



Information Report

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A Literature Review: The Influence of Preschool Attendance

Introduction

Much of the great hope for early childhood education today is to prepare children to “get ready to learn.” While admirable, the erroneous belief in the statement that we must help children to “get ready” to learn upon school entry may unwittingly perpetuate the notion that children are not capable of learning from very young ages. Brain research reveals the truth: *children learn from birth*. As a result, the first years of life are critical to the development of linguistic, emotional, conceptual and physical competencies as children begin to explore and understand the world around them.

As young children grow and develop, the environments in which they are cared for are the same environments that provide the *educational* experiences and interactions that foster children’s cognitive development and learning. When discussing the influence of the early years on later success in school, no longer can we separate the notion of *early care* from *early education*. Instead, we must be intentional to talk about early childhood learning in relation to the care settings where children are growing up.

In the executive summary of their commissioned report *Eager to Learn: Educating our Preschoolers* (2000), the Committee on Early Childhood Pedagogy explained the phenomenon in this way:

Historically, there have been two separate and at times conflicting traditions in the United States that can be encapsulated in the terms of child care and preschool. A central premise of this report, one that grows directly from the research literature, is that care and education cannot be thought of as separate entities in dealing with young children. Adequate care involves providing quality cognitive stimulation, rich language environments, and the facilitation of social, emotional, and motor development. Likewise, adequate education for young children can occur only in the context of good physical care and of warm affective relationships. Indeed, research suggests that secure attachment improves social and intellectual competence and the ability to exploit learning opportunities. Neither loving children nor teaching them is, in and of itself, sufficient for optimal development; thinking and feeling work in tandem (p. 2).

The link between the early care and education experiences during the first five years of life on later success in school is a timely and relevant topic since Iowa ranks in the top states in the nation where all adults work outside the home (U.S. Census Bureau, 2003). This means at a minimum, at least 70 percent of Iowa children under the age of six experience some form of child care outside the home prior to school entry (U.S. Census Bureau, 2003). With the high demand for child care and the growing interest in providing high quality early childhood education for

young children, it is important to work from common definitions for terms associated with the issues. For the purposes of this report, the terms related to early child care and education are defined in the following ways:

Early Childhood Care and Education

A broad phrase that encompasses the primary care and educational experiences provided for young children from infancy through age 5. Early child care and education experiences are provided in different settings which include parental homes, licensed care centers, preschools and child-development homes.

Child Care Centers

Centers licensed through the Department of Human Services that usually provide full-day, full-year child care and educational experiences for young children from birth to age five. Centers may or may not provide a structured preschool education program as part of their service. Centers that offer a preschool program typically offer “wrap around” services that provide child care before and after the preschool program so that children experience both child care and the preschool program in one environment.

Preschool

Activities and experiences offered in a variety of settings that promote the development of children from infancy to age five. These activities and experiences may be guided by curricula or established practices designed to improve children's development and competencies in one or more domains, including cognition, language, literacy, math, social-emotional development and physical development. Funding sources vary; preschools can be private or public (federally- or state-funded) or can be subsidized through combined funded streams. Preschools can be part of a licensed child care center, a public school system, a faith-based organization or can be a stand alone program. Preschools can be half-day, part-year programs or they can be full-day, full-year programs.

Child Development Homes

Child care and education provided in a home by an adult outside of the child's family. In Iowa, child development home providers must be registered if they provide care/education for more than six children, otherwise, registration is optional.

Since a vast majority of parents depend on other adults to provide care and education for their children, it is important that policies and supports exist to ensure all children in Iowa have access to high quality early care and education environments. Therefore, it is critical that legislators, school board members and other key stakeholders access and use the best research and information to support decisions that impact and improve the lives of Iowa's youngest children. The purpose of this report is to provide state and local policymakers with summarized findings of the research on the link between early childhood education interventions and student achievement. This report primarily focuses on interventions serving young children outside the home that are related to increases in student achievement as measured by such indicators as cognitive abilities, academic outcomes and progression through the grades.

The Research Questions

This report is a literature review of the research that focuses on the impact of early childhood preschool intervention on student achievement and the characteristics of those preschool programs:

1. What is known about the relationship between preschool attendance and student academic performance/student achievement in the K-12 system? (In other words, is there evidence that preschool attendance has a positive impact on student achievement in the K-12 system?)

A second research report will answer a related question on the preschool program components linked to student learning:

2. What are the characteristics of preschools that are associated with higher academic achievement in the K-12 system?

The Literature Review Process

The Iowa School Boards Foundation (ISBF) staff conducted a review of the literature to help answer and summarize findings related to the two research questions. The staff utilized the following process to identify the studies to be reviewed.

Several literature searches accessed various databases:

- Education Resources Information Center (ERIC)
- UMI ProQuest Digital Dissertations
- Primary Search
- Middle Search Plus
- Education Abstracts
- Current Research

Additional studies were then identified from searches of web sites, tables of contents and the reference sections of previously reviewed studies and reports. The database searches were conducted using one or more of the following search terms: *preschool, pre-school, prekindergarten, pre-kindergarten, preschool attendance, pre-school attendance, prekindergarten attendance, pre-kindergarten attendance*. Each search term was combined with one or more of the following secondary search terms: *achievement, student achievement, student performance, improved student achievement*.

The following criteria were used to identify studies to be included in the review:

- Relevance – (the research question in the study relates to the question being examined)
- Quality – (no significant flaws in the design of the study – study conducted according to the design)
- Current – conducted within the past 40 years
- Research – is it a report of a research study (with preferences for specific types of studies)

Studies Included in the Synthesis

Description of the Studies

Based on the initial screening of the abstracts, 20 studies were reviewed by the ISBF staff. The studies were read and summarized in terms of: (a) the research question/hypothesis being tested, (b) the type of study, (c) the population studied, (d) the design of the study and the methods used, and (e) the key findings and limitations of each study.

The studies represented a range of early care and education research spanning the last 40 years. Ten studies were associated with three prominent, longitudinal studies known for their rigor and study design. Two of the studies, the Carolina Abecedarian Project and the Perry Preschool Project, utilized a carefully controlled, experimental design with random selection and control groups with non-treatment participants. The third study, the Chicago Longitudinal Study, employs a quasi-experimental design with children who did and did not attend preschool and continues today in the Chicago Public Schools. Brief descriptions of the programs and a list of studies related to each program follow.

The Carolina Abecedarian Project

Developed in 1972, the Abecedarian project was a carefully controlled, experimental scientific study of the potential benefits of early childhood education for poor children. The North Carolina project took place in high quality childcare settings and exposed children to five years of treatment, from infancy to age 5. Children's progress was monitored over time with follow-up studies conducted at ages 12, 15 and 21.

Specific studies related to the Carolina Abecedarian Project.

Campbell, F. A., & Ramey, C. T. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development, 65*(2), 684-698.

Campbell, F. A., & Ramey, C. T. (1995). Cognitive and school outcomes for high-risk african-american students at middle adolescence: Positive effects of early intervention. *American Educational Research Journal, 32*(4), 743-772.

Ramey, C. T., & Campbell, F. A. (1984). Preventive education for high-risk children: Cognitive consequences of the carolina abecedarian project. *American Journal of Mental Deficiency, 88*(5), 515-523.

Ramey, C. T., & Ramey, S. L. (2004). Early learning and school readiness: Can early intervention make a difference? *Merrill Palmer Quarterly Journal of Developmental Psychology, 50*(4), 471-491.

The High-Scope/Perry Preschool Study

The Perry Preschool Study operated in Ypsilanti, Michigan from 1962-1965. The program was an experimental, carefully controlled research study that served three- and four-year-old children born into poverty with low tested intellectual abilities, and the purpose of the experiment was to determine the impacts of early intervention on children at risk for school failure. Researchers followed the lives of the majority of the 123 children for 40 years and have published reports at different intervals. The most recent longitudinal study, published in 2005, reports findings for the preschool participants who recently turned 40.

Specific study related to the Perry Preschool Study.

Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime effects: The high/scope perry preschool study through age 40* (No. 14). Ypsilanti, MI: High/Scope Educational Research Foundation.

The Chicago Longitudinal Study

The Chicago Longitudinal Study, sometimes referred to as the Child-Parent Center Study, is a quasi-experimental study designed to investigate the educational and social development of low-income, minority children who grew up in central-city Chicago high-poverty neighborhoods. The government-funded early childhood intervention program in the Chicago Public Schools began in 1985, serves children ages 3-9, and continues today.

Specific studies related to the Chicago Longitudinal Study.

Reynolds, A. J., Mehana, M., & Temple, J. A. (1995). Does preschool intervention affect children's perceived competence? *Journal of Applied Developmental Psychology, 16*(2), 211-230.

Reynolds, A. J., Ou, S.-R., & Topitzes, J. W. (2004). Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago child-parent centers. *Child Development, 75*(5), 1299-1328.

Reynolds, A. J., Mavrogenes, N. A., Bezruczko, N., & Hagemann, M. (1996). Cognitive and family-support mediators of preschool effectiveness: A confirmatory analysis. *Child Development, 67*(3), 1119-1140.

Reynolds, A. J. (1995). One year of preschool intervention or two: Does it matter? *Early Childhood Research Quarterly, 10*(1), 1-31.

Temple, J. A., Reynolds, A. J., & Miedel, W. T. (1998). *Can early intervention prevent high school dropout? Evidence from the Chicago child-parent centers*. Madison, WI: Wisconsin University, Madison Institute for Research on Poverty.

Additional Studies

The remaining ten studies in the literature review primarily utilized a quasi-experimental design, though the study methods used to determine the influence of preschool attendance on student achievement differed. Most studies examined the impact of a specific early childhood education intervention on student achievement in school. For example, Susan Gray developed and implemented a summer preschool program for high-risk students and then monitored and later reported the children's student achievement as they progressed through elementary school (Klaus & Gray, 1968). On the other hand, a few of the studies used available data to study the general influence of preschool attendance on later student achievement. For instance, Nelson (2005) used data collected in the Early Childhood Longitudinal Study (National Center for Education Statistics, 2001) and compared the student achievement of children who had attended preschool to those who had not. One of the ten studies, the report entitled *Lasting Effects of Early Education: A Report from the Consortium of Longitudinal Studies*, employed a unique study design of its own.

The *Consortium of Longitudinal Studies* is a cross-study meta-analysis of 11 different early childhood education studies. Using a sophisticated study design, Lazar and Darlington (1982)

developed a new study to examine the long-range effects of early education intervention by first creating a common data pool from 11 highly rigorous early education studies. Then, as a follow-up to the original studies, researchers collected new, longitudinal data from original preschool participants from all 11 studies. The entire data set was then analyzed to determine the long-term effects of early education programs on children's success (or failure) in school. The list of additional studies included in the literature follows.

Specific additional studies included in the literature review.

Barnett, W. S., Lamy, C., & Jung, K. (2005). *The effects of state prekindergarten programs on young children's school readiness in five states*. New Brunswick, NJ: Rutgers University. National Institute for Early Education Research (NIEER).

Buntaine, R. L., & Costenbader, V. K. (1997). The effectiveness of a transitional prekindergarten program on later academic achievement. *Psychology in the Schools, 34*(1), 41-50.

Gormley, J., William T., Gayer, T., Phillips, D., & Dawson, B. (2005). The effects of universal pre-k on cognitive development. *Developmental Psychology, 41*(6), 872-884.

Klaus, R. A., & Gray, S. W. (1968). The early training project for disadvantaged children: A report after five years. *Monographs of the Society for Research in Child Development, 33*(4), 1-66.

Lazar, I., & Darlington, R. (1982). Lasting effects of early education: A report from the consortium for longitudinal studies. *Monographs of the Society for Research in Child Development, 47*(2-3), 1-151.

Miller, L. B., & Bizzell, R. P. (1983). Long-term effects of four preschool programs: Sixth, seventh, and eighth grades. *Child Development, 54*(3), 727-741.

Miller, L. B., & Bizzell, R. P. (1984). Long-term effects of four preschool programs: Ninth- and tenth-grade results. *Child Development, 55*(4), 1570-1587.

Nelson, R. F. (2005). The impact of ready environments on achievement in kindergarten. *Journal of Research in Childhood Education, 19*(3), 215-221.

Raban, B., & Coates, H. (2004). Literacy in the early years: A follow-up study. *Journal of Research in Reading, 27*(1), 15-29.

Sheehan, R., Cryan, J. R., Wiechel, J., & Bandy, I. G. (1991). Factors contributing to success in elementary schools: Research findings for early childhood educators. *Journal of Research in Childhood Education, 6*(1), 66-75.

Focus of the Studies: Influence of Preschool on Student Achievement

Aspects of the intervention programs in the literature review differed in many ways, but all examined the impact of early childhood education (preschool) intervention programs on student achievement. Some programs were single-year interventions, while others served participant children for several years. Some interventions worked with infants and parents in the home, while others were center-based initiatives. Programs varied in the ages of children they served. Some programs worked with three- and four-year-olds, one served children from birth to age five, and other programs served children from ages three and four to age nine. Though diverse in other

programming characteristics, all intervention programs served preschool-aged children, that is, children prior to kindergarten entry.

The majority of the studies included in the review examined interventions designed to learn the influence of early childhood education on children most at risk for school failure – children living in poverty. Researchers examined the impact of preschool interventions on the intellectual and academic achievement of children from impoverished backgrounds along with long-term effects associated with school progress and other quality of life indicators lasting into adulthood. Other more recent studies targeting diverse populations of students are also included in this review. National trends to provide children with increased access to preschool have resulted in new studies examining the influence of preschool attendance on student achievement. Two studies report the effects of state-funded preschool programs on academic achievement.

The following section of this report summarizes findings from the literature review to help address the research question - what is the impact of preschool attendance on student achievement?

The Research Findings

The Influence of Preschool Attendance on Student Achievement

Findings Summary

The literature review on early childhood education intervention suggests preschool education is positively associated with significant and long-lasting effects on student achievement. Findings across studies suggest that children from diverse populations benefit from educational programs prior to school entry, but in particular, high-risk children living in high poverty tend to benefit from preschool experience. Preschool participation was linked to short- and long-term increases in student achievement as measured by school success indicators such as increased cognitive ability and academic achievement, improved social skills, lower retention and special education rates, and increased graduation rates. In addition, long-lasting effects related to other quality of life indicators included higher education attainment levels, increased economic status and decreased incidence of crime.

Influence of preschool attendance on cognitive abilities.

The early preschool studies hypothesized that early education interventions could positively influence the cognitive development of high-risk children, thereby limiting intellectual disabilities and increasing the likelihood of success in school. Findings across studies on the short-term effects of preschool attendance related to cognitive abilities were consistent. All studies that examined the immediate effects on cognitive abilities (typically measured using IQ tests) found significant differences between children who participated in preschool interventions and those who had not. That is, in all studies monitoring cognition, children who attended preschool demonstrated higher cognitive skills and abilities during or after treatment than children who did not attend preschool. Follow-up data in later years, however, revealed mixed results.

All but one intervention included in the review reported that the cognitive advantage gained by children who attended preschool did not endure past the first few years in elementary school. The exception was the findings from the Carolina Abecedarian Project. Children who participated in the Abecedarian early childhood intervention maintained higher cognitive (IQ) scores through

age 15 than control students who did not participate in the preschool intervention (Campbell & Ramey, 1994, 1995; Ramey & Campbell, 1984; Ramey & Ramey, 2004). Although the advantage difference between groups of children decreased over time, long-term differences remained statistically significant. The inconsistent short and long-term findings raise questions in regards to early education intervention and the influence on cognitive abilities, as well as the adequacy of the tests to measure cognitive ability. Although the effect on cognition is less certain, robust findings across studies demonstrate compelling evidence that preschool attendance is positively associated to increases in student achievement outcomes.

Influence of preschool attendance on academic performance.

Early education programs designed to promote academic abilities, especially for children from disadvantaged backgrounds, were linked to lasting effects on indicators related to student achievement. Children who experienced preschool tended to enter school with increased literacy, language and mathematics skills and tended to hold that advantage across the years over peers who did not attend preschool. Unlike the results in diminished cognitive advantage over time, academic gains in reading and mathematics achievement tended to persist through the grades for children who had attended preschool.

In terms of academic gains, literacy achievement was consistently and positively associated to preschool attendance. In all studies measuring the short-term influence of preschool attendance, all found that children with prior preschool experience tended to outperform peers without preschool experience on literacy assessments. Long-term findings were strikingly similar. Eight out of nine longitudinal studies reported a significant literacy advantage for children who attended preschool over those who did not. For example, participants in the Perry Preschool Study demonstrated superior literacy achievement at ages 10, 14, and 19 over control-group participants who did not attend preschool. Other longitudinal studies reported similar findings (Campbell & Ramey, 1994, 1995; Klaus & Gray, 1968; Miller & Bizzell, 1983, 1984; Ramey & Campbell, 1984; Ramey & Ramey, 2004; Reynolds, 1995; Reynolds *et al.*, 1996; Reynolds *et al.*, 1995; Schweinhart *et al.*, 2005; Sheehan *et al.*, 1991).

Preschool experience also demonstrated positive and long-lasting benefits linked to student mathematics achievement. Nine out of ten studies measuring short-term effects reported a significant advantage for children with preschool experience, while seven out of nine longitudinal studies found that students in later years tended to maintain superiority in mathematics achievement over peers without preschool experience. In follow-up studies, high-school aged children who participated in the Abecedarian and Chicago Longitudinal Study interventions outperformed peers in mathematics assessments over non-preschool participants. Findings across studies reviewed in the literature review reveal consistent, significant patterns; early education interventions are associated with long-lasting academic benefits for children.

Other indicators of progress and success in school also reveal the significant and lasting effects linked to preschool attendance. As preschool participants progressed through school over the years, early education interventions were related to significantly reduced special education and retention rates, increased graduation rates and were related to positive attitudes of students and family members toward school. Findings from research on early childhood education reveal benefits that seem to endure for children in school years long past the preschool intervention.

Influence of preschool attendance on other quality of life indicators.

In addition to factors directly related to school achievement, researchers also found results on other quality of life indicators related to preschool attendance. Two longitudinal studies included in this review, The Chicago Longitudinal Study and the Perry Preschool Study, measured other

indicators related to success in life. As adults, preschool participants were more likely to be employed, typically earned higher wages and were less likely to utilize welfare programs than non-preschool participants. Preschool attendees were also less likely to be involved in violent crime, tended to have more stable marriages and were more likely to raise their own children than those who had not attended preschool. The benefits linked to preschool attendance are significant and powerful. The reported lifetime influences related to early childhood intervention include and exceed indicators related to school achievement. Early childhood education interventions are positively associated to increased academic performance, positive progression through school and economic and social success into adulthood.

Preschool education is positively linked to enduring social, economic and societal benefits, particularly for children from disadvantaged backgrounds. Rigorous research spanning the last 40 years has revealed compelling evidence on the importance of preschool education; exposure to high quality, consistent early education experiences appears to significantly and profoundly improve the lives of children fortunate enough to have access to these preschool programs.

Review of Findings by Measured Indicators

Preschool influence on cognitive abilities and student achievement.

Robust findings show preschool attendance is related to short- and long-lasting, positive effects on academic performance:

- ❖ **Cognitive Abilities:** Findings for the effects of preschool attendance on cognitive abilities were inconsistent. Six studies that measured short-term treatment effects on cognitive abilities all found significant differences between children who had attended preschool and those who had not. Two out of four longitudinal studies that examined long-term effects of preschool attendance on cognitive abilities found children who had attended preschool performed significantly higher on cognitive ability measurements than children who had not attended preschool. The only studies that found long-term cognitive differences were both related to the Abecedarian Project.
- ❖ **Reading Readiness:** Five studies measured the impact of preschool intervention on reading readiness skills. All five studies showed that children who had attended preschool had higher reading readiness scores than children who had not taken part in the intervention.
- ❖ **Language Development:** Seven studies measured short-term effects of preschool intervention on language development, and two studies reported both short- and long-term effects. All studies found that preschool intervention was positively associated to language development in the short-term; children who had attended preschool outperformed their peers who had not attended preschool on language development measures. Findings from both follow-up studies demonstrated participants who had attended preschool scored significantly higher on language assessments given in elementary and middle school than study participants who had not attended preschool.
- ❖ **Reading Achievement:** Eight studies that measured short-term effects on reading achievement all reported that children who had attended preschool performed significantly higher on reading achievement measures than children who had not attended preschool. Seven out of nine longitudinal studies found positive, significant differences in

the reading achievement for students who had attended preschool compared to those who had not.

- ❖ **Mathematics Achievement:** In the short-term, eight out of nine studies found that children who had attended preschool had significantly higher mathematics achievement scores than children who had not attended preschool. In follow-up studies, seven out of nine studies reported long-term effects of preschool attendance on later mathematics achievement.

Preschool influence on other indicators related to school success.

Preschool attendance is related to significant and positive benefits for children on other outcomes associated with student success in school. Studies in this literature review reported both short- and long-term findings related to social and emotional outcomes, behavioral outcomes and progression through the grades.

- ❖ **Social, Emotional & Behavioral Outcomes:** Six studies reported either short- or long-term influences of social, emotional, or behavioral outcomes for preschool participants. All studies reported significant differences between children with preschool experience over those without. Short-term results for young children included increased prosocial and adaptive behaviors and other positive behaviors related to school adjustment. Longitudinal findings related to children's increased positive values and attitudes toward school and significantly lower juvenile and adult crime rates.
- ❖ **Progression through the Grades:** Six out of six studies reported significant differences related to short or long-term effects on grade retention and/or special education rates. In all studies, children with preschool experience were more likely to progress through the grades without being retained or without receiving special education services than peers who did not attend preschool.

Preschool influence on other quality of life indicators.

Preschool attendance positively associated to economic and social benefits into adulthood.

- ❖ **Economic, Social and Familial Stability:** Two longitudinal studies reported significant findings related to the benefits of early education into adulthood. The Perry Preschool Study and the Chicago Longitudinal Study found robust evidence that preschool education was significantly linked to higher education levels, higher wages and higher skilled jobs. Preschool participants were also more likely to have more stable marriages, were more involved in raising their own children and used fewer social service programs than adults who had not experienced early childhood education.

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