

## Research Brief

# **Early Care and Education Programs: What Does Research Tell Us about Their Effects on Child Development?**



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## Executive summary

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### ***Will preschool programs improve children's school readiness?***

As federal, state, and local governments invest more in early care and education (ECE), politicians, policy makers, scholars, journalists, and parents want to know whether programs are achieving their goals of improving children's readiness for school.

This research brief offers some tentative answers to such questions. It reviews eleven important studies that examine the relationship between ECE programs and child development in real-world settings. Rather than focus on small model pilot programs, these recently completed or ongoing projects studied Head Start, child care, state prekindergarten, and other common ECE program types that collectively enroll an estimated five million three- to five-year-olds annually.

Each of these studies found that ECE program participation is associated with improvements in children's cognitive skills; four found greater gains for children from economically disadvantaged backgrounds. However, the size of the effects found varied significantly. Findings on the link between program participation and social-emotional outcomes were mixed, and varied by the number of hours spent in care.

Findings are summarized in this brief and presented in depth in "Early Care and Education Programs: A Review of Research Methods and Findings" (see [http://www.ericson.edu/files/nonimages/ece\\_report.pdf](http://www.ericson.edu/files/nonimages/ece_report.pdf)). The findings suggest the value of providing preschool for all, especially low-income children, and the need for additional research in this burgeoning area.

## Early Care and Education Programs

### ***What can we learn from the research about the effects of early care and education programs on child development?***

Will a program improve children's school readiness? Do some groups of children benefit from preschool more than others?

No single research project can answer all of the many relevant questions about the relationship between early care and education program participation and children's success in school and life. Even more than older children and adults, young children are complex creatures. Their development is in flux and often uneven. As they head off to preschool, they bring along the advantages or disadvantages of their family and community. There are no simple answers to questions about child development.

Researchers, therefore, must choose different methods and research questions. Some studies compare one group of children with another at a moment in time. Others follow a group of children over many years. One study might look primarily at the cognitive and social-emotional effects of a program, while another examines the interaction of parental attitudes and child achievement and behavior.

Analyses of small model pilot programs such as the Abecedarian Project or the High/Scope Perry Preschool Project have traditionally dominated both the ECE program evaluation field and early childhood policy discourse more broadly. Those studies tell us little about large-scale contemporary programs, since the conditions of model programs are rarely replicated when programs go to scale.

In contrast to these early studies of model programs, the eleven studies reviewed here

(see box pp. 2–3) examined large-scale, commonly available programs. We chose studies that use rigorous research methods and consider questions relevant for policy makers and early childhood specialists. All of the studies have generated (or are in the process of generating) important findings regarding the relationship between ECE program participation and children's development.

Because many of the studies employ significantly different research methods, findings may not be comparable and cannot be aggregated to give a single answer to complex questions about the effects of ECE programming. We can, nevertheless, offer some general conclusions.

Each of the eleven featured studies found that ECE program participation is associated with improvements in children's level of cognitive skills. Four studies that looked at gains based on socioeconomic status found that children from economically disadvantaged families reaped comparatively larger cognitive gains than their more affluent peers. Two studies also found significant positive relationships between classroom quality and cognitive outcomes. However, the estimated size of these associations or effects varied significantly, both for the typical child and for specific subgroups.

Several studies found that ECE program participation continues to be associated with small cognitive gains through the early elementary school years, and that this relationship is larger and longer-lasting for children from economically disadvantaged homes. In addition, the Chicago Parent-Child Center evaluation, which is the only study of a large-

scale ECE program that tracks children from preschool to adulthood, found that the longer children and their parents participated in the program, the greater their gains.

Findings on the short- and long-term relationships between ECE program participation and children's social-emotional outcomes varied significantly. Some studies found small-to-moderate positive associations or effects; others found negative relationships of a similar magnitude. Outcomes tended to vary significantly among subgroups and by the

number of hours spent in center-based care.

ECE programs will be most effective at producing positive cognitive and social-emotional outcomes for participating children when they function in harmony with their families, communities, schools, and other educationally-relevant institutions. Properly conceived, ECE program evaluations and accountability procedures should help programs achieve the challenging but fruitful task of playing a maximally supportive role within the larger fabric of children's lives.

## Research studies reviewed for this report

### Experimental Studies

1. Head Start Impact Study: Six-year impact evaluation designed to determine the effect of program participation on children's school readiness. See [http://www.acf.hhs.gov/programs/opre/hs/impact\\_study/](http://www.acf.hhs.gov/programs/opre/hs/impact_study/)

### Quasi-experimental Studies

2. Chicago Child-Parent Centers (CPC): Longitudinal evaluation that compares children who participated in Child-Parent Centers in the mid-1980s with a statistically equivalent group that graduated from CPS kindergartens in 1986 but were not involved in CPC. See <http://www.waisman.wisc.edu/cls/PUBLICATION.HTM>.
3. Oklahoma Universal Pre-K Program: Two studies that examined the effects of participation in Tulsa's state pre-k program using regression-discontinuity method (i.e., samples of entering pre-k and kindergarten children are considered to represent treatment and comparison groups, respectively). See <http://www.crocus.georgetown.edu/papers.html>

4. National Institute for Early Education Research (NIEER) Five-State Pre-Kindergarten Study: Study using a regression-discontinuity design to estimate the effects of state-funded pre-kindergarten programs on the academic skills of entering kindergartners in Michigan, New Jersey, Oklahoma, South Carolina, and West Virginia. See <http://www.nieer.org/resources/research/multi-state/fullreport.pdf>

### Nonexperimental Designs

5. Family and Child Experiences Survey (FACES): A large-scale study of Head Start designed to provide information on program quality, child outcomes, and school readiness that can be used for national decision-making and program quality improvement. See <http://www.acf.hhs.gov/programs/opre/hs/faces/index.html>
6. Cost, Quality, and Outcomes Study: A five-year project that examined the relationship between cost and quality in full-time, center-based ECE programs and the impact of these factors on children's development from preschool through second grade. See <http://www.fpg.unc.edu/~nced/pages/cq.cfm>

*(Research studies reviewed for this report, continued)*

7. National Institute of Child Health and Human Development (NICHD) Study of Early Child Care: Longitudinal study whose primary purpose is to examine how variations in nonmaternal care are related to children's social-emotional adjustment, cognitive and linguistic development, school achievement, and physical growth and health. See <http://secc.rti.org/home.cfm>
8. Early Childhood Longitudinal Study—Birth Cohort (ECLS-B): Longitudinal study of a nationally representative sample of 14,000 children born in 2001 who are being tracked through first grade. Data are being collected on children's homes, communities, health care, and nonparental care, including ECE participation. See <http://nces.ed.gov/pubsearch/getpubcats.asp?sid=024>
9. Early Childhood Longitudinal Study—Kindergarten Cohort (ECLS-K): Longitudinal study of a nationally representative sample of approximately 22,000 children who attended kindergarten during 1998–99. Data on children's cognitive, social, emotional, and physical development are collected from study participants and their families, teachers, and schools. See <http://nces.ed.gov/pubsearch/getpubcats.asp?sid=024>
10. Georgia Early Childhood Study: Study whose primary purpose was to compare child outcomes from the beginning of the preschool year to the end of first grade among children who had attended state pre-k, Head Start, private preschool, or no preschool as four-year-olds. See <http://aysps.gsu.edu/epg/index.htm>.
11. National Center for Early Development and Learning (NCEDL) Multi-State Study of Pre-Kindergarten and Study of State-Wide Early Education Programs (SWEEP): Comprehensive study of state-funded pre-k programs in 11 states (California, Georgia, Illinois, Kentucky, New York, Ohio, Massachusetts, New Jersey, Texas, Washington, and Wisconsin) looking at how important variations in pre-k programs relate to child outcomes at the end of pre-k and in kindergarten. See [http://www.fpg.unc.edu/~ncedl/pages/products.cfm#sweep\\_ms](http://www.fpg.unc.edu/~ncedl/pages/products.cfm#sweep_ms) and <http://www.fpg.unc.edu/ncedl/pages/ED9.cfm>

## Overview of ECE program research

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Various large-scale, widely implemented ECE programs are currently estimated to enroll more than five million three- to five-year-old children annually (Iruka & Carver, 2006). The most important research on ECE programs during the past decade has focused on such large-scale, commonly utilized programs as Head Start, child care, and state pre-k, as contrasted with the small model programs that were the primary subject of more rigorous studies several decades ago.

Over time, the basic structure of research on these various types of large-scale programs has begun to converge. Differences among formerly distinct areas of inquiry (for example, cognitively-oriented studies of preschool as opposed to attachment-centered examinations of child care) have been replaced by a common emphasis on examining the relationship among program structures, classroom quality, teacher characteristics, child and family characteristics, and child outcomes across multiple domains.

All of the studies examined in this report share this basic agenda, with most addressing some variation of these research questions:

1. What are the relationships among program and teacher characteristics, classroom quality, and child outcomes?
2. What are the relationships among ECE program experience, child and family characteristics, and child outcomes?
3. Is preschool participation associated with improved outcomes on measures of children's cognitive and social-emotional development?
4. What is the long-term relationship between preschool participation and children's later school achievement?

The projects employ various methods. Most fundamentally, these may be divided into the three primary categories of experimental, quasi-experimental, and nonexperimental designs. Across these different categories, researchers used a wide range of data collection methods and studied such variables as preschool-year and post-preschool child assessments, family and teacher characteristics, preschool program characteristics and classroom quality, post-preschool school and classroom characteristics, and other demographic and child-level information. In all cases, sampling techniques were employed to reduce a larger universe of children and classrooms to smaller number of representative cases.

## What does the research say?

This synthesis of research findings focuses on children's short- and long-term cognitive and social-emotional outcomes. Although issues of program quality are equally important, here they are mentioned primarily in terms of their relationship to child outcomes.

### ***All eleven studies found preschool participation to be associated with improvements in children's levels of cognitive skill.***

Standardized measures showed progress relative to national norms and/or statistically significant gains for the typical child in each study. The estimated size of these effects, as well as the particular domains in which gains occurred, varied significantly among different projects, both for the typical child and for specific subgroups.

For example, the Head Start Impact Study found small positive effects on letter-word identification and letter naming (both three- and four-year-olds), spelling (four-year-olds only), and vocabulary, color naming, and perceptual motor skills (three-year-olds only). Analyses of Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) data similarly found small positive effects on children's prereading and math skills associated with participation in a non-Head Start center-based program. However, while the former employed a rigorous experimental design that compared the impact of a Head Start-eligible child being admitted or denied entry upon application to the program, the latter used a nonexperimental design that retrospectively analyzed ECE program effects based on kindergarten test score data (and did not collect

entry-level data at preschool). Given these very different methodologies, the reported effect sizes—which were small in both studies—cannot be considered equivalent.

Both the Oklahoma Universal Pre-K and the NIEER Five-State Pre-K studies found moderate-to-large positive effects on the cognitive measures employed. Since both studies employed a regression-discontinuity design, these findings are relatively comparable. However, the question of how these findings should be considered vis-à-vis those emanating from research that did not employ this method is debatable. Both studies constructed comparison groups using children whose birthdays could be up to a full year short of the pre-k entry cut-off date, so it is not unreasonable to question whether the unusually large effect sizes might be in part attributable to the method employed.

### ***In general, children from low-income families make greater gains than their more affluent peers.***

Several studies found that children from economically disadvantaged families reaped comparatively larger short-term cognitive gains from ECE program participation than their more affluent peers. In the Oklahoma study, children who qualified for free lunch posted larger effects from pre-k participation on each of the three cognitive assessment used. In the Cost, Quality, and Outcomes Study, there were generally larger positive associations between program participation and cognitive outcomes for children whose mothers had low levels of education. Several analyses of

ECLS-K data found that cognitive, and particularly prereading, gains were larger and lasted longer for low-income children.

The Family and Child Experiences Study (FACES) found significant short-term cognitive outcome differences between children whose early language and number skills were in the highest- or lowest-scoring quartile of their cohort at program entry. Those entering with lower levels of knowledge and skill showed the largest gains. While those entering with higher skill levels posted higher scores in the spring than the fall, their standing in terms of national norms declined slightly for seven of the nine measures used.

***Participation in ECE programs is associated with small but statistically significant positive gains on cognitive measures through the early elementary school years. Effects are larger and more long-lasting for low-income children.***

Several studies document the continuation of small, statistically significant positive gains on cognitive measures attributable to ECE program participation through the early elementary school years. Analysis of ECLS-K data found that, although 60 percent of the cognitive gains associated with participation in non-Head Start center-based programs had faded out for the typical child by the spring of first grade, this left a small effect equivalent to almost one additional question answered correctly on relevant assessments (Barnett, Lamy, & Jung, 2005).

For the average child living in poverty or with a parent with relatively low levels of for-

mal education, attending pre-k raised the level of kindergarten reading skills from the 33rd to the 44th percentile. Further, reading effects remained large and math effects were significant for children in families receiving TANF support through the spring of first grade (Magnuson, Meyers, Ruhm, & Waldfogel, 2004a).

The Georgia Early Childhood Study found that children who participated in the state pre-k program gained relative to national norms from beginning of preschool to end of first grade on measures of receptive language, letter-word recognition, expressive language, and problem solving. However, the same general pattern of gains was found for the entire study sample, including children who did not attend preschool at all.

Magnuson et al. (2004a) found that children who participated in center-based programs were retained in kindergarten at a rate that was about two percentage points lower than those who did not. Participation in Head Start was also associated with lower rates of kindergarten retention after controlling for child and family demographic characteristics.

***Longer and more intensive participation has greater effects.***

The longitudinal Chicago Child-Parent program study found that by age 15, former program participants had a five-month gain in both reading and math achievement over the comparison group. By age 18, 14 percent had received special education services, as contrasted to 25 percent of the comparison group; 23 percent had repeated a grade,



compared to 38 percent of the comparison group. By age 22, 65 percent of program participants had completed high school, as compared to 54 percent of the comparison group (Reynolds, 2000; Ou & Reynolds, 2006). These findings represent the average effects of between one and seven years of program participation. Children who participated longer, with greater family involvement, had better outcomes. The results cannot be compared to participation in a traditional one- or two-year preschool program.

Analyses of why CPC participation was associated with such positive outcomes identified early cognitive development as only one of several major factors. Others included parent involvement in school, quality of the post-preschool learning environment, and avoidance of school mobility. The “cognitive advantage” conferred by CPC participation should be viewed neither as the most important indicator of long-term ECE program effects, nor as a direct or exclusive means of leveraging such positive effects (Reynolds, 2000). This finding emphasizes the fact that ECE programs should not be assessed solely on the basis of children’s cognitive score gains. Indeed, factors such as a program’s ability to increase parental engagement with their children’s out-of-home education experiences may be equally important predictors of long-term positive outcomes.

The NICHD study also emphasized the importance of family experiences in determining children’s cognitive and social-emotional outcomes, as well as their experience of out-of-home care.

***Children in high-quality classrooms have better cognitive outcomes than those in low-quality classrooms.***

Both the NICHD and the Cost, Quality, and Outcomes Study found significant positive relationships between classroom quality and cognitive outcomes. NICHD researchers found that children in classrooms rated in the top third by quality measures obtained higher scores on assessments of pre-academic and language skills than those in the bottom third. By the end of third grade, having participated in higher quality child care continued to have a small positive effect on cognitive outcomes as measured by standardized tests of math, reading achievement, and memory.

The Cost, Quality, and Outcomes Study found that preschool quality, considered independently of K–2 classroom quality, had a modest positive association with children’s receptive language, early math skills, and cognitive/attention skills through kindergarten, and on math and cognitive attention skills through second grade. In general, these relationships were stronger for children whose mothers had low levels of education. Like the CPC study, these findings suggest that high-quality early education experiences after preschool are important, both independently and with regard to building on initial ECE program gains.

The quality of many publicly-funded ECE programs needs improvement. The large NCEDE study found that 81 percent of the classrooms in the study sample received only minimal quality ratings.

***The relationship between ECE program participation and social-emotional development is significantly more complex and varied than is true with regard to children's cognitive development.***

Findings on the short- and longer-term relationship between ECE program participation and children's social-emotional outcomes varied significantly among the eleven studies. Outcomes tended to differ significantly among subgroups and by the number of hours spent in center-based care. Although some consistent findings were reported across studies, others seem to contradict one another.

The NICHD study presented the most troubling short- and long-term findings. This study emphasized the negative effects of cumulative time spent in nonmaternal care during the first four years of life: the greater the length of time in care, the more that mothers, caregivers, and/or teachers reported that children exhibited externalizing problems and conflict with adults at four and one-half years of age and in kindergarten. These effects remained significant after controlling for the quality, type, and stability of child care, as well as for maternal sensitivity and other family background factors (NICHD Early Childhood Research Network, 2005a). By the end of third grade, spending more than 30 hours per week in child care had a small negative association with work habits and social skills. However, the relationships between the amount of time in child care and externalizing behaviors and teacher-child conflict decreased during the primary grades and were insignificant by Grade 3 (NICHD Early Childhood Research Network, 2005b).

Findings from the ECLS-K largely paralleled those of the NICHD. Loeb et al. (2005), for example, found that, while 15–30 hours per week in center-based care had a small negative association with behavioral outcomes, 30 or more hours per week increased this effect. These effects varied by subgroup, with middle-class and affluent children in care for 30 or more hours per week exhibiting the largest negative outcomes. Low-income children showed fewer negative results, which were not statistically significant when broken into dosage components. Hispanic children, in contrast, demonstrated no statistically significant effects at all.

Analysis of ECLS-K data found pre-k attendance associated with small levels of increased externalizing behavior and decreased self-control (Magnuson, Ruhm, & Waldfogel, 2004b). This finding is inconsistent with those of the NCEdL, which found teacher-reported social skills and behavior problems to have remained the same or improved slightly between the fall and spring of the pre-k year. (It should be remembered that the two studies used completely different research methods.) Given that pre-k children are typically in half-day programs, the NCEdL's finding of neutral-to-small positive changes could be hypothesized to be consistent with the NICHD and ECLS-K findings that negative social-emotional effects are associated with higher cumulative and/or absolute hours in center-based programs.

The FACES study presents an interesting comparison case, as it found both positive and negative social-emotional change for Head Start children, depending on where they

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stood on relevant assessments at the time of program entry. Children who demonstrated the lowest levels of social skills and the highest levels of problem behaviors at entry showed the greatest gains. Children who scored in the top quartile of social skills and minimal problem behaviors at program entry showed a slight increase in negative behavior (Zill et al., 2006).

The Cost, Quality, and Outcomes Study found that preschool quality had a modest positive association with children's sociability through kindergarten and on problem behaviors through second grade. After controlling for K-2 classroom quality, children of mothers with fewer years of education continued to show a significant reduction in problem behaviors. Unlike the NICHD, the Cost, Quality, and Outcome Study found a relationship between preschool climate and long-term behavior: Children in preschool classrooms with higher levels of peer interaction during play had significantly better relationships with their peers in second grade. In contrast,

children in preschool classrooms with high levels of problem behaviors and low levels of teacher-child closeness demonstrated more aggression and disruptive behavior as second graders (Peisner-Feinberg et al., 2000).

The field needs to grapple more seriously with these research findings. Social-emotional development must not be ignored, either in program planning or in program evaluation. Given the focus on cognitive outcomes in the upper elementary and secondary grades driven by the No Child Left Behind Act, there is ample reason to be concerned that such methods may be pushed down to the early childhood level. In addition to violating well-established understandings of the nature of child development and the most scientifically credible means for its assessment, such an approach would ignore the cautionary lessons represented by the NICHD and ECLS-K findings.

## Summary

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The eleven studies presented in this report illustrate the complexities involved in assessing the relationship between ECE program participation and children's development. Although the studies differ from one another in sample, design, and methods, they suggest several common conclusions about the impact of ECE programs on children's development.

One overarching conclusion is that such research requires a multidimensional design intended to examine the relationship among program characteristics and quality (including teacher-child interactions) on the one hand,

and child and family characteristics and child outcomes on the other. Although it is tempting to simplify this process in an attempt to save time and money, to do so would be, at best, wasteful and, at worst, potentially misleading. Particularly as the number of children enrolled in ECE programs continues to grow at an unprecedented rate, it is critical to keep processes of program assessment firmly tethered to the complex realities of young children's lives.

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The Herr Research Center for Children and Social Policy at Erikson Institute informs, supports, and encourages effective early childhood policy in the Great Lakes Region. The center generates original research and analysis that addresses important questions about the optimal organization, funding, assessment, and replication of high-quality early childhood programs and services. Further, it provides comparisons of policies across states to determine which works best and why. Through publications, conferences, policy seminars, and advocacy efforts, the center shares this research and analysis with state and local legislators, advocates, foundation officials, and other researchers in the field.

The center was established in 2005 with a gift from the Jeffrey Herr Family and grants from the Joyce and McCormick Tribune Foundations, as well as support from the Spencer Foundation and the Children's Initiative, a project of the Pritzker Family Foundation. For information, see <http://www.erikson.edu/hrc>.

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