was reauthorized and Section 619 under Part B was added to provide incentives to states to increase the quantity and quality of preschool special education services. This increased the number of children with disabilities in Head Start programs who received special education services through IEPs and consequently reduced the amount of Head Start funding required to support special education services (Schwartz & Brand, 2001).

Currently, the Improving Head Start for School Readiness Act of 2007 continues to require that children with disabilities represent at least 10% of the total enrollment in Head Start programs. Specifically, the regulations require that at least 10% of the total number of children enrolled in each Head Start agency and in each delegate agency be children who are eligible for special education services under the IDEA (ACF, 2009). Typically, Head Start programs enroll some children who have been previously diagnosed with disabilities, then, throughout the year, other children are identified through the programs’ screening and referral process (ACF, 2009). Together, the number of children who come into the program with a diagnosed disability and the number of children who are diagnosed throughout the year must total 10% of the program’s overall enrollment from the midpoint through the end of each program year (ACF, 2009).

For children age 3 through 21, the disability determination under IDEA is two-fold. First, the child must be determined to have one of the thirteen disabilities included in IDEA. These include autism, deaf-blindness, deafness, hearing impairment, mental

retardation, multiple disabilities, orthopedic impairments, other health impairments, emotional disturbance, specific learning disability, speech or language impairment, traumatic brain injury, and visual impairment including blindness. Second, the child is eligible for IDEA services if the disability adversely affects the child's educational performance [34 CFR §300.8(c)]. If a child meets both of these criteria, he or she is considered eligible for IDEA services and consequently, would be counted toward the 10% enrollment set aside for students with disabilities in Head Start programs.

Additionally, states may choose to provide special education and related services to children age 3 through 9 who are experiencing a developmental delay in their physical, cognitive, communication, social or emotional, or adaptive development and by reason thereof, need special education and related services [34 CFR §300.7(b)]. Children who meet the criteria for developmental delay are also counted toward the 10% enrollment set aside in Head Start programs.

Head Start programs only serve a small number of children under the age of 3; however, for these children the definition of disability is slightly different. These children must meet the eligibility requirements in Part C of the IDEA. Part C eligibility does not require that children fit into a category of disability, but rather the child is eligible if he or she is experiencing developmental delays in one of the following areas: (a) cognitive development, (b) physical development including, vision and hearing, (c) language and speech development, (d) psychosocial development, or (e) self-help skills (Yell, 2006). Additionally, children under the age of 3 are also eligible for services under Part C if they have a diagnosed condition that has a high probability of resulting in a developmental delay (Yell, 2006). Children under the age of 3, who meet these criteria

and are receiving special education services under Part C of the IDEA are also counted toward the 10% enrollment set aside for children with disabilities.

In addition to the 10% enrollment set aside for children with disabilities, the Head Start regulations have several other requirements regarding children with disabilities in Head Start programs including (a) disability service plans, (b) recruitment and enrollment, (c) screening and assessment, (d) the development of IEPs, and (e) the transition of children into and from Head Start programs.

Disability service plans. The Improving Head Start for School Readiness Act (P.L 110-134) requires each grantee or delegate agency to develop a disabilities service plan which describes their strategies for meeting the collective needs of the children with disabilities served within their program [45 CFR §1308.4(a)]. The disabilities service plan must be used by Head Start grantees to guide all aspects of the agency's efforts to serve children with disabilities and to ensure that children with disabilities are included in the full range of activities and services provided to Head Start children [45 CFR §1308.4(c)]. The disability service plan outlines the grantee's overall goals regarding the disability effort, the specific objectives and activities of the disability effort, how and when the activities will be carried out and the goals that will be attained, the personnel responsible for carrying out each aspect of the plan, and how individual activities will be monitored (45 CFR §1308 appendix). Additionally, the plan should address enrollment information, identification and recruitment efforts, screening and assessment procedures, the process for developing IEPs, professional development efforts to increase the staff's ability to work with children with disabilities, procedures for facilitating the transition into and out of the program, and collaboration with other agencies serving children with

disabilities (45 CFR §1308 appendix). Finally, in the disabilities service plan, the Head Start grantee is required to designate a disabilities service coordinator who is responsible for overseeing the agency's efforts to provide education and services to children with disabilities.

Recruitment and enrollment. As a part of their recruitment efforts, Head Start programs are required to actively locate and recruit children with disabilities [45 CFR §1308.5(a)]. The disabilities coordinator for each grantee or delegate agency is responsible for facilitating collaboration between the Head Start program and other agencies that serve young children with disabilities including the LEA's Child Find program, the program responsible for ensuring that students who are in need of special education and related services are identified and evaluated (45 CFR §1308 appendix). Furthermore, Head Start grantees are prohibited from denying a child placement on the basis of the child's disability or the severity of the disability if: (a) the parents wish to enroll the child, (b) the child meets the Head Start age and income eligibility criteria, (c) Head Start is an appropriate placement according to the child's IEP, and (d) the program has space to enroll the child [45 CFR §1308.5(c)].

Screening and assessment. Head Start programs are required to complete health and developmental screenings for all children enrolled in the program within 45 days of the child's entry to the program [45 CFR §1308.6(a)(1)]. After the initial screening, children who are suspected of having a disability are referred for a developmental assessment. Typically the LEA assures that children are evaluated in accordance with the provisions of IDEA, however occasionally the Head Start grantees may provide the assessment (45 CFR §1308 appendix). In accordance with IDEA, the Head Start

regulations require that the evaluation must be conducted by a multidisciplinary team and the child's parents must consent in writing prior to the evaluation [45 CFR §1308.6(a)(2)(iv)]. Based upon their evaluation, the team decides whether or not the child has a disability and is in need of special education services.

Development of IEPs. If a child is determined to have a disability and is eligible for IDEA services, an IEP must be developed that specifies the type of placement and specific programming that are appropriate for the child (45 CFR §1308 appendix). If the child is not eligible for IDEA services, the Head Start program can still determine that the child would benefit from special education services through the Head Start program and develop an IEP for the child; however, these children are not counted toward the 10% enrollment set-aside for children with disabilities [Head Start Act, 42 U.S.C. § 9835(d)(1)]. For children who are eligible for both Head Start and IDEA, the IEP is developed by a multidisciplinary team that must include at the minimum, the child's parents, a special education teacher, a general education teacher, a representative from the LEA, and an individual who can explain the results of the evaluation (Yell, 2006). In addition, the Head Start regulations require that a representative from the Head Start program must attempt to participate in the process [45 CFR §1308.19(c)]. At a minimum, the IEP must include the child's present levels of academic achievement and functional performance, measurable annual goals, the reporting requirements and measurement criteria to determine the child's progress toward meeting his or her goals, the special education and related services that will be provided to the child, the identification of the personnel responsible for planning and supervision of the services and for delivery of the services, the projected dates for the initiation of services and the

duration of those services, and the family goals and objects related to the child's disability [45 CFR §1308.19(e)]. In addition, IDEA requires the IEP to include a statement of the extent to which the child will not participate in the general education classroom and the student's participation in state- or district-wide assessments (Yell, 2006).

Rather than IEPs, Individualized Family Service Plans (IFSPs) are required for the small number of children with disabilities, who are enrolled in Head Start programs and are under the age of 3. Similar to an IEP, IFSPs must include the child's present levels of performance, a statement of the family's resources, priorities, and concerns, a statement of the major outcomes expected, the specific early intervention services that will be provided, the anticipated date for initiation of services and the duration of those services, the name of the case manager, and the steps that will be taken to support the transition of the child to special education services provided under Part B of the IDEA (Yell, 2006).

Transition. Head Start programs are required to assist children and their families when the children transition into and out of Head Start programs. As children enter the program, or when they are first diagnosed with a disability, programs support the parents by providing them with information on how to foster the development of their child, provide opportunities for the parents to observe activities described in the child's IEP, reinforce the activities in the child's home, refer parents to support groups and other resources, and inform the parents of their rights under IDEA [45 CFR §1308.21(a)]. Furthermore, Head Start programs should help parents to understand the value of special education and early assistance and provide parents with information and training as

needed (45 CFR §1308 appendix). In addition, Head Start programs must assist parents in their child's transition from Head Start to public school or any other placement in order to minimize discontinuity and stress for the child and family [45 CFR §1308.21(b); 45 CFR §1308 appendix).

Summary of federal policies. Preschool children with disabilities from low income families receive services through two federal policies: the IDEA and the Head Start program. Section 619 under Part B of the IDEA provides special education services to children with disabilities ages 3 through 5. The Head Start program provides comprehensive preschool services to young children from low-income families. Additionally, this program is required to set aside 10% of its enrollment for children with disabilities. For these children, IDEA service providers and Head Start programs collaborate to provide individualized services tailored to fit the children's needs in addition to the services typically provided by Head Start programs. In the next section, I provide a description of the children who receive IDEA services, those who attend Head Start programs, and the characteristics of the programs attended by these children.

Characteristics of Preschool Children with Disabilities and their Programs

In order to understand the intersection of the IDEA and the Head Start program, it is necessary to know the characteristics of the children who receive preschool services through these two policies. In this section I provide a description of the children, age 3 through 5, who receive special education services and an overview of those services. This is followed by a description of the characteristics of children who attend Head Start programs and the characteristics of the programs they attend.

Preschool children with disabilities and the services they receive. In 2007, 710,371 children with disabilities ages 3 through 5 received special education services through the IDEA (U.S. Department of Education, OSEP, 2008). Together, these children represent 5.7% of the population of preschool children in the United States (U.S. Department of Education, OSEP, 2008). In this section I provide a description of those children, as well as of the services they received.

The characteristics of preschool children who receive IDEA services. Of the preschool children who received special education services in 2007, 62% were White, 19% were Hispanic, and 14% were Black (U.S. Department of Education, OSEP, 2008). Asian and American Indian/Alaska Native children make up a much smaller proportion of preschool children with disabilities (3% and 1%, respectively; U.S. Department of Education, OSEP, 2008). These percentages of children with disabilities from the different racial/ethnic groups are comparable to the racial composition of the general population of children age 3 through 5 (U.S. Department of Education, 2006). In contrast, preschool children who receive special education services are disproportionately male (U.S. Department of Education, 2006). In 2007, approximately 69% of all children age 3 through 5 who received special education services were male (U.S. Department of Education, OSEP, 2008). Finally, more than one quarter of preschool children with disabilities were from families with incomes below the poverty line (U.S. Department of Education, 2006).

The majority of the preschool children who received special education services in 2007 had either speech or language impairments (46.2%) or developmental delays (38.0%; U.S. Department of Education, OSEP, 2008). Children with other disabilities

represented a much smaller proportion of the population of preschool children who received special education. Children with autism represented 5.5% of the children receiving services and no other disability category consisted of more than 1% of the population of children receiving services (U.S. Department of Education, OSEP, 2008).

The characteristics of special education services received by preschoolers with disabilities. Of the 710,371 preschool children who received special education services in 2007, 22.0% attended ECE programs specifically for children with disabilities located in public schools and 2.9% attended special education ECE programs in separate schools (U.S. Department of Education, OSEP, 2008). Another 10.2% of preschool children with disabilities received special education services in their home, in a residential facility, or in at a service provider location. Finally, 64.9% spent at least some time in an ECE program for typically developing preschoolers (U.S. Department of Education, OSEP, 2008).

In addition, data from the PEELS provide information on the qualifications and experience of teachers and services providers who work with preschool children with disabilities. Approximately 55% of children with disabilities were taught by teachers who have a graduate level degree (master's or doctorate), 38% were taught by teachers with bachelor's degrees, 4.9% were taught by teachers with an associate's degree, and 2.9% were taught by teachers with a high school diploma or GED (U.S. Department of Education, 2006). On average, the teachers had 10.3 years of experience working with children ages 3 through 5 and 9.0 years of experience working with children ages 3 through 5 with disabilities. These data provide some insight into the characteristics of

children ages 3 through 5 who receive special education services, as well as a brief description of the characteristics of the programs and services they receive.

The characteristics of the Head Start program and its participants. Since its inception in 1965, Head Start has served over 25 million children (ACF, 2008). In 2007 alone, the program provided preschool education and services to a diverse group of over 908,000 children across the country. In this section, I provide a description of the characteristics of the children who attend Head Start programs and an overview of the characteristics of those programs. These data primarily comes from three sources. First, the AFC provides an annual fact sheet which briefly describes the characteristics of children attending Head Start. Second, the ACF publishes a biennial report to Congress providing a more in depth description of the characteristics of the Head Start program and is attendees. Finally, FACES and the Head Start Impact Study provide some information on nationally representative samples of children attending Head Start programs and information on the programs they attend.

The characteristics of the Head Start participants. In the most recent Head Start fact sheet, the ACF (2008) reported on the ages and race/ethnicity of the children attending the Head Start program. To be eligible to for Head Start, children must be 3-years old on the date used to determine eligibility for the local public schools. In 2007, the majority of children enrolled in Head Start programs were 4-years old. Of all Head Start attendees, just over 51% were 4-years old, 36% were 3-years old, 10% were under the age of 3, and finally, only 3% were 5-years old or older. In addition, Head Start programs served a racially diverse group of children. Approximately 30% of all children enrolled in Head Start programs were Black and 40% were White. In addition, 34.7% of

the children attending Head Start were Hispanic/Latino. A much smaller percentage of Head Start enrollees were American Indian/Alaskan Native (4.0%), Asian (1.7%), Hawaiian/Pacific Islander (0.8%), or bi-racial/multi-racial (4.9%).

In the Biennial Report to Congress, the ACF (2005a) provides additional information on the characteristics of children enrolled in Head Start programs. The AFC reported that 71% of the families of children attending Head Start primarily spoke English, 24% primarily spoke Spanish, and 5% primarily spoke another language. Additionally, 2.7% of the children attending Head Start programs were reported to be from homeless families and 3.9% were children of migrant and seasonal farm workers. Finally, the ACF reported that 19% of the families of children enrolled in Head Start were receiving Temporary Assistance for Needy Families (TANF). Taken together, these statistics show that Head Start enrolls a very diverse group of children, many of which are exposed to a variety of factors that put them at risk for poor developmental outcomes.

In addition, the most recent Biennial Report to Congress reports the percentage of children in each disability category attending Head Start programs during 2005 (ACF, 2005a). Overall, 12.5% of all children enrolled in Head Start programs in 2005 were reported to have a disability. The majority these children had speech or language impairments (61%), followed by children with developmental delay (21%). A much smaller number of Head Start attendees had other disabilities. Children with autism, learning disabilities, and mental retardation together made up 3% of all children with disabilities. Similarly, children with other health impairments and serious emotional disturbance each made up 3% of all children with disabilities served by Head Start

programs. The final 9% of the children with disabilities were reported to have other or multiple conditions.

Additionally, data show that children with disabilities only make up a small percentage of the overall enrollment in Head Start programs at the beginning of the year, but the percentage grows over the course of the year. In the 2007-2008 school year, 6% of all children enrolled in Head Start programs had disabilities who were identified prior to the start of the school year and an additional 6% of the children were identified with disabilities during that program year (ACF, 2009).

Characteristics of Head Start grantees and classrooms. In the 2007-2008 school year, Head Start services were provided by 1,604 grantees. These grantees provided children with services in 49,400 classrooms located within 18,275 centers across the nation (ACF, 2008). In 2005, the grantees consisted of community action agencies (31%), school systems (17%), private or public non-profit and for profit agencies (39%), government agencies (6%) and American Indian tribes (7%; ACF, 2005a). Half of all children attending Head Start programs in 2005 attended full-day programs (ACF, 2005a). The remaining children attended part-day programs (41%), home-based programs (5%), and locally-designed combinations of home-based and center-based programs (4%; ACF, 2005a).

The quality of Head Start programs. The quality of preschool programs, including Head Start programs is typically rated based on two dimensions: process characteristics and structural dimensions (Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000). The process characteristics are aspects of the classroom environment as experienced by the children, including their interactions with teachers and peers, the use

of curriculum, schedule of activities, and instructional materials. On the other hand, structural dimensions are the organizational features of programs such as the staff-child ratio, the class size, and staff experience, qualifications, and wages. Both the Head Start Impact Study and FACES have examined the process characteristics and the structural dimensions of Head Start programs.

In the Head Start Impact Study, the process characteristics of Head Start classrooms were measured using the Early Childhood Environment Rating Scale – Revised (ECERS-R). The ECERS-R provides ratings of six subscales of the process quality of early childhood programs including: (a) space and furnishings, (b) personal care routines, (c) language and reasoning, (d) activities, (e) interactions and (f) program structure. The findings from the Head Start Impact Study indicate that on each of these six dimensions of process quality, Head Start programs had average ratings that were in the “good” range (ACF, 2005b). Similarly, the FACES study found that on the ECERS-R, approximately 8% of Head Start classrooms in the FACES study were rated as having minimal quality, 30.1% were rated somewhere between minimal and good, 33.9% were rated good, and 27% were rated in between good and excellent (ACF, 2006). This indicates that on average, the process quality of Head Start programs is good, but there is some variation in the process quality across Head Start classrooms.

The structural dimensions of preschool classrooms are studied frequently because they are easily quantified and are amenable to policy regulation (Phillips et al., 2000). The structural dimensions of quality include characteristics of Head Start programs such as teacher experience and qualifications, class size, and adult-child ratio. Data from the Biennial Report to Congress indicate that, in 2005, 32.8% of Head Start teachers had an

associate's degree, 31.5% had a bachelor's degree, and an additional 4.7% had a graduate degree. However, 22% of Head Start teachers had only a state certificate or child development associate credential (ACF, 2005b). Also in 2005, the average salary for a Head Start teacher was \$24,608 (ACF, 2005b). The FACES study provides additional information on the structural dimensions of Head Start programs. In 2002, Head Start teachers had been teaching in Head Start programs for an average of 8.5 years and for an average of 12.1 overall. Additionally, in the spring of 2002, Head Start classrooms had an average of one adult for every 6.1 children; however this number includes volunteers in addition to paid staff (ACF, 2003). When only paid staff members are included, the average student-to-staff ratio was 6.9 to 1.

Summary of characteristics. Together, these data provide an overview of the characteristics of children ages 3 through 5 who receive special education services and children who attend Head Start programs, as well as descriptions of the programs these children attend. Despite these descriptions of the characteristics of preschool children who receive IDEA services and those who attend Head Start, the data on how these two policies intersect is limited. The data described above are insufficient for drawing comparisons between preschool children with disabilities who attend Head Start programs versus those who attend other types of ECE programs. The data on preschool children who received special education services describe the entire population of children ages 3 through 5 who received special education services, including those who received services within a Head Start program. Currently there is no research that directly compares the preschool children with disabilities who attend Head Start programs to those who attend other types of programs. In addition to understanding the

characteristics of the children with disabilities who attend Head Start programs and those who attend other ECE programs, it is important to understand the impact that these programs have on the school readiness of the attendees. In the next section, I provide an overview of the benefits associated preschool programs for children from low-income families.

The Benefits of Preschool Programs for Children from Low-Income Families

Much of the evidence for the effects of the Head Start program comes from studies of model preschool programs targeted at children from low income families. In addition, there have been several federally mandated studies of the impact of the Head Start program to determine whether the effects of the Head Start program are similar to the model programs. However, neither the seminal studies nor the federally mandated studies have focused specifically on children with disabilities in preschool programs. Because of the dearth of research examining the effects of Head Start on young children with disabilities, in this section I review the benefits associated with preschool programs for children from low income families. First, I provide an overview of seminal studies of preschool programs. Then, I discuss the findings from federally mandated studies examining the effects of the Head Start program.

The benefits of model preschool programs. The majority of the evidence for preschool programs targeted at children from low-income families and for the Head Start program actually comes from research on smaller, model programs that are funded at much higher level than Head Start (Condry, 1983; Currie & Thomas, 1995; Garces et al., 2002). This evidence comes from seminal studies from the Consortium of Longitudinal Studies, and studies of the Perry Preschool and Carolina Abecedarian programs.

Together, these studies provide evidence that preschool programs for children from low-income families can have positive benefits that last into adulthood and provide a rationale for the national Head Start program. However, when compared to the Head Start program, these programs were much smaller, were funded at a higher level, and were closely watched by researchers. Therefore, the findings from these studies do not necessarily generalize to Head Start, rather, they provide upper bounds for the impact that preschool education can have.

The Consortium for Longitudinal Studies. The Consortium for Longitudinal Studies was formed in 1975 to determine whether early childhood programs have measurable, long-term effects on children from low-income families (Condry, 1983). The project was funded by the ACYF (now the ACF) who decided that rather than evaluating the efficacy of preschool programs through a traditional approach of randomly assigning children to either a treatment group that would attend Head Start program or a control group and following the children through their high school years, they would form a consortium of studies that were already underway (Condry, 1983). Every early intervention study completed prior to 1969 that had a specific curriculum, focused on children from low-income families, used an experimental or quasi-experimental design, and had a sample of at least 100 children was invited to join the Consortium (Royce, Darlington, & Murray, 1983). In total, researchers from 11 studies agreed to participate. For each of these studies, the original data were reanalyzed, follow-up data were gathered, and then the results were statistically pooled (Condry, 1983). In 1975, the participants in the Consortium studies were between 8 and 15 years old (Condry, 1983). Consequently, the results of the Consortium studies provide information on the long-term

effects of preschool programs from almost the entire population of large-scale preschool intervention studies conducted in the United States in the 1960s (Royce et al., 1983).

The Perry Preschool Program. The Perry Preschool program was one of the 11 studies included in the Consortium for Longitudinal Studies. However, due to the extensive follow-up of the study's participants, it has become well known on its own as a seminal study that demonstrates the long-term benefits of high-quality preschool for children from low-income families. Originally, the study included 123 children born between 1958 and 1962 that were randomly assigned to either an experimental group that attended the preschool program or a control group that did not receive an intervention (Schweinhart & Weikart, 1983). The children were selected based upon their parents' low educational attainment, their low socio-economic status, and the participants' low IQ scores (Barnett, 1985). These children were then randomly assigned to experimental or treatment groups. The first wave of 13 program participants began the program at age 4 and participated for one year. The remaining 45 children entered the program at age 3 and attended for 2 years. The program consisted of highly structured, center-based care for 2.5 hours a day, 5 days a week. Part of the reason the study of the Perry Preschool Program is so exceptional is because the participants in the study have been followed through age 40 with very minimal attrition (Schweinhart et al., 2005). In addition to the age 40 follow-up, data were collected on the participants at ages 5 through 7, 10, 15, 19, and 27.

The Carolina Abecedarian Program. In a similar study, researchers investigated the long-term benefits associated with preschool education in a series of studies of the Carolina Abecedarian program. In these studies, a total of 104 children living in poverty

were randomly assigned to either the treatment or control group between 1972 and 1977. The children assigned to the treatment group attended the Abecedarian program which provided enriched center-based care for 10 hours per day, 5 days a week, for 50 weeks per year, from infancy through age 5. The program was designed with full-day and year-round care in order to meet the childcare needs of full-time working parents (Barnett & Masse, 2007). The participants of this study have been followed through age 21 with a very small rate of attrition.

Benefits of model preschool programs. In the Consortium for Longitudinal Studies, as well as the studies of the Perry Preschool Program and the Abecedarian Program, researchers found many short- and long-term benefits associated with attending preschool programs. In all three sets of studies, researchers found that preschool was associated with many academic and cognitive benefits. Children who attended the preschool programs had higher IQ scores than the children in the control group (Campbell & Ramey, 1995; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Royce et al., 1983; Schweinhart et al., 2005); however in the Consortium and Perry Preschool studies, this effect faded overtime (Schweinhart et al., 2005; Royce et al., 1983). In addition, preschool programs were associated with an increase in participants' academic achievement, academic attainment, and a reduction in the likelihood of being retained in grade or placed in special education (Campbell, Ramey, Pungello, & Miller-Johnson, 2002; Campbell & Ramey, 1995; Schweinhart et al., 2005; Royce et al., 1983).

Furthermore, the Perry Preschool Program and the Abecedarian Program were associated with several long-term benefits. Both programs were associated with an increase in participants' earnings and had a positive effect on their health (Barnett &

Masse, 2007; Montie, 2005; Schweinhart et al. 2005). In addition, the Perry Preschool Program was associated with a reduction in criminal activity (Schweinhart et al., 2005); however there was no difference in the crime rates of adults who attended the Abecedarian Program and those in the control group (Barnett & Masse, 2007).

In addition to examining the benefits associated with the Perry Preschool and Abecedarian programs, researchers conducted cost-benefit analyses of these programs. Barnett (1985) first published a cost-benefit analysis of the Perry Preschool Program based on the participants' outcomes through age 19. The most recent cost-benefit analysis of the program was published by Belfield et al. (2006) utilizing the age 40 data. The researchers found that, at a cost of \$15,166, the program was associated with an economic return to society of \$258,888 per participant. The associated benefit-cost ratio is \$17.07 per dollar invested. Using data from the age-21 follow-up, researchers found that the Abecedarian program was associated with \$158,278 in benefits for each participant (Barnett & Masse, 2007). The overall program cost was \$63,476, which was much higher than the cost of the Perry Preschool program due to its longer duration (Barnett & Masse, 2007). Consequently, the benefit-cost ratio is smaller than that of the Perry Preschool program, yielding only \$2.50 for every dollar invested. These positive benefit cost ratios indicates that both the Perry Preschool and the Abecedarian programs had economic returns that exceeded the costs of the programs, providing evidence that preschool programs for children from low-income families can be good monetary investments for society.

Critique of the studies. Despite the many benefits found in these studies, the Consortium, Perry Preschool, and Abecedarian studies are not without their critics.

Critics frequently point out that, although these studies found benefits associated with preschool participation, they do not indicate that Head Start or other programs will necessarily produce similar effects (Condry, 1983; Currie & Thomas, 1995; Garces et al., 2002; Woodhead 1985, 2004; Zigler, 1987). The Consortium, Perry Preschool, and Abecedarian programs were funded at a higher level and were smaller than Head Start programs (Condry, 1983; Currie & Thomas, 1995; Garces et al., 2002). In addition, due to their experimental nature, the programs were well-planned and closely watched by researchers, which may have affected the program quality (Condry, 1983; Currie & Thomas, 1995; Garces et al., 2002; Woodhead 1985, 2004; Zigler, 1987). Furthermore, the findings may be affected by the Hawthorne effect; participating in an experiment may have motivated the teachers and consequently increased the programs' impacts on the participants (Zigler, 1987). As noted by Woodhead (2004), the features of experimental projects make it difficult or even impossible to replicate these programs and their effects in a large-scale program such as Head Start.

In addition, the ability to generalize the findings from the Consortium and Perry studies to Head Start may be limited further by the sampling methods that were used. The sample included in the Consortium and Perry studies included mostly Black students (Woodhead, 1985; Zigler, 1987), and in Perry, the sample was further limited to children with an IQ less than 88 (Zigler, 1987). Only 30% of children who attend Head Start programs are Black, therefore, the results of these studies may not generalize to the overall population of Head Start attendees.

Federally commissioned evaluations of the Head Start program. Since the beginning of the Head Start program, the federal government has issued several

evaluations of the program. The first evaluation, the Westinghouse Report, was conducted in 1969, shortly after the inception of the program. Since then, three more major evaluations have been conducted. In this section, I discuss the findings from these four evaluations regarding the impact of the program on children's school readiness.

The Westinghouse Report. The first federally commissioned evaluation of the Head Start program was conducted for the Office of Economic Opportunity by the Westinghouse Learning Corporation in collaboration with Ohio University (Cicirelli, 1969). In this study, commonly referred to as the Westinghouse Report, researchers examined the intellectual and social-personal development of children in first through third grade who had and had not attended Head Start programs (Cicirelli, 1969). Researchers selected a sample of students who had attended 104 Head Start centers across the country. Additionally, the researchers obtained a sample of control children attending the same elementary schools as the Head Start children. Cicirelli found very few differences between the children who attended Head Start and those who did not. On a test of school readiness, the children who attended full-year Head Start programs scored higher than the children who did not attend the program, however the difference between the two groups was small. Additionally, children who attended full year Head Start programs were found to score higher on a test of visual sequential memory and manual expression. However, there were no differences between the children who attended Head Start programs and those who did not on tests of school achievement, self-concept, teacher's ratings of desire for achievement, or children's attitudes toward school, peers, and society.

The findings in the Westinghouse Report indicated that Head Start programs had a very minimal effect on children (Cicirelli, 1969). However, the methodology used in the Westinghouse Report has been widely criticized and the validity of the report's findings has been questioned (Barnett, 2004; Condry, 1983; Henrich, 2004; C. T. Ramey & S. L. Ramey, 2004). First, most of the children in the sample only attended summer Head Start programs (Condry, 1983; Henrich, 2004; C. T. Ramey & S. L. Ramey, 2004) which even the program's founders believed were insufficient (Henrich, 2004). Second, the sampling procedures which matched children based on grade level were criticized. This procedure potentially distorted the achievement comparison because children in the two groups may have been differentially lost due to special education placements and grade retentions (Barnett, 2004). The children in the second and third grade comparison groups were significantly older than the children in the Head Start group, indicating that there may have been higher rates of grade retention and special education among the comparison children (Barnett, 2004). Third, the range of dependent variables was criticized for being inadequate to measure the program's broad range of objectives (Condry, 1983). Finally, the external validity of the findings has been questioned because the more than half of the original sample sites refused to participate in the study, therefore the sample may not have been representative of the national population of Head Start programs (Condry, 1983). This heavy criticism of the Westinghouse Report has caused the findings to be largely discounted.

The Head Start Evaluation, Synthesis, and Utilization Project. In 1981, the ACYF commissioned a second report on the impact of the Head Start program: the Head Start Evaluation, Synthesis and Utilization Project. In order to address the program's

impact on children's cognitive development, socioemotional development, and health, the project synthesized the findings from the large body of existing studies that had evaluated the Head Start program (ACYF, 1985). Through an extensive search process, the researchers collected 210 published and unpublished studies of Head Start program. They conducted a narrative review of each of these studies, and for the 76 studies that reported sufficient information; the researchers conducted a meta-analysis.

The results of the meta-analysis indicate that Head Start programs have a positive impact on several domains of children's development (ACYF, 1985). The researchers found that Head Start had an immediate positive impact on children's cognitive ability; however within two years of the end of the program, there was no longer a meaningful difference between the cognitive scores of children who attended the program and those who did not. Additionally, the researchers found some evidence that children who attended Head Start programs were less likely to be retained in grade or placed in special education than children who did not attend the program, but these findings were based upon very few studies. Finally, the researchers found evidence that attending Head Start programs had positive effects on the children's health, motor development, and nutrition.

In addition to examining research that examined the impact of Head Start on children's development, the Head Start Evaluation, Synthesis and Utilization Project reviewed three research reports that examined the program's impact on the health of children with disabilities (ACYF, 1985). The researchers concluded that Head Start likely has some positive effects on children with disabilities. The researchers could not determine the effect more conclusively due to the small number of studies and because the reports that did examine children with disabilities in the Head Start program mostly

reported on the characteristics of children with disabilities and the types of services they received. These reports give some insight into the experiences of children with disabilities within the Head Start program, but these reports are dated (i.e., 1984 and older) and were done prior to the reauthorization of IDEA that extended special education services to children under the age of 5. Therefore, it is unlikely that the findings in these reports would generalize to the current population of children with disabilities in Head Start programs.

The Head Start FACES. FACES is a longitudinal study that examined the characteristics, experiences, and outcomes of a nationally representative sample of children who attended Head Start programs and their families (ACF, 2006). Researchers have collected data on three cohorts of children who attended Head Start programs in 1997, 2000, and 2003. The study sample only included children enrolled in Head Start programs, without a control or comparison group. Therefore, the study only provides limited information regarding the impact of the Head Start program on its participants, because, without a control or comparison group, it is not possible to attribute the changes in the children's achievement to the program rather than to other factors such as to typical maturation.

In all three cohorts, the children attending Head Start programs entered the program with vocabulary, early math, early reading, and early writing skills that were below the national norms. Over the course of the year, the children attending Head Start programs made significant gains in vocabulary, early math, and early writing skills (ACF, 2003; ACF, 2006). Additionally, the children showed growth in their social skills over the course of the Head Start program (ACF, 2003; 2006). Moreover, when comparisons

were made across the three cohorts of participants, the researchers found that the average number of letters that Head Start children knew by the end of the year increased and the gap between the early reading skills of Head Start children and the national norm had been reduced (ACF, 2006). Despite these gains, the children's skills remained below the national norms at the end of the year (ACF, 2003; 2006).

In addition, the FACES study examined the satisfaction of parents of children with disabilities (ACF, 2000). The majority of the parents (76%) reported being very or somewhat satisfied with the program. Only 19% of the Head Start parents reported that they were somewhat or very dissatisfied and 5% reported that they did not know. Additionally, 73% of the parents of children with disabilities reported that they were very satisfied with the help they received in terms of special needs resources and with special needs at home. These data are promising, in that most parents are satisfied with the services Head Start provides to their children with disabilities, however the study did not report any information on the impact the program had on the children's development or school readiness.

The Head Start Impact Study. The most recent federally commissioned study of the Head Start program is the Head Start Impact study, which was mandated by Congress in the 1998 reauthorization of the Head Start Act. The goals of the study were to examine how Head Start affects the school readiness of children who were enrolled in the program as compared to children who were not enrolled and to understand under what circumstances the program is most effective. The study sample included 4,667 3- and 4-year-old applicants to a nationally representative sample of Head Start programs across the nation. The applicants were randomly assigned to either the treatment group that

attended the Head Start program or the control group that could receive other services available in the community, but did not attend the Head Start program. Because children in the control group were able to receive other services and attend other preschool programs, it is important to note that the control group is not a “no service” group (ACF, 2005b). Instead, the study compared children in the Head Start program to children in a mixture of alternative programs. Data collection began in the fall of 2002 at the start of the Head Start program and continued through 2008 when the children were in third grade.

Preliminary findings from the study show that the Head Start program had a positive impact on children after one year of participation. Head Start had a positive impact on 3-year-old children’s pre-reading, pre-writing, vocabulary, and parent-reported literacy skills (ACF, 2005b). The sizes of these effects were small, ranging from 0.10 for children’s vocabulary skills (as measured by color naming) to 0.34 for literacy skills, based on parental report. The program did not have a significant effect on the oral comprehension, phonological awareness or early math skills of 3-year olds (ACF, 2005b). Additionally, the program had a positive effect on 4-year-old children’s pre-reading, pre-writing, and parent reported literacy skills (ACF, 2005b). These effects sizes were also small, ranging from 0.16 for children’s prewriting skills to 0.29 for literacy skills, based on parental report. Furthermore, the program had a larger effect on the 3-year-olds than on the 4-year-olds. These effects were in relation to the skills of children from low-income families who did not attend the Head Start program. When the scores of the children who attended Head Start were compared to national norms, Head Start

children were still behind the average performance level for children in the U.S. by approximately one-third of a standard deviation (ACF, 2005b).

In addition to the effects on children's academic skills, the findings from the Head Start Impact Study suggest that the program has some positive effects on the children's social-emotional development. The program was associated with a reduction in the total number of problem behaviors reported by parents as well as a reduction in the children's hyperactive behavior as reported by the parents (ACF, 2005b). However, there was no effect on the aggressive behavior, withdrawn behavior, social skills and approaches to learning, or social competencies of either age group. Finally, the program did not have a significant effect on the 4-year-old children's total problem behaviors or hyperactive behaviors.

The final report on the findings from the Head Start impact study includes children's outcomes through the end of first grade (ACF, 2010). These findings indicate that many of the effects of Head Start had faded by the end of first grade. On 22 measures of cognitive and academic achievement, each cohort of children who attended Head Start (i.e., those who attended for two years and those who attended for one year) only performed significantly better than the control groups on one measure. Children who attended the program for one year had significantly high vocabulary scores than the control group and children who attended Head Start for two years did significantly better on a test of oral comprehension than the control group. Furthermore, both of these effects size were small (.09 and .08, respectively). There was some indication that the program had lasting effects on children's social-emotional outcomes; however these effects were mixed and only evident on a few measures. Children who began Head Start

as 3-year-olds and attended for two years had closer and more positive relationships with their parents than the control group at the end of first grade. In contrast, first grade teachers rated children who began Head Start as 4-year-olds as more shy and having more problems with teacher interactions, but parents rated the children who attended Head Start as being less withdrawn. Like the cognitive effects, these social-emotional effects were small, with effect sizes less than .20. Finally, Head Start seemed to have some longer-term effects on children's health, both in terms of overall health status, as well as receipt of health insurance.

In addition, the final report from the Head Start impact study included a brief examination of the impact of Head Start participation on children with disabilities (ACF, 2010). The findings from this report indicate that the Head Start had very few effects on children with disabilities and the effects the program did have were not immediately evident. There was no difference in the academic skills of children with disabilities who did and did not attend the program at the end of the Head Start program or at the end of kindergarten. However, children with disabilities who attended Head Start for two years had higher math skills at the end of first grade than children with disabilities who did not attend the program. Furthermore, Head Start had a favorable impact on the social-emotional development of children with disabilities who attended the program for two years but these effects were also not evident until the end of first grade. These children had less hyperactivity, less conflict, more positive relationships, and fewer problems with structured learning than the children randomly assigned to the control group. In contrast, at the end of kindergarten, children with disabilities who attended Head Start for only one year had lower ratings of social-emotional outcomes than children who did not attend the

program. These findings suggest that Head Start has some favorable impacts on children with disabilities, but these effects are largely for children who attended the program for two years and are not evident until the end of first grade. It is important to note that in the random assignment of children to Head Start programs, children who were considered “high risk” could be placed in the program, rather than being randomly assigned, and were therefore excluded from the study. The children who were considered high risk were often children with more severe disabilities (ACF, 2010), so the findings from the Head Start impact study may not generalize to the overall sample of children with disabilities who attend the program.

Summary of the benefits of preschool programs. Taken together, the Consortium for Longitudinal Studies, and the studies of the Perry Preschool and Abecedarian programs indicate that high-quality preschool programs for children from low-income families have a positive impact on the development of children, with some benefits lasting into adulthood. However, these programs were likely of much higher quality than most Head Start programs (Zigler et al., 1993). The federally mandated studies of the Head Start program indicate that Head Start has a positive impact on the children who attend the program, yet these effects are smaller than the effects of Consortium, Perry Preschool, and Abecedarian programs.

For the most part, the federally mandated research examining the impact of the Head Start program as well as the Consortium, Perry Preschool and Abecedarian programs overlooks children with disabilities. Of these studies, only the Head Start Evaluation, Synthesis and Utilization Project, FACES, and the Head Start Impact Study examined the effects on students with disabilities. These studies found that, in general,

parents of children with disabilities tended to be satisfied with the services their children received (ACF, 2000) and that the program likely had some positive effects on children with disabilities (ACYF, 1985). Furthermore, the Head Start Impact Study provides some evidence that Head Start has a positive impact on the math skills and social-emotional development of children with disabilities, but these effects were only found for children who attended the program for two year and the effects took several years to emerge (ACF, 2010). In the next section, I provide a review the empirical literature that examines the effects of Head Start on the children who attend the program.

Empirical Research on the Impact of Head Start Programs

In order to determine the current state of knowledge on the impact of the Head Start program on children with disabilities, I reviewed the empirical literature relating to this subject. However, because the literature that focuses specifically on children with disabilities is limited, I expanded my review to include research that examined the impact of the Head Start program on the general population of attendees. In the subsequent section, I first describe my literature search methods. Then, I provide a methodological critique of this body of literature. Finally, I provide a synthesis of the findings from reviewed studies.

Search methods. To compile literature on the impact of Head Start programs on young children, I used electronic, ancestral and forward searches. First, I conducted an electronic search using the Education Resources Information Center (ERIC), PsychInfo, EconLit, and Education Research Complete databases. I used “Head Start” as a key word and specified that articles containing “Early Head Start” should not be included in the results. Additionally, I used two sets of descriptors as key words. First, I specified that

the abstract should include “outcome*”, “impact*”, “assess*”, or “evaluat*.” Second, I specified that the abstract should include “national”, “longitudinal” or “federal.” I reviewed the results from this search and only included articles that met the following two inclusion criteria in the review. First, I only included articles that examined Head Start programs. Articles examining the effects of prekindergarten or preschool in general were excluded. Second, I only included articles that looked at the overall impact of the Head Start program, not specific interventions or curricula used within Head Start programs. These search procedures resulted in seven relevant articles.

Next, I used an ancestral search of the seven articles that met the inclusion criteria to find additional articles. I reviewed the reference section of each article included in the review to locate additional articles examining impact of the Head Start program. In the ancestral searches, I did not find any particular journals to be most useful, so I relied on the reference sections of articles I had already located. Finally, I used the Social Science Citation Index database to find additional relevant articles that cited the articles included in this review. I subjected the articles I found through the forward and ancestral searches to the same inclusion criteria listed above. The ancestral and forward searches resulted in an additional four articles.

Methodological review of the empirical research. In this section, I provide a methodological critique of the 11 studies I identified in my literature search. This critique provides an overview of the research that has examined the effects of the Head Start program and methodological strengths and weaknesses of this body of literature. Specifically, I reviewed the purpose and research questions, design and sample, variables and instrumentation, and data analysis in the 11 studies. These criteria were primarily

based on indicators of quality research described by Gay et al. (2006) and Huck (2008). The methodological critique is followed by a synthesis of the studies' findings.

Purpose and research questions. It is important that researchers clearly state both the purpose of their study and the research questions which they will be examining. Well written research topics should include the variables of interest and the relationships between those variables (Gay et al., 2006). Furthermore, the statement of the purpose should guide the methodology used within the study (Huck, 2008). All of the 11 reviewed studies included a well defined purpose which, in all cases was to examine the impact of Head Start on a variety of outcomes. These outcomes included cognitive, language, and academic achievement (Abbott-Shim et al., 2003; Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Henry, Gordon, & Rickman, 2006; Kreisman, 2003, Lee et al., 1988; Lee et al., 1990), social development (Abbott-Shim et al., 2003; Lee et al., 1990), health (Abbott-Shim et al., 2003; Currie & Thomas, 1995; Henry et al., 2006; Ludwig & Miller, 2007), indicators of economic success (Caputo, 2003; Garces et al., 2002), and other school outcomes (e.g., school suspensions, grade repetition, high school completion etc.; Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Garces et al., 2002; Ludwig & Miller, 2007). Of the 11 studies, 3 examined the participants' outcomes immediately after participation in the program (Abbott-Shim et al., 2003; Henry et al., 2006; Lee et al., 1988), 4 studies examined outcomes during the elementary school years (Currie & Thomas 1995, 1999; Kreisman, 2003; Lee et al., 1990) and 4 studies examined the long-term outcomes of students in high school and beyond (Aughinbaugh, 2001; Caputo, 2003; Garces et al., 2002; Ludwig & Miller, 2007). Additionally, three studies compared the outcomes of children who attended Head Start to other children without

indicating the preschool experiences of those children (Abbott-Shim et al., 2003; Aughinbaugh, 2001; Ludwig & Miller, 2007), seven studies compared the outcomes of Head Start children to children who did not attend any preschool program (Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990) and six studies compared the outcomes of Head Start participants to who attended other preschool programs (Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Lee et al., 1988; Lee et al., 1990). Finally, one study compared the outcomes of Head Start participants to who attended a state prekindergarten program (Henry et al., 2006). Table 1 describes the purpose of each of the reviewed studies.

INSERT TABLE 1 ABOUT HERE

Design and sample. 9 of the 11 studies I reviewed used data from extant datasets (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990; Ludwig & Miller, 2007) and 2 studies used original data collected specifically for the use of their study (Abbott-Shim et al., 2003; Henry et al., 2006). Of the studies that used extant datasets, six utilized datasets that were nationally representative (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003). Of these studies that drew upon data from nationally representative datasets, four used the National Longitudinal Study of Youth (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas 1995, 1999), one used data from Prospects: The Congressionally Mandated Study of Educational Growth and Opportunity (Kreisman, 2003) and one used data from the Panel Survey of Income

Dynamics (Garces et al., 2002). Table 2 describes the data sources, samples, and research designs for the 11 studies included in this review.

INSERT TABLE 2 ABOUT HERE

The use of data from nationally representative datasets has several advantages. First, because the samples in these datasets were representative of the national population at the time of the study, the findings from these studies have strong external validity and generalize to the national population. In addition, all three of these datasets have the advantage of including longitudinal data. This allowed the researchers to examine the longer-term effects of participation in a Head Start program. However, a disadvantage of the longitudinal data provided by these datasets is that the participants in many of these studies attended Head Start several decades ago. For example, the participants in Aughinbaugh's (2001) study attended Head Start between 1980 and 1984; the participants in Caputo's study attended Head Start programs in the first six years the program was offered (i.e., 1965-1971); and the participants in Kriesman's (2003) study attended the program between 1983 and 1989. This provides insight into the long-term effects of Head Start, but at the same time, the age of the data is a threat to the external validity of the findings. Since the time these participants attended Head Start, there have been many changes to the Head Start program, the availability and quality of other preschool programs, and to society which may limit the extent to which the findings from these studies generalize to current Head Start programs. For example, in their study of the effects of Head Start on Hispanic children's development, Currie and Thomas (1999)

point out that their sample was nationally representative when the data were collected in 1978, but subsequent immigration has caused changes in the population of Hispanic children. Therefore the sample is no longer representative of the population of Hispanic children currently living in the United States.

Of the three studies that used extant datasets that were not nationally representative, one used a combination of data from Vital Statistics, Census data, and the National Educational Longitudinal Study of 1988 (Ludwig & Miller, 2007), and the final two studies used data from the Head Start Longitudinal Study (Lee et al., 1988; Lee et al., 1990). The Head Start Longitudinal Study was administered by the Educational Testing Service (ETS) to research the development of children who: (a) attended Head Start programs, (b) attended other preschool programs, or (c) did not attend preschool. The study began in 1969 and followed children through 1972, prior to the inclusion of children with disabilities. ETS collected data on 969 participants located in Trenton, New Jersey and Portland, Oregon.

Description of the analytic sample. It is important that researchers using extant datasets describe the analytic sample they used for analyses in order to facilitate the reader's understanding of the external validity of the results and to facilitate replication of the study (Huck, 2008). All nine of the studies that used extant datasets provided sufficient descriptions of the analytic sample used in their analyses (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990; Ludwig & Miller, 2007). In each of these studies, the authors reported descriptive statistics of the analytic sample for each of the variables included in the analyses. These descriptive statistics included information on the sex, race, SES, age

and other relevant information about the participants. In three of the studies, researchers limited their analytic samples to Black and White children, excluding children of other race/ethnicities (Currie & Thomas, 1995; Garces et al., 2002; Lee et al., 1988). In other studies, the researchers limited the analytic sample to only Black children (Lee et al., 1990) and only Hispanic children (Currie & Thomas, 1999). The remainder of the studies included children from all racial/ethnic backgrounds (Aughinbaugh, 2001; Caputo, 2003; Kreisman, 2003; Ludwig & Miller, 2007).

Despite the sufficient descriptions of the analytic samples provided in all of the reviewed studies, very few researchers reported on the prevalence of disabilities within the study's sample. Abbott-Shim et al. (2003) excluded children with documented disabilities and Lee et al. (1990) excluded children with severe disabilities, although they did not define how the severity of the disability was determined. The remaining nine studies did not mention children with disabilities (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Henry et al., 2006; Kreisman, 2003; Lee et al., 1988; Ludwig & Miller, 2007). The impact of Head Start on the development of children with disabilities is arguably outside of the scope of these studies; however, a substantial portion of each of these samples of children should have included children with disabilities due to the mandate that 10% of each Head Start program's enrollment must include children with disabilities.

Missing data. In addition to describing the analytic sample, it is important for researchers to describe the amount of data that are missing, as well as how they dealt with the missing data and the potential consequences. Data can either be missing at random or systematically missing (McKnight, McKnight, Sidani & Figueredo, 2007). If data are

systematically missing, then the findings may be biased. Researchers should compare cases with missing data to those without in order to examine whether the exclusion of cases with missing data will bias the results (McKnight et al., 2007). Only three of the studies that used extant datasets referred to missing data (Aughinbaugh, 2001; Caputo, 2003; Lee et al., 1990). Aughinbaugh and Caputo both reported how they dealt with missing data (i.e., cases with missing data were excluded and in some cases values for missing data were imputed), but they did not make any attempt to describe the potential consequences of the missing data. Only Lee et al. (1990) provided any description of the cases that were excluded due to missing data. Their analyses of these cases indicated that the missing data were not expected to bias their results. Without this type of investigation in the eight remaining studies (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003; Lee et al., 1988; Ludwig & Miller, 2007), the extent to which missing data potentially biased the results and inhibits the external validity of the findings is unclear.

Empirical design. A final important consideration regarding the design and sample of the studies is the process by which participants were assigned to either the treatment group (i.e., Head Start) or control group (i.e., no preschool or other preschool program). Only Abbott-Shim et al. (2003) utilized an experimental design. Abbott-Shim and colleagues randomly assigned children in overcrowded Head Start centers to either Head Start or the program's waitlist. Of the 11 studies included in the review, this design has the strongest internal validity. The other ten studies relied on correlational research designs (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Kreisman, 2003; Lee et al., 1990; Lee et al., 1988; Ludwig & Miller,

2007) and quasi-experimental designs (Henry et al., 2006). The internal validity of these studies is not as strong because children were not randomly assigned to programs; rather the families chose whether or not the children would attend Head Start. Therefore, there may be systematic differences between families who chose to send their children to Head Start programs and those who did not. If these differences did exist, they may have biased the results. To control for these familial differences, researchers in these nine studies statistically controlled for a variety of observable family characteristics (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Henry et al., 2006; Kreisman, 2003; Lee et al., 1990; Lee et al., 1988; Ludwig & Miller, 2007). Additionally, in three studies, researchers compared the development of children who attend Head Start to their siblings who either attended a different preschool program or no preschool (Currie & Thomas 1995, 1999; Garces et al., 2002). This enhanced the internal validity of these studies by controlling for unobserved family characteristics.

Variables and instrumentation. In addition to providing a detailed description of the data source, analytic sample, and missing data, it is necessary for researchers to define the variables used in analyses, provide information on how the variables were measured, and report on the reliability and validity of their measures (Gay et al., 2006). The dependent variables in the 11 studies included variables measuring cognitive and academic achievement (Abbott-Shim et al., 2003; Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Henry et al., 2006; Kreisman, 2003, Lee et al., 1988; Lee et al., 1990), social development (Abbott-Shim et al., 2003; Lee et al., 1990), health (Abbott-Shim et al., 2003; Currie & Thomas, 1995; Henry et al., 2006; Ludwig & Miller, 2007), economic indicators (Caputo, 2003; Garces et al., 2002), and school outcomes (Aughinbaugh, 2001;

Currie & Thomas, 1995, 1999, Garces et al., 2002; Ludwig & Miller, 2007).

Additionally, the 11 studies included a wide range of variables controlling for individual, family, and teacher characteristics. The variables used in the various studies are presented in Table 3.

INSERT TABLE 3 ABOUT HERE

For the most part, the reviewed studies included sufficient information describing the source of both the dependent and control variables. Data were collected through a combination of direct assessments (Abbott-Shim et al., 2003; Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Henry et al., 2006; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990), parental report (Abbott-Shim et al., 2003; Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Henry et al., 2006; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990), self-report (Caputo, 2003), and teachers' ratings (Henry et al., 2006). Only one study (Garces, et al., 2002) did not specify the source of their data. The authors stated that, "information was collected on all adult household members age 30 or below" (Garces et al., 2002, p. 1002), however they do not say who the information was collected from (i.e., self-report or parental report).

In addition to describing the source of the data for each variable, it is important that researchers define their variables to enable readers to understand the construct that is being measured and to facilitate replication. For the most part, the reviewed studies provided a sufficient definition of the variables included in analyses. Only, Aughinbaugh (2001) failed to provide a sufficient definition of each variable included in the analyses.

Aughinbaugh provided a definition of the three dependent variables and nine of the control variables; however she did not define the variable indicating whether or not the “youth experienced hard times” (p. 648). Without a definition, it is not clear exactly what this variable measured. Although the majority of the reviewed studies provided adequate definitions of their variables, five of the studies failed to provide information about the reliability and validity of their measures (Aughinbaugh, 2001; Currie & Thomas, 1995, 1999; Henry et al., 2006; Kreisman, 2003). For some of these measures, the exclusion of reliability and validity information is not concerning because the measures used are well-known assessments with acceptable levels of reliability and validity, such as the Peabody Picture Vocabulary Test (PPVT), the Peabody Individual Achievement Test, and the Woodcock Johnson Test of Achievement-III (WJIII). However, Henry et al. (2006) and Kreisman (2003) use assessments that are not well known; therefore data on the reliability and validity of these assessments should have been included to substantiate these measures.

A final concern regarding the variables is the validity of the independent variable (i.e., Head Start participation) in several of the studies. In six of the studies that used extant datasets, data on the participants’ preschool experiences were collected retrospectively either through self-report or parental-report (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002, Kreisman, 2003). This may be problematic because retrospective data may be contaminated by recall error (Garces et al., 2002). Garces and colleagues point out that because Head Start received widespread public support, some participants may have mistakenly reported that their son or daughter attended a Head Start program rather than another type of preschool. In their sample,

Garces et al. found that 5% of the reported Head Start participants were from families with incomes above 150% of the poverty line and never received welfare, indicating that it is unlikely that the participant was eligible for and attended a Head Start program. Only two studies (Aughinbaugh, 2001; Garces et al., 2002) attempted to validate the parental report of Head Start participation by examining other related variables (i.e., income, receipt of welfare, and enrollment rates in sample versus the enrollment in the population). This potential misclassification of Head Start participation may bias the results, causing the effects of Head Start participation to be either over- or underestimated.

Data analysis. The data analyses used to examine the impact of the Head Start program varied across studies; however, the researchers in the majority of the studies used OLS regression (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Lee et al., 1988; Lee et al., 1990). The remaining studies used hierarchical linear growth curve modeling (Abbott-Shim et al., 2003), propensity score matching (Henry et al., 2006), growth mixture models (Kreisman, 2003), and a regression discontinuity design (Ludwig & Miller, 2007). All authors provided sufficient descriptions and rationales for the data analyses used in their studies.

The use of OLS regression analyses allows the researchers to control for a variety of variables, which is essential in these studies because participants were not randomly assigned to participate in Head Start, no preschool, or other preschool programs. The use of regression analyses to control for potentially confounding variables helps to increase the internal validity of these studies, however there are still many potential confounding variables that researchers were unable to control. For example, in the studies that

examined the long-term effects of Head Start (i.e., effects lasting beyond one or two years after Head Start participation; Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995; Currie and Thomas, 1999; Garces et al., 2002), researchers were unable to control for factors occurring in the time between Head Start participation and the measurement of the dependent variable. This is problematic because children attending Head Start may have different experiences after the program than children who did not attend preschool or attended other preschool programs. For example, research has found that children who attend Head Start programs go on to attend lower quality schools when compared to children who do not attend Head Start programs (Currie & Thomas, 2000; Lee & Loeb, 1995). This type of experience was not controlled for in any the studies that examine long-term effects of Head Start using a regression design, which threatens the internal validity of these studies (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995; Currie and Thomas, 1999; Garces et al., 2002).

Caputo (2003) did attempt to control for some of the participants' experiences that occurred in the time between Head Start and the measurement of the outcome variables. However, this likely confounded the analyses rather than helped to control for school experiences. Caputo controlled for the participants' self-esteem and sense of mastery or control over their lives, as well as whether or not they had ever been suspended or expelled from school. These variables may be indicators of students' experiences subsequent to the Head Start program, but they are problematic because the participants' self-esteem, sense of mastery and behavior may have been affected by the Head Start program.

Synthesis of the findings on the impact of Head Start participation. Table 4 provides a summary of the results of each of the reviewed studies. Overall, the results of these studies suggest that Head Start has small to moderate effects on children's development immediately following participation, but these effects tend to fade overtime. Because the effects of Head Start have been found to fade, I first describe the findings in studies that examined the short-term effects of Head Start (i.e., effects lasting into children's elementary school years). Then, I describe the findings in the studies that examined the long-term effects (i.e., participants' outcomes in high school and adulthood) of the Head Start program.

INSERT TABLE 4 ABOUT HERE

Short-term effects of Head Start participation. Five of the studies I reviewed examined the short term effects of Head Start participation (Abbott-Shim et al., 2003; Henry et al., 2006; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990). These studies examined the effects of Head Start participation on children's academic achievement, social skills, and health in the first 3 years after participating in the program.

Academic achievement. One of the goals of the Head Start program is to improve children's academic achievement to ensure that children start school ready to learn. Consequently, many studies have examined the impact of Head Start on children's academic achievement. For the most part, researchers have found that Head Start has a positive effect on the academic achievement of participants. In two of the first studies that examined the impact of Head Start on children's achievement, Lee et al. (1988;

1990) found positive effects associated with participation in the program. In the first study, Lee and colleagues (1988) examined the effect of the Head Start program on children's receptive vocabulary and school achievement over the course of the year. The authors found that children who attended Head Start made vocabulary and school achievement gains that were statistically significantly larger than children who attended other preschool programs or did not attend preschool. After controlling for initial background and cognitive differences, Head Start was found to have moderate positive effects on the school achievement of Black children when compared to Black children who did not attend preschool. In addition, Head Start had a significant and positive effect on the school achievement of Black children, when compared to children who attended other preschool programs. There were no statistically significant differences in the vocabulary or school achievement gains of White children who attended the program, when compared with children who attended a different preschool program or did not attend a preschool program; however, this may be in part due to the small number of White children in the sample and, consequently, the low statistical power in these analyses. Overall, Lee and colleagues' findings suggest that Head Start has a positive effect on the children who participate in the program. However, the authors found that, despite the gains made by participants, Head Start participants were still behind their peers at the end of the year.

In a subsequent study, Lee and colleagues (1990) found that the positive effects of Head Start persisted through first grade. The authors used the same sample as Lee et al. (1988), but due to high attrition among the White participants, Lee et al. (1990) limited the sample to Black children only. In this study, Lee and colleagues found that when

compared to children who did not attend preschool, Head Start participation was associated with an increase in children's perceptual reasoning and verbal achievement. However, when compared to children who attended other preschool programs, there was no statistically significant effect on the Head Start children's perceptual reasoning.

Kreisman (2003) and Abbott-Shim et al. (2003) provide further evidence for the positive effects of Head Start on children's academic achievement. Both of these studies examined the growth curves of children attending Head Start programs and compared them to the growth of children who did not participate in the program. Abbott-Shim and colleagues found that over the course of the year, children who attended Head Start programs showed faster rates of growth in receptive vocabulary and phonemic awareness than children who were placed on the program's waitlist. Similarly, Kreisman found that income was less predictive of high reading and math achievement growth for children who attended Head Start than for those who did not attend the program. This indicates that Head Start may reduce the influence of income on reading and math achievement.

Finally, Henry et al. (2006) compared the cognitive and academic gains made by children who attended Head Start to the gains made by children who were eligible for Head Start, but whose parents chose for their child to attend a state prekindergarten program. The researchers found that children who attended the Head Start programs started the year with lower vocabulary skills, cognitive achievement, and phonemic awareness, and the gap grew over the course of the year. Furthermore, at the start of the children's kindergarten year, teachers rated the children who attended Head Start as having lower academic skills, intellectual curiosity, attitudes toward school, and overall school readiness. Although this shows that children attending Head Start programs do

not do as well as children attending prekindergarten programs, this study does not provide direct evidence that Head Start is ineffective. Children in the Head Start programs did make gains over the course of the year, indicating they may have been better off attending the Head Start program than no program at all. However, it is not clear if these gains were due to the Head Start program or to typical maturation. Additionally, because the parents chose whether their child would attend Head Start or the state prekindergarten program, there may be systematic differences between the types of parents who would choose each program which may bias the results.

Social skills and behavior. In addition to examining the effects of Head Start on children's academic and cognitive achievement, three studies examined the effects of the program on children's social skills. In the previously mentioned studies by Lee et al., the authors examined the effects of Head Start participation on children's impulsivity (1988) and social competency (1990). Lee et al. (1988) found that Head Start participation was associated with a decrease in Black children's impulsivity when compared to who did not attend preschool program and who attended other preschool programs. Similarly, Lee et al. (1990) found that, when compared to children who did not attend preschool, Head Start had a positive effect on children's social competency that lasted into first grade. However, there was no difference in ratings of the social competency of the Head Start participants and who attended other preschool programs.

In contrast, Abbott-Shim and colleagues (2003) found that, over the course of the year, there was no change in the ratings of problem behavior of children attending the Head Start program. However, the authors found that children who were placed on the program's waitlist showed a reduction in behavior problems over the course of the year.

Taken together, these studies provide inconclusive evidence of the effects of Head Start on children's behavior and social skills. There is some evidence that that Head Start has at least a short-term effect on children's social competency (Lee et al., 1990) and impulsivity (Lee et al., 1988), but no effect on children's problem behavior (Abbott-Shim et al., 2003)

Health. As with the research examining the effects of Head Start on children's social skills and behavior, the findings from research examining the short-term effects of Head Start participation on children's health have been inconclusive. Abbott-Shim and colleagues (2003) found that, when asked about well care, health screenings, immunizations, and dental examinations, parents of Head Start children indicated they had addressed more of their children's health issues than parents of children who were on the program's waitlist. Additionally, a higher percentage of Head Start parents indicated that their children showed improvements in health behaviors over the course of the Head Start year, such as washing their hands after using the bathroom and eating nutritious and healthful foods. Similarly, a higher percentage of the Head Start parents reported improvements in their own health behaviors, including teeth brushing, eating nutritious and healthful foods, exercising and staying fit, and regular seat belt use.

In contrast, Henry et al. (2006) found that, when compared to children who were eligible for Head Start but chose to attend a state prekindergarten program, kindergarten teachers rated the health of children who attended Head Start significantly lower. Henry et al. did not have teachers rate the health of children prior to the start of the program (i.e., Head Start or prekindergarten), so the impact of Head Start on children's health cannot be determined from this study. Therefore, these findings do not indicate that the

Head Start program had no effect on the health of children who attended Head Start, only that health of children attending a state prekindergarten program was rated higher.

Long-term effects of Head Start participation. In addition to the research examining the short-term effects of Head Start, six of the studies I reviewed examined the long-term effects of the Head Start program (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002; Ludwig & Miller, 2007). These studies examined the effects of the Head Start program on the academic achievement and school outcomes, health, economic success, and criminal activity of individuals at least 3 years after participation in the program.

Academic achievement and schooling. Compared to the evidence of the short-term effects of Head Start on participants' academic achievement, the results of research examining the long-term effects has yielded even more mixed results. Aughinbaugh (2001) found that Head Start had no effect on the math achievement of youth age 12 through 16. In contrast, Currie and Thomas (1995) found that Head Start had some long-term effects on children's academic achievement, however these effects varied by race. They found that participation in Head Start programs was associated with a 5.6% increase in the receptive vocabulary of White youth, but there was no effect on the receptive vocabulary of Black children. However, when Currie and Thomas (1995) examined the effect of the interaction between age and program on the children's receptive vocabulary scores, they found that White and Black children experienced comparable initial gains, but for Black children, these initial gains faded quickly. By age 10, the effects of Head Start on Black children's receptive vocabulary were completely gone. In an additional study, Currie and Thomas (1999) found that Head Start participation had strong positive

effects on Hispanic children's receptive vocabulary, math, and reading achievement. The authors estimated that the Head Start program closed between one-quarter and one-third of the gap in test scores between Hispanic and non-Hispanic White children.

In addition, Aughinbaugh (2001) examined the effects of Head Start on the rates of grade repetition and school suspensions. Results indicated that youth who attended Head Start programs were more likely to be suspended from school than youth who did not attend Head Start. Additionally, Aughinbaugh found that Head Start participation had no effect on the probability that a student would repeat a grade. However, this null finding may have been due to the model used by Aughinbaugh which examined the effects of Head Start on Black and White children simultaneously. When Currie and Thomas (1995) examined the long-term effects of Head Start on Black and White students separately, they found that White students who attended Head Start programs were 47% less likely to repeat a grade than their siblings who did not attend Head Start. Similarly, Currie and Thomas (1999) found that Hispanic children who attended the Head Start program were approximately 20% less likely to repeat a grade than their siblings who did not attend the program. However, Head Start had no significant effect on the grade repetition of Black children (Currie & Thomas, 1995).

In addition to examining the effects of Head Start on participants' academic achievement, school suspensions, and grade repetition, researchers have investigated the program's effect on the educational attainment of participants. Garces and colleagues (2002) found that White Head Start participants were more likely to finish high school than their siblings who did not attend the program. Similarly, White Head Start participants were 28% more likely to attend college than their siblings who did not attend

preschool and 20% more likely than their siblings who attended other preschool programs. Correspondingly, Ludwig and Miller (2007) found suggestive evidence that graduation rates and rates of post-secondary education attendance are higher in counties with higher rates of Head Start participation. However, the authors caution that these findings are only suggestive because the authors were unable to account for individuals moving from county to county between early childhood and the time they would graduate from high school and attend post-secondary education.

Health. Two studies have examined the long-term effects of Head Start on participants' health. Currie and Thomas (1995) found that for both Black and White children, attending Head Start was associated with an 8 to 9% increase in the probability of being immunized. Ludwig and Miller (2007) found additional evidence for the positive effects of Head Start participation on health. They found counties with higher Head Start enrollment rates had lower child mortality rates from causes that could have been affected by Head Start participation such as tuberculosis, other infections, diabetes, nutritional causes, anemia, meningitis, and respiratory causes. Despite this evidence for the positive effects of Head Start on children's health, Currie and Thomas (1995) found that Head Start had no impact on the health and nutrition of participants as measured by the individuals' height for their age.

Economic Success. In addition to examining the long-term effects of Head Start on participant's academic achievement and health, researchers have examined the impact of the program on indicators of participants' economic well-being or success. For the most part, this research has found that Head Start has no effect on the economic well-being of participants. Caputo (2003) found that adults who attended Head Start as

children did not significantly differ from adults who attended either no preschool or other preschool programs on measures of the number of years living in poverty, economic mobility, or receipt of government aide. Similarly, Garces et al. (2002) found that Head Start had no effect on the income of any participants except for White participants whose mothers had dropped out of high school. This group of individuals earned significantly more than their sibling who did not attend preschool programs.

Crime. Finally, only one study (Garces et al., 2002) has examined the long-term effects of Head Start participation on the criminal activity of adults that attended the program as children. The authors found that people who attended Head Start were significantly less likely to be booked or charged with a crime than their siblings who did not attend the program. This effect was largest for Black participants. Black adults who attended Head Start as children were 12% less likely to be booked or charged with a crime than their siblings who did not attend the program.

Summary of the impact of Head Start. Overall, this body of literature suggests that Head Start has some short-term benefits. Participation in the program is associated with short-term, positive effects on children's cognitive and academic achievement (Abbott-Shim et al., 2003; Kreisman, 2003; Lee et al., 1988; Lee et al., 1990). The research on the short-term effects of Head Start participation on children's social skills, behavior, and health is less conclusive. There is some evidence suggesting that Head Start has a positive impact on children's social skills (Lee et al., 1988, Lee et al., 1990), but that it has no effect on their behavior (Abbott-Shim et al., 2003). Similarly, the findings on the effect of Head Start participation on children's health are mixed. Children attending Head Start programs have been found to improve their health

behaviors over the course of the year (Abbott-Shim et al., 2003), however teachers rated the health of Head Start attendees lower than the health of children who attended a state prekindergarten program (Henry et al., 2006).

In addition, Head Start participation is associated with some benefits that last into adolescence and adulthood (Currie & Thomas, 1995, 1999; Garces et al., 2002; Ludwig & Miller, 2007). Head Start participation was associated with increases in academic achievement (Currie & Thomas 1995, 1999) and academic attainment (Garces et al., 2002; Ludwig & Miller, 2007). Additionally, participation in the program was associated with a reduction in the likelihood that White and Hispanic students would repeat a grade (Currie & Thomas, 1995, 1999). Finally, Head Start was associated with improved health (Currie & Thomas, 1999; Ludwig & Miller, 2007) and reductions in criminal activity (Garces et al., 2002). Despite these benefits, Head Start did not have any effect on a range of indicators of economic well-being (Caputo, 2003; Garces et al., 2002).

Overall, the reviewed research indicates that there are many benefits associated with Head Start participation. Yet, in spite of this, there are several methodological weaknesses in this body of literature. First, of the 11 studies that have examined the effects of the Head Start program, only 1 (Abbott-Shim et al., 2003) included a randomized design in which children were randomly assigned to either the Head Start program or the program's wait-list. Second, several of the studies that examined the effects of the Head Start program did not verify whether or not the participants actually attended the Head Start program (Aughinbaugh, 2001; Caputo, 2003; Currie & Thomas, 1995, 1999; Garces et al., 2002, Kreisman, 2003). Instead these studies relied on children or parents' recall many years after the child would have participated in Head Start which

may be problematic. Third, these studies did not account for factors that may have an effect on children's outcomes that occur between Head Start participation and the time when the outcome variables are measured. Finally, none of the reviewed studies accounted for the quality or characteristics of the Head Start programs that the children attended.

Furthermore, little is known about the effects of the program on children with disabilities or about the characteristics of children with disabilities who attend Head Start programs. Due to the requirement that 10% of each Head Start program's enrollment must include children with disabilities, it is likely that a substantial portion of the reviewed studies samples include children with disabilities. However, none of these studies disaggregated the results to subgroups of children with disabilities or even gave descriptive statistics on the number of children with disabilities included in the samples. Two studies (Abbott-Shim et al., 2003; Lee et al., 1990) excluded children with disabilities from their samples. Therefore, it is unclear how well the findings discussed in this literature review generalize to children with disabilities. In addition, there have been no studies that have specifically examined the effects of Head Start on children with disabilities.

Chapter Summary

There are two federal policies that affect young children with disabilities from low-income families: IDEA and the Head Start program. Section 619 under Part B of the IDEA provides special education services to children with disabilities ages 3 through 5, whereas the Head Start program provides primarily center-based preschool to children from low-income families. In addition, Head Start programs are required to set aside at

least 10% of their enrollment for children with disabilities. Despite the collaboration between these two programs in providing preschool services to children with disabilities, little is known about the intersection of these two policies. First, there is limited information on the characteristics of children with disabilities who attend Head Start programs and how these children compare to children with disabilities who attend other ECE programs. Second, there is very little information on the impact of the Head Start program on children with disabilities, or how the school readiness of these children compares to the school readiness of children with disabilities who attend other ECE programs.

Chapter III

Methodology

Findings from Chapter II indicate that that Head Start has some short-term positive effects on children's academic and cognitive achievement as well as some benefits that last into adulthood. However, as noted, there are several methodological limitations of this body of research including the dearth of research on children with disabilities who attend Head Start programs. Although several studies have examined the outcomes of children who attend Head Start programs no research has disaggregated these results to look specifically at the school readiness of children with disabilities who attend Head Start programs. Similarly, despite previous research that has reported on the characteristics of the general population of Head Start attendees; the child, family, program and district characteristics of children with disabilities who attend the program have not been examined. Furthermore, these characteristics of children with disabilities who attend Head Start programs have not been compared to the characteristics of

children who attend other ECE programs. The purpose of this study was to examine the characteristics and school readiness of children with disabilities in the Head Start program. First, I examined the characteristics of children with disabilities who attended Head Start programs, the characteristics of the districts in which they received special education services, and the characteristics of the programs they attended. Second, I examined the school readiness of children with disabilities who attended Head Start and compared their school readiness to that of children with disabilities who attended other ECE programs.

As noted in Chapter 1, I planned to examine the impact of the Head Start program on children with disabilities; however, there are limitations to the PEELS dataset that prohibited me from examining the program's impact. Therefore, I decided that rather than examining the program's impact, I would examine the school readiness of children (i.e., their assessment scores after attending the program).

In this chapter, I describe the dataset and methodology I used in the study. First, I describe the PEELS including the purpose of the study, the study design, sampling methods, and instrumentation. Second, I describe the variables I used in my analyses and provide a rationale for why I selected these variables. Finally, I provide an overview of the methods I used to answer my research questions, a description of how I handled missing data, and the statistical analyses I used.

PEELS Dataset

PEELS was funded by the U.S. Department of Education's National Center for Special Education Research (NCSER) to collect data on the early experiences of children with disabilities. The study was designed to describe a nationally representative sample

of children ages 3 through 5 with disabilities, the services they received, their transitions from both early intervention to preschool and preschool to elementary school, and their performance in preschool and elementary school. The sample included 3,100¹ children with disabilities receiving special education services. In addition to collecting data on the participating children, data were collected on the parents and family, teachers, service providers, the child's preschool program, LEA, and SEA. Data collection began in 2003-2004 and data were collected annually through 2006-2007, then again in 2008-2009 when the participants were ages 8 through 10.

PEELS research design and sampling strategy. To obtain a nationally representative sample of children ages 3-5 with disabilities, researchers used a two-stage sample design: a national sample of LEAs was selected, and then from within these LEAs, a sample of preschoolers with disabilities was selected. This process resulted in a sample of approximately 3,100 children age 3 through 5 with disabilities that is representative of the national population of children with disabilities in 2003-2004.

LEA sample. To obtain the LEA sample, the universe of LEAs serving preschoolers with disabilities was stratified by four Census regions, four categories of

¹ All sample sizes in this study have been rounded to the nearest 10.

estimated preschool special education enrollment, and four categories of district poverty level, resulting in 64 cross-classified stratum cells (U.S. Department of Education, 2006). A total of 709 LEAs were contacted in 2001 and, of these, 245 agreed to participate (U.S. Department of Education, 2008). When the LEAs were re-contacted in 2003, 46 of the original 245 LEAs recruited in 2001 dropped out of the study. The remaining 199 LEAs agreed to remain in the study and supplied a list of all preschool children receiving special education services.

Serious under-coverage in one region was caused by one large state which banned its districts from participating in the study. This issue of under-coverage was resolved in Wave 2 when the state lifted the ban, allowing districts to participate in the study. In order to ensure the final sample was nationally representative, a supplemental sample of LEAs stratified by size was randomly selected from the state in Wave 2. The sample in Wave 1 continues to have the issue of undercoverage in the one region; however researchers weighted the Wave 1 sample as though the state had been covered in order to obtain reasonable national estimates. In addition, imputation based on the Wave 2 data was used to create missing Wave 1 data for the supplemental sample. The Wave 1 sample was then reweighted. The weights included in the PEELS dataset adjust for the undercoverage in Wave 1, but because I did not use weights in my study, the issue of undercoverage may remain resulting in a sample that is not representative of the national population. However, to examine whether my sample was representative of the national population of children age 3 through 5 with disabilities, I compared the characteristics of my sample to the population. I describe the procedures I used to compare the sample and population in a subsequent section.

Because only 199 of the 709 LEAs that were originally contacted agreed to participate in the study, the U.S. Department of Education funded a nonresponse study. A random sample of 32 LEAs stratified by district size was selected from the nonparticipating LEAs that were originally contacted, but did not agree to participate. Of these 32 LEAs, 25 agreed to participate in the nonresponse study. The nonresponse study indicated that there were no systematic differences between the respondents and nonrespondents for key variables. Because there were no systematic differences, the two samples were merged into one sample. The final LEA sample includes the Wave 1 main sample, the nonresponse bias study sample, and the supplemental sample for a total of 232 LEAs.

Child sample. A sample of children was selected from each of the 232 LEAs using two different selection methods. Because LEAs are required to keep track of all children who receive special education services, the PEELS researchers were able to sample from the complete population of children age 3 through 5 who were receiving special education services. However, because children with disabilities are identified on an ongoing basis, two methods were used for sampling children. One method was used for the Wave 1 main sample and the nonresponse sample and a separate method was used for the supplemental sample. Therefore, these two sampling methods are discussed separately.

Wave 1 main sample and nonresponse sample. In Wave 1, the participating LEAs submitted two types of lists of eligible children: a historical list and ongoing lists. The historical list identified age-eligible children who had an IEP (or IFSP in districts that used IFSPs for children age 3 through 5) prior to March 1, 2003. The ongoing lists were

submitted by the LEAs monthly for 1 year, identifying newly eligible children in the district (i.e., children who received their first IEP or IFSP during that month). The children identified on the lists were stratified into five groups by age cohort and list type. There were three age cohorts in the PEELS study: (a) 3-year-olds, (b) 4-year-olds, and (c) 5-year-olds. Cohort A was drawn from the ongoing lists whereas Cohorts B and C were drawn from both the ongoing and the historical lists. Consequently, there were five combinations of age cohort and list type for each district. Table 5 shows the criteria for each cohort as well as the source (list) from which these participants were drawn.

INSERT TABLE 5 ABOUT HERE

Each district had a predetermined sampling rate for each of the five groups. The sampling rates for the five sampling groups in each district were determined based upon the district-level sampling weights and the district-level child counts, by cohort. Additionally, the rates were determined to achieve the target sampling rates within each of the five groups and efforts were made to keep the weights within the groups as equal as possible. When districts provided the historical lists, children were sampled from the historical list using the predetermined sampling rates. Children were sampled from the ongoing lists as the districts sent the lists. A total of 5,260 children were selected from the Wave 1 main sample and the nonresponse sample (U.S. Department of Education, 2008).

Supplemental sample. A similar sampling procedure was used to select children from the supplemental sample; however there were two important exceptions to the

procedure. First, the age cohort was determined based on the children's age in Wave 1. Second, the children were not selected on an ongoing basis because by Wave 2 every child was on a historical list. In order to simulate the sampling procedure used for the Wave 1 main sample and the nonresponse sample, the date of the children's special education enrollment was taken into account when selecting the children. A sample of 540 children was selected from the supplemental sample, increasing the total number of selected children to 5,800.

Family recruitment. Once children were sampled from either the historical or ongoing lists, recruitment packets were sent to the district site coordinators. The site coordinators were then responsible for determining if children were eligible, and if so, inviting the child's parents or guardians to participate in the study. Eligibility was based upon three criteria: (a) there was an English- or Spanish-speaking adult or an adult who used signed communication in the household who could respond to the telephone interview either through verbal communication or a telephone relay services or interpreter for individuals with hearing impairments, (b) this was the first child in the family sampled for the PEELS study, and (c) the family resided in the participating district at the time of enrollment in the study.

Once a family was determined to be eligible, the site coordinator provided the family with recruitment materials and informed the family about the study. Families who agreed to participate were asked to fill out enrollment and consent forms, and return these materials. Upon returning the materials, parents received \$15. Completed enrollment forms were received from 4,070 children, of whom 88% were found to be eligible. Of the eligible children, 81% of the eligible families agreed to participate in the study.

Overall, signed consent forms were received from 2,680 families in the main sample, 230 in the nonresponse sample, and 200 in the supplemental sample for a total of 3,100 families (U.S. Department of Education, 2008).

PEELS instrumentation. Data for the PEELS were collected from the children, parents, teachers, program directors, LEA directors of special education, and state preschool special education coordinators. Data collection instruments included direct child assessments, parent interviews, teacher questionnaires, principle or program director questionnaires, LEA questionnaires and state agency questionnaires. Data were collected in five waves over the course of six years, from 2003-2004 through 2008-2009. Table 6 shows the data collection schedule for each of the instruments used in PEELS and Table 7 provides the response rates for each of the instruments. In the following sections, I provide a brief description of each of the questionnaires used in the PEELS data collection.

INSERT TABLE 6 ABOUT HERE

State Agency Questionnaire. The State Education Agency Policy and Practices Questionnaire was sent to the state preschool special education coordinator in all 50 states and the District of Columbia in Wave 1. The questionnaire was not administered in subsequent waves of data collection because it was believed that the responses would be relatively stable over the 6-year course of the study (U.S. Department of Education, 2006). The questionnaire included questions about the state's preschool special education programs and policies, strengths, weaknesses, and plans for improvement. In

addition, the questionnaire requested data on the state's inclusion policies, collaboration with early intervention providers, and interagency agreements related to preschoolers with disabilities. Questions consisted of yes or no responses and Likert-scale items. In Wave 1, all 51 questionnaires were returned, for a 100% response rate.

LEA Questionnaire. The Local Education Agency Policy and Practices Questionnaire was sent to local directors of special education in the LEAs included in the sample in Wave 1 and in the supplemental sample in Wave 2. Like the State Agency Questionnaire, the LEA questionnaire was only administered once because it was believed that the responses would be fairly stable over the course of the study. The LEA questionnaire was used to collect data on the districts' enrollment, demographics, preschool programs for children without disabilities, inclusion policies, policies for identification of preschoolers with disabilities, interagency agreements, and special education services settings. In addition, the questionnaire asked about the LEA's strengths, weaknesses and plans for improvement. These questions consisted primarily of yes or no questions, Likert-scale items, and numeric responses (.e.g., district enrollment, number of children with IEPs or IFSPs, etc.). The response rate for the LEA questionnaire was 89%.

Principal/Program Director Questionnaire. The Elementary School Principal Questionnaire or Early Childhood Program Director Questionnaire was sent to the principals or program directors of the participants' schools or programs in the first four waves of data collection. In Wave 1, the questionnaire was sent to all principals/program directors of PEELS participants. In Waves 2 through 3, the questionnaire was sent to principals/program directors of PEELS participants who moved to new schools or

programs. The questionnaires asked about the enrollment, student characteristics, community characteristics, fees, licensing/accreditation, services provided, philosophy, strengths, weakness, and setting of the school/program. In addition, the questionnaire collected data on the program/schools' personnel and the director. Finally, the questionnaire asked about the program/schools' special education services and parent involvement.

The initial response rate for the principal/program director questionnaire in Wave 1 was 40%. However, in 2005, the field period for this instrument was reopened and researchers followed up with the initial non-responders, increasing the final response rate to 72% (U.S. Department of Education, 2008). In Wave 2, the response rate was 65% and the response rate for Wave 3 was not reported (U.S. Department of Education, 2008). Because the response rates were so low, PEELS researchers imputed data from the Quality Education Data (QED) Early Childhood and Elementary and Secondary School Files (U.S. Department of Education, 2008).

Teacher Questionnaire. Three versions of the teacher questionnaire were used throughout the study: the Early Childhood Teacher Questionnaire, the Kindergarten Teacher Questionnaire, and the Elementary Teacher Questionnaire. In Wave 1, the Early Childhood Teacher Questionnaire was sent to the teachers of participants who were not yet in kindergarten and the Kindergarten Teacher Questionnaire was sent to teachers of participants who were attending kindergarten programs. Teacher questionnaires were also administered in Waves 2 through 4, with the type of questionnaires sent determined by the type of program the participant attended (early childhood, kindergarten, or

elementary). The Teacher Questionnaire response rates ranged from 76% to 84% in Waves 1-4.

All three versions of the teacher questionnaire asked about the specific child (the PEELS participant) and the child's experiences in the class or program. The questionnaires asked about the classroom personnel, materials, resources, and enrollment, as well as the teacher's experience, education or training, and philosophies of ECE. In addition, the questionnaires collected information on the special education and related services that the child received. Finally, the teacher questionnaires included several teacher rating scales (indirect assessments) including: (a) the Adaptive Behavior Assessment System, Second Edition (ABAS-II), (b) the Vineland Adaptive Behavior Scales, Motor Skills Domain, (c) the Preschool and Kindergarten Behavior Scales (PKBS-2), (c) the Academic Rating Scale (ARS), and (d) the Social Skills Rating System. Table 8 shows the waves in which each of the indirect assessments were administered. In addition, a description of these assessments is provided in Appendix A.

INSERT TABLE 8 ABOUT HERE

Parent interviews. In Waves 1 through 4, the parent or guardian of each child was asked to complete a one hour computer-assisted telephone interview (CATI). During the interview, the parent was asked about the child's health, disability, behavior, school programs and services, special education and related services, child care, and out-of-school activities. In addition, the parent/guardian was asked questions about their household, the family's resources, and family's background. The interviews were

conducted in English, Spanish, or American Sign Language using a text telephone, based upon the parent/guardian's preference.

Direct child assessments. Direct child assessments were administered in all five waves of data collection. The assessments were administered by more than 400 assessors who were employed and trained to administer the one-on-one assessments to the participants. The assessors consisted of school psychologists, teachers, administrators, and other individuals experienced in administering standardized assessments to young children with disabilities. The assessors included employees of participating districts, neighboring districts, and health care agencies, as well as retired individuals. The use of local assessors potentially threatens the objectivity of the test results; however the use of local assessors was necessary because it facilitated access to the children and their families (U.S. Department of Education, 2006). The assessors received an initial 1½ day training that was conducted at locations throughout the country. In addition, the training was supplemented with video-based instruction on test procedures and bi-weekly phone calls with a supervisor. At the in-person training, the administrative procedures were explained and the assessors practiced each subtest following the PEELS protocol then completed a quiz on the assessment procedures. In Waves 2, 3, and 4, assessors who participated in previous in-person trainings were only required to participate in a telephone training rather than repeating the in-person training.

Prior to the assessment, a screening interview was conducted with the child's teacher, service provider, or parent in order to determine whether the child should be administered the direct or alternate assessment, the language of the assessment, and whether or not accommodations were needed. For children who were not able to follow

simple directions, who had a visual impairment that would interfere with the administration of the direct assessment, or who began the direct assessment but could not meaningfully participate, the ABAS-II which was administered as a part of the teacher questionnaire was used as an alternate assessment. A Spanish version of the direct assessment, which included many of the same instruments as the English assessment, was administered to children who primarily spoke Spanish. Both the alternate assessment and the Spanish assessment are described in the subsequent section. Finally, the accommodations that were provided included: (a) enlarged print, (b) assessments administered by someone familiar with the child, (c) assessments administered with someone familiar with the child present, (d) someone to help the child respond, (e) specialized scheduling, (f) adaptive furniture, (g) special lighting, (h) abacus, (i) communication device, and (j) multiple testing sessions.

The direct assessment included the following assessments: (a) the PreLanguage Assessment Scales (PreLAS), (b) the Peabody Picture Vocabulary Test III-Revised (PPVT-III-R), (c) the Leiter International Performance Scale-Revised (Leiter-R), (d) the Individual Growth and Development Indicators (IGDI), (e) WJIII, (f) the Test of Early Math Skills, and (g) the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). Table 9 shows the waves in which each of these assessments were administered. I provide a description of each of these assessments in Appendix A.

INSERT TABLE 9 ABOUT HERE

Spanish assessment. A Spanish version of the assessment was available for children who had limited English proficiency. In order to be eligible for the Spanish assessment, participants had to answer fewer than five items correctly on the English versions of the PreLAS Simon Says and Art Show and answer at least five items correctly on the Spanish Simón Dice and Muestra de Arte. Because only a small number of children participated in the Spanish assessment, the data were not included in the restricted version of the PEELS data.

Alternate assessment. The ABAS-II was used as an alternate assessment for children who were unable to complete the direct assessment. To determine if participants were able to complete the direct assessment, the assessor asked the child a series of questions. Reasons for administering the alternate assessment included: (a) the child could not understand and follow simple directions, (b) the child had a visual impairment, (c) the child did not speak English or Spanish, and (d) the child scored four or less on the combined PreLAS Simon Says and Art Show.

Teachers of children receiving the alternate assessment were asked to complete the entire ABAS-II checklist, rather than just the three subtests described previously which were used for the entire PEELS sample. The complete ABAS-II assesses children's functional performance in several areas including communication, community use, functional academics, school living, health and safety, leisure, self-care, self-direction, social, and work. In addition, it produces composite scores in conceptual, social and practical domains and an overall General Adaptive Composed Domain.

PEELS data cleaning and imputation. In order to minimize missing data, PEELS researchers conducted data cleaning and editing procedures that involved calling respondents to clarify responses, reviewing electronically recorded parent interviews, conducting frequency and cross-tabulation reviews, and completing structural and data integrity edits. In addition, they used a proprietary editing system called COED to identify errors in data, check for consistency of logic edits, and check skip patterns for accuracy. These data cleaning procedures were conducted to ensure the accuracy of the data by identifying responses that were out of the range of valid responses to an item, comparing items that should correspond with one another to make sure they did not conflict, and checking that the skip patterns within the parent interviews were accurately followed. Although these procedures helped to ensure the accuracy of the data, no data on the technical properties of the data from the PEELS questionnaires were available, therefore the reliability and validity of data from the LEA and parent questionnaires is not known.

PEELS researchers imputed values for variables they determined were important. The majority of the variables were imputed using AutoImpute software which uses hot-deck imputation. Hot-deck imputation estimates missing values by creating imputation cells based on regression models (U.S. Department of Education, 2008). Single imputation was conducted which allows the analysis of imputed values using an ordinary variance estimator. This process may cause variances to be underestimated, but the underestimation is proportional to the imputation rate, and therefore, in the PEELS data the underestimation is expected to be small (U.S. Department of Education, 2008).

Variables

In order to answer the research questions in this study, I used variables from the parent interviews and the LEA questionnaire from the first four waves of data collection and data from the direct child assessments administered in the first three waves of data collection. In this section, I provide an overview of the variables used in the analyses including child and family-level variables, LEA variables, program characteristics, and school-readiness variables. First, I provide a description of the variable indicating the type of preschool program attended by the children.

Preschool program. My analyses included a variable describing the child's educational services the year prior to entering kindergarten. Because my research questions only apply to children with disabilities who only attended center-based ECE programs in the year prior to entering kindergarten, I removed all other children from the analytic sample. In order to identify the types of programs children attended, I used data from several variables from the parent interview that took place in the wave of data collection prior to child's kindergarten year using a four-step process.

First, I identified the year the children attended kindergarten. I identified this primarily based upon data from the parent interview. In each Wave of data collection, parents were asked about the child's current grade level (P1CHCURGRD, P2CHCURGRD, P3CHCURGRD, and P4CHCURGRD). From these variables, I determined the year the child first attended kindergarten, then used this to flag the data from the previous wave of data collection. For children who were missing this data, I imputed the current grade level using data from the teacher interview in which teachers were asked about the child's current grade level (T1KA1, T2KA1, T3KA1, T4KA1, T2LA1, T3LA1, T4LA1). I excluded all children who were in kindergarten during the

first wave of data collection (n = 410) or who did not enter kindergarten by Wave 4 (n = 10) from the analytic sample.

Second, I determined the number of programs the children attended using data from the parent interview. In the interview, parents were asked about the types of programs their child was attending at the time of the interview, including whether they attended (a) a preschool program in an elementary school (CHATTPP), (b) an early childhood or preschool center, or nursery school (CHATTECC), (c) a child care center (CHATCCCC), (d) received home-based care (CHATTHBS), or (e) attended another type of program (CHATTOTH). If a parent answered yes to more than one of these questions, the child attended more than one type of program, whereas if the parent answered yes to only one question, the child attended only one type of program. I excluded all children who attended more than one program from the sample (n = 820).

Third, I used data from the parent interview from the wave of data collection prior to the child's kindergarten year to determine whether or not the child attended a Head Start program. Parents were asked if the program in which the child spent the most time was a Head Start program (HEADSTR1). If the parent answered yes to this question, I determined that the child attended Head Start. For the remaining children, I determined the type of program the child attended from the same variables used to determine the number of programs the child attended. From these variables, I determined if the child attended an ECE program in an elementary school (CHATTPP), and ECE program in another location (CHATTECC), or attended another type of program (i.e., childcare, home-based, etc.; CHATCCCC, CHATTHBS, or CHATTOTH). I excluded the children who attended another type of program from the analytic sample (i.e., day care center,

home-based services, or other; $n = 120$), leaving a sample of children who only attended Head Start, an ECE program in an elementary school, or an ECE program in another location. Finally, I used the information from steps one through three to create a series of dummy coded variables indicating whether (a) the child attended a Head Start program, (b) the child attended an ECE program in an elementary school, or (c) the child attended an ECE program in another location. For the regression analyses, I used children who attended Head Start as the reference group in order to draw comparisons between them and the other two groups of children.

Child and family variables. I included a series of independent student-level variables representing both child and family characteristics in my analyses. I included the children's gender, disability, race, income, and mother's educational attainment for two reasons. First, compared to the overall population of children ages 3 through 5, children with disabilities are disproportionately male and disproportionately from low-income families, yet there are no differences in the racial/ethnic composition of 3- to 5-year-old children with disabilities and those without disabilities (U.S. Department of Education, 2006). Furthermore, largely due to the purpose and enrollment requirements of the program, the general population of Head Start attendees tends to be from low-income families, from minority racial/ethnic groups, and have parents who have low educational attainment (ACF, 2005a). However these trends have not been examined among children with disabilities who attended Head Start programs. In addition, several of the child and family variables I included are associated with children's school readiness. Children from low-income families (Brooks-Gunn & Duncan, 1997; Yeung, Linver, & Brooks-Gunn, 2002), those whose parents have low educational attainment

(Duncan & Magnuson, 2005), and those from minority racial/ethnic groups (Duncan & Magnuson, 2005) tend to start school with less advanced academic skills than their peers. Similar trends exist among children with disabilities, with children from minority racial ethnic groups and those from low-income families beginning kindergarten with low levels of school readiness (U.S. Department of Education, 2006). Because these demographic variables are associated with disability status among young children, whether or not they attend Head Start, and their school readiness, I included these variables in this study both as important variables necessary to describe the characteristics of children with disabilities and as important covariates needed in the multivariate analyses examining children's school readiness across the three types of programs.

I derived the child and family variables from the parent interview data, unless otherwise specified. For several of the demographic variables, PEELS created composite variables from the data collected in the parent interview, as well other instruments, across the five waves of data collection. If such a composite variable was created, I included the composite. However, for variables for which there was no composite, I used the data from the parent interview that took place in the wave of data collection prior to the child's kindergarten year. If these data were missing, I imputed the data from the parent interviews from the previous waves.

Gender. I used the gender composite variable (CHDSEX) created by PEELS. These data were collected from the parent interviews across the five waves of data collection. In the PEELS dataset, gender is a dichotomous variable (male = 1; female =

2). I recoded this variable into a dummy variable (male = 0; female = 1). Males were the reference group in all analyses.

Disability category. I used the composite variable representing the children's primary disability category from the wave of data collection prior to the child's kindergarten year (DISAB). PEELS researchers created this variable primarily based upon data obtained from the children's teachers or service providers, but in some cases, the information was taken from the parent interview. In the PEELS dataset, the variable includes 17 categories for the child disability including: (a) autism, (b) deaf/blindness, (c) deafness, (d) developmental delay, (e) emotional disturbance/behavior disorder, (f) hearing impairment, (g) learning disability, (h) mild mental retardation, (i) moderate/severe mental retardation, (j) multiple disabilities, (k) orthopedic impairment, (l) other health impairment, (m) speech or language impairment, (n) traumatic brain injury, (o) visual impairment/blindness, (p) other, and (q) the child does not have an IEP. I excluded all children who did not have an IEP from my analytic sample. Then, I collapsed the remaining 16 categories into three categories: (a) developmental delay, (b) speech or language impairment, and (d) other disabilities. I grouped children with disabilities other than developmental delay or speech language impairment into one group due to the low incidence of these other disabilities among children who attend Head Start programs. Children with speech delays make up 61% of all children with disabilities in the Head Start program and children with developmental delay consist of another 21% (ACF, 2005a). Children with other disabilities only represent 28% of all children with disabilities in Head Start (ACF, 2005a). For the regression analyses, I dummy coded this variable and used children with speech delays as the reference group.

Race/ethnicity. In the interview, parents were asked to identify their child's race/ethnicity. First, parents were asked if their child was of Hispanic, Latino, or other Spanish origin (CHDETHN). Then the parent was asked to identify the race that best describes the child: (a) White (CHRACEWH), (b) African American or Black (CHRACEBL), (c) American Indian or Alaskan Native (CHRACEAI), (d) Asian (CHRACEAS), or (e) Native Hawaiian or other Pacific Islander (CHRACEPI). For the purposes of this study, I collapsed these racial/ethnic groups into five categories: (a) White, non-Hispanic, (b) Black/African American, non-Hispanic, (c) Hispanic, (d) Asian/Pacific Islander, and (e) American Indian or Alaskan Native. I dummy coded these variables and used White, non-Hispanic children as the reference group in all regression analyses.

Family income. In the parent interview, parents were asked to identify their total family income. In the PEELS dataset, family income was categorized into 11 categories in increments of \$5,000 up to \$50,000. These data were split into two variables depending on if the family earned \$25,000 or less per year (HOWMCH) or more than \$25,000 (P1INCME). I collapsed these variables into one variable with three categories: (a) less than \$25,000, (b) \$25,001 to \$50,000, and (c) more than \$50,001. For the regression analyses, I dummy coded this variable and used children from families earning less than \$25,000 as the reference group in all analyses.

Mother's educational attainment. I included a variable representing the children's mother's educational attainment. These data were from multiple questions within the parent interview. First, if the respondent was the child's mother, I used data from a question in which the respondent was asked to identify the highest year or grade

she completed in school (less than high school with no GED, high school diploma or GED, some college/postsecondary or vocational courses, 2- or 3-year college degree or vocational diploma, 4-year college degree, some graduate work/no graduate degree, or graduate degree; P1GRADE, P2GRADE, or P3GRADE). If the respondent was not the mother, I imputed the data from question in which the respondent was asked to identify the child's mother's highest year or grade completed in school (MOGRADE). Finally, if the child was missing data on both of these variables and the primary caregiver was someone other than the mother, I imputed the primary caregiver's educational attainment. I collapsed the seven categories included in the PEELS dataset into four categories: (a) less than high school with no GED, (b) high school diploma or GED, (c) some college (some college/postsecondary or vocational courses, 2-or 3-year college degree or vocational diploma), and (d) at least a 4-year college degree. For the regression analyses, I dummy coded this variable and used children of mothers with a high school diploma as the reference group in all analyses.

Age at time of assessment. The PEELS dataset included variables representing the children's age in months at the time of each assessment (ASSESSAGEMW1; ASSESSAGEMW2; OR ASSESSAGEMW3). I used this variable from the wave of data collection prior to the year the child entered kindergarten as a covariate in my OLS regression models. I included this variable because, although the assessment took place in winter or spring prior to the child's kindergarten year, the children's age at the time of the assessment may vary. The inclusion of this variable controlled for the variation in scores that is attributed to the children's age.

Type of services received. I included a series of variables representing the types of special education and related services the children received. In the interviews, parents were asked about the types services their child was receiving that were provided by the public schools. The PEELS dataset included a series of categorical variables indicating whether or not the child received each type of related service (1 = yes; 2 = no). I included a series of these variables indicating whether or not the child received (a) speech or language therapy (ESPCHTX), (b) occupational therapy (EOCCUPTX), (c) physical therapy (EPHYSTX), or (d) special instruction or tutoring (ESEINSCL or ETUTORNG). I recoded each of these variables (1 = the child received the service; 0 = the child did not receive the service). In addition, due to the small number of children receiving the other types of related services parents were asked about, I also created a category entitled “other” which included children who were receiving auditory integration therapy (EAUDIOTX), sensory integration therapy (ESENSORY), nursing (ENURSING), psychological services (EPSCHYHTX), audiological services (EAUDIOSV), behavior therapy (EBEHAVTX), feeding related services (EFEEDING), music, (EMUSICTX), play therapy (EPLAYTX), vision (EVISION), or the parent reported the child was receiving another service that did not fall into one of the categories listed above. To create this variable, I coded children that received one or more of these types of services as a 1 and children who did not receive any of those services as a zero.

Number of services received. From the data indicating the types of services the child received, I created a variable indicating the number of services the child received. To do this, I summed the variables listed above. The sum was used as a variable representing the severity of the child’s disability. This variable was included in the

analyses comparing the characteristics of children who attended Head Start and those who attended other ECE programs to examine whether the severity of children varied across program type. Furthermore, I included the variable as a covariate in the OLS regression models to control for severity of impairment when I examined differences in the school readiness of children who attended the three types of programs.

Age of first special education services. I included a categorical variable representing the age the child first began receiving special education services. In the interview, the parents were asked how old their child was when he or she first began regularly receiving special education or therapy services from a professional. In the PEELS dataset, the parents' answer to this question was represented in two variables. First, there was a continuous variable (BPRFMNTH) the child's age in months when he or she first began receiving services. Second, there was a categorical variable (BPRFAGE) indicating whether the child was less than one year old when he or she began receiving services. Due to missing data on the continuous variable for many of the children who were under the age of one when they first received services, I combined these two variables to create a categorical variable. The variable included four categories: (a) 0-11 months, (b) 12-23 months, (c) 24-35 months, and (d) 36 months or later.

LEA variables. I included a series of variables that represented the demographic characteristics of the LEAs in which the children received services. These variables were included in order to examine whether the characteristics of school districts are associated with the types of programs that children with disabilities attend.

Urbanicity. I included a categorical variable representing the urbanicity of the LEA (METRO3). In the PEELS dataset, this was a categorical variable from the QED data, indicated whether the school district is located in an urban, suburban, or rural area. For the regression models, I dummy coded this variable dummy coded and used suburban districts as the reference group in all analyses.

Geographic region. I included a variable to indicate the region of the country in which the school district was located (REGION2). The four geographic regions included in the PEELS data were: Northeast, Southeast, Central, and West/Southwest. For the regression models, I dummy coded this variable and used the Northeast as the reference group in all analyses. Like the urbanicity variable, the data for this variable in the PEELS dataset was from the QED data.

Poverty. I included a variable representing the district poverty rate (WLTHCAT) which, in the PEELS dataset, was a categorical variable with four levels of poverty: high, medium, low, and very low. For the regression models, I dummy coded this variable and used very low poverty districts as the reference group in all analyses. This data for this variable in the PEELS dataset was based on QED data.

District enrollment. I included a categorical variable representing the size of the district. The PEELS dataset included a continuous variable indicating the number of students enrolled in the LEA, based on data from the LEA questionnaire (Q1). I recoded this variable to have three categories: small (3,500 students or less), medium (3,501 – 25,000 students), or large (more than 25,000 students).

District preschool special education enrollment. I included a categorical variable representing the number of children age 3 through 4 with IEPs or IFSPs in the

school district. This variable was based on a continuous variable included in the PEELS dataset representing obtained from the LEA questionnaire (Q8). I recoded the continuous variable into a categorical variable with three categories: small (80 or less), medium (81 – 350), and large (more than 350).

Program characteristics. I included two variables representing program characteristics: the number of hours per week the program child attended the program and the number of children within the child’s class who had disabilities. Both of these variables were derived from data from the parent interview. These data were also available from the teacher questionnaire, but I decided to use the data from the parent interview because the response rate for the teacher questionnaire was fairly low. Therefore, using the data from the parent interview limited the amount of missing data. However, in order to examine the validity of the parent reported data, I examined the correlations between the teacher and parent variables.

Hours per week. In the interview, parents were asked to report the number of hours per week that the child attended the preschool program (HOURNUM1). I included this continuous variable in my proposed study, both to examine whether there are differences in the intensity of the programs that children attend and to control for these differences when examining school readiness. The correlation between the parent-reported and teacher-reported variables was moderately strong ($r = .68, p < .01$), providing support for the validity of the parent-reported variable.

Number of children with disabilities. Parents were asked whether all, most, some or none of the children in the child’s class had disabilities (NUMSPNDS1). I included this categorical variable in this study to examine whether there were differences

in the proportions of children with disabilities across the types of preschool programs. To examine the validity of the parent-reported variable, I examined its correlation with the teachers' report of the percentage of children with disabilities within the child's class. The teacher-reported variable was a continuous variable, so I used Kendall's Tau to determine the correlation between the two variables. The correlation between the parent-reported variable and the teacher-reported variable was moderate (Kendall's $\tau = .51$, $p < .01$).

Time in program. Finally, to control for variations in the amount of time children had attended the ECE programs during the school-year prior to kindergarten, I created a variable representing the amount of time in days that the children spent in the program prior to being tested. The PEELS dataset did not include the actual date that children started the ECE program they attended. Instead, I created this variable based on the date the child was assessed. To create the variable, I subtracted September 1 from the date of the child's assessment. This variable was used in the regression models examining variations in children's school readiness.

School-readiness variables. I used three variables to represent the children's school readiness: (a) receptive language skills, (b) early math skills, and (c) pre-reading skills. These variables represented the results of three of the direct-child assessments: the PPVT-III, the WJIII Applied Problems subtest, and the WJIII Letter-Word Identification subtest. For all three of these variables, I used the results from the assessment administered in the wave of data collection prior to the child's kindergarten year.

Receptive language skills. I used the PPVT-III as a measure of children's receptive language skills. The PPVT-III is a widely-used, norm-referenced assessment of

children's receptive vocabulary. The version of the PPVT-III used for the PEELS data collection was shortened using item response theory; however the standard version is reported to have high alternate form reliability for the standardized scores (.86 to .97) split-half reliability (.86 to .97) and test-retest reliability (.90; Dunn & Dunn, 1997). In addition, the PPVT is correlated with the Wechsler Intelligence Scale for Children ($r = .82$ to $.92$; Wechsler, 1992), the Kaufman Brief Intelligence Test ($r = .62$ to $.82$; Kaufmann & Kaufman, 1990) and the Oral and Written Language Scales ($r = .63$ to $.83$; Carrow-Woolfolk, 1995). An adapted version of this assessment was administered in all five waves of PEELS data collection. The original assessment was shortened using item response theory (IRT) which uses patterns of correct, incorrect, and omitted responses of the subset of administered items and the difficulty of each item to estimate the score the participant would have earned, had all the items been administered (U.S. Department of Education, 2008). For the PEELS, all children completed a core set of items, then based upon their score on the core items, they took either an easier or more difficult set of items. The shortened version of the PPVT yields the same expected scores as the full PPVT; therefore, the publisher's norms are appropriate (ACF, 2006). The scores on the shortened version have somewhat larger standard errors, but are still appropriate for research settings (ACF, 2006).

Early math skills. I used the Applied Problems subtest of the WJIII as a measure of children's early math skills. This subtest assesses how well the children analyze and solve math problems. The assessment is reported to have high test-retest reliability (.92; McGrew & Woodcock, 2001). In addition, the complete WJIII assessment is correlated

with the Wechsler Individual Achievement Test ($r = .79$; Wechsler 1992) and the Kaufman Test of Educational Achievement ($r = .79$; Kaufman & Kaufman, 1985).

Pre-reading skills. I used the Letter-Word Identification subtest of the WJIII as a measure of the children's pre-reading skills. This subtest assesses children's ability to identify letters and words. Like the Applied Problems subtest, the Letter-Word Identification subtest is reported to have a high test-retest reliability coefficient for children ages 4 through 7 (.92; McGrew & Woodcock, 2001). In addition, the complete WJIII assessment is correlated with the Wechsler Individual Achievement Test ($r = .79$; Wechsler 1992) and the Kaufman Test of Educational Achievement ($r = .79$; Kaufman & Kaufman, 1985). This assessment may be limited due to the small number of items that are designed for younger children which may create a floor effect. Only seven test items are designed for children under the age of 5; however, I examined the distribution of the samples assessment scores and there was no evidence of a floor effect.

Procedures

In this section, I provide an overview of the data analyses that I used to answer my research questions including a description of how I dealt with the complex sample and missing data, the data analyses, and the software that I used.

Complex samples. In nationally representative studies such as PEELS, sampling weights are typically used to generate estimates that generalize to the national population. Furthermore, replicate weights can be used to account for the complex sampling procedures. Researchers can use these replicate weights with an appropriate software program to more accurately calculate the standard error of statistics and to obtain results that generalize to the national population. In the PEELS dataset, multiple sets of replicate

weights were included to be used in analyses using data from the various data collection instruments and from the four waves of data collection. However, the PEELS dataset does not include replicate weights that can be used when the multiple waves of data are collapsed into one sample, as I did in this study to examine children the year prior to kindergarten. Furthermore, the stratification variables and sampling rates were not included in the dataset; therefore I was unable to create replicate weights myself. In the absence of appropriate replicate weights, I ran the data analyses unweighted. Running the analyses unweighted potentially has two consequences. First, weights typically adjust for over- and under-sampling. Therefore, running analyses without weights can cause children from sampling strata that were over- or under-sampled to be over- or underrepresented. Consequently, the statistics generated from the unweighted sample will not be representative of the national population. To determine whether this was the case with the sample I used, I compare my analytic sample to data on the national population of 3 to 5 years old children with disabilities in the United States. This comparison helps to determine whether or not my sample deviates from the national population on key variables, and if so, to what degree. This information was used to evaluate the external validity of my study.

Second, without weights, it is not possible to use statistical software that is designed to accurately estimate the standard errors for data collected with complex sampling procedures. However, sampling weights are unnecessary when a model is properly specified. Therefore, in the absence of weights, I included the stratification variables in my OLS regression models to improve my models' specification and to account for the effects of the sample stratification. I included six stratification variables,

four representing the stratification of school districts and two representing the stratification of the child sample. To determine whether these variables were necessary, I ran exploratory OLS models with just these stratification variables and program type entered as independent variables. I only retained the stratification variables that were statistically significant in the final regression models.

District stratification. The district sample was stratified by region, district poverty rates, urbanicity, and special education enrollment rates. I included the region, district poverty, and urbanicity variables described previously as stratification variables, along with a variable representing special education enrollment. This variable (DISTSIZE) was based on the districts' special education enrollment from the QED data. In the PEELS dataset, the districts were categorized into four sizes: very large, large, medium, or small. I dummy coded this variable and used medium districts as the reference group in all analyses.

Child stratification. Two variables were used to stratify the child sample: cohort and list. Children were stratified into cohorts based on age. Cohort A included 3-year-old children, Cohort B included 4-year-olds, and Cohort C included 5-year-olds. The variable representing the child's cohort was dummy coded and Cohort C was the reference group. In addition, the child sample was stratified by the list the children were sampled from. As described previously, within each cohort, children were sampled from either the historical list which included all children with an IEP or IFSP prior to March 1, 2003 or the ongoing list which included children who received their first IEP or IFSP after March 1, 2003. From the variable indicating the age of the children when they received their first IEP or IFSP and their date of birth, I calculated the date the children

received their first IEP. I used this variable to create a dummy coded variable indicating whether the child received their first IEP late (i.e., after March 1, 2003).

The analytic sample and missing data. In order to create my analytic sample, I removed all children who were in kindergarten or elementary school in Wave 1 (n = 410), children who did not enter kindergarten by Wave 4 (n = 10), children who attended more than one program or no programs (n = 820) and children who attended programs other than center-based ECE programs in the year prior to entering kindergarten (n = 120). Excluding these cases left sample of 1,630 participants who are relevant to my research questions. I did not consider the 1,480 cases that I excluded to be cases with missing data. Rather, I intentionally removed them from my dataset because my research questions only apply to children who attended one center-based program the year prior to entering kindergarten. Consequently, I did not include these excluded cases in any of the missing data analyses.

Despite the imputation methods used by PEELS researchers, there were still missing data in the PEELS dataset. Data can be missing due to either item nonresponse (i.e., a respondent did not reply to a particular item within an instrument), instrument nonresponse (i.e., a respondent did not complete a particular instrument), or wave nonresponse (i.e., the respondent did not participate in a particular wave of data collection). Missing data are often prevalent in large-scale datasets such as the PEELS and can have consequences relating to how results are interpreted because it affects both the internal and external validity of the results (McKnight et al., 2007). Large portions of missing data cause researchers to use smaller, potentially biased samples which can lead

to inaccurate and unstable parameter estimates and limit the researchers' ability to generalize the findings (McKnight et al., 2007)

There are many ways to deal with missing data including imputing values for the missing data or using a listwise deletion procedure in which cases with missing data are deleted from the dataset. Data imputation consisted of substituting a reasonable estimate for the missing data. Reasonable estimates can be based upon sample or group means, or estimated based up multiple imputation procedures using a variety of software programs. I explored using a software program to impute data; however the majority of cases with missing data were missing the entire parent interview making it near impossible to estimate a reasonable value for imputation. Therefore, I used listwise deletion and deleted all cases with missing data. In order to maximize the amount of data included in my analyses, I used three analytic samples. For all three analytic samples, I removed cases that were missing the variable describing their educational services the year prior to kindergarten (i.e., Head Start only, Head Start plus other services, or no Head Start; n = 220). For analytic sample one, I removed all cases that were missing data on one or more of the variables from the parent interview (n = 230). This analytic sample (n = 1,340) was used in analyses that included only variables from the parent interview. For the second analytic sample, I removed all cases that were missing data on one or more of the LEA variables (n = 350). This sample (n = 1,270) was used in analyses that included only LEA variables and program type. Finally, for analytic sample three, I removed all cases that were missing data on variables from the parent interview, LEA variables, or data from the child assessments (n = 520). This analytic sample (n = 1,110) was used in

analyses that included data from all of these sources. The amounts of excluded and missing cases are displayed in Table 10.

INSERT TABLE 10 ABOUT HERE

Because the exclusion of participants may result in a biased sample, I ran a series of analyses to test for differences between the analytic samples and the cases that were excluded due to missing data. I conducted a series of chi-square analyses for categorical variables and t-tests for continuous variables to test for statistically significant differences on key variables including direct assessment scores and child, family, and district characteristics. I considered the results of these analyses, as well as the amount of missing data, in order to evaluate the external validity of my analytic sample.

Analyses. I conducted three main types of analyses to answer my research questions: chi-squares, ANOVAs, and OLS regression. I conducted all analyses using the SPSS 16.0 software program.

Research Question 1. What are the characteristics of children with disabilities who attend Head Start programs, the school districts in which they receive special education services, and the programs they attend? To answer research question 1, I used descriptive statistics to describe the characteristics of children with disabilities who attend Head Start programs. Specifically, I used descriptive statistics to examine the characteristics of the children including their disability, race/ethnicity, gender, family income, and mother's educational attainment. In addition, I examined the types of services children in Head Start received, the number of services they received, and the

age they began receiving services. I also examined characteristics of the Head Start programs children with disabilities attended including the number of children in their program with disabilities and the number of hours per week that they attended. Finally, I examined the characteristics of the school districts in which children with disabilities who attend Head Start received services, including the urbanicity, district poverty rate, district size, and region. For these analyses, I used analytic sample one to examine the child, family and program characteristics and analytic sample two to examine the district characteristics.

Research question 2. Is there an association between the type of program children with disabilities attend and the characteristics of the children, the characteristics of school districts in which they receive special education services, and the characteristics of the programs they attend? To answer research question 2, I used independent-sample chi-square analyses and ANOVAs, depending on the scale of the variable. The results of these analyses describe the differences in the characteristics of children with disabilities who attend Head Start, ECE programs in elementary schools, and ECE programs in other locations, as well as the differences in the school districts and programs in which the children receive services. In these analyses, the child and family variables, LEA characteristics, and program characteristics were included as the dependent variables. For these analyses, I used analytic sample one to examine the child, family and program characteristics and analytic sample two to examine the district characteristics.

Chi-square analyses were used to examine the group difference for all categorical variables including primary disability category, gender, race/ethnicity, family income, mother's education, types of services received, age the child began receiving services,

district poverty, urbanicity, geographic region, district enrollment, and the proportion of children in the child's class who have disabilities. Chi-square analyses compare two or more groups on a categorical response variable (Huck, 2008) by comparing the observed frequency of an occurrence to the expected frequency (Hinkle, Wiersma, & Jurs, 2003). For these analyses, I considered chi-square statistics with a corresponding *p*-value of less than .05 statistically significant. However, I ran a series of chi-square analyses and consequently, there is an increased risk for a Type I error across the analyses.

Because chi-square statistics only indicate whether the proportions of participants within a group differ across categories, but do not indicate which group or category is the source of the difference (Hinkle et al., 2003), I used standardized residuals to identify the cells that contributed the most to this difference. Standardized residuals of greater than 2.00 for a specific cell indicate that the cell is a contributor to the significant chi-square value (Hinkle et al., 2003).

I used a one-way ANOVA to examine group differences for all continuous variables. These variables include the number of services received and the number of hours per week the child attended the program. For these analyses, I considered the group differences to be statistically significant if the F-statistic has a corresponding *p*-value of less than .05. In addition, I used post hoc procedures following a statistically significant omnibus ANOVA to determine differences between the specific groups. The type of post hoc procedure I used depended upon whether the variances were equal across groups as determined by the Levene's Test for Equality of Variances. In the case of equal variances, I used the Dunn-Bonferroni post hoc procedure, whereas in the case of unequal variances across groups, I used the Dunnett's T3 post hoc procedure. Both of

these types of post hoc analyses control for the increased probability of a Type I error associated with performing a series of comparisons of means; however, the Dunnett's T3 post hoc procedure also adjusts for violations of the homogeneity of variance assumption.

Research Question 3. Research Question 3: Is there an association between the school readiness of children with disabilities and the type of preschool program they attend?

To answer Research Question 3, I used a series of three OLS regression analyses. OLS regression examines the relationship between one dependent variable and one or more independent variables (Allison, 1999). Furthermore, OLS regression separates the effects of independent variables on the dependent variable, thus allowing researchers to examine the unique contribution of each independent variable (Allison, 1999). I used OLS regression to examine the relationship between children's school readiness (i.e., receptive language skills, early math skills, and pre-reading skills) and the type of program they attend, controlling for child and family demographics and program intensity. I used analytic sample 3 in all three OLS regression models.

I used a series of three models to examine the school readiness of children with disabilities who attend early childhood programs. The first model included the children's receptive language skills as the dependent variable. In the second model, the children's early math skills was the dependent variable, and finally in the third model the children's pre-reading skills were the dependent variable. All three models included the same independent variables. These independent variables were entered into the model in a series of five blocks. In the first block, I included the program type (i.e., Head Start, ECE program in an elementary school, or ECE program in another location) in the model, as

well as the statistically significant stratification variables to account for the sampling structure. In the second block, I added in variables representing the children disability including the disability category and the number of services the child received (i.e., a proxy for the severity of the child's disability). In the third block, I added interaction terms which represented the interactions between the child's disability and the type of program they attended. In the fourth block, I added the child and family characteristics including (a) the child's gender, (b) the child's race, (c) the family's income, (d) the mother's educational attainment, and (e) child's age at the time of the assessment. Finally, in the fifth block, I added the program intensity variables including the number of hours per week the child attended the program and the number of days the child had been enrolled in the program in that school year. By adding the variables in blocks, I was able to determine whether there are statistically significant differences in the school readiness of children with disabilities who attended the three types of programs and whether or not these differences persist after controlling for disability category, child characteristics and program intensity. Furthermore, by adding the interaction variables, I was able to examine whether children with different disabilities had different levels of school readiness across the three types of programs.

Prior to conducting the OLS regression for Research Question 3, I used exploratory data analyses to screen the variables to be included in the analyses for problems regarding the normality of the data, homoscedasticity of variables, multicollinearity, and outliers. First, I screened for univariate outliers by examining the descriptive statistics and box-plots for each of the continuous variables. Second, I checked the continuous variables' distributions for normality by examining histograms,

as well as the distributions' skew and kurtosis. Third, I examined the relationships between the variables I included in the regression models to screen for heteroscedasticity and multicollinearity, both of which can be problematic when running an OLS regression. To check for heteroscedasticity, I looked at scatterplots of relationships between all of the variables included in the analyses to ensure that the covariance of the variables is uniform across the distributions. To check for multicollinearity, I examined the bivariate correlations between all the continuous independent variables I included in the models. High correlations (i.e., close to one or negative one) can indicate that there is multicollinearity. Finally, I also screened for potential issues of multicollinearity by examining tolerance statistics and variance inflation factors for each of the independent variables.

Summary

To answer my research questions, I conducted a secondary data analysis of data from the PEELS. PEELS provides data on the preschool experiences of a nationally representative sample of children with disabilities who were age 3 through 5 in 2003-2004. The PEELS includes data on the children's disability, characteristics, families' characteristics, the services they receive, direct and indirect assessments of their academic, social, and behavioral functioning, and their transition into and out of preschool. These data were collected through parent interviews, direct-child assessments, and a series of questionnaires administered to teachers, early childhood program directors, elementary school principals, LEA special education coordinators, and state directors of special education. I used data from the parent interviews, LEA questionnaires, and the direct-child assessments from the year prior to the child's entry

into kindergarten in my analyses. I used descriptive statistics to examine the characteristics of children with disabilities who attended Head Start programs, as well as the characteristics of their programs and the districts in which they receive special education services. I used chi-square statistics and ANOVAs to determine if there were differences in the characteristics of children with disabilities who attend Head Start programs and those who attend other center-based preschool programs, as well as differences in the characteristics of their school districts and programs. Finally, I used OLS regression to compare the school readiness of children with disabilities who attend Head Start to that of children who attend the other center-based preschool programs.

Chapter IV

The purpose of this study was to examine the characteristics of children with disabilities who attend Head Start programs, as well as the characteristics of the programs they attend and the school districts in which they receive services. In addition, I examined whether there are differences in these characteristics across children with disabilities who attend Head Start programs and those who attend other ECE programs.

Specifically, the research questions were:

Research Question 1: What are the characteristics of children with disabilities who attend Head Start programs, the school districts in which they receive special education services, and the programs they attend?

Research Question 2: Is there an association between the type of program children with disabilities attend and the characteristics of the children, the characteristics of school districts in which they receive special education services, and the characteristics of the programs they attend? Research Question 3: Is there an association between the school readiness of children with disabilities and the type of preschool program they attend?

In this chapter, I present the results of this study. First, I provide the results of the non-bias analyses. This is followed by the findings related to the three research questions.

Non-Bias Analysis

I conducted non-bias analyses to determine the effects of excluding cases with missing data from the analytic sample and to determine how the analytic sample compares to the national population of preschool children with disabilities. These analyses help to determine the external validity of the findings. In this section, I first

present the results of the missing data analyses, followed by the comparison of the analytic samples to the national population of preschool children with disabilities.

Missing data analyses. In order to maximize the sample size in my analyses, I used three analytic samples. In each of these three samples, I excluded cases that were missing data indicating the year they attended kindergarten or the number or type of program they attended. In addition, cases that were missing one or more of the child, family, or program characteristics were excluded from analytic sample one, cases that were missing one or more of the LEA variables were excluded from analytic sample two, and cases that were missing any child or family variables, LEA variables, or assessment variables were excluded from analytic sample three. Overall, I excluded 230 (14.1%) cases from analytic sample one due to missing data, 350 (21.8%) cases from analytic sample two, and 520 (31.8%) cases from analytic sample three. Table 10 shows the amount of missing data in each of the three analytic samples.

To examine the effects of the missing data, I ran chi-square statistics to determine whether there were statistically significant differences between the analytic sample and cases that I excluded due to missing data. For all three analytic samples, there were statistically significant differences between the analytic sample and the excluded cases.

Analytic sample one. The cases that I excluded from analytic sample one due to missing data were different from the analytic sample on several key variables. Analytic sample one and the cases that were excluded were found to be statistically significantly different in terms of the proportions of students from various racial/ethnic groups (χ^2 [df = 4] = 26.6, $p < .01$), district urbanicity (χ^2 [df = 2] = 10.8, $p < .01$), district poverty (χ^2 [df = 3] = 15.9, $p < .01$) and district preschool special education enrollment (χ^2 [df = 2] =

8.2, $p = .02$). Students with missing data were more likely to be Hispanic or Black and less likely to be White. In addition, students with missing data were more likely to be from districts that were urban, high poverty, and that had a large number of preschool children receiving special education. There were no differences between the two groups in terms of gender, disability category, geographic region, or school readiness assessment scores. Table 11 shows the descriptive statistics for cases that were dropped from the sample and those who were retained in analytic sample one.

INSERT TABLE 11 ABOUT HERE

Analytic sample two. There were statistically significant differences between analytic sample two and the cases excluded due to missing data in terms of the proportion of students from various racial/ethnic groups (χ^2 [df = 4] = 26.3, $p < .01$), geographic regions (χ^2 [df = 3] = 7.6, $p = .05$), district urbanicity (χ^2 [df = 2] = 11.7, $p < .01$), district poverty (χ^2 [df = 3] = 18.6, $p < .01$), and district preschool special education enrollment (χ^2 [df = 2] = 8.5, $p = .01$). Students with missing data were more likely to be Hispanic or Black and less likely to be White. In addition, students with missing data had lower pre-reading skills than those who were included in analytic sample two ($t_{1350} = 2.5$, $p = .01$). Finally, students with missing data were more likely to be from the southeastern region and from districts that were urban, high poverty, and with a large number of preschool children receiving special education. There were no differences between the analytic sample and cases with missing data in terms of gender or disability category.

Table 12 shows the descriptive statistics for cases that were dropped from the sample and those who were retained in analytic sample two.

INSERT TABLE 12 ABOUT HERE

Analytic sample three. There were statistically significant differences between analytic sample three and the cases excluded due to missing data in terms of the proportion of students from various racial/ethnic groups (χ^2 [df = 4] = 62.3, $p < .01$), disability categories (χ^2 [df = 2] = 78.1, $p < .01$), district urbanicity (χ^2 [df = 2] = 24.5, $p < .01$), district poverty (χ^2 [df = 3] = 17.1, $p < .01$), and district size (χ^2 [df = 2] = 28.0, $p < .01$). Participants with missing data were more likely to be Hispanic or Black and less likely to be White. In addition, the participants with missing data were less likely to have speech impairments and more likely to have other disabilities. Finally, participants with missing data were more likely to be from districts that are urban, high poverty, and very large and were less likely to be from districts that were rural. There were no differences between analytic sample three and the excluded cases in terms of gender school readiness assessment scores, or region. The comparisons of the analytic sample three to cases with missing data are displayed in Table 13.

INSERT TABLE 13 ABOUT HERE

Comparison of the three analytic samples and the baseline sample. In addition to comparing the analytic samples to the cases that were excluded due to missing data, I

compared the characteristics of the three analytic samples to one another and to the baseline sample (i.e., the 1,625 cases that met my inclusion criteria) to determine the degree to which dropping the cases with missing data changed the characteristics of the samples. Table 14 shows the characteristics of the baseline sample and the three analytic samples. These comparisons provides insight into how the analytic sample deviate from the baseline PEELS sample, as well as how they deviate from each other.

INSERT TABLE 14 ABOUT HERE

Typically, researchers use one analytic sample to ensure that all findings from a study generalize to the same population. However, as discussed in Chapter 3, I used three analytic samples to minimize the number of cases excluded due to missing data. These comparisons provide evidence that the three analytic samples I used in this study have similar characteristics. Across the three samples, the largest differences were in the proportions of children from different racial/ethnic groups and with different disabilities. The percentages of White children in analytic samples 1, 2, and 3 were 60.5%, 61.3%, and 64.4%, respectively: with a 3.9 percentage point difference between analytic samples 1 and 2. Similarly, there was a 3.1 percentage point difference in the number of Hispanic children in analytic samples 1 and 3, with sample 1 having a larger number of Hispanic students. Furthermore, the percentages of students with disabilities other than speech language impairments or developmental delays in analytic samples 1, 2, and 3 were 22.2%, 21.3%, and 16.4%, respectively, with a 5.8% difference between analytic samples 1 and 3. In addition, analytic sample 3 had a high proportion of children with speech

language impairments than analytic sample 1, a difference of 4.4 percentage points.

Other than these differences in the analytic samples, there were only minor differences in the characteristics of the samples (approximately 2 percentage points or less). Because the characteristics of the three analytic samples only deviate slightly from one another, the results of my analyses should generalize to the same population, regardless of which analytic sample was used.

In addition, the comparisons of the three analytic samples to the baseline sample provide evidence that the samples do not differ drastically from the baseline sample. As shown in the table, the characteristics of analytic samples one and two are fairly similar to those of the baseline sample, indicating that the exclusion of cases with missing data may not affect the external validity of the findings from analyses using those two analytic samples. On the other hand, the characteristics of cases retained in analytic sample three did deviate from the baseline sample. In analytic sample three, there are fewer Hispanic children (17.9% versus 22.1%) and more White children (64.4% versus 58.1%) than in the baseline sample. Furthermore, there are more children with speech language impairments (52.1% versus 48.0%) and fewer children with other disabilities (16.4% versus 22.2%) in analytic sample three. Finally, in analytic sample three, more children are from large districts than in the baseline sample (24.3% versus 27.6%). This indicates that the findings from analyses using analytic sample three may not generalize as well to populations with large numbers of Hispanic students, students with disabilities other than developmental delays or speech language impairments, and students from large school districts.

Comparison to the national population. To further examine the external validity of the analytic samples, I compared the characteristics of the analytic samples to the characteristics of the national population of 3- to 5-year-olds with disabilities who attend center-based ECE programs using data from the U.S. Department of Education Office of Special Education Programs (2005). This website provides annual data on the national population of children who received special education services. For my comparisons, I used the national data from 2004 because that was the first year of data collection in PEELS. As seen in Table 15, the analytic samples used in my analyses have a higher percentage of children with speech language impairments and a slightly lower percentage of children with developmental delays. Furthermore, children with other disabilities are overrepresented in analytic samples one and two; however the percentage of children with other disabilities in analytic sample three is comparable to the percentage in the national population. In addition, Black students tend to be underrepresented in the analytic samples, whereas Hispanic students are overrepresented in analytic samples one and two. Finally, compared to the national population, the analytic samples consist of a higher percentage of students from the Western region and a lower percentage of students from the South.

INSERT TABLE 15 ABOUT HERE

Summary. Overall, the results of the non-bias analyses indicate that there are several differences both between analytic samples and the cases that were excluded due to missing data and between the analytic sample and the national population. These

differences have implications for the external validity of the findings in this study. The analytic sample tends to over represent White children and children with speech language impairments as well as children from districts that are not poor, very large, or urban. In addition, children from the South are underrepresented, whereas children from the West are overrepresented.

Research Question 1

Research Question 1: What are the characteristics of children with disabilities who attend Head Start programs, the school districts in which they receive special education services, and the programs they attend?

I used descriptive statistics to examine the characteristics of children with disabilities who attended Head Start programs. Specifically, I examined the characteristics of the children and their families, the services they received, the programs they attended, and the school districts in which they received services.

Characteristics of children and their families. Overall, the majority (53.1%) of children with disabilities who attended Head Start programs had speech language disabilities. A smaller proportion had developmental disabilities (29.6%) or other disabilities (17.3%). In addition, the children with disabilities who attended Head Start programs were predominately male (68.1%). Just under half of the children with disabilities who attended Head Start programs were White (45.5%). Together, Black (23.3%) and Hispanic (27.2%) children consist of approximately half of the total enrollment of children with disabilities in Head Start programs, whereas Asian/Pacific Islanders (1.8%) and American Indian (2.1%) students make up only a small proportion.

Students with disabilities who attended Head Start programs tended to be from low SES families. Just over half of the children with disabilities who attended Head Start programs were from families with incomes under \$25,000 (57.1%). An additional 30.4% were from families with incomes between \$25,000 and \$50,000 and 12.6% were from families with incomes over \$50,000. Furthermore, the children's mothers' tended to have low educational attainment. Overall, 28.5% had less than a high school diploma and 38.5% had either a high school diploma or GED. Only a small percentage of the children's mothers attended postsecondary education (27.5%) or had at least a 4-year degree (5.5%). Table 16 shows the child and family characteristics of children with disabilities who attended Head Start programs.

INSERT TABLE 16 ABOUT HERE

Services and programs. The majority (84.6%) of children with disabilities who attended Head Start programs received at least one type of related service through the school district during the year before they entered kindergarten. On average, children who attended Head Start programs received 1.7 (SD = 1.4) types of related services. The majority of the children with disabilities who attended Head Start received speech therapy (80.6%). In addition, a large proportion received special instruction or tutoring (35.1%) and occupational therapy (23.2%). Only a very small percentage of students received physical therapy (12.8%) or other types of services (1.0%). Among children with disabilities who attend Head Start programs, there seems to be some variation as to when they first began receiving special education services. Many of these children began

receiving special education after their third birthday (64.1%). A much small percentage began receiving special education services when they were 2 (18.1%), 1 (7.9%), or prior to their first birthday (9.9%). Table 17 provides a description of the services that children with disabilities who attended Head Start program received.

INSERT TABLE 17 ABOUT HERE

Furthermore, I found that there is some variation in the number of children with disabilities in the Head Start programs attended by the children in the sample. According to the parents' report, most of the children with disabilities attended Head Start programs that include "some" children with disabilities (56.5%), as opposed to "all" (23.0%), most (9.9%), or none (10.5%). In addition, children with disabilities who attended Head Start programs attended the program for 20.2 (SD = 10.2) hours per week, on average. Table 18 shows the characteristics of the Head Start programs attended by children with disabilities.

INSERT TABLE 18 ABOUT HERE

Characteristics of school districts. Descriptive statistics indicate that there is little variation in the characteristics of the school districts of children with disabilities who attended Head Start programs. Very few students with disabilities who attended Head Start programs were from school districts that have very low poverty rates (17.7%); however the proportions of students from districts with low (25.3%), medium (30.2%), or

high (26.7%) poverty were fairly similar. In addition, approximately equal proportions of children who attended Head Start programs were from urban (32.8%), suburban (35.2%), and rural (32.0%) school districts. A higher percentage of children who attended Head Start programs were from medium sized districts (i.e., districts with between 3,501 and 25,000 students; 43.6%), than small (i.e., 3,500 students or less; 30.5%) or large (i.e., more than 25,000 students; 25.9%). Finally, only a very small proportion of the students with disabilities who attended Head Start programs were from the Northeast (12.5%). Larger proportions of the children were from the South (36.6%), Midwest (24.1%), or West (26.7%). Table 19 provides an overview of the characteristics of the school districts of children with disabilities who attended Head Start programs.

INSERT TABLE 19 ABOUT HERE

Research Question 2

Is there an association between the type of program children with disabilities attend and the characteristics of the children, the characteristics of school districts in which they receive special education services, and the characteristics of the programs they attend?

To answer research question two, I compared the characteristics of children with disabilities who attended Head Start programs to the characteristics of children with disabilities who attended ECE programs in Elementary Schools and those who attended ECE programs in other locations using chi-square analyses and ANOVAs, depending on the scale of the variable.

Comparison of child and family characteristics. There was statistically significant variation in the characteristics of children with disabilities who attended Head Start programs, ECE programs in elementary schools, and ECE programs in other locations on several child and family variables. Table 20 shows the child and family characteristics of the three groups. There were statistically significant variations in children's disabilities across Head Start programs, ECE programs located in elementary schools, and ECE programs in other locations (χ^2 [df = 4] = 29.5, $p < .01$). Children who attended Head Start programs were less likely than expected to have disabilities other than speech language impairment or developmental delays, whereas children who attended ECE programs located in elementary schools were more likely than expected to have other disabilities. Children with speech language impairments were less likely than expected to attend ECE programs located in elementary schools and more likely to attend programs in other locations. The proportion of children with speech language impairments who attended Head Start programs was not statistically significantly different from what was expected, given the proportion of children with speech language impairments in the overall sample. Finally, there was no difference in the proportions of children with developmental delays across the three types of programs.

In addition, there were no differences in the proportions of males and females who attended Head Start or ECE programs in elementary school or other locations (χ^2 [df = 2] = 0.68, $p < .71$). However, there were statistically significant differences in the proportions of children from different racial/ethnic groups that attended the three types of programs (χ^2 [df = 8] = 80.62, $p < .01$). Children who attended Head Start programs were more likely than expected to be Black or Hispanic and less likely to be White, whereas

the opposite was true for ECE programs in locations other than elementary schools. In these programs, the children were more likely than expected to be White and less likely than expected to be Black or Hispanic. The children who attended ECE programs located in elementary schools were less likely than expected to be Black. Finally, there were no statistically significant differences in the proportions of American Indian or Asian/Pacific Islander children who attended the three types of programs, however, this may be due to the small number of American Indian and Asian/Pacific Islander children included in the sample.

Across the three types of programs, there were statistically significant variations in the incomes of the children's families (χ^2 [df = 4] = 169.5, $p < .01$) as well as their mothers' education attainment (χ^2 [df = 6] = 143.9, $p < .01$). Children who attended Head Start tended to be from families with low incomes: they were more likely than expected to be from families with incomes of \$25,000 or less and less likely than expected to be from families with incomes of more than \$50,000. Approximately 57.1% of the children who attended Head Start were from families with incomes of \$25,000 or below, whereas only 28.7% of children who attended ECE programs in elementary schools and 19.8% of children who attended ECE in other locations were from families with incomes below \$25,000. Furthermore, only 12.6% of children who attended Head Start were from families with incomes of more than \$50,000. The percentage of children from families with incomes over \$50,000 was much higher in the other groups: 34.8% of children who attended ECE programs in elementary schools and 49.1% of those who attended other locations were from families with incomes over \$50,000. In addition, children who attended Head Start programs tended to have mothers with lower

educational attainment. The mothers of children who attended Head Start were more likely than expected to have less than a high school diploma or a high school diploma or GED and less likely to have at least a 4-year degree. In addition, the mothers of children who attended ECE program in other locations were less likely than expected to have a high school diploma or less and more likely to have at least a 4-year degree. The educational attainment of the mothers of children who attended ECE programs in elementary schools did not differ from what was expected given the proportions in the overall sample.

INSERT TABLE 20 ABOUT HERE

Comparison of services received. There were statistically significant differences in the proportion of children receiving various types of services including: special instruction or tutoring (χ^2 [df = 2] = 36.9, $p < .01$), speech therapy (χ^2 [df = 2] = 10.4, $p = .01$), physical therapy (χ^2 [df = 2] = 17.7, $p < .01$), and occupational therapy (χ^2 [df = 2] = 47.8, $p < .01$). Table 21 shows the percentage of children receiving each type of service, as well as the mean number of services the received by the children who attended each type of program. A smaller proportion of children in Head Start received physical (12.8%) or occupational (23.3%) therapy than was expected given the proportions in the overall sample. In addition, children who attended ECE programs in elementary schools were less likely than expected to not receive speech therapy (14.5%) and more likely than expected to receive special instruction or tutoring (48.7%). Furthermore, children who attended ECE programs in other locations were more likely than expected to not receive

speech therapy (22.3%) and less likely to receive special instruction or tutoring (69.2%). The proportions of Head Start children who received speech therapy and special instruction or tutoring were not statistically significantly different from what was expected, given the proportions in the overall sample.

There was also statistically significant variation in the number of services received by children who attended the three types of programs ($F_{2,1390} = 25.6, p < .01$). Post hoc comparisons using the Bonferroni adjustment indicated that children who attended Head Start received fewer services on average than children who attended ECE programs in elementary schools ($M = 1.7$ and $M = 2.2$, respectively; $p < .01$). There was no difference in the number of services received by children attending Head Start programs and those attending ECE programs in other locations ($p = 1.0$). Table 22 shows the differences in the means for each of the three program types.

Finally, across the three programs, there were statistically significant differences in the age when children first began receiving services ($\chi^2 [df = 6] = 19.8, p < .01$). Children who attended Head Start programs were more likely than expected to have begun receiving services after their third birthday. Overall, 64.1% of children in Head Start began receiving services after their third birthday, whereas only 51.6% of children in ECE programs in elementary schools and 51.2% of children in ECE programs in other locations did not begin receiving services until after the age of 3.

INSERT TABLE 21 ABOUT HERE

INSERT TABLE 22 ABOUT HERE

Comparison of program characteristics. There were statistically significant differences in the proportions of children with disabilities in the classes across the three types of programs (χ^2 [df = 6] = 125.4, $p < .01$). These differences are shown in Table 23. Children who attended Head Start programs tended to be enrolled in programs with fewer children with disabilities. Overall, 23.0% of Head Start children attended programs where their parent reported that all of the other children had disabilities and 45.7% of children who attended ECE programs in elementary schools were in such programs. Moreover, 56.5% of Head Start children's parents reported that their child attended programs with only "some" children with disabilities, whereas only 33.1% of children who attended ECE programs in elementary schools were in such programs. Programs in locations other than elementary schools had a different pattern of enrollment. These programs were less likely than expected to enroll only children with disabilities and were more likely than expected to enroll no other children with disabilities.

In addition, there were statistically significant differences in the number of hours per week that the children attended the program ($F_{2,1390} = 17.4$, $p < .01$). Post hoc analyses using the Dunnett's T3 post hoc procedures indicated that children who attended Head Start programs attended more hours per week ($M = 20.2$), on average, than children who attended either ECE programs in elementary schools ($M = 16.6$; $p < .01$) or in other locations ($M = 16.9$; $p < .01$). Table 24 shows the differences in the mean number of hours children attended the three types of program per week.

INSERT TABLE 23 ABOUT HERE

INSERT TABLE 24 ABOUT HERE

Comparison of school district characteristics. There were statistically significant differences in the proportions of children attending the three types of program across district characteristics including urbanicity (χ^2 [df = 4] = 42.3, $p < .01$), district enrollment (χ^2 [df = 4] = 19.3, $p < .01$), district preschool special education enrollment χ^2 [df = 4] = 10.8, $p = .03$), region (χ^2 [df = 6] = 85.6, $p < .01$), and poverty (χ^2 [df = 6] = 69.7, $p < .01$). Table 25 shows the differences in the school district characteristics across children with disabilities who attended Head Start programs, ECE programs in elementary schools, and ECE programs in other locations.

Children who attended Head Start were more likely than expected to be from districts that were rural and less likely to be from suburban school districts. Only 35.2% of children who attended Head Start programs were from suburban school districts whereas, 52.3% of children who attended ECE programs in elementary schools and 54.5% of children who attended programs in other locations were from suburban districts. Furthermore, 32.0% of children who attended Head Start programs were from rural school districts, whereas only 17.4% of children who attended ECE programs in elementary schools and 18.6% of children who attended programs in other locations were from rural districts. In addition, children who attended Head Start programs were more

likely than expected to be from the South, whereas in the Northeast a smaller than expected proportion of children attended Head Start programs.

Larger than expected proportions of children who attended Head Start were from districts with either high or medium poverty rates. Approximately 26.7% of children who attended Head Start were from districts with high poverty rates as compared to only 12.9% of children who attended ECE programs in elementary schools and 14.9% of children who attended ECE in other locations. Similarly, children who attended Head Start programs were less likely than expected to be from districts with very low poverty rates. Only 17.7% of children who attended Head Start were from districts with very low poverty levels.

Finally, the proportion of children from large districts who attended ECE programs in elementary schools was larger than expected, given the proportions in the overall sample and the proportion of children from large districts who attended ECE programs in other locations was small than expected. However, the proportion of children with disabilities who attended Head Start programs that were from large, medium, and small districts did not deviate from what was expected based on the overall sample proportions. The proportions of children who attended Head Start, ECE programs in elementary schools, and ECE programs in other locations varied across districts with small, medium, and large enrollments of preschool children with disabilities; however the standardized residuals indicated that no one subgroup was driving this difference.

It should be noted that because I ran a series of chi-square statistics and ANOVAs to compare the characteristics of the three groups of children, there is an increased risk of a Type I error. However, of all the analyses I ran, none resulted in a p -value greater than

.01 and only two resulted in a p -value greater than .001. This suggests that the results were highly significant and correspondingly the chance of a Type I error is not large.

INSERT TABLE 25 ABOUT HERE

Research Question 3

Is there an association between the school readiness of children with disabilities and the type of preschool program they attend?

I ran a series of three OLS regression analyses with the three dependent variables (i.e., receptive language, early math skills, and pre-reading skills) to examine the relationship between the type of program children with disabilities attended and their school readiness, while controlling for children's disability, demographic characteristics, and program characteristics. In addition, the stratification variables were included in these analyses to control for the effects of the sampling methods used in PEELS. For all three models, I entered the variables in five blocks. The first block consisted of only the program type variables and stratification variables. In the second block I added in the disability variables, followed by the interactions between disability and program type in the third block. Finally, in blocks three and four, I added the demographic characteristics and the program variables to the model. The results of the three regression analyses are displayed in Tables 26, 27, and 28.

INSERT TABLE 26 ABOUT HERE

INSERT TABLE 27 ABOUT HERE

INSERT TABLE 28 ABOUT HERE

The results of the three regression analyses suggest that children's school readiness is associated with the type of program children with disabilities attend, as well as the characteristics of the children. The type of program children attended, along with the stratification variables (model 1), explained approximately 10% of the variance in children's receptive language skills, 5% of the variance in their early math skills, and 3% of the variance in their pre-reading skills. In addition, children's disability and demographic characteristics explained a significant proportion of the variance in children's school readiness beyond what was explained by model 1. The disability variables (model 2) explained an additional 9% of the variance in children's receptive language skills ($\Delta R^2 = .09, p < .01$), 13% of the variance in their early math skills ($\Delta R^2 = .13, p < .01$), and 3% of the variance in their pre-reading skills ($\Delta R^2 = .03, p < .01$). Finally, in addition to the program type and disability characteristics, the demographic characteristics (model 4) explained an additional 7% of the variance in children's

receptive language and early math skills ($\Delta R^2 = .07, p < .01$ and $\Delta R^2 = .07, p < .01$, respectively) and 10% of the variance in their pre-reading skills ($\Delta R^2 = .10, p < .01$). Overall, program type, disability, demographic characteristics, and program characteristics together explained approximately 27% of the variance in children's receptive language skills and early math skills and 16% of the variance in their pre-reading skills.

Across all three regression analyses, the results of model 1 indicate that, prior to controlling for disability, demographic, and program characteristics, the children with disabilities who attended Head Start programs had less advanced skills than children who attended ECE programs in other locations. The difference in the school readiness of children with disabilities who attended Head Start and those who attended ECE programs in other locations was approximately 0.38 standard deviations in receptive language skills ($b = 5.7, p < .01$), 0.36 standard deviations in early math skills ($b = 5.4, p < 0.1$), and 0.25 standard deviations in pre-reading skills ($b = 3.8, p < .01$). Conversely, there was no difference in the receptive language skills ($b = 1.8, p = .10$), early math skills ($b = -0.2, p = .89$), or pre-reading skills ($b = 0.9, p = .44$) of children with disabilities who attended Head Start programs and those who attended ECE programs in elementary schools.

Subsequent models indicate some fluctuation in the relationship between program type and school readiness but most differences are explained by the characteristics of the students served by programs (see model 5). After controlling for children's disability, demographic characteristics, and program characteristics, there continued to be no difference between the receptive language skills ($b = 2.2, p = .12$), early math skills ($b = 1.1, p = .52$), and pre-reading skills ($b = -1.1, p = .47$) of children with disabilities who

attended Head Start programs and those who attended ECE programs in elementary schools. This pattern holds true for differences in school readiness between children attending Head Start and ECE programs in locations other than elementary schools with two exceptions – receptive language skills and children with developmental delays and pre-reading skills and children with other disabilities. As indicated by the interaction term for developmental delay and other program type, children with developmental delays who attended Head Start programs had more advanced receptive language skills than those who attended ECE programs in other locations ($b = -5.8, p = .03$). On average, children with developmental delays who attended Head Start programs scored 0.38 standard deviations higher on the PPVT than those who attended ECE programs in other locations. In contrast, children with disabilities other than speech impairments or developmental delays who attended Head Start programs had less advanced pre-reading skills than those who attended ECE programs in other locations by approximately 0.57 standard deviations ($b = 8.5, p = .02$).

In addition, children's disability category and the number of services they received were associated with school readiness. In general, children with speech language impairments had more advanced skills than those with developmental delays or other disabilities. Children with developmental delays have early math skills that are approximately 0.49 standard deviations lower ($b = -7.4, p < .01$) than children with speech language impairments (see model 5); however, there were no differences in the children's receptive language skills ($b = -3.0, p = .09$) or pre-reading skills ($b = -2.2, p = .26$). Furthermore, in comparison to children with other disabilities, those with speech language impairments had more advanced receptive language skills by 0.55 standard

deviations ($b = -8.5, p < .01$) and more advanced early math skills by 0.59 standard deviations ($b = -8.9, p < .01$). Finally, the number of services children received was negatively associated with all three measures of school readiness. On average, for every additional service a child received, their receptive language skills decreased by approximately 0.10 standard deviations ($b = -1.5, p < .01$), their early math skills decreased by 0.17 standard deviations ($b = -2.66, p < .01$), and their pre-reading skills decreased by 0.07 standard deviations ($b = -1.1, p < .01$).

Furthermore, all of the demographic characteristics I included in my regression analyses were associated with one or more measures of children's school readiness (see model 5). On average, females had more advanced receptive language skills than males by approximately 0.12 standard deviations ($b = 1.8, p = .03$); however, there was no difference in the early math skills ($b = 0.3, p = .78$) or pre-reading skills ($b = 1.7, p = .08$) of males and females. In addition, children from minority racial/ethnic groups tended to have less advanced school readiness skills than White children. Compared to Black children, White children had more advanced receptive language ($b = -4.8, p < .01$) and early math skills ($b = -7.2, p < .01$) by approximately 0.32 and 0.48 standard deviations, respectively. Similarly, compared to Hispanic children, White children had more advanced receptive language ($b = -5.8, p < .01$), early math ($b = -4.2, p < .01$), and pre-reading skills ($b = -3.1, p = .02$), by approximately 0.39, 0.28, and 0.21 standard deviations, respectively. Asian children had less advanced receptive language ($b = -5.9, p = .01$) and early math ($b = -9.4, p < .01$), but more advanced pre-reading skills ($b = 5.5, p = .03$) than White children. Finally, children's age was negatively associated with their early math ($b = -0.6, p < .01$) and pre-reading ($b = -0.6, p < .01$) skills. For every one

month increase in a child's age, their early math and pre-reading skills tended to decrease by approximately 0.04 standard deviations (0.6 points).

Moreover, children's socioeconomic status was associated with school readiness. In general, children from higher income families and those with more educated mothers had more advanced school readiness (see model 5). In comparison to children from families earning \$25,000 or less, children from families earning between \$25,001 and \$50,000 had more advanced pre-reading skills ($b = 2.9, p = .02$) by approximately 0.19 standard deviations. Similarly, in comparison to children earning \$25,000 or less, those from families earning more than \$50,000 had more advanced receptive language ($b = 5.0, p < .01$), early math ($b = 4.6, p < .01$), and pre-reading skills ($b = 4.5, p < .01$), by approximately one-third of a standard deviation. Furthermore, in comparison to children whose mother's highest degree was a high school diploma, children whose mothers had not graduated high school had less advanced receptive language ($b = -2.7, p = .04$) and pre-reading skills ($b = -3.0, p = .04$) and those whose mothers had at least some college had more advanced early math ($b = 4.8, p < .01$) and pre-reading skills ($b = 6.2, p < .01$).

Finally, the characteristics of the programs that the children attended were largely unrelated to their school readiness. Children's receptive language and pre-reading skills were not significantly associated with the number of hours they attended the program per week or the amount of time they had been enrolled in the program. Similarly, children's early math skills were not significantly associated with the number of hour per week that they attended the program ($b = 0.6, p < .32$); however, there was a statistically significant associated between early math skills and the amount of time the child had been enrolled in the program ($b = 0.02, p = .04$). On average, children's WJ Applied Problems scores

increased by 0.04 standard deviations (0.6 points) for every 30 days they were in the program.

Chapter Summary

Overall, children with disabilities who attended Head Start programs were a diverse group of children. The majority of children with disabilities who attended Head Start programs had speech language impairments and were male. Almost half of the children were White, whereas Black and Hispanic children made up approximately one-quarter of the children with disabilities who attended the program. Just over half of the children were from families with incomes of \$25,000 or less. Finally, the mothers of children with disabilities who attended Head Start programs tended to have low educational attainment. Almost 70% had a high school diploma, GED, or less, whereas only about 30% had attended at least some postsecondary education.

There was some variation in the special education and related services that children with disabilities who attended Head Start programs received, as well as in the Head Start programs they attended. The majority of children were receiving speech therapy, and many were receiving occupation therapy, physical therapy, and special instruction or tutoring. Furthermore, most children began receiving special education when they were three or older; however some began receiving services as early as in the first year of their life. The majority of children with disabilities who attended Head Start programs attended programs that included some children with disabilities and a smaller percentage attended programs that enrolled, all, mostly, or no children with disabilities. Finally, there was only a small amount of variation in characteristics of the school

districts in which children with disabilities who attended Head Start program receive services.

In addition, there were statistically significant differences in the characteristics of children with disabilities who attended Head Start programs and those who attended ECE program in elementary schools or other locations. Children with disabilities who attended Head Start programs were more likely than expected to be Black or Hispanic, to be from families with low incomes, and to have mothers with low educational attainment. In addition, these children were less likely than expected to have disabilities other than speech language impairments or developmental delays.

Furthermore, there were differences in the characteristics of programs that the children attended, the services they received, and the school districts in which they received services. Children who attended Head Start programs were less likely than expected to receive physical or occupation therapy and were, on average, receiving fewer services than children who attended ECE programs in elementary schools. Additionally, children who attended Head Start programs began receiving services later than expected. Compared to children who attended ECE programs in elementary schools, children who attended Head Start attended programs with fewer other children with disabilities. Children who attended Head Start were more likely than expected to be from rural school districts, from districts with high or medium poverty rates, and from districts in the southern region.

Finally, the results of the OLS regressions that I conducted indicated that, after controlling for children's disability and demographic characteristics, there were no differences in the school readiness of children with disabilities who attended Head Start

programs and those who attended ECE programs in elementary schools. In contrast, I found that there were differences in the school readiness of children with disabilities who attended Head Start and those who attended other programs; however, these differences were dependent upon the type of disability of the children. Children with developmental delays who attended Head Start programs had more advanced receptive language skills than those who attended ECE programs in other locations, whereas children with disabilities other than speech impairments or developmental delays who attended Head Start had less advanced pre-reading skills than those who attended programs in other locations. There was no difference in the school readiness of children with speech impairments who attended Head Start and those who attended other programs.

In addition, I found that children's disability and demographic characteristics were related to their school readiness. Children with speech impairments had more advanced receptive language and early math skills than those with other disabilities and more advanced early math skills than those with developmental delays. Furthermore, on measures of children's receptive language and early math skills, White children scored higher than Black, Hispanic, and Asian children. In contrast, Asian children had more advanced pre-reading skills than White children and White children had more advanced pre-reading skills than Hispanic children. In addition, family socioeconomic status, including the family's income and mother's educational attainment, was related to the school readiness of children with disabilities, with children from families with higher socioeconomic status scoring higher on all three measures of school readiness.

Chapter V

The purpose of this study was two-fold. First, I examined the characteristics of children with disabilities who attended Head Start programs, as well as the characteristics of the programs they attended and the school districts in which they received special education. In addition, the purpose was to determine whether there were differences in these characteristics and school readiness across children who attended Head Start programs and those who attended other ECE programs. The results of this study indicate that there is some variation in the child, family, and district characteristics of children with disabilities who attend Head Start and children with disabilities who attend other ECE programs. Furthermore, the results suggest that, although there is no difference in the school readiness of children with disabilities who attend Head Start programs and those who attend ECE programs in elementary schools, there are differences in the school readiness of children who attend Head Start and those who attend other ECE programs, depending on the child's disability classification. In this chapter I discuss the findings of this study and their implications for policy, practice, and future research.

Discussion of Findings and Implication for Policy and Practice

Due to the dearth of research examining children with disabilities in Head Start programs, this study was largely exploratory and the purpose was to provide a descriptive profile of the characteristics of children with disabilities who attend Head Start programs. In this section, I discuss the findings, both of the analyses examining the characteristics of children with disabilities who attended Head Start programs and of the analyses examining their school readiness. Because this is the first study to investigate the characteristics and school readiness of children with disabilities who attend Head Start

programs, it was exploratory and largely descriptive. The findings from one study are insufficient to warrant changes in policy and practice; however the results of this study do provide insight regarding children with disabilities in the Head Start program

School Readiness. The findings from this study indicate that, controlling for children's disability and demographic characteristics, there is no difference in the school readiness of children with disabilities who attend Head Start programs and those who attend ECE programs in other locations. This suggests that, regardless of the type of program a particular child attends (Head Start or ECE in an elementary school), he or she will have the same skills at the onset of kindergarten. Although this may suggest that the two types of programs are equally effective, because this study utilized a post-test only design, it is not possible to attribute children's school readiness to the effectiveness of the program.

In contrast, the findings suggest that there are some differences in the school readiness of children who attend Head Start programs and those who attend ECE programs in locations other than Elementary schools, depending on the child's disability. Children with developmental delays who attend Head Start programs have more advanced receptive language skills than those who attend other ECE programs, whereas children with disabilities other than speech language impairments or developmental delays who attend Head Start programs have less advanced pre-reading skills than those who attend other programs. This may suggest that the programs have differential effects on children, depending on their disability, with Head Start programs having a larger impact on children with developmental delays and other programs having a larger impact on children with other disabilities. However, due to the absence of pretest scores, I was

unable to control for the skills that children had at the start of the program and therefore the results of this study are only descriptive and differences in children's skills at the end of the program cannot be attributed to the impact of the programs.

Furthermore, it is also possible that the severity of children's disabilities could differ across programs even though the children have the same disability classification. This is especially possible for children classified as having developmental delays. In many states, developmental delay encompasses a wide range of impairments and disabilities; therefore, there may be significant variation in the abilities of children receiving special education under a classification of developmental delay. The findings from this and other studies (Redden, Ramey, Ramey, Forness, & Brezaussek, 2002) suggest that children with less severe impairments tend to be enrolled in Head Start programs, which would likely result in these children having more advanced skills than those enrolled in ECE programs in other locations. Without controlling for children's skills at the start of the ECE program or the severity of their disability, it is not possible to determine whether the differences across Head Start programs and ECE programs in other locations are due to differences in the effectiveness of the programs or differences in the children enrolled in the programs.

In addition, I found that age was related to both children's early math skills and their pre-reading skills, with older children tending to have lower scores. This trend is counterintuitive, but, because I used standard scores which account for age this finding does not necessarily indicate that older children actually had less advanced skills than the younger children. Rather, it indicates that older children had less advanced skills for their age than younger children. This effect may actually be related to the severity of the

children's disability. It is possible that children with more severe impairments were kept in preschool longer to delay their start of kindergarten. If this is true, then there would be a correlation between age at the time of assessment and severity of impairment, with children with more severe impairments being assessed at an older age. This would then create the negative association between assessment scores and age found in this study.

Characteristics. Overall, the results of my analyses indicate that the majority of children with disabilities who attended Head Start programs had speech impairments, followed by developmental delays, and with other disabilities. These findings are consistent with previous research on Head Start (ACF, 2005a); however the findings from this study extend previous research by comparing the disabilities of children who were enrolled in Head Start programs to those of children who were enrolled in other center-based ECE programs. The findings from these comparisons indicate that although the majority of children with disabilities enrolled in Head Start programs have speech impairments; this proportion does not differ from the proportion of children with speech impairments in the overall population of children with disabilities who attend a center-based ECE programs. However, children with disabilities other than developmental delays or speech impairments were less likely to attend Head Start programs than ECE programs in elementary schools. This finding supports previous research which has suggested that Head Start programs are under utilized by children with more than mild disabilities (Beauchesne, Barnes, & Patsdaughter, 2004; Redden, et al., 2002). Because these findings suggest that the children with disabilities who are enrolled in Head Start programs tend to have less severe disabilities and that many of them have speech language impairments, it is important to ensure that teachers and other staff members

who work in Head Start programs are trained in strategies for working with this particular population of children with disabilities and adapting the curriculum to their individual needs.

Furthermore, on average, the children who attended Head Start programs received fewer types of special education and related services through their school district than those who attended ECE programs in elementary schools. It is possible that this implies that children with disabilities who attend Head Start programs are underserved.

However, it is more likely that these findings may confirm previous findings that Head Start programs tend to enroll children with less severe impairments (Beauchesne et al., 2004; Redden et al., 2002). It is likely that public preschool programs funded through Section 619 under Part B of the IDEA, have more resources and program options designed specifically for children with disabilities and thus are better equipped to provide services to children with more severe disabilities. Furthermore, Head Start teachers may be less prepared to provide services to children with disabilities. Previous research has found that over one-third of Head Start teachers report that they do not understand how to implement children's IEP goals and objectives into the existing curriculum and that they do not have the knowledge of where to locate and how to use adapted materials (Bruns & Mogharreban, 2007, 2008). In addition, less than half of Head Start teachers reported being familiar with alternative forms of communication (Bruns & Mogharreban, 2007, 2008). Differences in the quality of the special education and related services may cause parents of children with more severe impairments to place their children in preschool programs that are better prepared to meet the needs of children with disabilities such as those funded through Section 619 under Part B of the IDEA. It is also possible that Head

Start programs discourage children with more severe disabilities from attending the program. Head Start programs are not allowed to deny a child placement in the program due to the child's disability. However, Head Start teachers and programs directors may feel that they are not able to provide adequate services to children with more severe disabilities and, do not explicitly deny placement to these children, but rather recommend other, more specialized programs.

The results of this study also indicate that children with disabilities who attended Head Start programs tended to start receiving special education services at a later age. Almost two-thirds of the children with disabilities who attended Head Start programs began receiving special education services after their third birthday. This is consistent with previous data which indicate that approximately half of children with disabilities in Head Start programs begin the program with an IEP and the other half are identified over the course of the program year (ACF, 2009). The high proportion of children with disabilities in Head Start programs who begin receiving special education services after their third birthday may further suggest that these children have less severe impairments that do not prompt earlier identification. For example, children with speech impairments typically begin receiving services later than children with other disabilities, with their first services beginning around their third birthday (ACF, 2006). In contrast, children with orthopedic impairments, other health impairments, intellectual disabilities, and other low incidence disabilities typically begin receiving services prior to their second birthday (ACF, 2006). On the other hand, these findings may suggest that children who attend Head Start programs are less likely to be screened for disabilities prior to attending the program as a result of factors such as families' lack of access to medical and

developmental services and general information about early intervention. Previous research has found that low-income and less-educated parents were less likely to report that their children needed specialized health services and were less likely to access services for their children (Porterfield, & McBride, 2007). Consequently, these children may be less likely to be referred for evaluation and identification prior to entering preschool. Head Start programs may provide children from low-income families with their first access to developmental and health screenings and as a result Head Start programs are identifying developmental delays and referring children for special education services. If this is the case, the Head Start program's health and developmental screening requirements are fulfilling an important need

Findings from this study also confirmed that children with disabilities who attend Head Start programs tend to be from minority racial/ethnic groups and from low socioeconomic status families. Moreover, the findings from this study indicate that children who attend Head Start are more likely to be from districts with high poverty rates. These findings are consistent with data on the general population of children who attend Head Start programs (ACF, 2005a, 2005b, 2006). Although this is not surprising given the purpose of the Head Start program, as well as the program's enrollment requirements, these findings suggest that the children with disabilities who attend Head Start programs are a particularly vulnerable group of children who face multiple risk factors in addition to their disability. The findings from this study, as well as previous studies on children with (U.S. Department of Education, 2006) and without disabilities (Brooks-Gunn & Duncan, 1997; Duncan & Magnuson, 2005; Yeung et al., 2002), indicate that children's school readiness is associated with the demographic

characteristics of the children including their race, the families' income, and their mothers' educational attainment. Children from minority racial/ethnic groups tend to have less advanced skills than White children. Moreover, children from low-income families and those with mothers with low educational attainment tend to have less advanced skills than those from families with higher socioeconomic status. The finding that a large number of children with disabilities in Head Start are from minority racial/ethnic groups, from low socioeconomic status families, and live in districts with high poverty rates emphasizes the importance of ensuring that Head Start programs are of high quality and capable of meeting the needs of a diverse group of high-risk children. Furthermore, because the quality of Head Start programs that children attend is associated with children's cognitive outcomes and school readiness skills at the end of the program (Bryant, Burchinal, Lau, & Sparling, 1994) it is particularly important that the highest-risk children, poor minority children with disabilities enrolled in the Head Start programs, have access to the highest quality programs.

Although the majority of children with disabilities were from suburban districts, findings from this study indicate that children with disabilities who lived in rural districts were more likely to attend Head Start programs than ECE programs in elementary schools or other locations. Previous research has found that children who live in rural areas are less likely to attend preschool programs, possibly due to issues of accessibility (Temple, 2009). It is possible that, due to the small number of ECE programs available in rural areas, Head Start programs are one of the few placement options of children with disabilities. Furthermore, young children living in rural areas are 60% more likely to be placed in special education than children living in non-rural areas (Grace, Shores,

Zaslow, Brown, Aufseeser, & Bell, 2006). It is likely that Head Start programs are an important resource for children with disabilities living in rural areas due to the scarcity of ECE programs coupled with the relatively high prevalence of disability. Regardless of the reason, the findings from this study indicate that a large number of children with disabilities in rural areas attend Head Start programs, emphasizing the importance of ensuring that rural Head Start programs are equipped to provide services to these children and that the teachers in these programs are trained in working with children with disabilities.

Although I found that children who attended Head Start programs were more likely to be from low-income families than those who attended other ECE programs, it is interesting to note that within Head Start programs, slightly less than half of the children with disabilities exceeded the income requirements of the program. At the time the children in this study attended Head Start, 90% of the children enrolled in each Head Start program were required to be from families below the poverty line, which was approximately \$19,000 for a family of four (U.S. Census Bureau, 2009b). However, among the children with disabilities who attended Head Start programs, 43% of the children were from families earning over \$25,000 per year. In the 2007 reauthorization of Head Start, the income requirements were changed. Currently, the regulations allow programs to have up to 35% of their enrollment consist of families who have incomes up to 130% of the federal poverty line (i.e., just over \$28,000 for a family of four; U.S. Census Bureau, 2010) and an additional 10% of the enrollment can be children from families who do not meet the income requirements [Head Start Act, 42 U.S.C. § 9840(645)(b)]. Even under the new regulations, there is still a large proportion of children

with disabilities whose families exceed the income guidelines. At least one study has suggested that the overall number of children in Head Start who do not meet the income requirements of the program may be as high as 28% to 35% (Besharov & Morrow, 2007). Because the process for selecting children to enroll in an individual Head Start program is made at the discretion of the individual grantees, it is possible that programs frequently use the 10% allotment for over-income children to enroll children with disabilities that they feel would benefit from the program. On the other hand, it is also possible that Head Start programs have difficulty meeting the 10% enrollment requirement, and in order to fulfill this requirement, they recruit and enroll children with disabilities, regardless of whether or not the family meets the programs income guidelines.

Not surprisingly, the results of this study indicate that, compared to children with disabilities who attended ECE programs in elementary schools, those who attended Head Start programs tended to be enrolled in more inclusive programs and are in classes with a higher percentage of their peers without disabilities. Given that attending inclusive preschool programs has been associated with positive outcomes for children with disabilities (Odom, 2000; Odom & Diamond, 1998), Head Start is providing a potentially important option for young children with disabilities. However, in order for inclusion to be effective, it is important for preschool programs to be high quality and for the program to be appropriate for and able to meet the needs of children with disabilities (Odom, 2000).

Limitations of the Study and Implications for Future Research.

The results of this study provide insight regarding children with disabilities who attend Head Start programs; however there are several limitations of the study. These

limitations affect both the external and internal validity of the findings and should be carefully evaluated when considering the implications of this study.

Missing data. Missing data are frequently prevalent in large-scale datasets and this was true in the case of the data I used from the PEELS. Overall, I excluded between 14.1% and 31.8% of the potential cases from my analyses due to missing data. This can have an effect on both the internal and external validity of the findings (McKnight et al., 2007). Because I excluded such a large amount of data, I used a smaller sample, which decreased the statistical power to detect significant differences. In addition, the large portions of missing data may have caused my sample to be biased. In order to examine the potential bias in my samples due to the exclusion of cases with missing data, I conducted missing data analyses by comparing my analytic samples to cases that were excluded. In addition, I compared my analytic samples to the baseline PEELS sample and to data on the national population of children age 3 through 5 with disabilities. These analyses indicate that there are some differences between my analytic samples and the PEELS baseline sample, as well as the national population. Compared to the overall PEELS sample, my samples tended to over-represent White children and children with speech impairments. In addition, Black and Hispanic children and children from districts with high poverty rates are under-represented. These differences should be considered when generalizing the findings from this study to the national population.

Sample weights. In nationally representative samples such as PEELS that were obtained through complex sampling procedures, sampling weights are typically used to generate estimates that generalize to the national population. In addition weights are used to account for the complex sampling procedures in order to more accurately calculate the

standard error of estimates. However, the PEELS dataset does not include weights that are appropriate to use when multiple waves of data are collapsed into one sample, as I did in my analyses. Therefore, I was unable to use weights in this study. Consequently, my sample may not be representative of the national population. As discussed in the previous section, I compared my analytic samples to data on the national population in order to evaluate the external validity of my sample. My sample appeared to over-represent children with speech impairments and under-represent those with developmental delays. In addition, Black children and children from the southern and central regions of the United States appeared to be under-represented in my sample. These differences should be considered when generalizing the results of this study to the national population. In addition, future research should examine the characteristics and school readiness of children with disabilities who attended Head Start programs using a sample that generalizes to the national population.

Program impacts. An additional limitation of this study is that I was unable to examine the actual impact of Head Start on children with disabilities, due to the dearth of data on children's skills prior to attending Head Start programs. In PEELS, children were assessed annually, so it would have been possible to examine the skills of children two years prior to entering kindergarten (i.e., the spring before attending a Head Start or other ECE program) and the spring prior to entering kindergarten. However, only approximately one-third of the PEELS sample began the study at age three, therefore there was only data on a very small number of children both prior to and after attending Head Start programs. This prevented me from examining the impact of Head Start on children with disabilities using a pretest-posttest design with data from the PEELS. In

addition, there are currently no other large-scale datasets that are better suited to examine this topic. Because such a large number of children with disabilities attend Head Start program, understanding the impact of the program on these child is important, yet, to date there is very little research on this topic. This study provides insight into the school readiness of children with disabilities who attend Head Start programs and suggests a child with a disability will have similar school readiness regardless of whether they attend a Head Start program or an ECE program in an elementary school; however without pre- and posttests or a randomized design, the findings in this study do not indicate that the programs are equally effective.. Future research should examine the impact of Head Start on children with disabilities, preferably using an experimental design with children randomly assigned to attend Head Start. However there are ethical constraints that may prevent researchers from using this type of design. The Head Start Impact study used a randomized design and randomly assigned children to either attend the program or to be placed on the program's waitlist. Yet, to ensure this process was ethical, program directors were allowed to select some children to attend the program and to be excluded from the evaluation based on the needs of the child. Many of the children who were selected to attend the Head Start programs and be excluded from the study were children with disabilities because program directors felt that they were the highest need children. This suggests that using a randomized design to study the impact of Head Start on children with disabilities would be difficult. At minimum, future research should examine the impact of the program on children with disabilities using a pretest-posttest design with an appropriate comparison group to control for the differences in the abilities and skills of the children at the onset of the program.

Multivariate analyses examining characteristics. This study provides preliminary insight into the characteristics of children with disabilities, using bivariate statistics to describe the characteristics of the children, their families, their programs, and the districts in which they receive special education services. Although the findings from this study provide important insight into the characteristics of children with disabilities in Head Start programs, future research should extend these findings using multivariate analyses such as multinomial logistic regression. This type of modeling can be used to determine the likelihood that a child with a disability will attend a Head Start program given a set of independent variable (i.e., child and district characteristics).

Program characteristics. Finally, due to the large number of cases that were missing data from the PEELS teacher questionnaire, it was not possible to compare many of the characteristics of Head Start programs attended by children with disabilities to the characteristics of other ECE programs attended by children with disabilities. I was able to include data from the parent interview on the number of children with disabilities in the child's class and the number of hours per week that the child attended the program, but beyond these two variables I was unable to examine the characteristic of programs. Consequently, it was also not possible to analyze whether there were differences in the quality of programs or if there was any relationship between program characteristics and children's school readiness. Future research should investigate the differences in the program characteristics of the Head Start programs and other ECE programs attended by children with disabilities and examine whether these differences in program characteristics are associated with children's school readiness or the impact of the program. Specifically, future research should examine whether there are factors within

Head Start programs that are associated with better outcomes for children with disabilities. This research would help to inform both practice and policy.

Chapter Summary

The purpose of this study was to examine the characteristics of children with disabilities who attend Head Start programs, as well as the characteristics of the programs they attend and the school districts in which they receive special education services.

Furthermore, an additional purpose was to examine whether there are differences in these characteristics across children with disabilities who attend Head Start programs and those who attended other ECE programs. I found that the majority of children with disabilities who attended Head Start programs had speech impairments, confirming what has been found in previous studies. However this study extends prior research by finding that the proportion of children in Head Start programs who have speech impairments does not differ from proportion of children with speech impairments in the overall population.

Furthermore, this study found that children with disabilities who attend Head Start programs face a number of risk factors that are associated with poor school achievement. Children with disabilities who attend Head Start tended to be from minority racial/ethnic groups, from low-income families, and to have mothers with low educational attainment. Moreover, children who attended Head Start programs were more likely to be from rural school districts and districts with high poverty rates.

Finally, I found that there is no difference in the school readiness of children with disabilities who attend Head Start programs and those who attend ECE programs in elementary schools, after controlling for their disability and demographic characteristics. In contrast there are some differences in the school readiness of children with disabilities

who attend Head Start and those who attend ECE programs in locations other than elementary schools; however, these differences were dependent upon the type of disability the children were identified with. Though there are several limitations to this study, it is the first to examine the characteristics and school readiness of children with disabilities who attend Head Start programs and it provides important insight regarding children with disabilities in the Head Start program.

Tables

Table 1

Articles Included in the Review of the Empirical Literature: Description of the Purpose

Study	Description of Purpose
Abbott-Shim, Lambert, & McCarty, 2003	To examine variations in the growth curves of children who did and did not attend Head Start programs. Specifically, the authors looked at children's social, cognitive, and language growth, as well as differences in measures of health.
Aughinbaugh, 2001	To examine the impact of Head Start participation on school suspensions, grade retentions and math achievement tests.
Caputo, 2003	To examine the long-term effects of Head Start and other preschool programs on life success measures (i.e. income, family poverty, and economic mobility)
Currie & Thomas, 1995	To examine the impact of participation in Head Start on children's school performance, cognitive development, receipt of preventative medicine, health and nutrition.
Currie & Thomas, 1999	To examine the impact of participation in Head Start, other preschools, or no preschool on several measures of the cognitive and educational attainment of Hispanic children.
Garces, Thomas, & Currie, 2002	To examine the economic and social success of former Head Start participants when they have reached adulthood.
Henry, Gordon, & Rickman, 2006	To compare the developmental outcomes of children who attended Head Start and state prekindergarten. In addition, the authors compare the quality of services and level of teacher education in Head Start programs and state prekindergarten programs.

Kreisman, 2003	To examine the growth patterns of who do and do not participate in Head Start programs. Additionally, the authors examine whether there are different patterns of growth within the group of who participate in Head Start programs and whether these patterns result from the number of years the children attend the program.
Lee, Brooks-Gunn, Schnur, & Liaw, 1990	To examine the sustained effects of Head Start participation on the cognitive development and social competence of Black children in kindergarten and first grade.
Lee, Schnur, & Brooks-Gunn, 1988	To examine the effects of Head Start participation on children's cognitive development.
Ludwig, & Miller, 2007	To examine whether discontinuities in Head Start funding are associated with discontinuities in health and educational outcomes.

Table 2

Articles Included in the Review of the Empirical Literature: Data Source and Analytic Sample

Study	Data Source	Date of Head Start Participation	Sample Size	Nationally Representative	Random Assignment	Students with Disabilities Included
Abbott-Shim, Lambert, & McCarty, 2003	Data were collected from three Head Start centers in a southern urban setting	Children attended Head Start during the 1998-1999 school year. Data were collected over the course of the year.	121 after the attrition of 52 participants	No	Yes	Excluded
Aughinbaugh, 2001	National Longitudinal Study of Youth: 1997	Data were collected in 1997 when participants were between 12 and 16 years old. Participants attended the program between 1980 and 1984.	7,787 students	Yes	No	Not reported
Caputo, 2003	National Longitudinal Study of Youth: 1979	Data were collected annually between 1979 and 1994 and again in 1996 and 1998. Participants attended Head Start	5,621 students	Yes	No	No reported

between 1965 and 1971.

Currie & Thomas, 1995	National Longitudinal Survey's Merged Child-Mother file (NLSCM).	Data pertaining to the children were collected in 1986, 1988, and 1990. Children who were age 4 and older at each of these data points were included in the sample.	Nearly 5,000 children	Yes	No	Not reported
Currie & Thomas, 1999	National Longitudinal Survey's Merged Child-Mother file (NLSCM).	Data pertaining to the children were collected in 1986, 1988, 1990, and 1992. Children age 5 and older at each of these data points were included in the sample.	750 children from 324 families	Yes	No	Not reported

Garces, Thomas, & Currie, 2002	Panel Survey of Income Dynamics (PSID)	Data collection began in 1968. In 1995, all adult household members under age 30 were asked if they had attended Head Start or any other preschool program.	Slightly less than 4,000 adults age 18 to 30.	Yes	No	Not reported
Henry, Gordon, & Rickman, 2006	Multistage probability sample of children who participated in Head Start and the Georgia Pre-K program	Children attended Head Start or prekindergarten during the 2001-2002 school year. They were followed through the fall of their kindergarten year.	315 children	No	No	Not reported
Kreisman, 2003	Prospects: The Congressionally Mandated Study of Educational Growth and Opportunity.	Data were collected from 1991-1994. Participants were in first, third and seventh grade in 1991 and therefore, would have attended Head Start in 1989, 1987, and 1983.	6,771 students	Yes	No	Not reported

Lee, Brooks-Gunn, Schnur, & Liaw, 1990	Head Start Longitudinal Study (HSLs)	The participants attended Head Start in the 1969-1970 school year and were followed through 1972.	646 children	No	No	Children with severe disabilities were excluded. Not reported
Lee, Schnur, & Brooks-Gunn, 1988	Head Start Longitudinal Study (HSLs)	The participants attended Head Start in the 1969-1970 school year and data were collected in the fall and spring of that year.	969 children	No	No	Not reported
Ludwig, & Miller, 2007	Vital Statistics, County-level data from the decennial censuses from 1960 through 2000, NELS:88	Children attended Head Start in 1965 through the late 1970s.	600 Counties	No	No	Not reported

Table 3

Articles Included in the Review of the Empirical Literature: Variables used in Analyses

Study	Data Analysis	Dependent Variables	Control Variables
Abbott-Shim, Lambert, & McCarty, 2003	HLM growth curve modeling, ANOVA, and Chi Square	Receptive vocabulary (Peabody Picture Vocabulary Test-III) Preliteracy (M-KIDS Preliteracy Inventory) Phonemic Awareness (Early Phonemic Awareness Profile) Parents' ratings of the children's social functioning Parents perceptions of health outcomes	
Aughinbaugh, 2001	OLS Regression	Math achievement (standard score on the Peabody Individual Achievement Test) Repetition of a grade (parent report) Suspension from school (parent report)	Age, gender, whether participant was first born, family income, whether the participant experienced hard times (not defined), mother's educational attainment, mother's height, grandmother's educational attainment, the ratio of the number of children enrolled in Head Start to the number of poor children ages 3 to 5, the federal expenditure on Head Start per participant from the fiscal year of the participant's fourth birthday, average weekly cost of child-care, median earnings for full-time year round working women during the year of the child's fourth birthday

Caputo, 2003	OLS Regression	Number of years living in poor families Receipt of TANF/AFDC and food stamps Average annual income-to-poverty ratios Economic mobility (average change in the respondent's income-to-poverty ratio between 1985 and 1998)	Whether the participant's mother completed high school, family structure at age 14, whether the youth was expelled or suspended from school, age 14 mastery over one's environment, age 14 self-esteem, U.S. native, number of years living in a poor family prior to 1985, economic mobility prior to 1985, income-to-poverty ratio prior to 1985, average unemployment rate in area of residence, number of years living in the inner city, marital status, race, and sex
Currie & Thomas, 1995	OLS Regression	Receptive vocabulary (Peabody Picture Vocabulary Test) Grade repetition Receipt of measles shot Height for age	Age, gender, whether the child was the first born, log household permanent income, maternal educational attainment, mother's Armed Forces Qualifying Test score, mother's height, mother's number of siblings at age 14, and maternal grandmother's educational attainment. Also controlled for unobserved family characteristics by including the children's siblings as control group.
Currie & Thomas, 1999	OLS Regression	Receptive vocabulary (Peabody Picture Vocabulary Test) Math and Reading achievement (Peabody Individual Achievement Test) Grade repetition	Gender, age, whether the child was first born, maternal educational attainment, mother's Armed Forces Qualifying Test score, the mother's number of siblings

Garces, Thomas, & Currie, 2002	OLS Regression	Completion of high school College attendance Earnings Whether the participant was ever booked with a crime	Gender, ethnicity, age, birthweight, maternal and paternal education, family income at age 4, whether the participant lived with both parents at age 4, whether the participant was first born. Also controlled for unobserved family effects by using siblings that did not attend Head Start as controls.
Henry, Gordon, & Rickman, 2006	Propensity score matching	Cognition (Woodcock Johnson Test of Achievement-III) Receptive language (PPVT-III) Recognition of words and letters (Woodcock Johnson Test of Achievement-III) Expressive Language (Oral and Written Language Scales) Sound matching (Comprehensive Test of Phonological Processing) Teachers' ratings of children's academics, health and well-being, creativity, communication skills, behavior, and school readiness Classroom quality (Early Childhood Environmental Rating Scale-Revised)	Age, gender, parental education, income, mother's age, marital status of the parents, parental employment, health/wellness screenings, classroom composition, teachers' education, teachers' credentials
Kreisman, 2003	Growth Mixture Models	Reading and Math achievement (Comprehensive Test of Basic Skills, 4th edition)	Family income, parental educational attainment, gender, years of Head Start experience

Lee, Brooks-Gunn, Schnur, & Liaw, 1990	ANCOVA	Verbal Achievement (The Cooperative Primary Test) Perceptual Reasoning (The Children's Embedded Figures Test and The Raven's Colored Progressive Matrices Test) Social Competence (The California Preschool Social Competency Scale)	Gender, father's presence in the household, the proportion of children to adults in the household, socioeconomic status.
Lee, Schnur, & Brooks-Gunn, 1988	ANCOVA, OLS Regression	Receptive Vocabulary (The Peabody Picture Vocabulary Test) School Achievement (The Caldwell Preschool Inventory) Impulsivity (The Motor Inhibition Test) Mother-child interactions (the Eight-Block Sorting Task)	Maternal education, father's presence in the household, family crowding, proportion of children to adults in the household, the amount the mother read to her child.
Ludwig, & Miller, 2007	Regression Discontinuity Design	Child mortality rates (due to tuberculosis, other infections, diabetes, nutritional causes, anemia, meningitis, and respiratory causes) Educational attainment	

Table 4

Articles Included in the Review of the Empirical Literature: Findings

Study	Findings
Abbott-Shim, Lambert, & McCarty, 2003	Head Start children showed faster rates of growth in receptive vocabulary and phonemic awareness; however, there were no differences in the growth rates for print concepts. There was no difference in the behavior of Head Start children over the course of the year, whereas the participants in the control group showed fewer behavior problems in the spring. Finally, Head Start was found to have a positive impact on the preventative health of children.
Aughinbaugh, 2001	Head Start attendance was not associated with any differences in PIAT math scores or grade repetitions. Children who attended Head Start programs were more likely to be suspended. Head Start attendance was associated with a 9% increase in the probability that a child will be suspended.
Caputo, 2003	Attending a preschool other than Head Start was associated with an increase in economic well being as measured by the family's income-to-poverty ratio. There were no other significant differences across groups. The number of years living in poverty, economic mobility, or receipt of government aide for the Head Start participants did not significantly differ from other preschool participants or who did not attend preschool after controlling for other factors.
Currie & Thomas, 1995	Participation in Head Start was associated with an 5.6% increase in PPVT scores of White children. Overall, Head Start did not have an impact on the PPVT scores of Black children, however, when the effect of the interaction between age and program was examined, the authors found that White and Black children experience comparable initial gains, but for Black children, these initial benefits fade and are completely lost by age ten. In addition, White children were 47% less likely to repeat a grade than their siblings who did not attend Head Start. For both Black and White children, Head Start attendance was associated with an 8-9% increase in the probability of being immunized. However, Head Start did not have an impact on nutrition and health as measured by height for age.

- Currie & Thomas, 1999
- Participation in Head Start was found to have a strong positive effect on Hispanic children's scores on both the PPVT and PIAT, and on the probability that the child has not repeated a grade. Head Start closed between one-quarter and one-third of the gap in test scores between Hispanic and non-Hispanic White children and two-thirds of the gap in the probability of repeating a grade. Attendance at other preschools had no statistically significant effect on child outcomes relative to no preschool. Finally, children of native born mothers benefited more from Head Start than children of foreign born mother and children of Mexican descent benefited more than children of Puerto Rican descent.
- Garces, Thomas, & Currie, 2002
- When compared to their siblings who did not attend preschool or attended other preschool programs, White participants who attended Head Start were 20% more likely to finish high school. Similarly, White attendees were 28% more likely to attend college than their siblings that did not attend preschool and 20% more likely than those who attended other preschool programs. However, there was no effect on graduation rates or rates of college attendance of Black participants. Head Start did not have an effect on the income of any participants except White participants whose mothers dropped out of high school. White Head Start participants whose mothers dropped out of high school earned significantly more than their siblings who did not attend preschool. Finally, people who attend Head Start are significantly less likely to be booked or charged with a crime. This effect is largest for Black participants. Black adults that attended Head Start were 12% less likely to be booked or charged with a crime than their siblings that did not attend preschool or attended another preschool program.
- Henry, Gordon, & Rickman, 2006
- Overall, there was no significant difference in the quality of Head Start programs and the state prekindergarten programs as measured by the ECERS-R. When compared to children who attended Head Start, children who attended prekindergarten started preschool with higher vocabulary skills and cognitive achievement and this gap grew over the course of the year. There was no difference in the letter-word recognition skills of the two groups at the start of preschool, but the prekindergarten children had scores that were statistically significantly higher at the start of kindergarten. There were also statistically significant differences in the phonemic awareness of the children at the onset of kindergarten, with the prekindergarten children outperforming the Head Start children. Finally, there were statistically significant differences in the kindergarten teachers' ratings of the children. The prekindergarten children were rated higher on their academic skills, health, intellectual curiosity and attitudes toward schooling,

and on overall school readiness.

- Kreisman, 2003 Children who participated in Head Start were found to have heterogeneous growth patterns. When compared to children who attended Head Start for only one year, children with two or more years of program participation did not have faster growth from first to third grade. Females, regardless of whether or not they attended Head Start, began first grade with higher reading achievement than boys, however the boys had much more rapid growth rates. Income was less predictive of higher achievement growth for children who attended Head Start than for those who did not attend the program, indicating that Head Start may reduce the influence of income on reading and math achievement.
- Lee, Brooks-Gunn, Schnur, & Liaw, 1990 When compared to who did not attend preschool, Head Start participation was associated with an increase in children's perceptual reasoning, verbal achievement, and social competency. For all of these measures, Head Start participation was associated with medium effect size. When compared to who attended other preschool programs, Head Start had a small effect on children's verbal achievement; however there was no significant effect on children's perceptual reasoning or social competency.
- Lee, Schnur, & Brooks-Gunn, 1988 On measures of receptive vocabulary, school achievement, and impulsivity, the children who attended Head Start made gains that were statistically significantly larger than the gains of children who did not attend preschool or attended other programs, without controlling for other factors. Despite these gains, the Head Start participants were still behind the other groups on measures of receptive vocabulary, and school achievement. After controlling for other factors, Head Start was found to have moderate positive effects on the school achievement and impulsivity of Black children, when compared to children who did not attend preschool. There were no statistically significant differences between White who attended Head Start and who did not attend preschool. When compared to children who attended other preschool programs, the authors found positive effects on the school achievement and impulsivity of Head Start participation on Black children, but negative effects on ratings of their mother-child interactions. There was no statistically significant effect found on the receptive vocabulary of Black children or on any measure for the White children.

Ludwig, &
Miller,
2007

The authors found evidence for positive effects of Head Start on health and educational attainment in the counties with increased funding. A difference in Head Start enrollment rates of around 12,000-30,000 per 100,000 4-year-olds lead to one or two fewer deaths due to causes that could have been effected by Head Start participation such as tuberculosis, other infections, diabetes, nutritional causes, anemia, meningitis, and respiratory causes. Furthermore, there is evidence that this discontinuity did not exist prior to the inception of Head Start. For individuals that were age 4 prior to the inception of the Head Start program, mortality rates were similar across counties with different levels of funding. Additionally, the authors found suggestive evidence for a discontinuity in educational attainment across counties with different levels of funding. Counties with higher levels of funding have high graduation rates and higher rates of post-secondary education attendance, however these results are only suggestive because there is no way to account for individuals moving between counties between early childhood and the time they would graduate high school.

Table 5.
Age Cohorts in the PEELS Dataset

Cohort	Source (List)	Age at Study Entry	Date of Birth
A	Ongoing	3 years	3/1/00 – 2/28/01
B	Historical and Ongoing	4 years	3/1/99 – 2/29/00
C	Historical and Ongoing	5 years	3/1/98 – 2/28/99

Table 6.
PEELS Data Collection Schedule

	Wave 1 2003-04	Wave 2 2004-05	Wave 3 2005-06	Wave 4 2006-07	Wave 5 2008-09
State Agency Questionnaires	X				
LEA Questionnaires	X	X ^a			
Program Director Questionnaire	X	X ^b	X ^b		
Teacher Questionnaires	X	X	X	X	
Parent Interviews	X	X	X	X	
Child Assessments	X	X	X	X	X

^aIn Wave 2, the LEA questionnaire was administered to LEAs included the supplemental sample only

^bOnly principals and program directors of schools or programs enrolling PEELS participants for the first time were surveyed.

Table 7.
Response Rates for PEELS Data Collection

Instrument	Number of Respondents	Response Rate
State Agency Questionnaire	51	100%
LEA Questionnaire	232	89%
Program Director Questionnaire		
Wave 1	Not Reported	76%
Wave 2	758	65%
Wave 3	Not Reported	Not Reported
Teacher Questionnaire		
Wave 1	Not Reported	76%
Wave 2	Not Reported	84%
Wave 3	Not Reported	84%
Wave 4	Not Reported	80%
Parent Interview		
Wave 1	2,802	96%
Wave 2	2,893	93%
Wave 3	2,719	88%
Wave 4	2,488	80%
Direct Child Assessment ^a		
Wave 1	2,792	96%
Wave 2	2,932	94%
Wave 3	2,889	93%
Wave 4	2,632	84%

^aThe response rates for the direct child assessments administered in Wave 5 are not yet available.

Table 8.
PEELS Indirect-Child Assessment Schedule^a

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
ABAS-II	X	X	X	X	X
Vineland – Gross and Fine Motor	X	X	X		
PKBS-2 – Social Skills	X	X			
PKBS-2 – Problem Behaviors	X	X			
Academic Rating Scale – Language and Literacy	X	X	X	X	
Academic Rating Scale – Mathematical Thinking	X	X	X	X	
Social Skills Rating System – Social Skills			X	X	
Social Skills Rating System – Problem Behaviors			X	X	

^aIndirect assessments were included in the teacher questionnaires

Table 9.
PEELS Direct-Child Assessments Schedule

	Wave 1			Wave 2			Wave 3			Wave 4		
	A	B	C	A	B	C	A	B	C	A	B	C
Pre-LAS– Simon Says	X	X	X	X	X	X	X	X	X			
Pre-LAS– Art Show	X	X	X	X	X	X	X	X	X			
PPVTIII	X	X	X	X	X	X	X	X	X	X	X	X
Leiter-R Attention Sustained	X	X	X	X	X	X	X	X	X			
IGDI – Picture Naming	X	X	X	X	X	X	X	X	X			
IGDI – Alliteration		X	X	X	X	X	X	X	X			
IGDI – Rhyming		X	X	X	X	X	X	X	X			
IGDI – Segment Blending		X	X	X	X	X	X	X	X			
WJIII – Letter Word Identification	X	X	X	X	X	X	X	X	X	X	X	X
WJIII – Quantitative Concepts – Number Series			X		X	X	X	X	X			
WJIII – Quantitative Concepts – Concepts			X		X	X	X	X	X			
WJIII – Applied Problems	X	X	X	X	X	X	X	X	X	X	X	X
WJIII – Passage Comprehension										X	X	X
WJIII – Calculation										X	X	X
Test of Early Math Skills	X	X	X	X	X	X						
PIAT-R Reading						X		X	X			
DIBELS – Oral Reading Fluency ¹										X	X	X

Note: Table adapted from U.S. Department of Education, 2008

¹The DIBELS was administered based on grade, not age. It was administered in grades one and higher.

Table 10.
Amount of Excluded and Missing Data

	Excluded/Missing		Included in Analytic Sample	
	n ^a	%	n	%
Excluded Cases	1,480	47.6	1,630	52.4
Kindergarten in Wave 1	410	13.2	2,690	86.8
No Kindergarten by Wave 4	10	0.2	3,100	99.8
Did Not Attend ECE Center	120	3.8	2,990	96.2
No IEP	190	6.2	2,910	93.8
Attended Multiple Programs	820	26.3	2,290	73.7
Cases with Missing Data				
Program Type	220	13.7	220	13.7
Year of Kindergarten	90	5.8	1,530	94.2
Parent Questionnaire Data	230	14.1	1,400	85.9
LEA Data	170	10.5	1,450	89.5
Child Assessment Data	300	18.6	1,320	81.4
Missing from Analytic Sample 1 – Child ^b	230	14.1	1,400	85.9
Missing from Analytic Sample 2 – LEA	350	21.8	1,270	78.2
Missing from Analytic Sample 3 – Child & LEA	520	31.8	1,110	68.2

^aThe sample sizes were rounded to the nearest 10.

^bThe number of cases with missing data from each source do not sum to the total number of cases with missing data because some cases are missing data from multiple sources.

Table 11.

Comparison of Participants Excluded Due to Missing Data and Analytic Sample 1

	Cases with Missing Data (<i>n</i> = 230)	Analytic Sample 1 (<i>n</i> = 1,400)
	%	%
Race/Ethnicity (<i>n</i> = 1,596)		
American Indian/Alaska Native	2.5	1.4
Asian/Pacific Islander	5.0	3.7
Hispanic	30.0*	21.0
Black	21.0*	13.4
White	41.5*	60.5
Gender (<i>n</i> = 1,625)		
Female	30.1	30.4
Male	69.9	69.6
Disability Category (<i>n</i> = 1,531)		
Developmental Delay	26.7	30.1
Speech Language Impairment	51.1	47.7
Other	22.2	22.2
Region (<i>n</i> = 1,454)		
Northeast	16.4	21.4
Southeast	33.9	25.4
Central	19.6	23.4
West/Southwest	30.2	29.8
Urbanicity (<i>n</i> = 1,454)		
Urban	41.3*	30.1
Suburban	37.0	48.1
Rural	21.7	21.7
District Poverty (<i>n</i> = 1,454)		
High	27.5*	17.2
Medium	24.9	24.7
Low	28.0	27.8
Very Low	19.6*	30.3
District Enrollment (<i>n</i> = 1,454)		
Small	25.4	29.2
Medium	40.2	44.2
Large	34.4	26.6
District Preschool Special Education Enrollment (<i>n</i> = 1,454)		
Small	27.5	32.7
Medium	30.7	36.0
Large	41.8*	31.3
School Readiness Mean (SD)		
PPVT (<i>n</i> = 1,323)	87.3 (15.6)	89.3 (15.7)

WJIII Applied Problems (n = 1,355)	85.7 (19.7)	89.3 (19.1)
WJIII Letter-Word (n = 1,355)	94.3 (14.2)	96.2 (16.6)

* $p \leq .05$

Table 12.

Comparison of Participants Excluded Due to Missing Data and Analytic Sample 2

	Cases with Missing Data	Analytic Sample 2
	(n = 350)	(n = 1,270)
	%	%
Race/Ethnicity (n = 1,596)		
American Indian/Alaska Native	2.5	1.3
Asian/Pacific Islander	4.6	3.7
Hispanic	28.3*	20.5
Black	18.8*	13.2
White	45.8*	61.3
Gender (n = 1,625)		
Female	31.4	30.1
Male	68.6	69.9
Disability Category (n = 1,531)		
Developmental Delay	25.4	30.7
Speech Language Impairment	48.1	48.0
Other	26.5	21.3
Region (n = 1,454)		
Northeast	16.4	21.4
Southeast	34.4*	25.3
Central	20.2	23.3
West/Southwest	29.0	30.0
Urbanicity (n = 1,454)		
Urban	41.5*	30.1
Suburban	36.1*	48.2
Rural	22.4	21.6
District Poverty (n = 1,454)		
High	28.4*	17.2
Medium	25.1	24.6
Low	27.9	27.9
Very Low	18.6*	30.4
District Enrollment (n = 1,454)		
Small	26.2	29.0
Medium	39.3	44.3
Large	34.4	26.7
District Preschool Special Education Enrollment (n = 1,454)		
Small	28.4	32.6
Medium	29.5	36.1
Large	42.1*	31.3
School Readiness Mean (SD)		
PPVT (n = 1,323)	88.5 (16.7)	89.2 (15.4)
WJIII Applied Problems (n =	90.7 (20.1)	88.7 (19.0)

1,355)		
WJIII Letter-Word (n = 1,355)	98.6 (17.0)	95.5 (16.2)*

* $p \leq .05$

Table 13.

Comparison of Participants Excluded Due to Missing Data and Analytic Sample 3

	Cases with Missing Data	Analytic Sample 3
	(n = 520)	(n = 1,110)
	%	%
Race/Ethnicity (n = 1,596)		
American Indian/Alaska Native	2.0	1.3
Asian/Pacific Islander	4.5	3.6
Hispanic	31.8*	17.9*
Black	17.8*	12.8
White	43.9*	64.4*
Gender (n = 1,625)		
Female	28.8	31.1
Male	71.2	68.9
Disability Category (n = 1,531)		
Developmental Delay	25.3	31.5
Speech Language Impairment	37.4*	52.1*
Other	37.4*	16.4*
Region (n = 1,454)		
Northeast	17.1	21.9
Southeast	27.5	26.2
Central	22.5	23.0
West/Southwest	32.9	28.9
Urbanicity (n = 1,454)		
Urban	41.9*	28.3
Suburban	42.2	48.1
Rural	15.9*	23.6
District Poverty (n = 1,454)		
High	25.4*	16.4
Medium	25.4	24.5
Low	25.7	28.5
Very Low	23.4	30.6
District Enrollment (n = 1,454)		
Small	22.0*	30.8
Medium	39.6	44.9
Large	38.4*	24.3*
District Preschool Special Education Enrollment (n = 1,454)		
Small	26.6	33.8
Medium	30.6	36.7
Large	42.8*	29.5
School Readiness Mean (SD)		
PPVT (n = 1,323)	88.8 (16.8)	89.2 (15.4)
WJIII Applied Problems (n =	87.1 (23.2)	89.4 (18.1)

1,355)		
WJIII Letter-Word (n = 1,355)	96.7 (17.8)	95.9 (16.1)
<hr/>		
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$		

Table 14.

Comparison of the characteristics of the baseline sample and the analytic samples

	Baseline Sample (<i>n</i> = 1,630)	Analytic Sample 1 (<i>n</i> = 1,400)	Analytic Sample 2 (<i>n</i> = 1,270)	Analytic Sample 3 (<i>n</i> = 1,110)
	%	%	%	%
Race/Ethnicity (<i>n</i> = 1,596)				
American Indian/Alaska				
Native	1.5	1.4	1.3	1.3
Asian/Pacific Islander	3.9	3.7	3.7	3.6
Hispanic	22.1	21.0	20.5	17.9
Black	14.3	13.4	13.2	12.8
White	58.1	60.5	61.3	64.4
Gender (<i>n</i> = 1,625)				
Female	30.4	30.4	30.1	31.1
Male	69.6	69.6	69.9	68.9
Disability (<i>n</i> = 1,531)				
Developmental Delay				
Speech Language	48.0	47.7	48.0	52.1
Impairment				
Other	22.2	22.2	21.3	16.4
Region (<i>n</i> = 1,454)				
Northeast	20.8	21.4	21.4	21.9
Southeast	26.5	25.4	25.3	26.2
Central	22.9	23.4	23.3	23.0
West/Southwest	29.8	29.8	30.0	28.9
Urbanicity (<i>n</i> = 1,454)				
Urban	31.6	30.1	30.1	28.3
Suburban	46.7	48.1	48.2	48.1
Rural	21.7	21.7	21.6	23.6
District Poverty (<i>n</i> = 1,454)				
High	18.6	17.2	17.2	16.4
Medium	24.7	24.7	24.6	24.5
Low	27.9	27.8	27.9	28.5
Very Low	28.9	30.3	30.4	30.6
District Enrollment (<i>n</i> = 1,454)				
Small	28.7	29.2	29.0	30.8
Medium	43.7	44.2	44.3	44.9
Large	27.6	26.6	26.7	24.3
District Preschool Special Education Enrollment (<i>n</i> = 1,454)				
Small	32.0	32.7	32.6	33.8

Medium	35.3	36.0	36.1	36.7
Large	32.7	31.3	31.3	29.5
<hr/>				
School Readiness Mean (SD)				
PPVT	89.1 (15.7)	89.3 (15.7)	89.2 (15.4)	89.2 (15.4)
WJIII Applied Problems	89.0 (19.2)	89.3 (19.1)	88.7 (19.0)	89.4 (18.1)
WJIII Letter-Word	96.0 (16.4)	96.2 (16.6)	95.5 (16.2)	95.9 (16.1)

Table 15.
Comparison of the National Population of Children Age 3-5 Receiving Special Education Services and the Analytic Sample

	National Population ^a (n = 596,796)	Analytic Sample 1 (n = 1,400)	Analytic Sample 2 (n = 1,270)	Analytic Sample 3 (n = 1,110)
Disability Category (%)				
Speech Language Impairment	42.9	47.7	48.0	52.1
Developmental Delay	39.9	30.1	30.7	31.5
Other	17.2	22.2	21.3	16.4
Race/Ethnicity (%)				
American Indian	1.4	1.4	1.3	1.3
Asian/Pacific Islander	2.8	3.7	3.7	3.6
Black	15.3	13.4	13.2	12.8
Hispanic	15.4	21.0	20.5	17.9
White	65.0	60.5	61.3	64.4
Region^b (%)				
Northeast	20.30	21.4	21.4	21.9
South	33.00	25.4	25.3	26.2
Central	25.50	23.4	23.3	23.0
West	21.20	29.8	30.0	28.9

^aThese data were derived from data from U.S. Department of Education, OSEP (2005) Tables 2-1 and 2-6. Only children receiving services in an early childhood setting, early childhood special education setting, separate school, or reverse mainstream environment were included.

^bChildren attending Bureau of Indian Affairs schools were excluded from these percentages because the region where the children received services is not provided.

Table 16.
Characteristics of Children with Disabilities who Attended Head Start Programs

	Percentage (n = 380)
Disability Category	
Speech Language Impairment	53.1
Developmental Delay	29.6
Other	17.3
Gender	
Female	31.9
Male	68.1
Race/Ethnicity	
American Indian	1.8
Asian/Pacific Islander	2.1
Black	23.3
Hispanic	27.2
White	45.5
Family Income	
\$25,000 or less	57.1
\$25,001 – \$50,000	30.4
More than \$50,000	12.6
Mother's Educational Attainment	
Less than High School Diploma	28.5
High School Diploma or GED	38.5
Some Postsecondary Education	27.5
At least a 4-year degree	5.5

Table 17.
*Characteristics of the Services Received by Children with
 Disabilities who Attended Head Start Programs*

	Descriptive Statistics (n = 380)
Types of Services Received	
Special Instruction or Tutoring	35.1
Speech Therapy	80.6
Physical Therapy	12.8
Occupational Therapy	23.3
Other Services	1.0
Number of Services Received	
Mean (SD)	1.7 (1.3)
Minimum	0
Maximum	10
Age of First Special Education Services	
0 – 11 months	9.9
12 -23 months	7.9
24 – 35 months	18.1
36 months of later	64.1

Table 18.
Characteristics of Head Start Programs Attended by Children with Disabilities

	Descriptive Statistics (n = 380)
Number of Children with Disabilities (%)	
All	23.0
Most	9.9
Some	56.5
None	10.5
Hours per Week	
Mean (SD)	20.2 (10.2)

Table 19.
*Characteristics of the School Districts in Which Children with Disabilities
 who Attended Head Start Programs Received Special Education Services*

	Percentage (n = 340)
Urbanicity	
Urban	32.8
Suburban	35.2
Rural	32.0
Region	
Northeast	12.5
South	36.6
Midwest	24.1
West	26.7
District Poverty	
High	26.7
Medium	30.2
Low	25.3
Very Low	17.7
District Enrollment (%)	
Small	30.5
Medium	43.6
Large	25.9
District Preschool Special Education Enrollment (%)	
Small	32.6
Medium	36.6
Large	30.8

Table 20.

Comparison of the Child and Family Characteristic of Children with Disabilities who Attended Head Start Programs and Those who Attended other ECE Programs

	Head Start (<i>n</i> = 380)	ECE in an Elementary School (<i>n</i> = 640)	ECE in Other Location (<i>n</i> = 370)
Disability Category (%)			
Speech Language Impairment	53.1	40.2*	55.0*
Developmental Delay	29.6	33.4	24.9
Other	17.3*	26.4*	20.1
Gender (%)			
Female	31.9	30.3	29.2
Male	68.1	69.7	70.8
Race/Ethnicity (%)			
American Indian	1.8	1.4	0.8
Asian/Pacific Islander	2.1	4.4	4.3
Black	23.3*	10.3*	8.6*
Hispanic	27.2*	20.9	14.7*
White	45.5*	63.0	71.6*
Family Income (%)			
\$25,000 or less	57.1*	28.7*	19.8*
\$25,001 – \$50,000	30.4	36.5	31.1
More than \$50,000	12.6*	34.8	49.1*
Mother's Educational Attainment (%)			
Less than High School Diploma	28.5*	14.5	7.8*
High School Diploma or GED	38.5*	33.2	24.7*
Some Postsecondary Education	27.5	29.6	32.4
At least a 4-year degree	5.5*	22.6	35.1*

* $p \leq .05$

Table 21.
Comparison of the Services Received by Children with Disabilities who Attended Head Start Programs and Those who Attended other ECE Programs

	Head Start (n = 380)	ECE in an Elementary School (n = 640)	ECE in Other Locations (n = 370)
Types of Services Received (%)			
Special Instruction/Tutoring			
Yes	35.1	48.7*	30.8*
No	64.9	51.3*	69.2*
Speech Therapy			
Yes	80.6	85.5	77.7
No	19.4	14.5*	22.3*
Physical Therapy			
Yes	12.8*	23.2*	17.4
No	87.2	76.8	82.6
Occupational Therapy			
Yes	23.3*	43.4*	29.5
No	76.7*	56.6*	70.5
Other Services			
Yes	1.0	2.5	3.5
No	99.0	97.5	96.5
Number of Services Received ^a			
Mean	1.7	2.2	1.7
SD	1.3	1.4	1.4
Age of First Special Education Services (%)			
0 – 11 months	9.9	14.5	12.6
12 -23 months	7.9	10.9	10.2
24 – 35 months	18.1	22.9	26.0
36 months of later	64.1*	51.6	51.2

^aThere were statistically significant differences across the three groups ($F_{2,1390} = 25.6$, $p < .01$).

* $p \leq .05$

Table 22.

Difference in the Group Means of Number of Services the Child Received

	Head Start (<i>n</i> = 380)	ECE in an Elementary School (<i>n</i> = 640)	ECE in Other Location (<i>n</i> = 370)
Head Start	-	-0.53***	0.01
ECE in an Elementary School		-	0.54***
ECE in Other Location			-

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 23.
Comparison of the Characteristics of Head Start Programs and Other ECE Programs Attended by Children with Disabilities

	Head Start (<i>n</i> = 380)	ECE in an Elementary School (<i>n</i> = 640)	ECE in Other Location (<i>n</i> = 370)
Number of Children with Disabilities (%)			
All	23.0*	45.7*	24.4*
Most	9.9	14.4*	8.6
Some	56.5*	33.1*	47.2
None	10.5	6.9*	19.8*
Hours per Week ^a			
Mean	20.2	16.6	16.9
SD	10.2	9.4	10.6

^aThere were statistically significant differences across the three groups ($F_{2,1390} = 17.4, p < .01$).

* $p \leq .05$

Table 24.

Difference in the Group Means of the Number of Hours the Child Attended the Program per Week

	Head Start (<i>n</i> = 380)	ECE in an Elementary School (<i>n</i> = 640)	ECE in Other Location (<i>n</i> = 370)
Head Start	-	3.65***	3.27***
ECE in an Elementary School		-	-0.38
ECE in Other Location			-

p* ≤ .05; *p* ≤ .01; ****p* ≤ .001

Table 25.
Comparison of the School District Characteristics of Children with Disabilities who Attended Head Start Programs, ECE Program in Elementary Schools, and ECE Programs in Other Locations

	Head Start (<i>n</i> = 340)	ECE in an Elementary School (<i>n</i> = 600)	ECE in Other Location (<i>n</i> = 320)
Urbanicity (%)			
Urban	32.8	30.3	26.9
Suburban	35.2*	52.3	54.5
Rural	32.0*	17.4*	18.6
Region (%)			
Northeast	12.5*	23.5	26.9*
South	36.6*	23.2	17.3*
Midwest	24.1	17.2*	33.7*
West	26.7	36.1*	22.0*
District Poverty (%)			
High	26.7*	12.9*	14.9
Medium	30.2*	25.2	17.6*
Low	25.3	30.1	26.3
Very Low	17.7*	31.8	41.2*
District Enrollment (%)			
Small	30.5	27.6	30.0
Medium	43.6	40.9	51.4
Large	25.9	31.5*	18.6*
District Preschool Special Education Enrollment (%)			
Small	32.6	33.1	31.6
Medium	36.6	32.5	42.4
Large	30.8	34.4	26.0

* $p \leq .05$

Table 26.
Regression of Program Type on the Receptive Language Skills of Children with Disabilities

	Unstandardized Regression Coefficients (b)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	92.6***	98.6***	97.9***	95.8***	95.7***
Program Type					
ECE in Elementary School	1.8	3.6***	4.5**	2.4	2.2
ECE in Other Location	5.7***	5.1***	6.3***	2.6	2.4
Stratification Variables					
Late IEP	2.2*	0.7	0.7	0.6	0.9
Region					
South East	0.3	0.1	0.2	-0.4	0.1
Central	-3.6**	-2.6*	-2.7*	-2.4	-2.4
West	-4.7***	-4.7***	-4.7***	-3.4**	-3.4**
District Poverty					
Low Poverty	-4.1***	-3.7***	-3.8***	-1.3	-1.2
Medium Poverty	-6.8***	-7.3***	-7.3***	-3.8**	-3.5**
High Poverty	-9.7***	-9.8***	-9.7***	-5.2***	-4.6**
Child's Disability					
Disability Category					
Developmental Delay		-6.8***	-4.3*	-2.9	-3.0
Other		-8.1***	-8.4***	-8.1***	-8.3***
Number of Services Received		-1.6***	-1.6***	-1.5***	-1.5***
Interactions					
Developmental Delay x Elementary			-2.3	-3.4	-3.3
Developmental Delay x Other			-6.1*	-6.0*	-5.8*
Other Disability x Elementary			-1.1	-1.1	-0.9
Other Disability x Other			4.0	4.2	4.4
Demographic Characteristics					
Female				1.8*	1.8*
Race/Ethnicity					
American Indian/Alaskan Native				-0.1	-0.3
Asian/Pacific Islander				-6.1**	-5.9**
Hispanic				-6.0***	-5.8***
Black				-5.1***	-4.8***

Income					
				0.6	0.5
				5.2***	5.0***
Mother's Educational Attainment					
				-2.5*	-2.7*
				1.1	1.0
				2.3	2.2
Age					
				0.0	0.1
Program Characteristics					
					-0.1
					0.0
R^2	.10	.19	.19	.26	.27
ΔR^2		.09***	.01*	.07***	.00

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Note: Age, Hours per Week, and Time in Program were mean centered.

Table 27.
Regression of Program Type on the Early Math Skills of Children with Disabilities

	Unstandardized Regression Coefficients (b)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	91.9***	100.7***	100.6***	97.8***	97.5***
Program Type					
ECE in Elementary School	-0.2	2.4*	2.9	1.0	1.1
ECE in Other Location	5.4***	4.6***	4.4*	1.1	1.1
Stratification Variables					
Late IEP	3.6**	1.4	1.4	1.3	0.8
Region					
South East	-0.6	-0.6	-0.6	-0.7	0.1
Central	-4.8**	-3.5*	-3.6*	-2.0	-1.9
West	-2.7	-2.5	-2.5	-1.5	-1.5
District Poverty					
Low Poverty	-2.8*	-2.2	-2.5	-0.4	-0.3
Medium Poverty	-4.1**	-5.0***	-5.0***	-1.7	-1.5
High Poverty	-7.1***	-7.3***	-7.3***	-3.5*	-3.3
Child's Disability					
Disability Category					
Developmental Delay		-10.0***	-9.0***	-7.4***	-7.4***
Other		-8.9***	-10.0***	-9.2***	-8.9***
Number of Services Received		-2.7***	-2.8***	-2.6***	-2.6***
Interactions					
Developmental Delay x Elementary			-0.8	-1.9	-1.8
Developmental Delay x Other			-2.8	-3.1	-2.8
Other Disability x Elementary			-0.8	-0.5	-0.6
Other Disability x Other			7.4	7.2	7.4
Demographic Characteristics					
Female				0.3	0.3
Race/Ethnicity					
American				-1.0	-1.1
Indian/Alaskan Native					
Asian/Pacific Islander				-9.4***	-9.4***
Hispanic				-4.0**	-4.2**
Black				-6.9***	-7.2***
Income					
\$25,001 - \$50,000				1.2	1.2

More than \$50,000				4.6***	4.6***
Mother's Educational Attainment					
Less than High School				-1.0	-0.8
Some College				1.5	1.4
4-year Degree				4.8***	4.8***
Age				-0.6***	-0.6***
Program Characteristics					
Hours per Week					-0.1
Time in Program					0.02*
R^2	.05	.18	.19	.26	.27
ΔR^2		.13***	.01	.07***	.00

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Note: Age, Hours per Week, and Time in Program were mean centered.

Table 28.

Regression of Program Type on the Pre-Reading Skills of Children with Disabilities

	Unstandardized Regression Coefficients (b)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	95.7***	98.6***	99.2	95.7***	95.3***
Program Type					
ECE in Elementary School	0.9	1.9	1.2	-1.1	-0.9
ECE in Other Location	3.8**	3.7**	2.8	-0.9	-0.6
Stratification Variables					
Cohort					
Cohort A	1.5	1.9	1.9	1.3	1.3
Cohort B	-2.7*	-2.8*	-2.7*	-0.7	-0.4
Urbanicity					
Urban	-0.5	-0.4	-0.3	0.9	0.7
Rural	-3.6**	-3.6**	-3.7**	-1.8	-1.9
Child's Disability					
Disability Category					
Developmental Delay		-3.6***	-3.6	-2.4	-2.2
Other		0.4	-3.5	-3.1	-2.9
Number of Services Received		-1.4***	-1.4***	-1.2**	-1.1**
Interactions					
Developmental Delay x Elementary			0.6	0.0	-0.1
Developmental Delay x Other			-1.1	-1.2	-1.4
Other Disability x Elementary			3.8	4.2	4.0
Other Disability x Other			9.0*	8.6*	8.5*
Demographic Characteristics					
Female				1.7	1.7
Race/Ethnicity					
American Indian/Alaskan Native				1.1	1.2
Asian/Pacific Islander				5.6*	5.5*
Hispanic				-3.1*	-3.1*
Black				-1.1	-1.4
Income					
\$25,001 - \$50,000				2.8*	2.9*
More than \$50,000				4.2**	4.5***
Mother's Educational					

Attainment					
Less than High School				-3.1*	-3.0*
Some College				1.2	1.3
4-year Degree				6.1***	6.2***
Age				-0.5***	-0.6***
Program Characteristics					
Hours per Week					0.1
Time in Program					0.0
R^2	.03	.06	.06	.16	.16
ΔR^2		.03***	.01	.10***	.00

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Note: Age, Hours per Week, and Time in Program were mean centered.

Appendix A

Child Assessments

ABAS-II. The ABAS-II is an indirect assessment that measures the adaptive behavior of individuals from birth through age 89 (Western Psychological Services, n.d.). The assessment is useful for evaluating people with disabilities, including pervasive developmental disorders, intellectual disabilities, neuropsychological problems, learning disabilities, and sensory or physical impairments (Western Psychological Services, n.d.). Two forms of the ABAS-II were used: the Teacher/Daycare Provider Form and the Teacher Form. The Teacher/Daycare Provider Form is designed for children ages 2 through 5 and measures adaptive behavior skills that toddlers and preschoolers typically use in a daycare center, home daycare, or preschool setting. The Teacher Form is designed for children in elementary school and measures adaptive skills that are relevant to students' functioning within a school setting. The forms were administered to the children's teachers based upon the age of the child: the Teacher/Daycare Provider Form was included in the Early Childhood Teacher Questionnaire and the Teacher Form was included in the Kindergarten Teacher Questionnaire and the Elementary Teacher Questionnaire. For each of these forms, three subtests were administered to each teacher: Functional (Pre) Academics, Self-Care, and Self-Direction. The Functional Pre-Academics subtest was administered to teachers of participants who were in kindergarten or an early childhood setting, whereas the Functional Academics subtest was administered to teachers of children in elementary school. The ABAS-II was administered in all five waves of data collection.

Vineland Adaptive Behavior Scales. The Vineland Adaptive Behavior Scale assesses children's adaptive behavior and is designed for use with children with intellectual disabilities, developmental disabilities, autism spectrum disorders, and attention deficit hyperactivity disorder (ADHD; Pearson Education, Inc, 2009a). The Fine Motor and Gross Motor subscales were included in the teacher interview to provide a measure of the participants' motor skills. Teachers were asked to rate the child's performance on a series of behaviors on a three point scale. The scores on the two subscales were converted to one standardized motor skills score ($M = 100$, $SD = 15$). The Vineland was administered in the first three waves of data collection.

PKBS-2. The PKBS-2 was included in the Early Childhood, Kindergarten, and Elementary Teacher Questionnaires. The norm-reference, standardized assessment is designed to evaluate the social skills and problem behaviors of children ages 3 to 6 (Pro-Ed Inc, 2008). The assessment included five subscales: (a) Social Cooperation, (b) Social Interaction, (c) Social Independence, (d) Externalizing Problems, and (e) Internalizing Problems. Teachers were asked to rate how frequently the child exhibited a series of skills or behaviors over the previous three months on a four-point scale (never, rarely, sometimes, and often). The standard scores for the subscales were summed to create a Social Skills composite score and a Problem Behaviors composite score.

ARS. The ARS was developed for and used in the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) to measure teacher's perceptions of their students' academic achievement. Teachers were asked to rate their student's skills in comparison to other students of the same age or grade level on a Likert scale ranging

from “not yet” to “proficient.” The ARS was included in the Kindergarten and Elementary School Teacher Questionnaires in all four waves of data collection.

PreLas. The PreLas is designed to assess the oral language proficiency of children in prekindergarten through first grade (CTB/McGraw Hill, 2009). The assessment is appropriate for children of all language backgrounds (CTB/McGraw Hill, 2009) and is often used to assess the oral language proficiency of second-language English Learners (U.S. Department of Education, 2008). In the first three waves of data collection, two subtests of the PreLas were administered: the Simon Says and Art Show subtests. In the Simon Says subtest, the assessor determined if the child understood simple commands by asking the child to perform a range of tasks. In the Art Show subtest, the assessor showed the children a series of pictures and asked the child to identify objects in the pictures.

PPVT-IIIIR. The PPVT-IIIIR is a norm-referenced assessment used to measure the receptive vocabulary of children and adults ages two and older (Pearson Education, Inc., 2009b). In this assessment, assessors show the child a page with four pictures on it and ask the child to point to an item. An adapted version of this assessment was administered in all five waves of PEELS data collection. The original assessment was shortened using item response theory (IRT) which uses patterns of correct, incorrect, and omitted responses of the subset of administered items and the difficulty of each item to estimate the score the participant would have earned, had all the items been administered (U.S. Department of Education, 2008). For the PEELS, all children completed a core set of items, then based upon their score on the core items, they took either an easier or more difficult set of items.

Leiter-R. The Leiter-R is a nonverbal test of intelligence and cognitive abilities that is suitable for children who are cognitively delayed, nonverbal, non-English speaking, or have a speech impairment, hearing impairment, physical disability, autism, ADHD, or traumatic brain injury (TBI; Par Inc, 2005). For the PEELS study, the Attention Sustained scale was administered to children in the first three waves of data collection. This subscale assesses the child's ability to attend to a series of pictures. The children are shown an image and asked to identify all of the matching images on the page.

IGDI. The IGDI are a set of measures designed to monitor young children's growth and progress (Juniper Gardens Children's Project, 2007). Four subtests of the IGDI were administered to the participants in Waves 1 through 3 of data collection: Picture Naming, Alliteration, Rhyming, and Segment Blending. The Picture Naming subtest requires the children to name as many pictures, shown to them on cards, as they can in one minute. In the IGDI Alliteration subtest, the assessor shows the child a card with one picture at the top and three pictures in a row at the bottom of the card. The assessor asks the child to point to the picture in the bottom row that starts with the same sound as the top picture. This subtest was only administered to children age 4 and older. The Rhyming subtest is similar to the alliteration subtest, in that children are shown a card with one picture above a row of three pictures; however in this subtest the children are asked to identify the picture that rhymes with the target picture. Finally, Segment Blending subtest assesses children's ability to blend sounds in words. In this subtest, the assessor reads words in segments (syllables or phonemes) with a half-second pause in

between segments. The child is asked to verbalize the blended word. This subtest was also only given to children age 4 and older.

WJIII. The WJIII is an assessment designed to measure achievement among individuals age two and older (Riverside Publishing, 2009). In the PEELS study, five subtests of the WJIII were administered to participants at various waves of data collection. First, the WJIII Letter-Word Identification subtest was administered in all five waves. This subtest requires children to identify letters that appear in large type and later items require the children to read words aloud. Second, the Quantitative Concepts subtest was administered during the first three waves of data collection to assess the children's knowledge of mathematical concepts, symbols, and vocabulary. The subtest is further divided into two parts: Concepts and Number Series. The Concepts part of the subtest requires the child to count and identify numbers, shapes, and sequences. The Number Series part of the subtest requires the children to look at a series of numbers, determine the pattern, and provide the number that is missing from the series. In Wave 1, the Quantitative Concepts subtest was only administered to children who were ages 5 or older.

Third, the Applied Problems subtest was administered during the first three waves of data collection to assess how well the children analyze and solve math problems. In this subtest, the assessor presents the child with a picture illustrating a math problem (e.g., counting objects, counting money, telling time, reading a temperature, etc.) and asks the child to solve the problem. The math problems increase with difficulty throughout the test.

The final two subtests of the WJIII that were administered in the PEELS study were the Passage Comprehension and Calculation subtests. These two subtests were only administered in the final two waves of data collection. The Passage Comprehension subtest includes an array of items designed to measure children's reading comprehension including matching words or phrases to corresponding pictures and identifying missing key words within short passages. The Calculation subtest measures the ability to perform mathematical computation. It includes items requiring the use of addition, subtraction, multiplication, division, and combinations of basic functions.

Test of Early Math Skills. The Test of Early Math Skills was administered in Waves 1 and 2 of data collection to measure the children's knowledge of mathematical concepts including counting, adding, and number and shape identification. The assessment was developed as part of the Head Start National Reporting System and is based on items adapted from the assessment used in the Early Childhood Longitudinal Study-Kindergarten Cohort.

PIAT-R Reading Comprehension. The Reading Comprehension subtest of the PIAT-R assessment was used to measure children's understanding of written material. In this assessment, the child is asked to read a sentence and then point to the picture that best illustrates the sentence. The PIAT-R was administered in Waves 2 and 3 of data collection.

DIBELS. The DIBELS was used to assess children's comprehension and general reading achievement. In the assessment, children are asked to read three passages aloud for one minute each. The difficulty of the passages corresponds to the child's grade

level. The child's score represents the number of words that were read correctly in the second passage. The DIBELS was administered in the final wave of data collection.

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