

# Early Childhood Program Participation and Long Term Effects on Reading Achievement among Boys and Girls

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## ABSTRACT

In this study reading scores for kindergarten through eighth grade students who participated in a Head Start program, center-based care program, or home-based care program prior to school entry were analyzed to determine effects of early childhood program participation on reading achievement for boys and girls. Through analyzing data from the Early Childhood Longitudinal Study-Kindergarten, girls consistently outperformed boys in reading with regard to each of the three early childhood programs. Furthermore, boys and girls who attended a center-based care program prior to kindergarten entry consistently performed higher in reading than boys and girls who attended Head Start or home-based care programs in kindergarten through eighth grade. Evidence was present regarding the importance of center-based care programs to future academic success of students. Implications for considerations for further research are discussed.

**Keywords:** *Academic achievement, Formal assessment measures, Gender, Head Start, Center-based care programs, Home-based care programs*

## INTRODUCTION

Many children enter kindergarten lacking the necessary skills to be successful academically and continually fall further behind as they matriculate through the educational system. However, researchers (e.g., Barnett, 1995, 1998; Kostelnik, Soderman, & Whiren, 2011; McPherson, 2008; Pianta, 2007) have revealed that children who attend high-quality early childhood education programs develop behavioral, academic, and social skills that enable them to achieve success in elementary school and beyond. Substantial differences in student knowledge, social development, and performance are apparent as children enter kindergarten. These differences place some children on a continuum of striving to catch up to their peers, thus giving support to the need for development and implementation of high-quality early childhood programs that provide equitable educational opportunities for all students (Barnett, Lamy, & Jung, 2005; Carlo et al., 2004; Pianta, 2007; Zimmerman, Rodriguez, Rewey, & Heidemann, 2008). Based on decades of research, researchers (e.g., Barnett, 1995, 1998; Kostelnik et al., 2011; McPherson, 2008; Pianta, 2007) have revealed positive outcomes for all children who participate in high-quality early childhood programs, especially those children considered high-risk for academic failure.

More children are enrolled in early childhood programs than ever before as the number of women joining the workforce has rapidly increased over the past decades; thus for many children, kindergarten is no longer considered the beginning of children's formal school experience (Graue, 2009). Barnett et al. (2009) reported that 30% of the nation's 4-year-olds attended a state funded preschool program in the 2008-2009 school year, and this percentage increased to 40% of children attending a state or federally funded early childhood program when including children who participated in a Head Start program. Additionally, Barnett et al. (2009) noted that according to the National Household Education Survey of 2007 (NHES) more than 30% of children were enrolled in either a private or locally funded preschool program, bringing the percentage to approximately 74% of children being served in an early childhood program the year before kindergarten entry. Researchers (e.g., Schulman & Barnett, 2005; Zigler, Gilliam,

Jones, 2006a) have noted positive long-term effects of early interventions for children considered high-risk for academic failure; however, little research exists regarding the effects of early childhood program participation in which student achievement has been compared based on participation in one of three types of early childhood programs: Head Start, center-based care, or home-based care.

Increased emphasis on accountability by federal and state policy makers has led educators to focus on early childhood education to provide developmentally appropriate programs which will better prepare children for future academic success (Britto, Brooks-Gunn, & Griffin, 2006; McPherson, 2008; Meisels, 2007; Pianta, 2007). According to Barnett, Friedman, Boyd, and Hustedt (2008), quality standards that enhance social, emotional, physical, and cognitive development of children before entrance into kindergarten are implemented in effective preschool programs. Zigler, Gilliam, Jones, and Malakoff (2006b) argued that the learning that occurs before entrance into formal schooling has a great impact on the learning processes and experiences that take place in later academic years. Moreover, Yaden, Rowe, and MacGillivray (1999) reviewed various studies regarding emergent literacy knowledge and processes of preschool children in home, childcare centers, and kindergarten environments, which revealed a need for further exploration as to the complexities of social, cognitive, and cultural differences among children in the different environments. With these factors in mind, undoubtedly one of the biggest problems facing the nation's educational system today is in the lack of accessibility of early childhood educational opportunities for all children and is not limited to children identified as economically disadvantaged.

The purpose of this study was to determine whether early childhood program participation prior to kindergarten entry has an effect on academic performance of students as they progress through school. Additionally, formal assessment data were analyzed as predictors of achievement through investigation of reading skill attainment by gender based on program participation. The Early Childhood Longitudinal Study-Kindergarten Class of 1998-1999 (ECLS-K) database, obtained from The National Center for Education Statistics (NCES), was analyzed to examine cognitive development of boys and girls with regard to language and literacy (reading) skills for three rounds of formal assessment data acquired from participants. Furthermore, analyses of data obtained through administration of formal measures were explored to determine if achievement was sustained or enhanced based on early childhood program participation year to year, in kindergarten, third grade, and eighth grade (NCES, Data file, User's Manual, 2009a, 2009b).

Long-term effects of early childhood program participation were investigated through analyses of formal assessment data in relation to gender for students who participated in Head Start, center-based care, or home-based care before kindergarten entry. The No Child Left Behind Act (2001) mandated states administer formal assessments yearly for accountability purposes and to determine adequate yearly progress (AYP) in student and school performance. Additionally, the Individuals with Disabilities Education Improvement Act (2004) mandated schools implement a response to intervention process to identify children in need of early academic interventions and to monitor their progress on a continual basis. Given the implications of the effects of early childhood education on future academic success, differences in reading achievement among students in kindergarten through eighth grade were examined with regard to early childhood program participation.

In this study the following research question was addressed: What is the difference in reading achievement among kindergarten boys and girls in the fall of the 1998-1999 school year, third grade boys and girls in the 2001-2002 school year, and eighth grade boys and girls in the 2006-2007 school year who participated in one of three types of early childhood programs prior to kindergarten entry: Head Start, center-based care, or home-based care.

### **Review Of Literature**

Although three groups of early childhood programs were included in this study, each of the groups consisted of varying types of programs, curriculums, settings, and theoretical perspectives that could not be examined. Therefore, from an educator's and researcher's approach to early childhood education, a constructivist perspective was employed for purposes of this study wherein the belief is that knowledge acquisition is a continually changing process in which the learner is an active participant (Bruner, 1966; Dewey, 1938/1998). Knowledge is constructed through a combination of exploration, personal experiences, and social interactions (Bruner, 1966). When children are afforded rich opportunities to participate in learning experiences that allow connections to be made between previous experiences and current activities, ideas are assimilated and knowledge is shaped. Implementing a constructivist approach to teaching and learning in early childhood education allows children to internalize information by synthesizing new and old schema to build on existing knowledge (Dewey, 1938/1998).

Each year kindergarten classes are filled with bright and shining faces of children eager to learn and become engaged, yet they enter with vastly differing degrees of skills and experiences with some children already lagging behind their peers (Wertheimer, Croan, Anderson Moore, & Hair, 2003). Some children have developed school readiness skills through extensive opportunities to learn, whereas others lack any formal educational experiences.

Further, little agreement exists among educators concerning what qualifies as school readiness; yet with increased emphasis on performance outcomes in subsequent grade levels, more attention has been given to early childhood programs and kindergarten as a means of developing skills necessary for future academic success (Bennett-Armistead, 2008).

McPherson (2008) noted that more than one-half of children who attended either a prekindergarten program or Head Start program were equipped with early learning skills which contribute to future academic success, in accordance with core academic indicators for literacy and math as set forth by the state of New York. Although focus has been placed on many factors correlated with student achievement, opportunity to learn remains most critical (Allington, 2002). In essence, children's performance in early years of schooling has been associated with later achievement because children who enter formal schooling with a strong foundation of emergent literacy skills learn to read at an earlier age and develop reading skills that enable future academic success (Downer & Pianta, 2006). Conversely, children who enter kindergarten with poor language and literacy skills tend to demonstrate poor achievement in reading through elementary school and beyond (Cunningham & Stanovich, 1997).

Before entering formal schooling, children acquire considerable language skills and knowledge through interactions with parents, siblings, and other close family members or caregivers (Morgan, 2007). Dewey (1938/1998) maintained that experiences include everything individuals encounter throughout their daily lives and that focusing attention on experiences translates into learning; therefore, the more opportunities young children have to participate in an array of experiences, greater amounts of actual learning takes place versus simply learned performance. Children enter school with the expectation they will succeed; however, students whose language and ethnicity are not highly represented in the school's population experience varying degrees of success academically, often resulting in an achievement gap (Risko & Walker-Dalhouse, 2007).

Furthermore, children with limited access to reading materials and children who are not read to have less exposure to vocabulary outside of daily conversations. This leads to fewer opportunities to learn more sophisticated language necessary to expanding knowledge of the world around them (Neuman, 2006). This argument is consistent with Allington's (2002) view that "the richer the language a preschooler experiences, the richer the child's language development" (p. 81). According to Carlo et al. (2004), a persistent gap in academic performance between groups of students presents both an intellectual and practical challenge.

### **Head Start**

In 1964, Head Start, a federally funded early childhood program, was developed and implemented to provide comprehensive support to children and families living below the poverty threshold. President Lyndon B. Johnson supported Head Start programs as a means of response to the vast number of children living in poverty and lacking necessary health and nutritional services (Head Start Bureau [HSB], 2009). The War on Poverty campaign offered early childhood program opportunities to the growing number of children from low-income families and addressed cognitive, social, behavioral, and physical development of children.

Though benefits of the program have been demonstrated as noted by Barnett, Brown, and Shore (2004), standards for Head Start have not risen to meet the levels necessary to improve children's potential for success in school, as indicated by current research on components of early childhood programs. Barnett et al. (2004) further detailed factors that may impact program effectiveness, such as established expectations of qualifications for teachers, substantially lower salaries for Head Start teachers than public school educators, and less spending per child than public school programs.

Additionally, the U. S. Department of Health and Human Services (2005) reported in the Head Start Impact Study little to no statistical significance in cognitive and social development of 3-year-old children, yet moderate statistical significance with regard to the domains of health and parent participation. Included in the study were two groups, program and no-program, of which the majority of children in the non-Head Start group participated only in home-based care. Participants in both groups scored well below the average of all U. S. children on measures of achievement; however, at the end of the year children in the program group had closed the gap by nearly half, whereas non-Head Start participants lagged far behind. Benefits for participants were noted, although the gains were far less than expected when compared to achievement of children in programs that employ high-quality standards (Barnett et al., 2004).

The U. S. Department of Health and Human Services (2010) revealed similar findings as in the previously mentioned study regarding the benefits of Head Start programs for 3- and 4-year-olds. As noted in the Head Start Impact Study: Final Report (2010), a nationally representative group of nearly 5000 children who participated in the study were assigned to a control or comparison group. These children were followed from 2002-2006, through the end of first grade. Children in the comparison group were allowed to enroll in other early childhood programs, providing a variety of options for this group in comparison to the group who participated in Head Start. Stronger

language and literacy skills were demonstrated by children upon completion of the Head Start program before kindergarten entry; however, significant impacts were not indicated in math skills or prewriting abilities. At the end of first grade, academic performance of Head Start children was minimally statistically significantly higher in only one cognitive ability area, specifically, vocabulary. Greater impacts of Head Start participation were noted in the area of health, whereas more children received dental care and overall health improvement of participants was evidenced. With regard to the social-emotional domain, children in the lowest quartile academically and Black children displayed the most substantial benefits of participation in Head Start; the same benefits were not notable for other subgroups. Most importantly, as revealed in the report by the U. S. Department of Health and Human Services (2010), was the absence of sustained benefits for Head Start participants as they progress through school. Researchers disclosed that inconsistencies among Head Start programs are apparent in key instructional areas, particularly in the development of early language, literacy, and math skills.

### **Home Based Care**

Providers of childcare are essential in helping to promote child development during the most impressionable years of a child's life, as early life experiences are critical to the development process (Smith, 2006). When making the decision with reference to center-based care versus home-based care, parents must examine many factors. As reported by Wood and Bassou (2008), in-home child care can offer many benefits to parents and children, such as allowing siblings to be together throughout the day, more flexibility in hours to meet the employment schedule of parents, and providing services at substantially reduced costs in comparison to center-based programs. Further, researchers revealed that home-based care helps develop stronger relationships between the caregiver and child, just as between parent and child, as often caregivers become somewhat of an extension of the family (Prescott, 1974; Wood & Bassou, 2008).

Zissner (2001) reported in an ethnographic study of families in a working-class neighborhood that many of the home-based childcare settings were unregulated and most often provided by relatives free of charge. Additionally, Zissner revealed that the development of a relationship of trust was more important for parents in selecting childcare than whether caregivers were licensed or not. Prescott (1973) compared three types of early childhood programs and revealed that the ideal setting for children from middle-class homes was a combination of in-home care and preschool, as children were provided nurturing and individual attention, as well as opportunities for socialization and cognitive development.

Families in rural areas frequently selected home-based care because of a shortage of childcare center options within the community and lack of flexibility in hours of operation to meet the needs of families with varying work schedules (Oliveira, 2007; Smith, 2006). As further noted by Smith, rural families relied more on relatives or non-relatives to provide in-home care versus center-based facilities whereas urban mothers, especially single mothers, most often depended on relatives to care for their children. Schulman and Barnett (2005) reported that the number of licensed childcare centers in middle-income neighborhoods was only slightly greater than in low-income areas and a shortage of spaces was available based on the population of children needing services. Thus many families, both lower and middle-income, had no other alternatives than home-based care options.

The most important factors indicated by parents in selecting home-based care over center-based facilities were the provision of a nurturing home environment where their child's needs would be met more readily due to a lower child to adult ratio, familial cultural patterns with regard to child care, and opportunity to experience emotional security and stability (Oliveira, 2007; Prescott, 1974; Smith, 2006; Wood & Bassou, 2008). Parents who revealed their preference for home-based care expressed that the emotional well-being of the child was more important in the early years than cognitive development and when children participated in a nurturing and secure environment, they would flourish when entering formal schooling (Prescott, 1974; Smith, 2006; Wood & Bassou, 2008; Zissner, 2001). Though the emotional benefits of home-based care are notable, caregivers need tools and training to help stimulate children's overall development, including behavioral, social, emotional, and cognitive skills to enhance school readiness and promote future academic success (Oliveira, 2007; Smith, 2006; Wood & Bassou, 2008). According to Oliveira (2007), more important in children's healthy cognitive and emotional development is the quality of childcare provided and not whether the setting is home-based or center-based.

### **Longitudinal Early Childhood Program Studies**

Decades of research exist detailing the long-term effects of early childhood program participation. Most notably are three of the most renowned longitudinal studies of long-term benefits of early childhood program interventions. Each program provided high-quality educational opportunities for enrichment to children from economically disadvantaged families and who were considered at-risk. The three studies are The High/Scope Perry Pre-school Program (PPP), The Carolina Abecedarian Project (ABC), and The Chicago Child-Parent Center Program (CPC). Design of each program placed emphasis on differing components in relation to early childhood interventions.

Curriculum served as the focus of the PPP wherein child initiated learning was the goal (Schweinhart, Barnes, & Weikart, 1993). On the other hand, the ABC program provided the most intensive program which included both full-day and year-round services for five years (Campbell & Ramey, 1995). However, the CPC provided the most comprehensive center-based program services, which included parent and family support services, health care professionals, and various other specialists to meet student needs (Reynolds, 2000). Although the programs varied in several aspects, common aspects among each included small class sizes, emphasis on development of language and cognitive skills, and satisfactory qualifications among teachers, as well as adequate compensation for teachers (Zigler et al., 2006a). Most important were the long-term benefits of high-quality preschool programs noted by researchers for each of the studies.

Revealed in the results of the three studies were many long-term benefits of early childhood program interventions with regard to participants; however, it should be noted that these model programs were specifically designed to meet the needs of children at-risk for academic failure. The same benefits may not be indicated for children participating in less intense programs (Currie, 2001; Zigler et al., 2006a). Although it may be that most early childhood programs currently do not maintain the same level of intensity as the three model programs previously discussed, the long-term benefits and the effectiveness of program participation cannot be denied. Findings of each of the three longitudinal studies support the need for the development of high-quality early education programs that better prepare children for academic and life-long success. Additionally, the information provided, based on the results of the three studies, serve as evidence of the positive outcomes of early childhood education interventions for children at-risk and should also encourage policymakers to realize that every child may experience similar success if they are fortunate enough to have early educational opportunities (Barnett et al., 2005; Zigler et al., 2006a). Whereas the benefits of these programs are clear, it should be noted that outcomes only applied to children from low socioeconomic status and almost exclusively children identified as Black.

Few longitudinal studies have been conducted wherein researchers reveal such comprehensive results as noted in the three studies previously discussed. Although, many researchers have investigated academic performance specific to boys and girls, various ethnic groups, and socioeconomic status in relation to early childhood program participation, there is a lack of research wherein achievement is compared longitudinally based on specific program participation prior to kindergarten entry.

## METHOD

Data were obtained from the National Center for Education Statistics, specifically; the ECLS-K for the purposes of this study. Participants in the study were selected as a representative sample of the national population of kindergarteners in the school year 1998-1999; it does not allow researchers to make estimates about third, fifth, or eighth graders (NCES User's Manual, 2006, 2009b). Data from the ECLS-K regarding reading achievement for three rounds of data to be examined were extracted from the ECLS-K Public Use Electronic Codebook (ECB) software. Readers are referred to the ECLS-K User's Manuals for additional information about sampling methods, calculations, and use of weighting (NCES User's Manual, 2006, 2009b).

## RESULTS

A multivariate analysis of variance (MANOVA) was conducted for the three rounds of data collected through formal measures of assessment to ascertain the extent to which gender differences were present in reading achievement for kindergarten through eighth grade students as a function of early childhood program participation. Although Box's *M* indicated that the assumption of homogeneity of variance was violated, MANOVAs were performed to answer the research question previously stated due to the robustness of this statistical procedure (Field, 2009). Additionally, Levene's Test of Equality of Error Variances was violated for each of the MANOVAs performed, with the exception of reading *T*-scores in relation to the variables of center-based care and gender for the first round of data analyzed, reading *T*-scores in relation to the variables of Head Start and gender for the second round of data analyzed.

### Reading Analyses For Kindergarten Students By Gender, Fall Of 1998

The first MANOVA, conducted for kindergarten students, revealed no statistically significant interaction between gender and Head Start,  $\Lambda = .99$ ,  $p = .59$ . The main effect for gender was statistically significant,  $\Lambda = .99$ ,  $p < .001$ ,  $\eta^2 = .01$ , as well as for Head Start participation,  $\Lambda = .97$ ,  $p < .001$ ,  $\eta^2 = .03$ , small effect sizes (Cohen, 1988). Follow-up ANOVAs revealed a statistically significant gender effect for reading,  $F(1, 2076) = 12.70$ ,  $p < .001$ ,  $\eta^2 = .006$ , and for Head Start participation,  $F(1, 2076) = 59.76$ ,  $p < .001$ ,  $\eta^2 = .03$ , trivial and small effect sizes, respectively

(Cohen, 1988). However, no statistically significant difference for reading as a function of gender and Head Start participation was noted,  $F(1, 2076) = 0.38, p = .54$ .

A second MANOVA conducted for kindergarten students for the initial round of data collection revealed no statistically significant interaction between gender and center-based care,  $\Lambda = 1.00, p = .83$ . The main effect for gender was statistically significant,  $\Lambda = .99, p < .001, \eta^2 = .01$ , as well as for center-based care,  $\Lambda = .97, p < .001, \eta^2 = .03$ , small effect sizes (Cohen, 1988). Follow-up ANOVAs revealed a statistically significant gender effect for reading,  $F(1, 7918) = 45.44, p < .001, \eta^2 = .006$ , and for center-based care,  $F(1, 7918) = 212.00, p < .001, \eta^2 = .03$ , trivial and small effect sizes, respectively (Cohen, 1988). A statistically significant difference was not revealed for reading as a function of gender and center-based care,  $F(1, 7918) = 0.37, p = .55$ .

According to the results of the third MANOVA, a statistically significant interaction between gender and home-based care was noted for kindergarten students in the first round of data collection,  $\Lambda = .99, p = .003, \eta^2 = .002$ , a trivial effect size (Cohen, 1988). The main effect for gender was statistically significant,  $\Lambda = .98, p < .001, \eta^2 = .02$ , a small effect size (Cohen, 1988). However, no statistically significant effect for home-based care was revealed,  $\Lambda = .99, p = .13$ . Examination of univariate analysis of variance procedures revealed the presence of a statistically significant gender effect for reading,  $F(1, 7419) = 64.20, p < .001, \eta^2 = .01$ , a small effect size (Cohen, 1988), but not for home-based care,  $F(1, 7419) = 2.15, p = .14$ . Additionally, a statistically significant difference was revealed for reading as a function of gender and home-based care,  $F(1, 7419) = 9.36, p = .002, \eta^2 = .001$ , a trivial effect size (Cohen, 1988). Presented in Table 1 are the descriptive statistics for reading and early childhood program participation.

Table 1: Descriptive Statistics for Reading Achievement by Gender and Program Participation for Kindergarten Students in the Fall of 1998

Gender/Participation	<i>n</i>	<i>M</i>	<i>SD</i>
Boys			
Head Start	764	43.90	7.93
Center-based care	3248	51.93	10.05
Home-based care	1812	49.01	10.03
Girls			
Head Start	783	45.68	8.22
Center-based care	3434	53.81	9.70
Home-based care	1942	51.62	10.23

**Reading Analyses For Third Grade Students By Gender, 2001-2002 School Year**

The first MANOVA, conducted for third grade students, revealed a statistically significant interaction between gender and Head Start,  $\Lambda = 1.00, p = .004, \eta^2 = .005$ , a trivial effect size (Cohen, 1988). The main effect for gender was statistically significant,  $\Lambda = .96, p < .001, \eta^2 = .04$ , as well as for Head Start participation,  $\Lambda = .94, p < .001, \eta^2 = .06$ , small and moderate effect sizes, respectively (Cohen, 1988). Follow-up ANOVAs indicated a statistically significant gender effect for reading,  $F(1, 2057) = 14.36, p < .001, \eta^2 = .007$ , and for Head Start participation,  $F(1, 2057) = 93.71, p < .001, \eta^2 = .04$ , trivial and small effect sizes, respectively (Cohen, 1988). However, no statistically significant difference for reading as a function of gender and Head Start participation was noted,  $F(1, 2057) = 2.40, p = .12$ .

A second MANOVA conducted for third grade students for the fifth round of data collection, revealed no statistically significant interaction between gender and center-based care,  $\Lambda = 1.00, p = .93$ . The main effect for gender was statistically significant,  $\Lambda = .96, p < .001, \eta^2 = .04$ , as well as for center-based care,  $\Lambda = .97, p < .001, \eta^2 = .04$ , small effect sizes (Cohen, 1988). Follow-up ANOVA procedures revealed a statistically significant gender effect for reading,  $F(1, 6169) = 16.34, p < .001, \eta^2 = .003$ , and center-based care,  $F(1, 6169) = 204.55, p < .001, \eta^2 = .03$ , trivial and small effect sizes, respectively (Cohen, 1988). However, a statistically significant difference was not present for reading as a function of gender and center-based care,  $F(1, 6169) = 0.07, p = .79$ .

According to the results of the third MANOVA conducted in relation to third grade students, a statistically significant interaction between gender and home-based care was revealed for the fifth round of data collection,  $\Lambda = 1.00, p = .004, \eta^2 = .002$ , a trivial effect size (Cohen, 1988). The main effect for gender was statistically significant,  $\Lambda = .94, p < .001, \eta^2 = .06$ , a moderate effect size (Cohen, 1988). However, no statistically significant effect for home-based care was revealed,  $\Lambda = 1.00, p = .23$ . Examination of univariate analysis of variance procedures indicated the

presence of a statistically significant gender effect for reading,  $F(1, 5598) = 35.43, p < .001, \eta^2 = .006$ , a trivial effect size (Cohen, 1988), but not for home-based care,  $F(1, 5598) = 1.59, p = .21$ . A statistically significant difference was present for reading as a function of gender and home-based care,  $F(1, 5598) = 9.17, p = .002, \eta^2 = .002$ , a trivial effect size (Cohen, 1988). Presented in Table 2 are the descriptive statistics for reading and program participation.

**Table 2: Descriptive Statistics for Reading Achievement by Gender and Program Participation for Third Grade Students in the 2001-2002 School Year**

Gender/Participation	<i>n</i>	<i>M</i>	<i>SD</i>
Boys			
Head Start	552	44.37	9.49
Center-based care	2690	52.31	9.27
Home-based care	1317	49.10	9.89
Girls			
Head Start	638	46.70	9.37
Center-based care	2453	53.65	8.48
Home-based care	1312	51.41	9.07

**Reading Analyses For Eighth Grade Students By Gender, 2006-2007 School Year**

The first MANOVA, conducted for eighth grade students, revealed a statistically significant interaction between gender and Head Start,  $\Lambda = .99, p = .01, \eta^2 = .01$ , a small effect size (Cohen, 1988). The main effect for gender was statistically significant,  $\Lambda = .98, p < .001, \eta^2 = .03$ , as well as for Head Start participation,  $\Lambda = .91, p < .001, \eta^2 = .09$ , small and moderate effect sizes, respectively (Cohen, 1988). Follow-up ANOVAs revealed a statistically significant gender effect for reading,  $F(1, 763) = 13.34, p < .001, \eta^2 = .02$ , and for Head Start participation,  $F(1, 763) = 68.51, p < .001, \eta^2 = .08$ , small and moderate effect sizes, respectively (Cohen, 1988). Additionally, a statistically significant difference for reading as a function of gender and Head Start participation was noted,  $F(1, 763) = 7.72, p = .006, \eta^2 = .01$ , a small effect size (Cohen, 1988).

A second MANOVA conducted for eighth grade students for the seventh round of data collection revealed the presence of a statistically significant interaction between gender and center-based care,  $\Lambda = 1.99, p < .001, \eta^2 = .01$ , as well as for the main effect for gender,  $\Lambda = 1.00, p = .003, \eta^2 = .004$ , and for center-based care,  $\Lambda = .97, p < .001, \eta^2 = .03$ , trivial and small effect sizes (Cohen, 1988). Follow-up ANOVAs revealed a statistically significant gender effect for reading,  $F(1, 2607) = 7.35, p = .007, \eta^2 = .003$ , and for center-based care,  $F(1, 2607) = 69.44, p < .001, \eta^2 = .03$ , trivial and small effect sizes, respectively (Cohen, 1988). In addition, a statistically significant difference was yielded for gender and center-based care,  $F(1, 2607) = 6.14, p = .01, \eta^2 = .002$ , a trivial effect size (Cohen, 1988).

According to the results of the third MANOVA conducted in relation to eighth grade students, a statistically significant interaction between gender and home-based care was not present for the seventh round of data collection,  $\Lambda = 1.00, p = .10$ . The main effect for gender was statistically significant,  $\Lambda = .98, p < .001, \eta^2 = .02$ , a small effect size (Cohen, 1988). However, no statistically significant effect for home-based care was revealed,  $\Lambda = 1.00, p = .24$ . Examination of univariate analysis of variance procedures indicated a statistically significant gender effect for reading,  $F(1, 2322) = 11.33, p = .001, \eta^2 = .005$ , a trivial effect size (Cohen, 1988), but not for home-based care,  $F(1, 2322) = 0.90, p = .34$ , as well as for reading as a function of gender and home-based care,  $F(1, 2322) = 0.50, p = .48$ . Noted in Table 3 are the descriptive statistics for reading and program participation by gender.

**Table 3: Descriptive Statistics for Reading Achievement by Gender and Program Participation for Eighth Grade Students in the 2006-2007 School Year**

Gender/Participation	<i>n</i>	<i>M</i>	<i>SD</i>
Boys			
Head Start	171	42.60	8.09
Center-based care	1109	53.21	9.84
Home-based care	578	50.17	10.83

Girls			
Head Start	219	47.01	10.23
Center-based care	1148	53.34	9.48
Home-based care	596	51.83	9.44

Analyses of data for the students in kindergarten revealed girls outperformed boys in reading for each of the three early childhood programs. Additionally, boys and girls who participated in Head Start scored substantially lower than non-participants in Head Start, as well as lower than boys and girls who participated in the other two programs. Furthermore, boys and girls who attended center-based programs outperformed all other groups in reading, with kindergarten girls who attended center-based care programs scoring the highest in academic performance. A smaller gap in scores between boys and girls who participated in home-based care was yielded for reading.

At third grade level, girls outperformed boys in reading for each of the three early childhood programs. Moreover, girls and boys who attended center-based care programs achieved the highest scores in reading, and boys and girls who attended Head Start scored far below students who attended center-based or home-based care programs. Boys who attended Head Start continued to perform considerably lower in reading than children in all other groups.

Consistent with previous rounds of data analysis, eighth grade results indicated that girls outperformed boys in reading for each of the three early childhood programs. Moreover, girls and boys who attended center-based care programs performed similarly in reading and considerably outperformed boys and girls who attended Head Start. For the last round of data analysis reading scores for boys who attended Head Start remained considerably lower than students in all other groups. In addition, girls who attended Head Start and home-based care programs outperformed boys, whereas boys who attended Head Start performed far below students in the other groups.

**CONCLUSION**

Findings of the present study support previous research regarding gender differences in achievement. As reported by the U. S. Department of Education (2006) in an analysis of gender differences in reading achievement among children in 35 countries, including the United States, girls consistently outperformed boys in reading. Further, according to Benbow (1988), Callahan and Reis (1996), and Lubinski, Benbow, and Sanders (1993) girls demonstrate stronger skills in language arts, whereas boys exhibit stronger skills in mathematical reasoning. In a more recent study, Haas and Slate (2010) documented that girls in kindergarten through fifth grade outperformed boys in reading.

Furthermore, Mucherah and Yoder (2008) and Logan and Johnston (2009) suggested that gender was a key factor influencing motivation to read wherein girls read more often for aesthetic reasons and demonstrated better reading comprehension skills than boys. The Education Alliance (2007) reported that girls performed higher on reading assessments, whereas Benbow (1988) revealed that boys continually outperformed girls in math achievement, and girls enjoyment in math decreased drastically beyond the fourth grade. Moreover, in an analysis of college readiness skills of girls and boys, Combs et al. (2010) documented statistically significant gender differences in reading and math performance; specifically, girls outperformed boys in reading, whereas boys scored higher in math. These findings, along with results of the present study, indicated differences in reading and math performance, were present in the earliest years of schooling, and continued as children progressed to upper grades and beyond.

Children who are afforded opportunities to participate in positive early educational experiences develop a stronger academic foundation for subsequent life-long success than children who are not afforded such opportunities (Kostelnik et al., 2011). Based on decades of research, researchers (e.g., Barnett, 1995, 1998; Kostelnik et al., 2011; McPherson, 2008; Pianta, 2007) have revealed positive outcomes for children who participate in high-quality early childhood programs, especially those children considered high-risk for academic failure. Children from lower income families enter school far less prepared than children from more affluent socioeconomic standing (Karoly, Kilburn, & Cannon, 2005; Peisner-Feinberg et al., 1999). However, many children from middle-income homes enter school less prepared socially and academically; therefore, academic readiness is not just a concern for children living in poverty (Barnett et al., 2004).

In an era of amplified accountability and high stakes testing, requirements as set forth by the NCLB legislation for all children to reach proficiency levels in reading and math by the school year 2013-2014 has led educators and policymakers to reexamine and restructure early childhood education programs as a means of addressing academic deficits at the earliest of ages (NCLB, 2001; Schwanenflugel et al., 2010; Stipek, 2006). Moreover, researchers (e.g., Barnett et al., 2005; Stegelin, 2004) have suggested the positive effects of student participation in high-quality early childhood programs are beneficial for children’s future academic success as well as cost effective for economic

growth. As noted by Barnett et al. (2009), approximately 74% of children in the United States were served in an early childhood program the year prior to kindergarten entry; therefore, consistency of quality standards among various programs should be considered for the provision of equitable educational opportunities for all children (Barnett et al., 2005; Stegelin, 2004).

Based on four decades of research, the positive effects of early childhood program participation and early intervention on the academic success of children is well documented; however, millions of children continue to be underserved or not served at all in a quality early education program (deVries, 2007; Zigler et al., 2006a). Although many children are served through state-funded preschool programs or the federally funded Head Start program, numerous children continue to lack the opportunity to attend a quality program due to limited funding, which often forces a ceiling to be placed on enrollment for only those children considered high-risk for academic failure.

With regard to the current study, findings support previous research conducted by the U. S. Department of Health and Human Services (2005, 2010) in which sustained academic benefits were absent for Head Start participants as they progressed through school. Additionally, as noted by Gottlieb (2002), children from disadvantaged homes showed greater academic gains when they were not segregated from their more socioeconomically advantaged peers. Furthermore, Schechter (2002) shared results in which children who attended an economically integrated preschool program acquired six times the gains in vocabulary than children who participated in an economically segregated program.

With 40 states offering prekindergarten programs and only three states offering a universal program to all families who choose to participate, it is clear that geography and economic status are considerable factors in early childhood program participation for numerous children (Barnett et al., 2009). As indicated in the findings of the present study, children who attended center-based care programs began kindergarten with stronger reading skills, and achievement was sustained through the eighth grade in comparison to academic performance of participants in Head Start or home-based care. Furthermore, the consistency of the results should encourage policymakers to support state efforts to offer a universal preschool program for all children as a means of addressing inequities in early educational opportunities. Finally, policies might be considered with regard to funding a universal preschool program wherein quality standards are consistent and a developmentally appropriate curriculum is implemented to better prepare our nation's children versus the multiplicity of opportunities currently available (Kostelnik et al., 2011; Zigler et al., 2006a).

With increased emphasis on student achievement and accountability, this study establishes a need for further research regarding the benefits of quality early childhood programs for all children. Additional research should be conducted to investigate quality standards of programs where student achievement is sustained or enhanced over time. Researchers may employ the national quality standards checklist set forth by The National Institute of Early Education Research to compare program quality (Barnett et al., 2009). A second recommendation for future research is to examine the curriculum implemented in various early childhood programs, along with methods of assessment and evaluation. According to Kostelnik et al. (2011) and Zigler et al. (2006a), curriculum should be developmentally appropriate and address the holistic needs of the child. Further, examination of various curriculums might reveal if a program is an extension of kindergarten curriculum or if the curriculum is designed to build skills necessary for success when entering formal schooling.

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