

## *Early Childhood Education: Review of Research*

### **Building Upon a Foundation of Success**

Taken as a whole, the research on pre-kindergarten education suggests that participating in high-quality pre-k has significant benefits for children, especially those who come from low-income backgrounds and experience other adversities. Importantly, these benefits are found in contemporary, large-scale, publicly-funded programs, not just “boutique” experiments with small sample sizes from the 1960s, such as the Perry Preschool Program or the Abecedarian Project. Also, the benefits last beyond kindergarten and sometimes, even beyond the elementary grades. Below are some general conclusions from a scan of the body of research. All studies mentioned below were conducted by independent third-party researchers and evaluated publicly-funded programs in states or cities.

#### **Pre-K Improves School Readiness**

A number of studies have examined the short-term impact of one year of pre-k participation at kindergarten entry. A study of the [Oklahoma](#) pre-k program in Tulsa found that compared to children who didn't participate in the program, children who did made advances in:

- Early literacy skills by an equivalent of 9 months of school;
- Spelling skills by an equivalent of 7 months of school; and
- Early math skills by an equivalent of 5 months of school.

This study took into account differences in children's gender, race and/or ethnicity, school lunch eligibility, their mother's education, whether they lived with his or her biological father, and whether they had Internet access at home.

More recently, similar findings were found in evaluations from [Boston](#) and [Georgia](#).

#### **Pre-K Has Short-Term Benefits Beyond Kindergarten**

A study in **New Jersey** found impacts of pre-k into the elementary years. [By the end of second grade](#), students who participated in pre-k scored significantly better on assessments in math, comprehension, and vocabulary skills. They were also 30 percent less likely to repeat a grade after one year of pre-k enrollment, and 50 percent less likely to have repeated a grade after two years of pre-k.

[By the end of fifth grade](#), students who participated in pre-k were 40 percent less likely to have repeated a grade, and 31 percent less likely to have been placed in special education. They also scored significant higher on standardized tests in reading, math, and science.

Throughout their analyses, the researchers took into consideration the following differences among children: ethnicity, free lunch status, gender, age, school district, parental employment, parental education, home language, and family structure.

More recently, the [Washington State Institute for Public Policy](#), the research arm of the state's legislative branch, released an analysis of **Washington's** pre-k program. They found a significant

relationship between pre-k participation and later test scores through 5<sup>th</sup> grade. The benefits translated to an increase of about six to seven percentage points in state's standardized tests.<sup>1</sup>

Studies examining short-term impacts have also been done in [Arkansas](#), [Louisiana](#), and [New Mexico](#) with similar results.

## **Pre-K Programs Can Have Long-Term Benefits**

Researchers have conducted longitudinal evaluations of pre-k programs, following both children who enrolled in these programs and those who didn't and documenting and comparing the academic development of both groups. These studies usually find that students who participated in pre-k tend to do better than their counterparts who didn't have a preschool experience.

One drawback from these studies is that none of them were randomized control trials, which means that it is possible that the program impacts were results of unobserved and difficult-to-measure differences between pre-k participants and those who didn't attend the program (e.g., their parents' engagement in and concern for their children's learning and development). That said, researchers in all of the studies below took into account a variety of factors to maximize the likelihood that the impacts did, indeed, result from the pre-k experience.

The evaluation of the [Chicago Child-Parent Centers \(CPC\)](#) has followed children into their 20s. Researchers found that when compared to children who didn't enroll in the CPC pre-k program, those who did scored significantly higher on standardized reading tests – by 5 percent at age 9 and by 4 percent at age 14. The study also found that pre-k participants were:

- 40 percent less likely to be retained through age 15;
- 41 percent less likely to have been placed in special education through age 18; and
- 19 percent more likely to have completed high school by age 21.

These studies took into consideration the following differences among the children: Gender, ethnicity, free/reduced price lunch status, high school's poverty rate, parents' completing high school, single parent status, parent employment status, and number of siblings in the family.

Researchers in **Michigan** have also tracked children's development in a longitudinal study of the state's [Great Start Readiness Program](#). They found the following impacts from elementary grades through high school:

- By the end of 4<sup>th</sup> grade, students who participated in pre-k were more likely to pass the state literacy test by 24 percent, and pass the state math test by 16 percent. They were also less likely to repeat a grade by 35 percent.
- By the end of 8<sup>th</sup> grade, students who participated in pre-k were 33 percent less likely to have ever repeated a grade.
- By the end of 12<sup>th</sup> grade, students who participated in pre-k were 35 percent more likely to graduate on time, and 25 percent less likely to have ever repeated a grade. In addition, students of color who participated in pre-k were 61 percent more likely to graduate on time.

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<sup>1</sup> An important caveat to this study is that because it relied on existing administrative K-12 testing data in the state's database (as opposed to assessing children for the purpose of the study every year), there were children in the study for whom there were no data on testing either because they did not take the test or they were not enrolled in the public school system. These children were dropped from the study.

Throughout these analyses, researchers took the following differences among children into consideration: family income, age, gender, ethnicity, special needs status, mother's level of education at school entry, free lunch status, and frequency of school transfers since middle school.

## **Research Shows Pre-K Investments Correlated with Academic Achievement**

In the past few years, two studies have taken a different approach in assessing the impact of state pre-k programs on later student outcomes. Instead of following specific children from pre-k into the later grades or adulthood, these researchers examined the relationship between differences in access to early education programs among districts or counties and the academic performance of children in those districts or counties. The theory being tested was that all else being equal, children in communities with greater investment in and access to early education programs should perform at a higher level academically. In the [Texas](#) study, researchers found that eligible children who lived in districts that offered pre-k when they were four years old scored significantly higher on standardized reading and math tests in 3<sup>rd</sup> grade than those whose districts didn't offer pre-k when they were of eligible age. The comparison controlled for factors such as the children's gender and socioeconomic status, their English proficiency, whether the district is urban or rural, and whether it offered full-day kindergarten.

Another study in [North Carolina](#) examined the relationship between differences in Smart Start and More at Four spending among counties and children's 3<sup>rd</sup> grade test scores in reading and math. Taking into consideration differences in children's demographic characteristics (e.g., race, family income, mother's education and marital status, immigrant background), county-level data (e.g., median income, proportion of families on food stamps), per-pupil education spending, and school-level data (e.g., proportion of non-white students, teachers' experience), the researchers concluded that spending in Smart Start and More at Four was correlated with higher 3<sup>rd</sup> grade test scores in math and reading. They estimated that spending the average amount on these programs was equivalent to adding another two to four months of instruction.

## **The Overall Body of Evidence on Pre-K**

When attempting to understand the relationship between preschool education and later outcomes, it is important to take into account the totality of research on this topic, rather than drawing conclusions from a few studies. In recent years, researchers have produced two analyses of evaluations of pre-k programs ([Yoshikawa, et al., 2013](#); [Camilli, et al., 2010](#)) from past decades. Both concluded that these programs can lead to significant short and long-term literacy, reading, and math outcomes. Taken together, the studies mentioned above and others provide strong evidence that high-quality pre-k can be an effective part of a state's education improvement strategy. Recently, hundreds of researchers signed onto [a consensus letter](#) that summarizes the evidence behind pre-k education and urges policymakers to invest in high-quality programs.

That said, some evaluations have shown that pre-k has little impact beyond kindergarten entry. The two most-often cited studies are the Head Start Impact Study and the Tennessee pre-k evaluation. The [Head Start Impact Study](#), a randomized control trial which showed the program had significant, but modest impacts on children's early literacy and math skills after participating in the program for one year. However, by the end of third grade, children who didn't enroll in Head Start had caught up with their Head Start peers in almost every academic measure. An evaluation of the [Tennessee](#) pre-k program, also a randomized control trial, had similar findings. Researchers found significant impacts on early academic skills after one year of pre-k, but by the

end of first grade, they found that students who didn't enroll in pre-k had caught up to their pre-k peers.

While both of these studies employed rigorous evaluation techniques, both had flaws that may have affected their findings. Even though the Head Start researchers randomly assigned the sample of children into a Head Start or no-Head Start group, about 15 to 20 percent of the Head Start group actually did not participate in the program, while about 14 to 17 percent of the no-Head Start group enrolled in some other Head Start program. It is also likely that other children in the no-Head Start group enrolled in other early learning programs, including state pre-k. Because of the subjects' non-compliance with random assignment, the findings of the study could have resulted from factors other than whether children attended Head Start or not.

In the Tennessee evaluation, the initial sample of children were randomly assigned to a pre-k group and a no-pre-k group in an attempt to ensure that both groups are similar in all ways except for their enrollment in the pre-k program. However, the researchers were only able to compare the academic skills of those children for whom their parents gave consent for assessment at the end of pre-k, kindergarten, and first grade. The study included two cohorts of children, and one cohort had a consent rate of 42 percent while the second one had a consent rate of 71 percent. (In comparison, the Chicago CPC and Michigan studies were able to follow 84 and 85 percent of their original sample, respectively.) Focusing on this subset of children could have skewed the results. Parents' decision to give consent or not could represent their confidence in their children or other characteristics of the children or families that can compromise the comparability of the pre-k and no-pre-k groups. In other words, the results of the study could have resulted from factors other than pre-k enrollment.

***Bottom line: While not all research on the impact of pre-k programs on later academic achievement points to positive effects, the collective body of evidence strongly suggests that publicly-funded pre-k programs can have significant short and long-term impacts on student outcomes.***

## **The Importance of Quality in Kindergarten and the Early Elementary Years**

Unlike pre-k, most children in the country attend some form of kindergarten. Therefore, studies tend not to focus on the effects of attending or not attending kindergarten. They are more focused on the difference between half-day and full-day programs. [Past studies of full-day kindergarten](#) have produced mixed results. They tend to show that immediate benefits for children who participate in a full-day program. However, by third grade, their academic achievement doesn't look significant different from their peers who went to a half-day program.

Some researchers argue that even short-term benefits of full-day kindergarten may be worth it from a cost-benefit perspective, when compared with other educational interventions. For example, [one recent study](#) in **Indiana**, the first randomized control experiment on this topic, found significant benefits for full-day kindergarten participants, especially for Hispanic students. The benefits are so significant that the author estimated a greater return on investments from full-day kindergarten than from other reform initiatives. Another [study](#) found that children who were randomly assigned to high-quality full-day kindergarten classrooms in **Tennessee** had higher college attendance rates and higher earnings than their peers who were assigned to lower-quality classrooms.

Indeed, the quality of instruction seems to be critical. A recent [study](#) found that children who are exposed to more basic content and instruction in kindergarten get very little out of the experience,

but those who receive more advanced instruction reap significant benefits. Given that [research](#) has shown most student-teacher interactions in elementary grades to be mediocre, policymakers interested in building on or ensuring the persistence of the impacts from pre-k and kindergarten should focus on quality improvement throughout the early elementary years as a goal.