



High-Quality Preschool Programs Can Reduce Minority Representation in Michigan's Justice System

Changing Perceptions and Practices: Addressing
Disproportionate Minority Representation in
Michigan's Child Welfare and Juvenile Justice Systems

October 5 & 6, 2009

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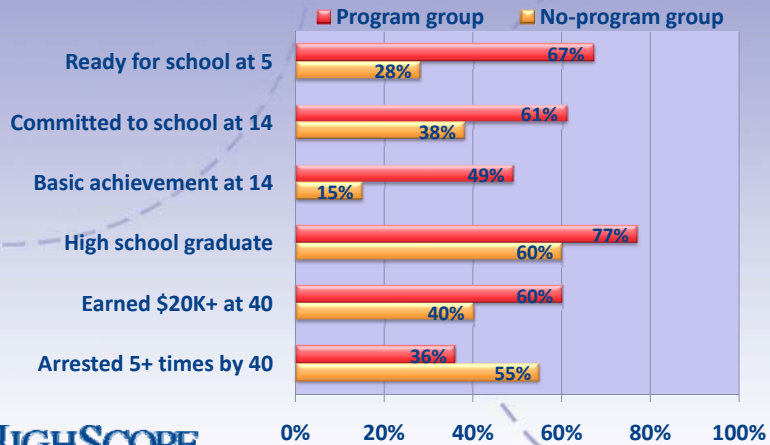
The HighScope Perry Preschool Experiment

- 123 young African-American children, living in poverty and at risk of school failure.
- Randomly assigned to initially similar program and no-program groups.
- 4 certified early childhood teachers held a daily class of 20-25 three- and four-year-olds and made weekly home visits.
- Children participated in their own education by planning, doing, and reviewing their own activities.



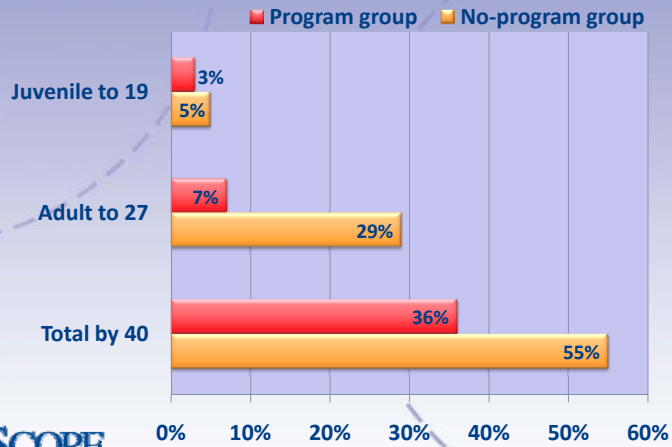
HighScope Perry Preschool Experiment

Major findings over time



HighScope Perry Preschool Study

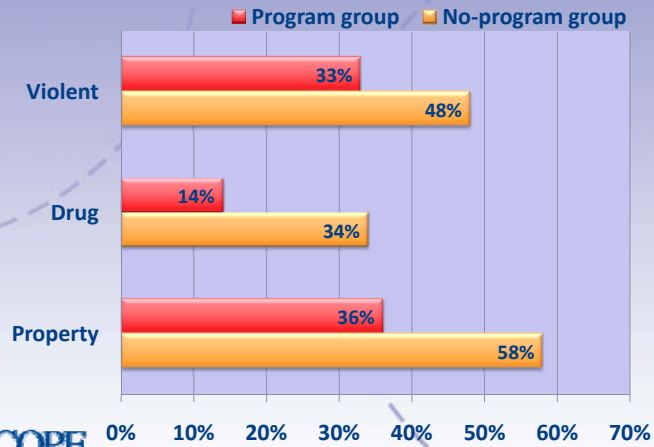
Fewer arrested 5 or more times



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HighScope Perry Preschool Study

Fewer arrested for serious crimes

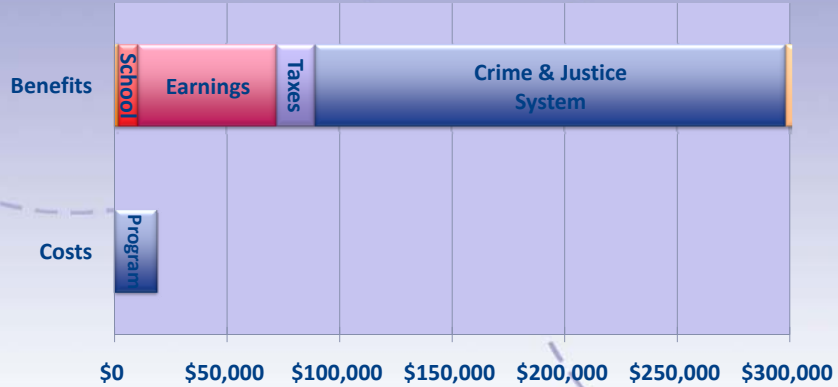


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HighScope Perry Preschool Study

Large return on investment

(Per participant in 2008 constant dollars discounted 3% annually)



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High/Scope Perry Preschool Study

Every dollar invested saves:

\$11.31 in crime costs

+

\$4.83 in school and welfare costs and increased earnings and taxes paid

\$16.14

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But other studies find only modest effects.

- Recent studies of Head Start and state prekindergartens find only modest short-term effects on children's literacy and social skills,
- Making them poor candidates for long-term effects and return on investment.



Implication

To get what we got...

Do what we did!



Michigan's Head Start and Great Start Readiness Programs get this return if they:

1. Have and support enough qualified teachers
2. Use a validated, interactive child development curriculum
3. Spend a lot of time with parents
4. Continuously assess program quality and children's development



1. Have and support enough qualified teachers.

- Qualified = Teaching certificate and relevant bachelor's degree.
- Curriculum-based supervision and systematic in-service training.
- Two qualified adults for 16-20 four-year-olds per class, fewer younger children.



2. Use a validated, interactive child development curriculum, like HighScope's.

- Children and teachers design learning activities
- Include cognitive and social, not just literacy and math
- To be effective, teachers need to receive interactive training, study, and practice



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3. Have teachers spend a lot of time with parents.

- Meet with parents and children regularly
- Educate parents about their children's development
- Include children's other center and home caregivers.



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4. Continuously assess program quality and children's development.

- Assess implementation of an effective program model.
- Assess children's developing school readiness.
- Attune teaching to assessment.



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the  **HIGHSCOPE**

Difference!

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Creating the Best Prekindergartens

Five Ingredients for Long-Term Effects and Returns on Investment

By Lawrence J. Schweinhart

State-funded prekindergarten for 4-year-olds has grown by leaps and bounds in recent years, with the number of such programs up by 40 percent over the last five years alone. One factor contributing to the growth is strong evidence that early-childhood experience influences the development of the brain's architecture. Another is the record of producing beneficial long-term effects and solid returns on investment established by high-quality prekindergarten for children living in low-income families.



The findings come from three major studies of the effects of such programs: the **High/Scope Perry Preschool Study**, begun by David P. Weikart in 1962; the **Carolina Abecedarian Project**, begun by Craig T. Ramey in 1972; and the **Chicago Child-Parent Centers study**, conducted by Arthur J. Reynolds since 1985. These longitudinal studies find strong evidence of the positive effects on participants' intellectual performance in childhood, school achievement in adolescence, placements in regular classes (rather than special education placement or grade retention), high school graduation rate, and adult earnings. They also show fewer teenage births and fewer crimes

among participants. Moreover, the economic returns for these programs are from four to 16 times as great as the original investments. This extraordinary economic performance is why leading economists, such as the University of Chicago Nobel laureate James J. Heckman, Federal Reserve Chairman Ben S. Bernanke, and others, have publicly embraced these programs.

Yet, most recent studies of the federal Head Start program and state-funded prekindergartens have found only modest, short-term effects on children's literacy and

social skills and parents' behavior, putting into question whether these programs too can have long-term effects or worthwhile returns on investment. It is time we explored the differences that make some prekindergartens highly effective, producing a lasting impact on participants' lives, while others are not. Five ingredients of the highly effective stand out as definitive, and can serve as rules for how to design such programs:

It is time we explored the differences that make some prekindergartens highly effective, producing a lasting impact on participants' lives, while others are not.

Include children living in low-income families or otherwise at risk of school failure.

Long-term effects have seldom been looked for and have yet to be found for children not in these circumstances, although there are arguments for serving them as well. For example, a recent study by William T. Gormley Jr. of Oklahoma's state prekindergartens, which are open to all children, found short-term effects on participants' school achievement that were large enough to promise long-term effects. Prekindergartens open to all children also enjoy a wider political base than a targeted program, and still include the children who are most in need.

Have enough qualified teachers and provide them with ongoing support. Qualified teachers are critical to the success of any educational program, a principle now embedded in the federal No Child Left Behind Act. In early-childhood settings, being qualified is taken to mean having a teaching certificate based on a bachelor's degree in education, child development, or a related field. Because research is constantly informing us about how young children learn and can best be taught, it is also important that early-childhood teachers receive curriculum-based supervision and continuing professional development. Systematic in-service training, in which teachers learn research-based, practical classroom strategies, also helps ensure that young children are having the educational experiences that contribute most to their development.

So that pupils receive sufficient individual attention, highly effective prekindergarten classes have two qualified adults—a teacher and an assistant teacher—for every 16 to 20 4-year-olds. Although having qualified teachers, a low child-to-teacher ratio, and ongoing professional development may cost more, cutting back on these components would threaten program effectiveness as well as the return on investment.

Use a validated, interactive child-development curriculum. Such a curriculum enables children as well as teachers to have a hand in designing their own learning activities. It

focuses not just on reading and mathematics, but on all aspects of children’s development—cognitive, language, social, emotional, motivational, artistic, and physical. And it has evidence of its effectiveness. Implementing such a curriculum requires serious interactive training, study, and practice, particularly for teachers who have little experience with this type of education.

Have teachers spend substantial amounts of time with parents, educating them about their children’s development and how they can extend classroom learning experiences into their homes. All the programs in the long-term studies worked with parents. In fact, in the High/Scope Perry Preschool program, teachers spent half their work time engaged in such activities. As child care beyond part-day prekindergarten has become more widespread, parent-outreach efforts also need to include other caregivers, in centers and homes, who spend time daily with enrolled children.

Confirm results through continuous assessment of program quality and children’s development of school readiness. Good curriculum and good assessment go hand in hand. Prekindergartens striving to be highly effective need to replicate the policies and practices of a program found to be highly effective, including the five ingredients listed here. The proof that this is being done lies in program-implementation assessment, a system for measuring how well a program carries out administrative and teaching standards. A program assessor uses standard protocols to observe classrooms and the school, and to interview teachers and others about the various aspects of program quality. The results can then be used for program improvement.

For the concept of school readiness to contribute to developing highly effective prekindergartens, it must serve as the mediator between prekindergarten and its long-term effects.

Systematic observation and testing measure prekindergarten children’s development of school readiness. With an interactive child-development curriculum, systematic observation fits better than testing, because it records children’s usual behavior rather than requiring them to respond on cue in a particular time and place. Program administrators and teachers who know how children are doing on such assessments will be able to use this information to monitor the children’s progress and attune their teaching to it.

Nearly two decades ago, the **National Education Goals Panel** defined “school readiness” as encompassing not only reading and mathematics, but also other aspects of general

knowledge and cognition, physical well-being and motor development, social and emotional development, approaches to learning, and language development. This broad definition also appears in the Head Start Child Outcomes Framework and Canada's Early Development Instrument, an effort in that country and others to assess children's school readiness by having kindergarten teachers rate them on 120 items.

For the concept of school readiness to contribute to developing highly effective prekindergartens, it must serve as the mediator between prekindergarten and its long-term effects. The validity of a school-readiness measure depends on its sensitivity to the effects of prekindergarten and its ability to predict later effects on school achievement and other important life outcomes. In the High/Scope Perry Preschool Study, the program was found to have improved children's intellectual performance and their commitment to schooling, which in turn led to improvements in school achievement, educational attainment, and adult earnings, and to reduced criminal offenses. So in this study, school readiness linking prekindergarten experience and later effects involved motivation as well as intellectual performance.

School readiness so defined could serve as a useful benchmark of the success of today's prekindergartens, guiding them toward both positive long-term effects and good returns on investment.

*Lawrence J. Schweinhart has conducted research at the High/Scope Educational Research Foundation (www.highscope.org) in Ypsilanti, Mich., since 1975, and has served as its president since 2003. He is the lead author of *Lifetime Effects: The High/Scope Perry Preschool Study Through Age 40* (High/Scope Press, 2004) and a section on early-childhood education for the upcoming AERA Handbook on Education Policy Research.*

Do Not End Michigan's Preschool Programs!

By Lawrence J. Schweinhart and Marijata Daniel-Echols

The Michigan Senate has passed a budget cut to end Michigan's Great Start Readiness Program. Not to cut it 10 percent or 20 percent, as you might expect with most areas of the budget, but to cut it completely, as if it had no real value.

If the joint Senate and House conference committee and Gov. Granholm agree to this in the coming months, the program will cease to exist. That will mean the end of Pre-K instruction for more than 30,000 Michigan youngsters. And this comes at a time when a survey of kindergarten teachers shows a third of Michigan's children still enter their classrooms unprepared.

The bad news doesn't end there. The Michigan Senate has also cut other early childhood programs and the Michigan Department of Human Services has removed almost as much funding from child day care subsidies to working parents in order to pay for other services.

Our state policy makers have signaled their willingness to solve today's budget problems by creating bigger problems in the future. This is a step backward for the short- and long-term financial health of our state. Solid research shows that every dollar invested in children in their earliest years comes back to us many times over. The savings come from fewer children repeating grades, fewer children needing special education, and, later on, fewer people who are not employable or who commit serious crimes.

Gov. Granholm speaks of ensuring the vitality of the state's economy by increasing the number of college students. The state's school readiness program does just that, and has done so for a quarter of a century. Evaluations of this program that we at the HighScope Educational Research Foundation have conducted repeatedly find that it works:

- It improves children's math skills and print awareness so they are more ready for kindergarten.
- Elementary school teachers rate program graduates higher than similar non-attending children in imagination, creativity, initiative, retaining learning, completing assignments, attendance, readiness to learn, and taking an interest in school.
- More program graduates pass the fourth grade Michigan Educational Assessment Program – 17 percent more pass math and 26 percent more pass reading.
- By eighth grade, one-third fewer program graduates repeat a grade, with the differences largest for boys and children of color.

High-quality early childhood education has been demonstrated to have both short- and long-term positive impacts on children living in poverty as well as savings to us taxpayers and potential crime victims.

In a study we have been conducting for over 40 years, we have found that the Perry Preschool program run by the Ypsilanti school district in the 1960s improved participants' school success and adult employment, prevented them from committing crimes, and saved taxpayers far more than it cost them. Program participation cut crime costs alone from a staggering \$1.8 million per

male by 55%. Nobel-prize-winning Chicago economist James Heckman checked and confirmed the analyses.

Turning our back on such findings is a guaranteed way to make today's deficit even worse in the future. Solid research can lead state policy makers to a great deal, but apparently can't make them buy it. Only we citizens can do that.

Lawrence Schweinhart is president of the HighScope Educational Research Foundation in Ypsilanti and director of the HighScope Perry Preschool Study. Marijata Daniel-Echols is HighScope's research director and directs the state's Great Start Readiness Program Evaluation.

EARLY CHILDHOOD EDUCATION

Lawrence J. Schweinhart, *High/Scope Educational Research Foundation*
and Rachel Fulcher-Dawson, *Michigan State University*

In

Educational Frontiers: AERA Handbook on Education Policy Research, (2009)

William Lowe Boyd, Editor

This article presents what we know about the importance and impact of early childhood education, from research on the development of young children's brains and from long-term research on the effects of early childhood programs. Abuse, poor care, and harsh settings harm young children's brains. Model early childhood programs for children from such environments contribute to their success in school and life, providing high return on investment. The U.S. has many early childhood programs and policies, including Head Start, the Child Care and Development Fund, preschool special education, state preschool programs, and child care programs in centers and in homes. The consensus finding of various studies is that typical and even special publicly funded early childhood programs have modest effects on children's literacy and social skills and parents' behavior. We know that certain model early childhood programs and model parent education programs contribute much to participants' lives, but we also know that many of our publicly funded programs are not of this quality. So we need to know what ingredients are necessary to cross the threshold of quality and effectiveness so that many programs can achieve the great contributions to children's development of which they are capable.

What We Know About Early Childhood Education

Our knowledge of the importance and potential impact of early childhood education comes from the implications of brain science and the findings of evaluative studies of early childhood programs.

Early Childhood Learning and Brain Growth

One source of evidence of the importance of early childhood learning is the burgeoning field of neuroscience or brain research. Essentially, such research examines the relationship of various kinds of early childhood experience to brain status, as measured by certain imaging techniques, such as positron emission tomography and functional magnetic resonance imaging. Another type of research looks at children with localized brain damage (National Research Council and Institute of Medicine, 2000). Such research has identified the conditions that are dangerous to the developing brain from which young children should be protected, but has yet to identify the conditions that enhance their brain development. Simply put, young children's brains are harmed by abuse, neglectful care, and harsh environments. Early childhood experience has a large role in shaping the developing brain, but few specific types of critical experiences have been identified. The early childhood experience that is needed is commonplace in young children's environments, except for children with sensory problems, such as blindness or deafness. A blind child, for example, has no visual experience.

The brain is a complex collection of interconnected cells that transmit information from one cell to another. It produces all our learning, abilities, and behavior. It accounts for our school achievement, social adaptation and responsibility, and workforce success. Genetics and experience are in constant interaction with each other. Genetics determines the timetable for brain development, while experience determines the actual construction of circuits between brain cells, known as brain architecture. A newborn baby has the capacity to learn any language in the world, but immediately begins to learn to discriminate the sounds of his or her home language rather than other languages. The brain begins by building basic circuits between cells, which become the basis for more complex circuits, and so on. Thus, the child first learns to discriminate language sounds and then learns to combine these sounds into words, then two-word utterances, and so forth.

Environments produce various levels of stress. Young children with supportive relationships readily handle the positive stress that arises from their everyday experience – being told no, having to share adult attention with someone else, having to get a shot from a doctor. Young children with supportive relationships also handle the extreme but tolerable stresses that arise from time to time – the death of someone close to them, serious illness or injury, and other types of calamities. But young children cannot handle the toxic stress that arises from persistent, dysfunctional poverty in which they experience physical or emotional abuse or neglect. Toxic stress involves the absence of supportive relationships and harms the development of young children’s brains. Most of the longitudinal studies of the effects of early childhood programs have been conducted with young children living in toxically stressful environments. These programs provided children with respite from the toxic stress as well as educational experiences that helped grow the circuitry of their brains. Brain research findings confirm the adage that an ounce of prevention is worth a pound of cure.

Long-Term Early Childhood Program Studies

Early childhood care and education is important because a great deal of learning takes place in this time before traditional schooling begins. Schooling traditionally begins at 5 or 6 years of age because most children begin to learn to read at this age, and reading is a fundamental ability that serves as a door to much other learning. But reexamination of learning by psychologists, largely inspired by Jean Piaget, indicates that young children learn skills that are even more fundamental. The abilities to listen and speak precede the abilities to read and write. Working vocabulary in speech and comprehension determines how good a reader one becomes. Thinking abilities, such as categorizing, ranking, spatial thinking, and temporal and causal thinking are the components of everyday problem-solving. The abilities to regulate one’s own actions and resolve conflicts with other people are essential to social living. Such abilities, which can and ought to develop in early childhood, are important not only in themselves, but as doors to all the rest of learning.

Early childhood experience has large economic consequences. Economic analyses of the program cost and longitudinal benefits of the model early childhood programs reviewed in this paper have found that the benefits far outweigh the costs, returning \$4 to \$17 for every dollar spent. In this way they are rare among publicly funded programs.

Several long-term early childhood program follow-up studies stand out for their duration

and methodological quality – the High/Scope Perry Preschool study, the Carolina Abecedarian Project study, and the Chicago Child-Parent Centers study. These three studies offer the best recent evidence of the long-term effects of good preschool programs. Studies by David Olds and his colleagues in Elmira, New York and Memphis, Tennessee are similar to these studies in employing random assignment of study participants, long-term follow-up, and cost-benefit analysis, but examine a different type of program – prenatal and infancy home visitation by nurses.

The **High/Scope Perry Preschool Study** is a scientific experiment that has identified the short- and long-term effects of a high-quality preschool education program for young children living in poverty (Schweinhart, Montie, Xiang, Barnett, Belfield, & Nores, 2005). From 1962 through 1967, David Weikart and his colleagues in the Ypsilanti, Michigan, school district operated the preschool program for young children to help them avoid school failure and related problems. They identified a sample of 123 low-income African American children who were living in poverty and assessed to be at high risk of school failure and randomly assigned 58 of them to a group that received a high-quality preschool program at ages 3 and 4 and 65 to a group that received no preschool program. Because of the random assignment strategy, children's preschool experience is the best explanation for subsequent group differences in their performance over the years. Project staff collected data annually on both groups from ages 3 through 11 and again at 14, 15, 19, 27, and 40, with a missing data rate of only 6% across all measures.

The program group outperformed the no-program group on various intellectual and language tests from their preschool years up to age 7; school achievement tests at 9, 10, and 14; and literacy tests at 19 and 27. During their schooling, fewer program than no-program females were treated for mental impairment (8% vs. 36%) or retained in grade (21% vs. 41%). More of the program group than the no-program group graduated from high school (77% vs. 60%), specifically, more program females than no-program females (88% vs. 46%). At 15 and 19, the program group had better attitudes toward school than the no-program group, and program-group parents had better attitudes toward their 15-year-old children's schooling than did no-program-group parents. More of the program group than the no-program group were employed at 27 (69% vs. 56%) and 40 (76% vs. 62%). The program group had higher median annual earnings than the no-program group at 27 (\$12,000 vs. \$10,000) and 40 (\$20,800 vs. \$15,300). More of the program group than the no-program group owned their own homes at 27 (27% vs. 5%) and 40 (37% vs. 28%). By 40, fewer of the program group than the no-program group were arrested 5 or more times (36% vs. 55%), and fewer were arrested for violent crimes (32% vs. 48%), property crimes (36% vs. 58%), and drug crimes (14% vs. 34%). Fewer of the program group than the no-program group were sentenced to prison or jail by 40 (28% vs. 52%). More program than no-program males raised their own children (57% vs. 30%).

Cost-benefit analysis indicates that, in constant 2000 dollars discounted at 3%, the economic return to society for the program was \$258,888 per participant on an investment of \$15,166 per participant– \$17.07 per dollar invested. Of that return, 76% went to the general public and 24% went to each participant in the form of increased lifetime earnings. Of the public return, 88% came from crime savings, and 1% to 7% came from each of three sources – education savings, increased taxes due to higher lifetime earnings, and welfare savings. Remarkably, 93% of the public return through age 40 was due to males because of the program's

large reduction of male crime, and only 7% was due to females.

Ramey and his colleagues at the University of North Carolina at Chapel Hill began the **Carolina Abecedarian Study** in 1972 (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Of 111 infants averaging 4.4 months of age from poor families, they randomly assigned 57 to a special program group and 54 to a typical child care group that used the child care arrangements in homes and centers that were prevalent in that place in the 1970s. The special program was a full-day, full-year day care program for children that lasted the 5 years from birth to elementary school. Some of the study participants also received follow-up support from kindergarten to grade 3. The special program's goal was to enhance children's cognitive and personal characteristics so they would achieve greater school success. It offered infants and toddlers good physical care, optimal adult-child interaction, and a variety of playthings and opportunities to explore them. It offered preschoolers a developmentally appropriate preschool learning environment. The curriculum was a series of 16-18 game-like activities for each 6-month period of development, designed to enhance the overall development of infants and toddlers and the language, problem-solving skills, and emergent literacy of preschoolers. Adults learned the significance of each activity for children's development. They were taught how to conduct each activity in a playful, back-and-forth exchange with the child, praising and encouraging the child to engage in the expected behavior.

This was the first study to find preschool program benefits on participants' intellectual performance and academic achievement *throughout* their schooling. Mean IQs of program and no-program groups, which were the same at study entry, were 101 versus 84 at age 3, 101 versus 91 at 4½, 96 versus 90 at 15, and 89 versus 85 at 21. Achievement scores at age 15 were 94 versus 88 in reading and 94 versus 87 in mathematics. When children were 4½, more teen mothers of program-group children than teen mothers of no-program-group children were self-supporting. By age 15, 31% of the program group versus 55% of the no-program group had been retained in grade, and 25% versus 48% had received special services. At age 21, 67% of the program group versus 51% of the no-program group had graduated from high school or received a GED certificate. By age 21, 35% of the program group versus 14% of the no-program group had attended a 4-year college. As teens, 26% of the program group and 43% of the no-program group became parents. Of those who were parents at 21, the average age at the birth of first child was 19.1 for the program group and 17.7 for the no-program group. However, the program and no-program groups did not differ significantly in arrests by age 19 (Clarke & Campbell, 1998).

Cost-benefit analysis of the Abecedarian program indicates that, in 2000 dollars discounted at 3% annually (converted from the 2002 dollars reported), the program cost \$34,476 per child (\$13,362 per child per year) and yielded benefits to society of \$130,300 – \$3.78 return per dollar invested (Massé & Barnett, 2002). Most of the benefits came from mothers' earnings (54%), participants' earnings (28%), and health improvement due to less smoking (13%).

Beginning in 1985, the **Chicago Longitudinal Study**, conducted by Arthur Reynolds and his colleagues examined the effects of the Chicago Child-Parent Centers (CPC) program offered by the nation's third largest public school district (Reynolds, Temple, Robertson, & Mann, 2001). This program was citywide – much larger in scale than the research programs of the Perry Preschool and Abecedarian studies. Hence, the study sample was larger, with 1,539 low-income children (93% African American, 7% Hispanic) enrolled in 25 schools, 989 who had been in the

CPC program and 550 who had not. Families in this study went to their neighborhood schools, and children were not randomly assigned to groups. Preschool-program group members attended a part-day preschool program when they were 3 and 4 years old, while the no-preschool-program group did not. At age 5, some members of both groups attended part-day kindergarten programs, while others attended full-day kindergarten programs. The CPC program involved the agency's traditional family-support services and preschool education. Parent outreach was provided by a family-support coordinator and a parent-resource teacher. The classroom program emphasized attainment of academic skills through relatively structured learning experiences presented by the teacher.

The preschool-program group did significantly better than the no-preschool-program group in educational performance and social behavior, with lower rates of grade retention (23% vs. 38%) and special education placement (14% vs. 25%) followed by a higher rate of high school completion (50% vs. 39%), almost half a year more of education (10.6 vs. 10.2), and a lower rate of school dropout (47% vs. 55%) and juvenile arrests (17% vs. 25%) – lower for both violent infractions (9% vs. 15%) and nonviolent ones (14% vs. 19%). High school completion rates by gender were 43% for program males versus 29% for no-program males (a 14% difference), but 57% for program females versus 48% for no-program females (a 9% difference); this was the reverse of the preschool experience by gender pattern of the High/Scope Perry Preschool study.

Analysis of the costs and benefits of the Chicago Child-Parent Centers program indicates that, in 2000 dollars discounted at 3% annually (converted from the 1998 dollars reported), the program cost \$6,956 per child participating 1.5 years on average and yielded benefits of \$49,564 per participant, \$7.10 return per dollar invested (Reynolds, Temple, Robertson, & Mann, 2002). Benefits to the general public were \$26,637 per participant, \$3.83 per dollar invested, with the largest benefits coming from more taxes paid on higher earnings (28%), reduced crime victim costs (18%), and reduced costs of school remedial services (18%).

Studies by David Olds and his colleagues in Elmira, New York and Memphis, Tennessee are similar to these studies in employing random assignment of study participants, long-term follow-up, and cost-benefit analysis, but examine a different type of early childhood program – **prenatal and infancy home visitation by nurses** (Olds, Henderson, Phelps, Kitzman, & Hanks, 1993). The program involved weekly to monthly home visits from the onset of pregnancy up to the child's second birthday. It focused on the topics of maternal health, parental role, parental life course, family and friends, and linkage with services. The semi-rural Elmira (New York) efficacy study involved 400 children, 89% of them Caucasian. It found 79% fewer verified reports of child abuse or neglect, 31% fewer subsequent births, a longer interval to the birth of the next child, fewer months receiving welfare, fewer behavior problems due to alcohol and drug abuse, and 69% fewer arrests of the mothers (Olds, Eckenrode, Henderson, Kitzman, Powers, Cole, Sidora, Morris, Pettit, & Luckey 1997; Olds, Henderson, Cole, Eckenrode, Kitzman, Luckey, Pettit, Sidora, Morris, & Powers, 1998).

Cost-benefit analysis of those families in the Elmira study who were at higher risk than the other families in the study found that the program cost \$7,208 (in 2000 dollars) per family and led to benefits of \$29,262 per family, 4 times as much (Karoly, Greenwood, Everingham, Houbé, Kilburn, Rydell, Sanders, & Chiesa, 1998). The urban Memphis (Tennessee)

effectiveness study involved 1,139 pregnancies and 743 children; 92% were African-American and 98% of the mothers were unmarried. It found that the nurse-visited mothers provided better care for their children and had fewer subsequent pregnancies, and their children were hospitalized for fewer days with injuries indicative of child abuse and neglect (Olds, Kitzman, Cole, Robinson, Sidora, Luckey, Henderson, Hanks, Bondy, & Holmberg, 2004).

Olds' nurse home visit program studies stand out among studies of home visit and other family support programs in their identification of long-term effects by experimental designs involving random assignment of families to receive or not receive the program. With the exception that some programs have a moderate effect on preventing child abuse, studies have found that such programs have no or small effects across a variety of child and parent outcomes, of unclear practical value (Board on Children, Youth, and Families, 1999; Layzer, Goodson, Bernstein, & Price, 2001). The most effective programs, such as Olds' program, used professional staff and targeted specific types of families.

Some of these long-term studies have included program replication at multiple sites. The Chicago Child-Parent Centers Study was conducted at multiple sites. Olds replicated his Elmira New York study in Memphis. The Abecedarian project was replicated to some extent in the Infant Health and Development Program study, which found program effects at age 8 for the heavier low-birth-weight babies (McCormick et al., 2006). The High/Scope Perry Preschool Study has not been replicated with an experimental design, although High/Scope training effects on teachers and children have been identified (Epstein, 1993).

Close scrutiny of these long-term studies is warranted to identify what characteristics of program or context account for their long-term success and differentiate them from other early childhood programs. These long-term studies identified larger short-term effects than recent short-term studies have. For example, in the Head Start Impact Study, the difference between the Head Start and no Head Start groups for the Peabody Picture Vocabulary Test (version III) scores of entering 3-year-olds after one year of Head Start was 1.5 points. Children gained 4 points on this measure during their program year in the Head Start FACES study and in the 5-state preschool study. In contrast, children in the High/Scope Perry Preschool program gained 8 points in their first year on the PPVT (original version), and a total of 14 points in two years.

Table 1 compares the principal characteristics and outcomes of the three long-term preschool studies. On most characteristics, one of the studies can be contrasted with the other two, but not always the same two versus the other one. The Abecedarian, Chicago, and High/Scope studies differed in time, place, and program.

Programmatically, the Abecedarian program was a full-day child care program serving children from shortly after birth to kindergarten entry, while the High/Scope and Chicago programs provided part-day preschool education to children 3 and 4 years old and related services to them and their families. The Abecedarian and Chicago programs provided a range of family and health services, but only the High/Scope program provided weekly home visits to parents and their participating children. The High/Scope project provided no follow-up program in elementary school, while both the Abecedarian and Chicago programs did provide school-age programs, although the Abecedarian study did not find these school-age programs to contribute to children's success as did the preschool child care program in the same study.

The Chicago study provides a useful bridge between the short- and long-term studies because it examined a large-scale publicly funded preschool program, putting to rest the idea that such programs are somehow incapable of achieving the long-term results of the Abecedarian or Perry programs. On the other hand, the Abecedarian and Perry programs were intended to be demonstration model programs. They were both the brainchildren of psychologists, Craig Ramey and David Weikart respectively, who acquired grants to fund them and were well-known nationally. Both took charge of not only the research, but also the program. This situation has been described as a conflict of interest, but the fact that the program administrator was so devoted to, and knowledgeable of, assessment and accountability may well have been a major determinant of the success of these programs.

At least two of these three studies found positive effects on children's intellectual performance in childhood, school achievement in adolescence, reduced placements in special education, reduced retentions in grade, improved high school graduation rate, reduced arrest rates, and older female age at first birth.

All three studies found economic returns that were at least several times as great as the initial program investment. For every dollar spent on them, the Perry program returned \$17, the Chicago program returned \$7, and the Abecedarian program returned almost \$4. Although public return (to taxpayers) was not calculated for the Abecedarian program, it constituted about two-thirds of the Perry program return and about half of the Chicago program return. The Perry program generated the highest return, even though its cost was in between the other two programs. Leading economists have viewed this evidence as stronger than the evidence for most other public investments (Heckman, 2006; Rolnick & Grunwald, 2003).

A Picture of Early Childhood Care and Education

This paper focuses on children from birth to 5 years old and so defines early childhood care and education as serving children of these ages. Child care refers to any nonparental care arrangement for any child, but this paper does not address out-of-school care for school-aged children. Infants are children from birth to 1 year old; toddlers are children 2 or 3 years old; and preschoolers are children 3 and 4 years old. Preschool refers specifically to a center-based arrangement for children 3 to 5 years old. Many government preschool programs limit enrollment to preschoolers who live in poverty or are otherwise at risk of school failure, but several states, including Georgia, Oklahoma, and Florida, have begun to offer preschool programs to all the state's 4-year-olds whose families choose to enroll them.

The 2001 National Household Education Survey of the National Center for Educational Statistics presents a national picture of early childhood care and education (Mulligan et al., 2005). This recurrent survey was conducted again in 2005, with results similar to those of 2001, for example, the same percentage of young children having some type of nonparental care arrangement at least weekly (60%; Iruka & Carver, 2006). However, results have not yet been reported by year of age, as they were in 2001. The U.S. Census Bureau conducted a similar

survey as part of the 2002 Survey of Income and Program Participation (Overturf Johnson, 2005).¹

According to this report (Mulligan et al., 2005), the U.S. in 2001 had 20.2 million children under 6 years old who had not yet entered kindergarten.

- 60% of these children had *some type of nonparental care and education arrangement* at least weekly, while 40% did not; the participation rate increased from 40% for infants under 1 year old to 79% for 4-year-olds, due to the increase in the center participation rate.
- 33% received *care and education in a center*, a proportion that grew steadily from 8% of infants, to 16% of 1-year-olds, 25% of 2-year-olds, 43% of 3-year-olds, and 65% of 4-year-olds.
- 16% received *care and education from a nonrelative in a home*, ranging from 13-14% for infants and 4-year-olds to 18-20% for 1- and 2-year-olds.
- 22% received *care and education from a relative in a home*, a proportion that varied by only 1% either way from infancy to age 4.² So 62% had *care and education all in the family*, with either no arrangement (40%) or relative care and education (22%).

The percentage of young children having some nonparental care and education arrangement at least weekly increased steadily with household income, from 53% for those with income of \$10,000 or less to 72% for those with income of more than \$75,000; and mother's level of education, from 43% of children of mothers with less than high school to 74% of children of mothers with a graduate or professional degree. It was highest for non-Hispanic Blacks (73%), followed by non-Hispanic Whites (60%), and Hispanics (48%). It was well over twice as high for children of employed mothers (80%) as for children of mothers not in the labor force (31%), an indicator of the magnitude of the impact of child care need on early childhood care and education.

The type of early childhood care and education arrangements varies by these same demographic factors. As household income goes up, use of center and nonrelative care goes up, while use of relative care goes down. Comparing households with incomes of \$10,000 or less to households with incomes of more than \$75,000, center care rises from 24% to 48%, nonrelative care rises from 9% to 21%, and relative care decreases from 30% to 15%. While 43% to 47% of families with incomes under \$50,000 have no weekly nonparental care arrangement, this is the case for only 28% to 35% of families with incomes over \$50,000.

Early childhood care and education takes place in various types of centers and private residences. Of the 22% of young children receiving care and education from *relatives* in homes, 44% are served in their own homes and 66% are served in other homes. Of the 16% of young children receiving care and education from *nonrelatives* in homes, 21% are served in their own

¹ The Education survey (Mulligan et al., 2005) presents parents' care and education arrangements for their young children under 6 but not in kindergarten, while the Census survey (Overturf Johnson, 2005) presents mothers' care arrangements for their young children under 5, with relative care including both mothers (while working or in school) and fathers. Surprisingly, even given the difference in definition, the Education survey found that 60% of young children had regular care arrangements, while the Census survey found that only 42% did.

² The Census survey found that 70% of nonparental relative care came from grandparents, 8% came from siblings, and 22% came from other relatives (Overturf Johnson, 2005).

homes and 81% are served in other homes. Of the 33% of young children receiving care and education in centers, 35% are served in centers dedicated to this use, 27% are in public or private K-12 schools, 26% are in centers at places of worship, 5% are in private homes that serve as centers, and 9% are in other places, such as libraries, universities, and community centers.

The 60% of young children with care and education arrangements spent an average of 30.5 hours per week in them, with the largest differences due to maternal employment: 38.1 hours per week for young children of mothers working full-time versus 18.1 hours for young children of mothers not in the labor force. Families' out-of-pocket expenses for these arrangements averaged \$68.95 a week, which is \$3.02 an hour. Expenses were higher for families with younger children, families with higher incomes, employed mothers, and mothers with higher levels of education.

Another federal study has looked at the types and quality of care experienced by age 2. The National Center for Education Statistics and other agencies are conducting the Early Childhood Longitudinal Study – Birth Cohort. This study involves a nationally representative sample of over 10,500 children born in 2001 that is being followed from their birth through first grade. To date, findings from interviews, parent and caregiver questionnaires, and developmental assessments of children have been reported for ages 9 months and 2 years (Flanagan & West, 2004; Mulligan & Flanagan, 2006). At age 2, 49% of the children received nonparental care: 19% from relatives, 15% from nonrelatives in homes, 16% in centers, and 1% in two or more settings (Mulligan & Flanagan, 2006). Of those in center-based care, 24% experienced high quality, 66% experienced medium, adequate quality, and 9% experienced low quality, as measured by the Infant/Toddler Environment Rating Scale (Harms & Clifford, 1990). Of those in home-based arrangements, 7% experienced high quality, 57% experienced adequate, medium quality, and the remaining 36% experienced low-quality care, as measured by the Family Day Care Rating Scale (Harms & Clifford, 1989).

Early Childhood Public Policies and Evidence of their Effectiveness

Of U.S. children under age 6 not yet in kindergarten in 2001, 40% received all their care and education from their *parents*, with no other arrangements for this purpose; an additional 22% received care and education from *relatives* other than their parents (Mulligan, Brimhall, West, & Chapman, 2005). The other half of the children under age 6 not yet in kindergarten received care and education from *nonrelatives* – 16% in *homes* and 33% in *centers* (percentages sum to more than 100% due to some children being in several categories). Center care and education increased sharply and steadily with age, from 8% for infants under 1, to 16% for 1-year-olds, 25% for 2-year-olds, 43% for 3-year-olds, and 65% for 4-year-olds. The dominant public policy toward children receiving nonrelative care and education is to have regulations that keep them safe. Only some of these programs are required to focus on children's development as well.

The federal government has initiated and funded early childhood programs since 1965. Total federal funding for early childhood programs in FY 2005 was \$16.4 billion. The U.S. Department of Health and Human Services funds early childhood programs through Head Start, Early Head Start, the Child Care and Development Fund, Temporary Assistance to Needy Families, and the Social Services Block Grant (White House, 2004). The U.S. Department of Education funds early childhood programs through Title I preschools, Early Reading First, Even

Start, Special Education Preschool Grants, Grants for Special Education for Infants and Toddlers, and the Early Childhood Educator Professional Development Program.

Head Start and Similar Federal Programs

Since 1965, the federal government has funded and supervised Head Start programs that provide various services for young children and their families. Head Start is the largest of the current federally funded early childhood programs, funded at \$6.8 billion in FY 2005. It gives local agencies grants to fund and run comprehensive child development programs that serve children from 3 to 5 years old. Head Start services include early childhood education, parent involvement, meals, and medical, dental, and mental health referrals. Grantees include local public agencies, private non-profit and for-profit organizations, Indian tribes, and school districts (Head Start Bureau, 2005). Program eligibility depends on family income, so that 90% of all recipients must be below the federal poverty level. In addition, 10% of the slots in a program must be reserved for children with disabilities. Most Head Start programs are center-based and are generally required to operate at least 3.5 hours a day, 4 days a week, 32 weeks of the year. The National Head Start Association (2005) reports that nationally, Head Start served about 50% of all children eligible for those services.

The Head Start Family and Child Experiences Survey (FACES) is a study of a representative national sample of Head Start programs in the U.S. (Zill, Resnick, Kim, O'Donnell, Sorongon, McKey, Pai-Samant, Clark, O'Brien, & D'Elio, 2003). The first cohort of 3,200 children entered Head Start in fall 1997; the second cohort of 2,800 children entered Head Start in fall 2000. In Head Start, children improved on important aspects of school readiness, narrowing the gap between them and the general population, but still lagging behind. Relative to national norms, children made significant gains during their Head Start year, particularly in vocabulary and early writing skills. Children in Head Start grew in social skills and reduced hyperactive behavior, especially if they started out more shy, aggressive, or hyperactive. The study found that Head Start classrooms were rated to have good quality. Most programs used a specific integrated curriculum, particularly Creative Curriculum and High/Scope. Use of these curricula and higher teacher salaries were predictive of positive child outcomes. Teachers' educational credentials were linked to greater gains in early writing skills. In addition, provision of preschool services for a longer period each day was tied to greater cognitive gains by children. Based on follow-up of the 1997 cohort, Head Start graduates showed further progress toward national averages during kindergarten, with substantial gains in vocabulary, early mathematics, and early writing skills. Most Head Start graduates could identify most or all of the letters of the alphabet by the end of kindergarten, and more than half could recognize beginning sounds of words.

The Head Start Impact Study, now under way, involves a nationally representative sample of Head Start programs and random assignment of about 5,000 children to Head Start or no Head Start. This study has so far provided results for entering 3-year-olds and entering 4-year-olds after one year in Head Start and will follow them through the end of kindergarten and first grade (Administration for Children and Families, 2005). It has found evidence of small to moderate Head Start effects on children's literacy skills (pre-reading, pre-writing, parent-reported literacy skills, 3-year-olds' vocabulary), reduced problem behaviors of 3-year-olds, children's access to health care, parents' reading to their children, and reduced use of physical

discipline of 3-year-olds.

The Head Start Comprehensive Child Development Program Evaluation randomly assigned 4,410 children and families living in poverty at 21 sites either to this program or no program and followed them for 5 years (Goodson, Layzer, St. Pierre, Bernstein, & Lopez, 2000). Although the program's comprehensive services centered on the assignment to each family of a case manager to help them meet their needs, only 58% of the program group actually met with a case manager, as did 18% of the control group due to other programs. The study found no statistically significant, positive group differences on either child or parent outcomes, suggesting that families do not really profit from case management associated with early childhood programs.

Two evaluations of the Even Start Family Literacy program randomly assigned children and families to Even Start or not (Planning and Evaluation Service, 1998). Somewhat greater percentages of the Even Start group than the control group received various services, 95% versus 60% participating in early childhood education, for example. Consequently, both groups experienced gains, with the Even Start group experiencing some greater gains – the pattern for adult literacy, adult GED attainment (22% vs. 6% in one of the studies), cognitive stimulation and emotional support by the family, and children's vocabulary. Even Start children improved their basic school readiness skills (e.g., recognition of colors, shapes, and sizes), but their non-Even Start peers caught up with them a year later. Again, the lack of compliance with group assignment may have led to underestimation of program effects.

The Early Head Start program evaluation of some 3,000 infants and toddlers and their low-income families found program effects through age 2 for this federal program that began in 1995 (Love, Kisker, Ross, Schochet, Brooks-Gunn, Paulsell, Boller, Constantine, Vogel, Fuligni, & Brady-Smith, 2002). When compared to a randomly assigned control group, Early Head Start children did modestly but statistically significantly better on measures of cognitive, language, and social-emotional development, and their parents scored significantly better than control-group parents on measures of parenting behavior and knowledge of infant-toddler development.

Early Childhood in the Individuals with Disabilities Education Act

The Individuals with Disabilities Education Act (IDEA) is the federal special education law. It provides regulatory guidance for states and school districts to provide special education and other services to eligible children. States are responsible for implementation and enforcement of this federal mandate. A child is evaluated by a team of experts and given an Individualized Education Program if he or she is found to have a disability and to need special education or other services in order to make progress in the general education curriculum. In 2001, IDEA served 31,378 infants and toddlers, 2.1% of all children under from birth to 2 years old, under part C and 620,195 preschoolers, 5.3% of all preschoolers 3 to 5, under part B (Office of Special Education and Rehabilitative Services, 2003).

Early Childhood in the No Child Left Behind Act

Early in his presidency, President George W. Bush successfully advocated the No Child Left Behind (NCLB) Act as a radical revision of the Elementary and Secondary Education Act

through which the majority of federal K-12 funding and directives flow (107th Congress, 2002). Among the many problems NCLB proposes to address are the school achievement gap between disadvantaged students and their peers and the low school-achievement ranking of U.S. children against their international peers. The Act sets strict standards of learning and holds schools accountable for them, based on the belief that these measures will reduce the school achievement gap and increase overall school performance. The major accountability measure of NCLB is annual testing of all public school students in reading and mathematics in grades 3-8 and high school. From these results, schools and states prepare annual report cards on school performance for the public.

President Bush has also advocated an early childhood education agenda called *Good Start, Grow Smart*. The main aims of this agenda are to align preschool programs with K-12 schools, increase and standardize the evaluation of early childhood programs, and increase the information on school readiness for parents and early childhood teachers and caregivers (White House, 2004). The initiative also includes new accountability measures for Head Start and the other federally funded preschool initiatives. The major impact of this initiative has not been to change the basic funding streams for early childhood care and education, but rather to introduce several new programs such as Early Reading First and to require more stringent evaluation and testing of existing federally funded programs, such as the new National Reporting System in Head Start.

The Child Care and Development Fund

The Child Care and Development Fund (CCDF; formerly called the Child Care and Development Block Grant Program) gives states funding for child care subsidies for low-income families (85% or less of the state's median family income) who are working or looking for work. While these funds can go to any children under age 13, about two-thirds of them go to children under 5 (Barnett & Massé, 2002). Of CCDF funds, 70% must be given for child care assistance to families receiving Temporary Assistance for Needy Families benefits. While the rules and regulations under this law changed with the new welfare laws, funding has generally increased over time.

Several studies of typical child care programs in the U.S. bear out the idea that high-quality programs contribute to children's development while low-quality programs do not. **The Cost, Quality and Child Outcomes in Child Care Centers Study** was a longitudinal study of how children's experience in center-based care and school related to their socio-emotional and cognitive outcomes concurrently and at age 7 (Cost, Quality & Child Outcomes Study Team, 1995). The study focused on a random sample of 100 nonprofit and for-profit centers in four states in the mid-1990s. Observers found that 65% of centers posted a medium score on the Early Childhood Environment Rating Scale (Harms & Clifford, 1980), 24% scored high, and 11% scored low. A follow-up examined 733 children from these settings from ages 4 to 8 as a function of their child care center experience, after adjusting for their background characteristics. The findings indicate that center quality had a modest long-term effect on children's cognitive and socioemotional development.

The NICHD Early Child Care Study is a longitudinal study initiated by the National Institute of Child Health and Human Development (NICHD) in 1989 to look at the relationship

between child care experience and children's developmental outcomes (NICHD Early Child Care Research Network, 2005). The sample began with 1,364 infants in 1991 and is continuing to follow up on 1,000 of them through age 15. The study team has involved researchers at several dozen universities. Higher quality child care was found to be associated with higher test scores on mathematics and reading achievement and of memory through third grade. Time spent in center child care was found to be associated with better memory and more conflictual relationships with adults. More hours of child care were found to be associated with poorer work habits and poorer social skills through third grade.

State-Funded Preschool Programs

The states are currently enacting and implementing a variety of early childhood policies. While some states target preschool-age children, others have a more comprehensive approach to support early childhood care and education. A few general trends and policies are emerging in this area. Most states have added state-funded preschool programming in the last two decades. As states have implemented these programs and evidence grows on the importance of program quality to preschool outcomes, states have heightened their attention to program quality in policies on curriculum models, high teacher qualifications, and increased size and scope of the program and the children served.

Currently, 38 states fund and run preschool programs (Barnett, Hustedt, Robin, & Schulman, 2005). Twenty states appropriate supplemental Head Start funds, either to serve more children or to support a range of things that the federal money does not sufficiently cover, such as administration and coordination of training. For 4 states this is the *only* state investment in early childhood.

The National Institute for Early Education Research (NIEER) now publishes an annual preschool yearbook with evaluations of preschool commitments of all 50 states and has recently released its third such report (Barnett et al., 2005). As of 2004-2005, NIEER reported that state-funded preschool programs serve more than 801,902 children in the U. S. This represents 17% of all 4-year-olds and 3% of all 3-year-olds nationwide. Oklahoma and Georgia provide the greatest access to preschool programs, enrolling 69% and 55% of children in their state-funded programs, respectively. It is interesting to note how similar these percentages are to the national rate of 65% of 4-year-olds enrolled in both public and private center programs. Florida has passed a ballot initiative requiring preschool programs for all the state's 4-year-olds.

NIEER ranks states in three ways: access to preschool, quality and resources. The *access ranking* is based on the percentage of the state's 3- and 4-year-olds enrolled. The *resources ranking* is based on spending per child enrolled. The *quality ranking* depends on state policies on ten factors, including comprehensive early learning standards, teacher and assistant teacher qualifications, teacher inservice training, class size and staff-child ratios, and required site visits by state monitors. In the 2004-2005 rankings, only Arkansas met all 10 benchmarks, and only 5 other states met 9 of the 10. Of the 38 states with programs, 21 met 5 or fewer of the quality benchmarks. Combined, states spent more than \$2.84 billion on preschool programs in FY2005.

Enrollment and programming for prekindergarten fluctuate over time. Overall, across the time period that NIEER has been reporting state data, the number of 3-year-olds served

decreased in 13 states and the number of 4-year-olds served decreased in 10 states. In contrast, some states have dramatically increased the access to state prekindergarten programs, with 12 states increasing access for 3-year-olds and the other 26 states with programs increasing their enrollment of 4-year-olds. Two additional elements of access are school districts' offerings and income eligibility requirements. Of the states that fund preschool programs, the percentage of school districts in which these programs are actually offered varies. Most state programs restrict access to children from families with incomes that are within some percentage, usually 185% to 250%, of the federal poverty line. By serving children above the poverty line, these programs expand access beyond Head Start, where poverty income is required of most children enrolled.

Overall, after controlling for inflation, 11 states had lower spending in 2004-05 on preschool programs than in 2001-02, 9 had higher spending, and the remaining states had the same amount of funding. In constant dollars, overall spending per child decreased in the U.S. by 7.3% from 2001-02 to 2004-05.

States have given some attention to program quality, though the progress has been slow and unsteady, with inconsistent funding and changes in program definitions. Most but not all new programs that states implement have higher quality ratings. Currently, 22 state programs have a quality rating of 6 or higher (on the NIEER 10-point scale), 16 states score between 1 and 5, and 12 states have no scores due to lack of program. NIEER ratings and rankings are not scaled or weighted; for example, serving a meal at a preschool is counted and valued the same as having a well-qualified and trained teacher, even though evidence strongly supports the value of teacher quality.

The governance of state preschool and early childhood education programs also varies across the states. At the state level, oversight and regulation is done by the state department of education in 28 states, a separate state department such as family services in 8 states, and a joint agency or quasi-agency in 6 states. Likewise, the program operators vary across and within states. While 5 states allow only public schools to run state-funded preschool, others allow any agency (private non-profit, private for-profit, community agency, or public school) to run state preschools as long as they meet the program standards, such as teacher training and class size.

Barnett, Lamy and Jung (2005) led a **study of the effects of five state-funded preschool programs** on the academic skills of entering kindergartners. It involved 5,071 children from Michigan, New Jersey, Oklahoma, South Carolina, and West Virginia. Children who did and did not make the age cutoff for program entry were compared using a sophisticated research design (regression discontinuity). The programs were found to have statistically significant, meaningful effects on children's vocabulary, print awareness skills, and early mathematics skills.

An **evaluation of Oklahoma's universal prekindergarten program in Tulsa** compared 1,461 children who just completed pre-K to 1,567 children just beginning pre-K using a regression discontinuity design, to avoid selection bias (Gormley, Gayer, Phillips, & Dawson, 2005). They found strong effects on achievement test scores for letter word identification (.79 of the standard deviation of the control group), spelling (.64 of the standard deviation), and applied mathematics problems (.38 of the standard deviation). Findings held for Hispanic, Black, White, and Native American children, and for middle-income as well as low-income children.

Gilliam and Zigler (2001) reported that as of 1998, 13 of the 33 state preschool programs had received evaluations. They summarize these evaluations as finding modest support for positive program effects on children's developmental performance, school performance and attendance, and reduced percentages of children held back a grade.

Early Childhood around the World

The IEA Preprimary Project examined various types of early childhood settings and their relationship to child outcomes, not only in the U.S., but also in other countries around the world. It was sponsored by the International Association for the Evaluation of Educational Achievement (IEA) and coordinated by the High/Scope Educational Research Foundation (Montie, Xiang, & Schweinhart, 2006; Olmsted, & Montie, 2001; Weikart, Olmsted, & Montie, 2003). The purpose of the study was to identify how process and structural characteristics of community preprimary settings affect children's language and cognitive development at age 7. The target population consisted of children in selected community settings who were 4½ years old. Data for the longitudinal project were collected in early childhood care and education settings in 10 countries: Finland, Greece, Hong Kong, Indonesia, Ireland, Italy, Poland, Spain, Thailand, and the U. S. The original sample included over 5,000 children in more than 1,800 settings in 15 countries. Ten of the 15 countries followed the children to age 7 to collect language and cognitive outcome measures. The number of children included in the longitudinal analyses varied from 1,300 to 1,897, with an overall retention rate of 86% of the original samples in the participating countries.

Four findings emerged that are consistent across all of the countries included in the data analysis.

- Children's language performance at age 7 improves the most when the predominant types of children's activities that early childhood teachers proposed were freely chosen by children rather than personal care, group social activities, or discipline. Physical and expressive activities were second in influence and preacademic activities were third.
- Children whose early childhood teachers had more years of full-time schooling have better language performance at age 7.
- Children who spent less time in whole-group activities, in which the teachers proposed the same activity for all the children in the class, have better cognitive performance at age 7.
- Children whose preschool settings had a greater number and variety of equipment and materials have better cognitive performance at age 7.

This study is unprecedented in the number of countries participating, so these findings transcend the sample limitations of the other studies reviewed here. The fact that these findings were found internationally suggests that these process and outcome variables have common meanings across all 10 countries. Also, unlike others studies reviewed here, these findings were found across all types of early childhood settings, not just those established by a particular early childhood funding source, again testifying to their unusual robustness and durability.

Table 2 summarizes the design and findings of the short-term studies reviewed here. The programs studied were either typical or enhanced Head Start or state preschool programs and typical child care centers. While one study (the CCDP evaluation) found no effects, the others found modest effects on children's literacy and social skills and parents' behavior. The

consensus finding of these studies is that typical and even special publicly funded early childhood programs have modest effects on children's literacy and social skills and parents' behavior.

What We Still Need to Know

We are at a crossroads in early childhood education research. On the one hand, brain research findings suggest that early childhood education is very important, and several long-term studies have established the fact that model preschool programs and model parent education programs can have lifelong benefits and a strong economic return in investment. On the other hand, evaluations of typical and even enhanced publicly funded early childhood programs reveal only modest short-term effects on children's development. Clearly, if the goal is to provide long-term effects and financial return on investment, the general intention to run an early childhood program is not enough. Emulation of effective programming is also essential.

We are in a season of expansion of public attention to early childhood programs. All but ten states are investing state dollars in preschool programs. Illinois, South Carolina, and a growing number of states are following North Carolina's lead with the Smart Start project to create a comprehensive, statewide early childhood system. We have an opportunity not only to gather needed research on early childhood education, but a critical opportunity to shape emerging public policy with such information.

Given this state of affairs, we need research that identifies the limits of the long-term findings we have. Some early childhood programs and parent education programs lead to long-term effects and economic return on investment, but some do not. What are the characteristics of the ones that do, and for that matter, what are the characteristics of the ones that do not? These characteristics may be internal, program characteristics – such as teacher qualifications, curriculum model, or parent involvement component. They may be external characteristics, such as population served or historical or geographic context. They may even be combinations of internal and external characteristics.

Based on the long-term findings, we would recommend that early childhood programs meet several broad standards.

- Every center-based preschool classroom, whether part-day or full-day, should have a professional teacher with a bachelor's degree and certification in early childhood, along with an aide and no more than 18 3- and 4-year-olds. Likewise, every home visit program should be run by a qualified teacher or registered nurse.
- Every teacher or nurse should know how to use a validated child development curriculum that has evidence that it contributes to all aspects of children's development.
- Every program should fully engage parents as genuine partners in their children's education, through frequent home visits and other meetings.
- Every program director should focus single-mindedly on the program's contribution to children's development and should continuously assess program implementation and child outcomes to confirm that the intended teacher practices and child outcomes are taking place as planned.

Long-term research has provided evidence of the value of these standards, but their formulations require interpretation of this research, so it would be wise to conduct further research on these formulations. Are one professional teacher and an aide enough for long-term effects, or are two professional teachers needed? How much program attention must be paid to parents? Are long-term effects limited to children in poverty or do they also apply to other children? Do these findings apply only in economically developed countries or also in economically developing countries?

Then there is the long bridge between the long-term studies of model early childhood programs and the short-term studies of today's publicly funded early childhood programs. Efforts to cross this bridge have been made in the studies of enhanced Head Start programs. But these efforts have not yet found the hoped-for breakthrough successes. Would Head Start, state preschool programs, or other early childhood programs that embodied the proposed standards identified above provide this breakthrough success?

- About one-third of today's center-based teachers (including Head Start) and 17% of family child care providers have a bachelor's degree (Burton, 2002). Lack of credentials follows from low pay: The average hourly wage for U.S. preschool teachers in 2004 was only \$9.34 (Bureau of Labor Statistics, 2006).
- A national survey of 400 early childhood educators conducted by Quality Education Data (2005) found that 10% of them used High/Scope as their primary curriculum, the same percentage found a decade ago (Epstein, Schweinhart, & McAdoo, 1996).
- Few early childhood programs fully engage parents as genuine partners in their children's education, through frequent home visits and other meetings. Head Start requires only two home visits a year, whereas the Perry program had weekly home visits.

These studies apply most clearly to children who are living in poverty or are otherwise at risk of school failure. What about the rest of young children, including the majority who are not enrolled in early childhood programs at a given point in time? While the research directions just described may be called confirmatory, research on the effects of early childhood programs on these children needs to be exploratory. What programs work best for them, fitting into families' lifestyles while contributing to young children's development? While 65% of all 4-year-olds enroll in center-based early childhood programs, 35% do not. How many more would enroll if high-quality programs were widely available? While nurse home visit programs are effective with some children, what of the 62% of all young children whom parents and other relatives now take care of? Perhaps the lessons of highly effective programs apply to these situations in modified form: that everyone who takes care of young children can and should profit from the scientifically established lessons of early childhood education.

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Table 1

Common Findings of Three Long-Term Early Childhood Program Studies

Characteristic	Carolina Abecedarian	Chicago Child-Parent Centers	High/Scope Perry
Intellectual performance tests	Ages 3-21	--	Ages 4-7
School achievement tests	Age 15	Ages 14-15	Ages 7-27
Placed in special education	25% vs. 48%	14% vs. 25%	65% vs. 60%
Retained in grade	31% vs. 55%	23% vs. 38%	35% vs. 40%
High school graduates	67% vs. 51%	50% vs. 39%	65% vs. 45%
--Males		43% vs. 29%	50% vs. 54%
--Females		57% vs. 48%	84% vs. 32%
Arrested by 21	45% vs. 41%	17% vs. 25%	15% vs. 25%
Age at birth of first child	19.1 vs. 17.7	--	20.0 vs. 21.0
<i>Cost-benefit analysis^a</i>			
Program cost	\$34,476	\$6,956	\$15,166
Program cost per year	\$13,362	\$4,637	\$8,540
Public return, total	--	\$26,637	\$195,621
Public return, per dollar invested	--	\$3.83	\$12.90
Societal return, total	\$130,300	\$49,364	\$258,888
Societal return, per dollar invested	\$3.78	\$7.10	\$17.07

^a All dollar entries are per participant in constant 2000 dollars discounted at 3% annually.

Table 2

Findings of Recent Short-Term Early Childhood Program Studies

Study	Findings
Head Start Impact Study	Modest effects on children's literacy skills, reduced problem behavior, parent reading to children
Head Start Family and Child Experiences Survey	Modest gains in children's literacy and social skills in Head Start and kindergarten years
Comprehensive Child Development Program	No effects on child or parent outcomes
Early Head Start Evaluation	Modest effects on children's development to age 2; effects on parents' behavior and knowledge
Even Start Evaluations	One-year improvement in children's readiness skills, gains in adult literacy, GED certification
Five-State Preschool Study	Improvements in children's literacy and mathematics skills
Oklahoma Preschool Study	Strong effects on literacy skills.
State Preschool Evaluations	Modest effects on children's development, school performance.
Cost, Quality and Child Outcomes Study	Quality had a modest effect on children's cognitive and socioemotional development at age 7.
NICHD Early Child Care Study	Higher quality child care was associated with higher math, reading, and memory test scores through grade 3.
IEA Preprimary Project	Children's self-chosen activities, lack of whole-group

activities, materials, teachers' schooling enhance development.

Evidence that Interactive Early Childhood Education Contributes to Human Development

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This talk describes five studies that affirm the importance of interactive early childhood education. *The High/Scope Perry Preschool Study* compares the life outcomes of study participants who did and did not attend an interactive preschool program. *The High/Scope Preschool Curriculum Comparison Study* compares the life outcomes of study participants who participated in three types of preschool programs – Direct Instruction, High/Scope interactive education and traditional Nursery School interactive education. *The Training for Quality Study* examines the effects of High/Scope interactive education training on teacher trainers, teachers, and children. *The Head Start Family and Child Experiences Survey (FACES)*, conducted by a consortium of independent research organizations, examines curriculum and child outcomes in a nationally representative sample of Head Start classrooms in the U.S. *The Preprimary Study of the International Association for the Evaluation of Educational Achievement (IEA)* examines early childhood settings and child outcomes in countries around the world. In addition to their common testimony on the value of interactive learning, these studies also constitute much of the research history of the High/Scope Educational Research Foundation.

The High/Scope Interactive Preschool Education Model

The model used in all of these studies but the IEA Preprimary Study was the High/Scope interactive education model designed for use with young children. Drawing on the child development ideas of Jean Piaget, it emphasizes the idea that children are intentional learners, who learn best from activities that they themselves plan, carry out, and review afterwards. Adults introduce new ideas to children through adult-initiated small- and large-group activities. Adults observe, support, and extend the children's play. Adults arrange interest areas in the learning environment; maintain a daily routine that permits children to plan, carry out, and review their own activities; and join in children's activities, asking appropriate questions that extend their plans and help them think about their activities. They add complex language to the discussion to expand children's vocabulary. Using key developmental indicators derived from child development theory and research, adults encourage children to make choices, solve problems, and engage in activities that contribute to their intellectual, social, and physical development.

While key developmental indicators are used to monitor children's progress, adults do not provide children with prescriptively sequenced lessons that cover a defined subject matter. Instead, they listen closely to children's plans and then actively work with them to extend their activities to challenging levels as appropriate. Adults' questioning style is important, emphasizing questions that initiate conversations with children and drawing out observations and reflections expressed in children's own language. Adults rarely ask questions merely to test children's grasp of letters, numbers, or colors. Instead, they ask for self-generated descriptions or ideas: What happened? How did you make that? Can you show me? Can you help another child? The questioning style permits free conversation between adults and children and serves as a model for conversations among children. This reflective approach permits adults and children to interact as thinkers and doers rather than taking on the traditional school roles of initiating teacher and responding pupil. Adults as well as children share and learn as they work.

In order to create a setting in which children engage in intentional learning activities, a consistent daily routine is maintained that varies only when children get fair warning that things will be different the next day. Field trips are not surprises, nor do adults initiate special visits or events in the classroom on the spur of the moment. This adherence to routine gives children the control that helps develop a sense of responsibility and offers the enjoyment of being independent. The daily routine includes a plan-do-review sequence, as well as small- and large-group activities. The plan-do-review sequence is the central device that gives children opportunities to express intentions about their activities and reflect on their experience, while keeping adults intimately involved in the process.

The High/Scope Perry Preschool Study

David Weikart and his colleagues in the Ypsilanti Michigan school district operated the High/Scope Perry Preschool program for 3- and 4-year-olds living in poverty to help them avoid school failure and related problems. Because people differed on whether such a program actually did help or not, they embedded the program in the High/Scope Perry Preschool study to find out.

Design

To conduct this study, they identified 123 young African American children in Ypsilanti living in poverty and assessed to be at high risk of school failure. They randomly assigned about half of them to a no-program group that received no preschool program and the other half to a program group that received a high quality High/Scope preschool program for the program group at ages 3 and 4. The project staff collected data on both groups annually from ages 3 through 11 and at ages 14, 15, 19, 27, and 40. After each period of data collection, they analyzed the data and wrote a report of the study (summarized by Schweinhart et al., 2005).

Findings

The various findings of program effects through age 40 span the domains of education, economic performance, crime prevention, and family and health. All findings reported herein for this study are statistically significant with a probability of less than .05, using a one-tailed test because the obvious direction of the hypothesis is that the preschool program group is doing better than the no-program group, not vice versa. A path model of the study suggests how preschool experience affects age 40 success. Beginning with preschool experience and children's pre-program intellectual performance, the model traces paths to children's post-program intellectual performance, then to their school achievement and commitment to schooling, then to their educational attainment, then to their adult earnings and lifetime arrests. This model did not differ for males and females. Figure 1 presents group differences for these variables.

More of the program group than the no-program group graduated from high schooling or received a GED (77% vs. 60%). This difference was due to a 42 percentage-point difference between program and no-program females in high school graduation rate (88% vs. 46%). This difference was related to earlier differences between program and no-program females in the rates of treatment for mental impairment (8% vs. 36%) and retention in grade (21% vs. 41%). Earlier, the program group outperformed the no-program group on various intellectual and language tests from their preschool years up to age 7; school achievement tests at 7 to 14; and literacy tests at 19 and 27. The program group had better attitudes towards school than the no-program group as teens, and program-group parents had better attitudes towards their teen children's schooling than did no-program-group parents. The preschool program affected children's performance and attitudes, regardless of their gender, but this common effect seems to have led school staff to track girls, but not boys. As will be seen, however, the program had plenty of long-term effects on boys as well.

More of the program group than the no-program group were employed at 27 (69% vs. 56%) and 40 (76% vs. 62%). The program group had higher median earnings than the no-program group, annually at 27 (\$12,000 vs. \$10,000) and at 40 (\$20,800 vs. \$15,300) and monthly at both ages. More of the program group than the no-program group owned their own homes at 27 (27% vs. 5%) and 40 (37% vs. 28%) rather than paying rent, receiving a subsidy, living with others, or being incarcerated. At 40, program males paid more per month for their dwelling than did no-program males. More of the program group than the no-program group had a car at 27 (73% vs. 59%) and 40 (82% vs. 60%). At 40, significantly more of the program group than the no-program group had a savings account (78% vs. 50%). At 27, fewer in the program group than the no-program group reported receiving social services at some time in the previous ten years (59% vs. 80%). The group difference at 40 had dropped from 21 percentage-points to 15 percentage points (71% vs. 86%) and was no longer statistically significant.

During their lives, fewer in the program group than the no-program group were arrested 5 or more times (36% vs. 55%) or were arrested for violent, property, or drug crimes. Group differences in various types of crime occurred in adolescence, early adulthood, and midlife. By 40, compared to the no-program group, the program group had fewer of 3 of the 78 types of crimes cited at arrest – dangerous drugs, assault and/or battery, and larceny under \$100. Fewer in the program group were sentenced to time in prison or jail by age 40 (28% vs. 52%), particularly from ages 28 to 40 (19% vs. 43%).

More program than no-program males raised their own children (57% vs. 30%). The two oldest children of the program group did not differ significantly from the two oldest children of the no-program group in education, employment, arrests, or welfare status. At 40, more of the program group than the no-program group said they were getting along very well with their family (75% vs. 64%). Fewer program than no-program males reported using sedatives, sleeping pills, or tranquilizers (17% vs. 43%) or marijuana or hashish (48% vs. 71%).

In constant 2000 dollars discounted at 3%, the economic return to society for the program was \$244,812 per participant on an investment of \$15,166 per participant – \$16.14 per dollar invested. Of that return, 80% went to the general public, and 20% went to each participant. Most of the public return came from crime savings, and the rest came from education and welfare savings and increased taxes due to higher earnings. Most of the public return was due to males, because of the large program effect of reducing male crime. This finding for males stands in stark contrast to the large program effect on the high school graduation rates of females. Preschool program participants earned 14% more per person than they would have otherwise – \$156,490 more over their lifetimes in undiscounted 2000 dollars. Male program participants cost the public 41% less in crime costs per person, \$732,894 less in undiscounted 2000 dollars over their lifetimes. This cost–benefit analysis is conservative, in two respects. It omits hard-to-monetize benefits, such as family, health, and wealth benefits; and it makes conservative assumptions about the earnings profiles and the unit costs of crimes, opting for the data source resulting in smaller group differences when multiple data sources were available.

Validity of the Study

The study's internal validity is strong because of the random assignment of study participants to the program and no-program groups. It is strengthened further by the use of seven covariates representing background characteristics in the age 40 analyses. Additional analyses confirm that major outcomes were not due to placing siblings in the same preschool-experience groups as their older siblings, nor to variations among classes of study participants. The study's statistical power is somewhat limited by its sample size of 123 study participants, but the sample size was adequate to identify many statistically significant group differences.

The study's external validity is the extent to which its study participants and program resemble the children and program to which it is generalized. Because this study is rare and relevant to public policy, the demands on its generalizability are great: Head Start, state preschool, and child care programs in the U.S. and early childhood programs throughout the world would like to lay claim to such effects.

The effects found in the study generalize to programs that are reasonably similar to the High/Scope Perry Preschool program – preschool education programs run by teachers with bachelors' degrees and certification in education, each serving up to 8 children living in low-income families. These programs run two school years at 3 and 4 years of age, use the High/Scope educational model, with daily classes of 2½ hours or more and teachers visiting families at least every two weeks.

Because such evidence is reflected neither in the quantity nor in the quality of existing publicly funded preschool programs, we set about to let as many people as possible know about this study. We disseminated the study through publications and presentations for national associations of policymakers, scientists, and educators and for conferences of them in most of the states. We even trained groups of speakers in four states – Michigan, Ohio, North Carolina, and South Carolina. We worked with newspapers and media throughout the country to spread the story. With continuing bipartisan support, overall Head Start funding from 1980 to 2007 increased ninefold from \$735 million to \$6.9 billion, and funding per child almost quadrupled, from \$1,953 to \$7,209.

While many of the features of the study have been the subject of some debate in designing preschool programs, a particularly important question is whether a preschool program must use the High/Scope educational model or some other educational model in order for its participants to experience long-term benefits. This question led to the next study.

The High/Scope Preschool Curriculum Comparison Study

The High/Scope Preschool Curriculum Comparison Study (Schweinhart & Weikart, 1997a, 1997b) suggests that curriculum has a lot to do with a preschool program's long-term benefits. This study found that young people born in poverty experience fewer emotional problems and felony arrests if they attended a preschool program that used High/Scope rather than direct instruction.

Design

Since 1967, the study has followed the lives of 68 young people born in poverty who were randomly assigned at ages 3 and 4 to one of three groups, each experiencing a different curriculum model:

- In the **direct instruction model**, teachers followed a script to directly teach children academic skills, rewarding them for correct answers to the teacher's questions.
- In the **High/Scope model**, teachers set up the classroom and the daily routine so children could plan, do, and review their own activities and engage in key active learning experiences.
- In the **traditional nursery school model**, teachers responded to children's self-initiated play in a loosely structured, socially supportive setting.

Program staff implemented the curriculum models independently and to high standards, in 2½-hour classes held 5 days a week and 1½-hour home visits every two weeks, when children were 3 and 4 years old. Except for the curriculum model, all aspects of the program were nearly identical. The findings presented here are corrected for differences in the gender makeup of the groups.

Findings

Figure 2 present the major findings of this study at age 23. By age 23, the High/Scope and nursery school groups had ten significant advantages over the direct instruction group – both groups had two advantages,

the High/Scope group alone had another six advantages, and the nursery school group alone had two additional advantages. However, the High/Scope and nursery school groups, after controlling for gender makeup, did not differ significantly from each other on any outcome variable (Schweinhart & Weikart, 1997b).

By age 23, the High/Scope and nursery school groups both had two significant advantages over the direct instruction group:

- Only 6% of either group needed treatment for emotional impairment or disturbance during their schooling, as compared to 47% of the direct instruction group.
- 43% of the High/Scope group and 44% of the nursery school group had ever done volunteer work, as compared to 11% of the direct instruction group.

The High/Scope group had six additional significant advantages over the direct instruction group:

- Only 10% had ever been arrested for a felony, as compared to 39% of the direct instruction group.
- None had ever been arrested for a property crime, as compared to 38% of the direct instruction group.
- 23% reported at age 15 that they had engaged in 10 or more acts of misconduct, as compared to 56% of the direct instruction group.
- 36% said that various kinds of people gave them a hard time, as compared to 69% of the direct instruction group.
- 31% of the group had married and were living with their spouses, as compared to none of the direct instruction group.
- 70% planned to graduate from college, as compared to 36% of the direct instruction group.

The nursery school group had two additional significant advantages over the direct instruction group:

- Only 9% had been arrested for a felony at ages 22 - 23, as compared to 34% of the direct instruction group.
- None of them had ever been suspended from work, as compared to 27% of the direct instruction group.

Through age 10, the main finding of this study had been that the overall average IQ of the three groups rose 27 points from a borderline impairment level of 78 to a normal level of 105 after one year of their preschool program and subsequently settled in at an average of 95, still at the normal level. The only curriculum group difference through age 10 was measured as the preschool programs ended: the average IQ of the direct instruction group was significantly higher than the average IQ of the nursery school group (103 vs. 93). Throughout their school years, curriculum groups did not differ significantly in school achievement, nor did their high school graduation rates differ significantly. The conclusion at that time was that well-implemented preschool curriculum models, regardless of their theoretical orientation, had similar effects on children's intellectual and academic performance. Time has proved otherwise. Scripted teacher-directed instruction, touted by some as the surest path to school readiness, seems to purchase a temporary improvement in academic performance at the cost of a missed opportunity for long-term improvement.

The High/Scope educational model was originally called the Cognitively Oriented Curriculum (Weikart et al., 1971) because it focused on cognitive, logical processes identified in Piaget's theory (Piaget & Inhelder, 1969) – such as representation classification, and seriation. Tests of early childhood intellectual performance demonstrably tapped these processes, in both the Perry study and the Curriculum study. So the High/Scope preschool classroom provides a preschool intellectual boost as measured by these tests. It also provides other experiences that facilitate these intellectual processes, such as planning and reviewing one's activities, exploring one's curiosity, and developing a sense of personal control over the events of one's life – what might be called intellectual performance broadly defined. It makes sense to combine or

supplement this emphasis on intellectual processes with a focus on early literacy or mathematics skills found to predict later achievement, but it does not make sense to replace the first with the second. To do so runs the risk of sacrificing the known long-term effects on school achievement, high school graduation rate, lifetime earnings, and crime prevention.

The Training for Quality Study

The High/Scope Training for Quality Study (Epstein, 1993, 1999) offers evidence of the effectiveness of the High/Scope preschool education model as practiced throughout the U.S. today. In this multi-study evaluation, we analyzed participant reports of 40 training projects; surveyed 203 certified High/Scope teacher trainers; surveyed and systematically observed the classrooms of 244 High/Scope and 122 comparison teachers; and systematically observed and tested 97 High/Scope and 103 comparison children in these classrooms.

Design

High/Scope trainers identified 244 High/Scope teachers in Michigan, New York, and California who had been employed at their agencies for at least six months, had attended at least four High/Scope workshops, and had received three classroom visits. We selected 122 comparison teachers from lists of licensed child care centers and from agencies nominated by staff or trainers, with efforts to maintain proportions of agency types similar to those of the High/Scope teachers.

The 200 children in the child outcomes study attended preschool programs in 15 agencies in urban, suburban, and rural settings in southeastern Michigan and northwestern Ohio; 46% were in Head Start, 19% in public schools, and 35% in nonprofit centers. Children ranged in age from 2 to 6, average 4.3; 47% were male, 53% female; 43% were white, 32% were African American, 5% were Hispanic American, and 20% were of other ethnic groups. Their fathers and mothers averaged 13.7 years of schooling, identifying these parents as relatively well-educated on the average. In both groups, according to Bureau of Labor Statistics codes, fathers' median occupational level was that of laborer, and mothers' median occupational level was that of service worker. Treatment groups did not significantly differ on any of these characteristics.

Findings

The **Registry trainer survey** found that half of High/Scope-certified trainers were in Head Start, 27% were in public schools, and 20% were in private child care agencies. Eighty-eight percent had completed college, including 37% with advanced degrees; 70% majored in early childhood. They had a median of 15 years of experience in early childhood. Seventy-eight percent of them were still in the same agency they were in when they received High/Scope certification; 85% had teacher-training responsibility, although they only spent an average of 8 hours a week training teachers. On the average, they made a large-group presentation for 36 staff annually, a hands-on workshop for 15 staff monthly, an observation-and-feedback classroom visit monthly, and an informal classroom visit weekly. The average teacher had attended one presentation and nine workshops and received an observation-and-feedback visit and three informal visits per month.

All the teachers trained had tried out the High/Scope model's room arrangement and daily routine; 91% had tried out the key experiences; 63% had tried out the child observation techniques. Eighty-nine percent of them were comfortable and effective with room arrangement; 80%, with the daily routine; 56%, with the key experiences; and 37%, with the child observation techniques. Trainers said they would show visitors 45% of the classrooms of trained teachers as examples of the High/Scope preschool model, an average of 4 classrooms per trainer.

The High/Scope Registry listed 1,075 early childhood leaders in 34 states and 10 other countries who successfully completed High/Scope's 7-week Trainer Certification Program in the past decade. The average trainer had trained 15 teaching teams, so an estimated 16,125 early childhood teaching teams, including 29% of all Head Start staff, had received High/Scope model training from these trainers. Since trainers regarded 45% of these classrooms as examples of the High/Scope model, they would nominate an estimated 7,256 early childhood classrooms throughout the U.S. and around the world as examples of the High/Scope model.

The **teacher survey** indicated that both High/Scope and comparison classrooms were of high quality. Both groups had at least ten years of teaching experience. Majorities of both groups had college degrees and early childhood degrees. Both groups had over 40 hours of inservice training annually. In both groups, teachers' annual salaries averaged about \$20,000 a year, considerably higher than the \$9,400 national average for child care teaching staff (Whitebook, Howes, & Phillips, 1989). The few group background differences seemed to compensate for each other: The High/Scope teachers had significantly more teaching experience than comparison teachers (12 vs. 10), but significantly fewer High/Scope teachers had college degrees (63% vs. 79%).

While High/Scope and comparison teachers did not differ significantly in their hours of inservice training per year, more High/Scope teachers received significantly more inservice training involving curriculum and teaching practices (91% vs. 71%), child assessment and evaluation (75% vs. 48%), and professional issues (48% vs. 34%). High/Scope teachers placed significantly more importance on the following topics than did comparison teachers: room arrangement, children choosing their own activities, adults participating in children's activities, ongoing training for adults, supervision and evaluation, multicultural awareness, and parent involvement.

High/Scope and comparison classrooms differed significantly in classroom environment, daily routine, adult-child interaction, and overall implementation, as assessed by the High/Scope Program Implementation Profile (High/Scope, 1989) adapted for generic use. High/Scope advantages in classroom environment involved dividing the classroom into activity areas, providing adequate work space in each area, arranging and labeling materials, providing enough materials in each area, providing real household and work objects, making materials accessible to children, and providing materials to promote awareness of cultural differences. High/Scope advantages in daily routine involved implementing a consistent daily routine, encouraging children to plan and review activities, and providing opportunities for planning, doing, and reviewing. High/Scope advantages in adult-child interaction differences involved observing and asking questions, participating in children's play, and balancing child and adult talk. Comparison classrooms had no significant advantages over High/Scope classrooms on this instrument. These findings indicate that the High/Scope classrooms were implementing the High/Scope Preschool Curriculum to a significantly greater extent than were the comparison classrooms.

As shown in Figure 3, the children in High/Scope programs significantly outperformed the children in comparison programs in initiative, social relations, music and movement, and overall child development. High/Scope advantages in initiative involved complex play and cooperating in program routines. High/Scope advantages in social relations involved relating to adults and social problem-solving. High/Scope advantages in music and movement included imitating movements to a steady beat.

Significant positive correlations of .39 to .52 were found between classroom daily routine (measuring children's opportunities to plan activities, carry out their ideas, and review what they had done each day) and children's overall development, specifically their development of creative representation, initiative, music and movement abilities, and language and literacy.

The Head Start FACES Study

The Family and Child Experiences Survey (FACES; Zill, Resnick, Kim, O'Donnell, Sorongon, McKey, Pai-Samant, Clark, O'Brien, & D'Elio, 2003) is a study of a national random sample of Head Start programs. The first cohort of 3,200 children entered Head Start in Fall 1997; the second cohort of 2,800 children entered Head Start in Fall 2000.

General Findings

In Head Start, children improved on important aspects of school readiness, narrowing the gap between them and the general population, but still lagging behind. As shown in Figure 4, relative to national norms, children made significant gains during the Head Start year, particularly in vocabulary and early writing skills. As shown in Figure 5, children in Head Start grew in cooperative classroom behavior – behavior that was helpful, compliant, mature and interactive; and they exhibited less inattentive, hyperactive behavior, especially if they started out more shy, aggressive, or hyperactive. Teachers rated children as inattentive and hyperactive if the children couldn't concentrate or pay attention for long, if they were very restless, fidgeted all the time, or couldn't sit still. The study found that Head Start classrooms were of good quality. Most programs use a specific curriculum, particularly Creative Curriculum and High/Scope. Use of these curricula and higher teacher salaries were related to child outcomes. Teachers' educational credentials were linked to greater gains in early writing skills. In addition, provision of preschool services for a longer period each day was tied to greater cognitive gains. Based on follow-up of the 1997 cohort, Head Start graduates showed further progress toward national averages during kindergarten, with substantial gains in vocabulary, early mathematics, and early writing skills during kindergarten. Most Head Start graduates could identify most or all of the letters of the alphabet by the end of kindergarten and more than half could recognize beginning sounds of words.

High/Scope Findings

Conducted independently of the High/Scope Foundation, the FACES study found that 4-year-olds in Head Start classes that used the High/Scope model improved from fall to spring in letter and word identification skills and cooperative classroom behavior and decreased their behavior problems (Zill et al., 2003), as shown in Figures 4 and 5.

- On a scale of letter and word recognition, children in High/Scope classes registered a highly significant gain ($p < .01$) of 12.6 scale points, significantly more ($p < .05$) than children in classes using Creative Curriculum or other curricula.
- On teacher ratings of cooperative classroom behavior, children in High/Scope classes experienced a highly significant gain ($p < .01$) of half a standard deviation, significantly more ($p < .05$) than children in classes using Creative Curriculum or other curricula.
- On teacher ratings of total behavior problems, particularly problems involving hyperactive behavior, children in High/Scope classes dropped significantly ($p < .05$) during the year, significantly more ($p < .05$) than did children in classes using Creative Curriculum or other curricula.

Of the 91% of the teachers who used one or more curriculum models, 39% used Creative Curriculum, 20% used High/Scope, and 41% used some other curriculum, such as High Reach, Scholastic, or Los Cantos Los Ninos. The quality of Creative Curriculum and High/Scope classes was significantly higher than the quality of classes that used other curricula, particularly with respect to language. On the 7-point Early Childhood Environment Rating Scale (Harms, Clifford, & Cryer, 1998), with 5 identified as good, High/Scope classes averaged 5.04, Creative Curriculum classes averaged 5.02, and classes using other curricula averaged 4.55. On its language items, average scores were slightly higher, but the differences were about the same. On a quality composite, the average scores for High/Scope and Creative Curriculum

were nearly half a standard deviation higher than the average scores for other curricula – clearly an educationally meaningful difference.

The IEA Preprimary Project

The IEA Preprimary Project is a multi-nation study of preprimary care and education sponsored by the International Association for the Evaluation of Educational Achievement (IEA) (Olmsted & Montie, 2001; Weikart, Olmsted & Montie, 2003). High/Scope served as the international coordinating center. Working collaboratively with researchers in 15 countries, High/Scope staff were responsible for sampling, instrument development, data analysis, and the writing of five published reports and one in press. The purpose of the study is to identify how process and structural characteristics of community preprimary settings affect children's language and cognitive development at age 7. The study is unique because many diverse countries participated, using common instruments to measure family background, teachers' characteristics, setting structural characteristics, experiences of children, and children's developmental status.

Design

The study is rooted theoretically in the ecological systems model of human development, which views children's behavior and developmental status as being influenced by multiple levels of the environment, some direct and proximal to the child, such as the child's actual experiences in an education or care setting, and some indirect and distal, such as national policy. The study findings focus on the influence of young children's experiences in community preprimary education and care settings on their language and cognitive development at age 7, controlling for family and cultural influences. Both proximal and distal variables are examined within that context.

The target population consisted of children in selected community settings who were approximately 4½ years old. Data for the longitudinal project were collected in early childhood care and education settings in 10 countries: Finland, Greece, Hong Kong, Indonesia, Ireland, Italy, Poland, Spain, Thailand, and the U. S. Each country's research team chose to sample settings that were used by large numbers of families in the community or important for public policy reasons. With expert assistance, each country's research team developed a sampling plan, using probability proportional to size to select settings and systematic sampling procedures to select four children within each classroom. The age-4 sample included over 5,000 children in more than 1,800 settings in 15 countries. Ten of the initial 15 countries followed the children to age 7 to collect language and cognitive outcome measures. The median retention rate across countries was 86%, ranging from 41% to 99%. The number of children included in the longitudinal analyses varied from 1,300 to 1,897, depending on the particular analysis.

Working with High/Scope researchers, measures used in the study were developed collaboratively by members of the international team. At age 4, data were collected with three observation systems and three questionnaire/interviews. Children's cognitive and language performance was measured at age 4 and age 7. The observation systems collected time-sampled information about how teachers schedule and manage children's time, what children actually do with their time, and the behaviors teachers use and the nature of their involvement with children.

Interviews were conducted to collect family background information and gather information regarding teachers' and parents' expectations about what is important for preschool-aged children to learn. A questionnaire that focused on the structural characteristics of the settings was administered to teachers and caregivers.

The children were followed until age 7, an age across countries when they had all entered primary school. At that time, cognitive and language measures developed by an international team were administered to assess developmental status.

Based on the structure of the data, with individual children nested within settings and settings nested within countries, a hierarchical linear modeling approach was used for the analysis. Accurate estimation of impacts for variables at different levels was especially important for this study because effects at two levels – settings and countries – were often confounded with one another. Although the relationship between setting variables and children’s later development was of primary interest, any such findings would have been hard to interpret if country effects had not been accurately estimated and adjusted for. A 3-level approach enabled decomposition of variation of child outcomes into 3 parts – variation among children within settings, among settings within countries, and among countries. As a result, relationships between care setting variables and children’s outcome scores are free of substantial influence from country-level effects.

Selected Findings

Four findings emerged that are consistent across all of the countries included in the data analysis:

- Children’s language performance at age 7 improves as *the predominant types of children’s activities that teachers propose are free rather than personal/social*. From greatest to least contribution, activity types were as follows:
 - Free activities, which teachers let children choose
 - Physical/expressive activities (gross- and fine-motor physical activity, dramatic play, arts, crafts, and music)
 - Preacademic activities (reading, writing, numbers, mathematics, physical science, and social science)
 - Personal/social activities (personal care, group social activities, and discipline)
- Children’s language performance at age 7 improves as *teachers’ years of full-time schooling* increase.
- Children’s cognitive performance at age 7 improves as they spend *less time in whole group activities* (the teacher proposes the same activity for all the children in the class – songs, games, listening to a story, working on a craft, or a preacademic activity).
- Children’s language performance at age 7 improves as *the amount and variety of equipment and materials available to children in preschool settings* increase.

The wide range of environments throughout the world in which young children grow and learn creates challenging questions for everyone concerned with providing high-quality programs for preprimary children. What are the essential program elements that promote optimum child development? How are these elements delivered in various communities? The findings tell us that teaching practices matter; how teachers set up their classrooms and the activities they propose for children make a difference.

Across diverse countries, child-initiated activities and teachers’ education appear to contribute to children’s later language performance; and minimization of whole group activities and a greater number and variety of materials in preschool settings appear to contribute to their later cognitive performance.

Although more research is necessary in the various countries to establish a pattern of cause and effect and explore the learning mechanisms involved, early childhood educators and policy makers can use these findings to examine local policies and practices and consider if changes are advisable.

Summary

Taken together, these studies make a strong case that interactive learning in early childhood contributes greatly to children's development throughout their lives. The High/Scope Perry Preschool Study presents evidence that a preschool program based on interactive learning prepares young children living in poverty for schooling and leads them to greater commitment to school and school achievement. As a result, they achieve a higher level of educational attainment and greater adult earnings and commit fewer crimes. The High/Scope Preschool Curriculum Comparison Study shows that while preschool programs can do a good job of preparing young children living in poverty for school whether they emphasize interactive learning, or direct instruction, interactive learning is the crucial ingredient that prevents later emotional problems and commission of crimes. The Training for Quality Study shows that we can train teacher trainers who can train teachers to implement successful preschool programs based on young children's interactive learning; in other words, these programs can go beyond isolated models to full scale, service programs. Conducted independently of the High/Scope Foundation in typical Head Start classrooms, the Head Start FACES Study shows that Head Start teachers who use the High/Scope model of interactive learning contribute to children's literacy and social skills. The IEA Preprimary Study shows evidence of a few universals in preschool education: children's freely chosen activities, the time they spend in activities other than whole-group activities, the amount and variety of equipment and materials available to them, and the educational attainment of their teachers all contribute to their intellectual growth.

Interactive Education

Interactive education is process, not content. Thus, it is consistent with whatever content is determined to be the appropriate content. Early childhood is a formative period for language, literacy, and mathematics skills. Such content is ideal for interactive learning. As process, interactive learning is distinguished from direct instruction. The attraction and apparent advantage of direct instruction is that it is very efficient, focused precisely on specific learning objectives. However, this advantage is also its disadvantage. Its precise focus limits the generalizability of direct instruction learning to other desirable skills that are not specifically targeted. When direct instruction focuses on language and literacy skills, it does so by eliminating spontaneous conversations between children and adults and among children themselves that give reality to their language development. It eliminates the give-and-take of unscripted interpersonal interaction that gives reality to children's ethical and moral values. There is nothing wrong with direct instruction in early childhood. It's just not enough.

Today in the U.S., early childhood programs are coming of age. They are making the transition from cottage industry (that is, work in homes) to full-fledged public institutionalization. As such, they are entering the domain of the nation's schools – public schools, private schools, elementary, secondary, and higher education schools. The nation's early childhood policy issues are becoming the educational policy issues. Early childhood programs become a key element in addressing the nation's literacy crisis. The question is no longer whether to invest in early childhood programs, but how to do so. What is the best balance of federal, state, and local funding? Should public funding go to schools and centers or to parents through vouchers?

The purpose of early childhood programs is the most basic issue of all. Should they extend dominant school traditions to younger children? Or should they extend family nurturance upward? Surely the best answer to these questions is that they should find the right balance between academic content demands and child-centered nurturance. A preschool program that emphasizes direct instruction only is heavy on academic content demands and light on child-centered nurturance. The reverse is true for a child care or nursery school emphasis that eschews academic demands. Interactive learning achieves a good balance by integrating academic content demands with child-centered nurturance. One might say that interactive learning is the way to support children's development.

This thinking has clear implications for appropriate assessment of young children. It is easy for early childhood assessment to focus only on academic content demands; indeed, that is its primary purpose for older students. Further, early childhood assessment standards of reliability and validity are most easily met in the assessment of academic content. But if early childhood assessment is to strike a good balance between academic content demands and child-centered nurturance, it must also assess the social and interpersonal aspects of children's behavior, that is to say, it must assess all of children's development.

At this crossroads in the history of early childhood education, three paths extend. One is to continue to pay too little for early childhood programs to maintain high quality and thereby to squander one of our best chances to enable young children to achieve their full potential. A second path is to convert early childhood programs to academically focused, teacher-directed programs that purchase long-term academic success by allowing other aspects of early childhood development to go wanting. This path has the advantage of proving itself quickly with hard-nosed research. It has the disadvantage of squandering the opportunity to develop children's character, motivation, and social skills. The third path is the middle path – investing enough in early childhood programs to let well-trained early childhood teachers engage in the artistry of early childhood education, educating young children to be whole and balanced high achievers and high producers who care about other people and take initiative and responsibility for the world in which they live. This is really the only path worth taking.

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Figure 1
Major Findings: High/Scope Perry Preschool Study at 40

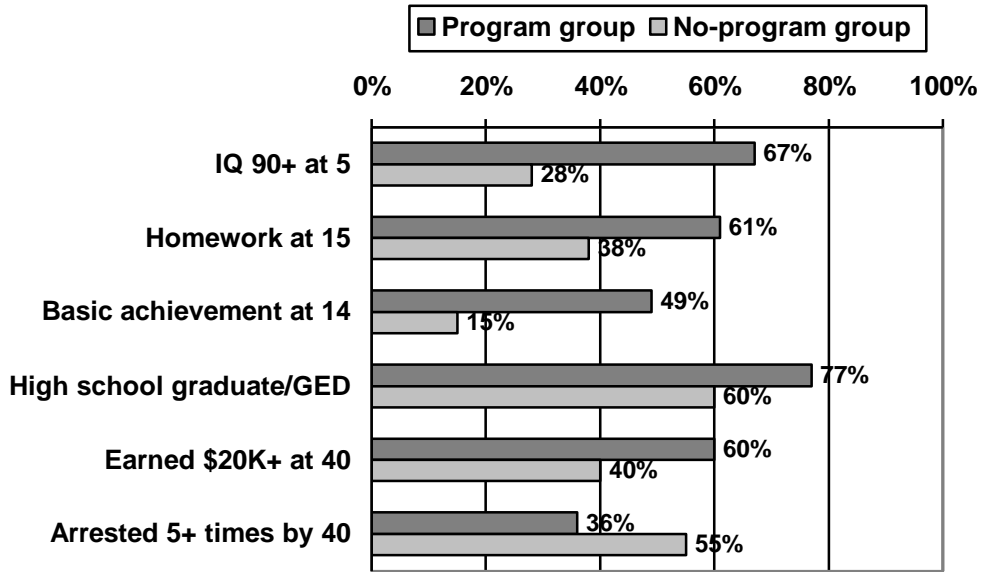


Figure 2
Major Findings: High/Scope Preschool Curriculum Study at 23

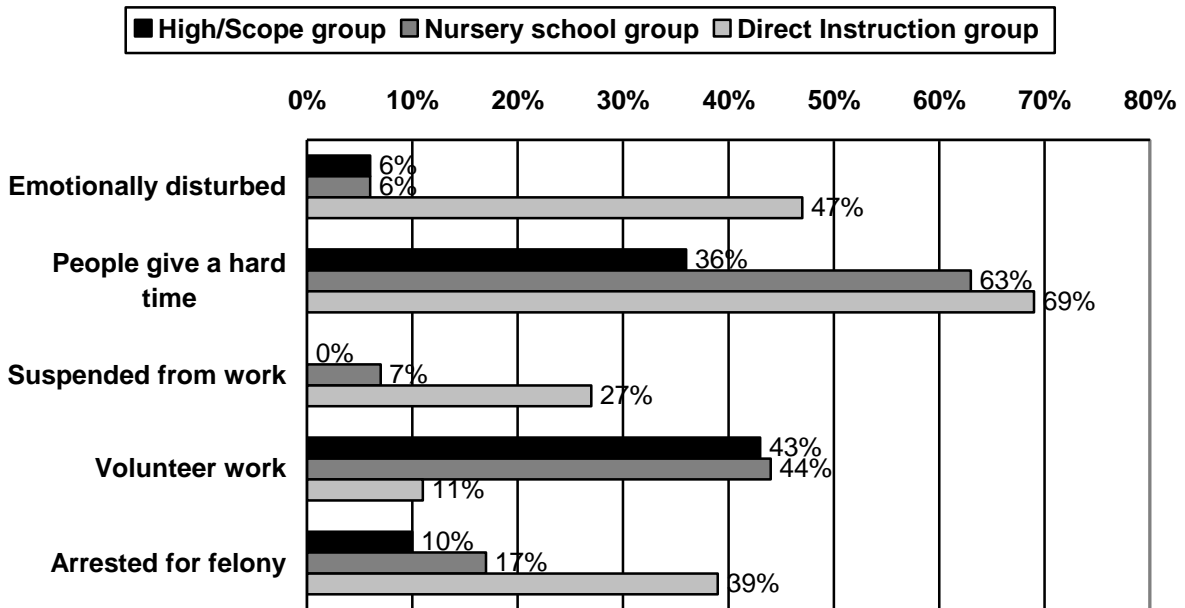


Figure 3
Findings: Training for Quality Children's Study

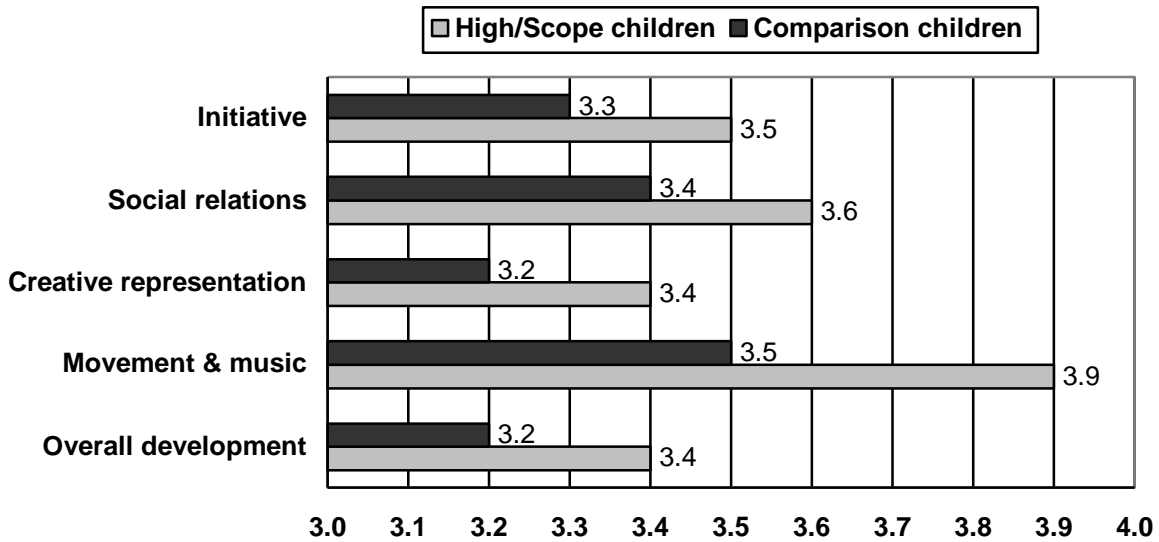


Figure 4
Selected Academic Findings: Head Start FACES Study

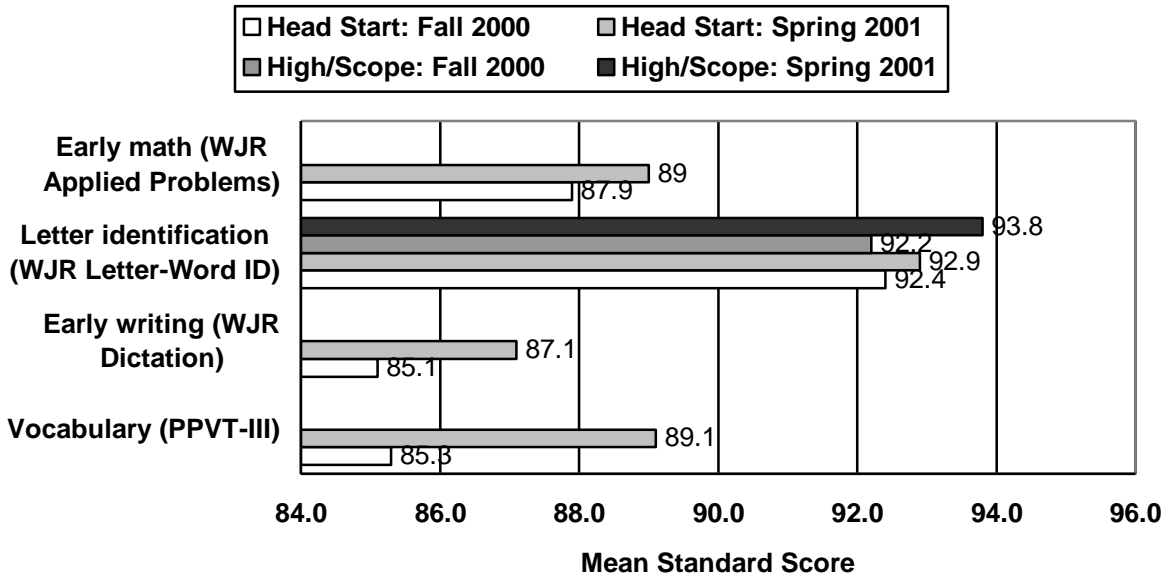


Figure 5
Selected Social Findings: Head Start FACES Study

