

## Early Childhood Education Programs

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**H**ead Start is a preschool program for disadvantaged children which aims to improve their skills so that they can begin schooling on an equal footing with their more advantaged peers. Begun in 1965 as part of President Johnson's "War on Poverty," Head Start now serves over 800,000 children in predominantly part-day programs, almost 50 percent of eligible three and four year-old poor children (Children's Defense Fund, 2000). Over time, federal funding has increased from \$96 million in 1965 to \$4.7 billion in 1999.

There have been dozens of studies of Head Start and closely related preschool and early school enrichment programs. Some studies involve small-scale model programs, others evaluate large-scale public programs which are generally of somewhat lower quality than the model programs. This paper discusses what is known about these early childhood education programs: what they try to do; the extent to which they work; what can be said about their optimal timing, targeting, and content; and the circumstances in which the benefits of providing these programs—ranging from gains to the children to the value of child care provided to the parents—are likely to outweigh the costs.

This review of the evidence concludes that these programs have significant short- and medium-term benefits, and that the effects are often greater for more disadvantaged children. Some of the model programs have produced exciting results in terms of improving educational attainment and earnings and reducing welfare dependency and crime. The jury is still out on Head Start, but a simple cost-benefit analysis suggests that Head Start would pay for itself in terms of

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cost-savings to the government if it produced even a quarter of the long-term gains of model programs.

It should be noted that many types of interventions other than early childhood education can affect the lives of young children. However, this essay focuses on center-based early childhood education programs for preschool children, which emphasize school readiness as a goal. Some of these programs may also include parenting skills or home visiting components, but early intervention programs that have parenting skills and/or home-visiting as their primary focus are excluded. Infant and child health programs have also been excluded from this review.<sup>1</sup>

### **What Are the Goals of Early Childhood Education?**

A recent National Research Council (2000) report on early childhood education and intervention divides skill development into three areas: cognitive skills, school readiness, and social and emotional development. The economics literature on this topic focuses primarily on the development of cognitive skills, and especially on IQ.

Although high IQ is certainly not a perfect predictor of adult outcomes, it is positively correlated with success in many areas. Still, while we know that the IQ of developing children can be impaired through deprivation, it is not obvious that it can be increased via extra stimulation in normal children. Moreover, although the gains in measured IQ scores associated with early intervention are often short-lived, it is not clear what significance can be attached to this finding. It can be surprisingly easy to create short-term gains in measured IQ scores. Zigler and Berman (1983) cite the case of an eight-week summer program which created a 10 point increase in measured IQ scores. They also cite a demonstration which showed that simply repeating an IQ test at an interval of one week produced similar “gains” as children became more comfortable with the test.

Given the uncertainties regarding measures of IQ, attention has shifted to school readiness. A survey of kindergarten teachers by the Carnegie Foundation for the Advancement of Teaching (1991) found that only 65 percent of entering students were deemed ready to learn. Many people assume that the teachers were referring to shortfalls in the children’s cognitive skills. Yet when asked to name the most important determinants of readiness to learn, the attributes cited most often by teachers were (in order): being physically healthy, rested, and well-nourished; being able to communicate needs, wants, and thoughts verbally; enthusiasm and curiosity in approaching new activities; taking turns; and knowing how to sit still and pay attention. While some of these attributes, like verbal skills, are doubtless

<sup>1</sup> An excellent review of interventions focusing on parenting skills can be found in Brooks-Gunn, Berlin and Fuligni (2000), while Gomby et al. (1999) provide a review of interventions that emphasize home visiting. Currie (1998) discusses several interventions aimed at improving child health.

associated with IQ, it is intriguing that the teachers placed so little weight on students' intellectual achievements. For example, only 10 percent of kindergarten teachers thought that it was important that entering children know the alphabet (Lewit and Baker, 1995).

Skeptics may find these teachers' views self-serving. After all, it is more pleasant to teach enthusiastic, verbal, well-behaved youngsters than sullen, silent, fidgety ones. However, a more charitable view is that the Carnegie Foundation's (1991) report reflects the great importance of social and emotional skills. There is increasing evidence that the absence of obvious behavior problems and the development of skills such as self-control may be at least as important to future success in life as formal cognitive skills (Lee et al., 1990; Heckman, Hsueh and Rubinstein, 2000). Self control—even in as basic a form as the ability to sit still and pay attention—may even be necessary for the full development of formal cognitive skills.

There is evidence that self-control can be taught. For example, experiments have shown that young children can delay engaging in an attractive forbidden activity longer when they are given helpful hints about how to distract themselves (Rodriguez, Mischel and Shoda, 1989). Thus, improving social skills such as self-control is a legitimate goal of early childhood education programs.

Finally, although it is not usually mentioned as a goal of early intervention and education programs, it is worth stressing that these programs generally provide quality child care. If society feels that poor mothers should work, then it is important to support these mothers by ensuring access to child care. Moreover, since exposure to inadequate care is potentially harmful for children (as discussed further below), the provision of quality care should perhaps be elevated to an explicit goal of early education programs.

## **What is the Economic Case for Governmental Involvement in Early Education?**

An economic case for government intervention in early childhood education can be made on the grounds of equity. Economic actors who start out with very unequal endowments (in terms of ability, environment, or opportunities) are likely to end up with very unequal allocations, even if the outcome is efficient (Inman, 1986). A government that is concerned with equity can compensate for differences in final outcomes, attempt to equalize initial endowments, or both. In principle, spending on programs of each type can be increased until the marginal benefit associated with an additional dollar of spending is equalized.

However, equalizing early endowments through early childhood intervention programs may be a superior approach to the problem of unequal allocations, both because it avoids many of the moral hazard problems that arise when society attempts to compensate those with poor outcomes and because early intervention

to equalize allocations may be a more cost-effective way of promoting equity than compensating for unequal outcomes. In many cases, an ounce of prevention is worth a pound of cure. For example, lead abatement and the treatment of lead poisoning prevents permanent brain damage, and abstention from alcohol during pregnancy prevents retardation caused by fetal alcohol syndrome. Similarly, Furstenberg, Brooks-Gunn and Morgan (1987) present evidence that it is important for children to get “off on the right foot” in school, and that children who started school with disadvantaged families had worse average performance than other children even if their parents’ situation improved subsequently.

The difficulty of overcoming poor endowments later in life—through job training programs for high school dropouts, for example—makes early intervention appear attractive as well. Public sector efforts to train low-skilled adult workers have generally found very small returns. LaLonde’s (1995) survey of the training literature in this journal points out that most training programs for adult males and youths have been ineffective (the exception for youths being the costly Job Corps program). Among poor adult women, the evidence suggests rapidly diminishing returns to training investments suggesting that it may not be possible to raise earnings all that much.

A second broad justification for government intervention in early childhood education is that there is a market failure in this area that the government might be able to address. Indeed, several market failures are likely to be important, including liquidity constraints, information failures, and externalities.

Liquidity constraints may prevent parents from making optimal investments in the human capital of their children. Liquidity constraints alone would only justify financial assistance to certain parents, not direct government intervention in the provision of child care services. However, information failures are also likely to be important. For example, there is increasing evidence that parents find it difficult to evaluate the quality of child care centers, and that some parents pay for care of such low quality that it may be harmful to their children (Helburn and Howes, 1996; U.S. Department of Health and Human Services, 1998). This finding suggests that government may be able to improve outcomes by developing, publicizing and enforcing standards. Finally, even altruistic parents may not take account of the consequences of the effects of their child-raising decisions on those outside the family. For example, a child who becomes a welfare mother imposes a tax burden on other citizens, a cost which may not be considered by the parents when they decide on investments in the child’s human capital.<sup>2</sup>

Externalities provide perhaps the strongest theoretical justification for direct government involvement in the provision of early intervention services. However, even the best justifications in terms of equity or market failures are moot if it is not

<sup>2</sup> This problem is sometimes referred to as the “Samaritan’s dilemma” and is explained further in Bruce and Waldman (1991) and in Coate (1995). Currie (1998) discusses evidence that in-kind programs appear to have larger effects on child outcomes than cash transfers to their parents.

actually possible to improve child outcomes through intervention. Hence, we turn to this question in the next several sections.

## **What is the Evidence About Whether Early Intervention Programs Can Work?**

There have been several excellent recent surveys of the literature on early childhood education. Table 1 presents information about selected “model” programs, which were typically funded at higher levels and run by more highly trained staff than large-scale, publicly-funded programs. The sample sizes for treatment and control groups in these model studies are small, often less than 100 children. However, evidence from these studies can be used to shed light on the issue of whether it is possible to use early intervention to improve child outcomes.

Randomized trials are the gold standard for this type of research, notwithstanding the problems that can arise in implementing experimental designs and interpreting their findings.<sup>3</sup> In a randomized trial, children are randomly assigned to treatment and control groups. The importance of random assignment is that experimenters can be reasonably certain that there are no preexisting, unobserved, and uncontrolled differences between the treatments and controls on average. In contrast, when comparison groups are created by some method other than random assignment, one can never be certain that the differences between the treatments and controls reflect the effects of the experimental intervention rather than the effects of some other unobserved difference between the groups. The excellent literature reviews of early childhood education programs in Barnett (1995) and Karoly et al. (1998) list 16 studies of model programs. Table 1 shows the results of the seven such studies that followed a randomized methodology.

Even a well-designed and randomized study can suffer from attrition; that is, people leaving the study. For example, the Institute for Developmental Studies program summarized in Table 1 (Deutsch et al., 1983) started with 503 participants but was able to conduct long-term follow-up at grade 7 on only 97 of them. The 97 who were followed may not be at all representative of the initial sample. For example, those who were successfully followed might be from more stable families. Unless attrition is random, it is difficult to draw any inferences about the long-term outcomes of the whole group from this small subset.

Four studies from Table 1 stand out because they used random assignment, are relatively free of attrition bias, and follow children at least into middle school. They

<sup>3</sup> Some of the more serious problems mentioned in Heckman and Smith (1995) include differential attrition from treatment and control groups, the fact that people randomized to the control group may seek “treatment” outside the experiment, and the fact that it is often difficult to generalize the results of experiments to differing settings.

**Table 1**  
**Randomized Evaluations of Model Early Childhood Programs<sup>a</sup>**

<i>Program Name</i>	<i>Program Description</i>	<i>Age of Participation</i>	<i>Outcomes<sup>b</sup></i>
Carolina Abecedarian (Campbell & Ramey, 1994) (Campbell et al., unpublished)	Preschoolers: full-day child care School age: home-school resource teacher	Entry 6 weeks to 3 months Exit: 5 to 8 years	IQ: T > C at age 12, T = C at age 15 Achievement tests: T > C at ages 8, 15, 21 Special education: T < C at age 15 Grade retention: T < C at age 15 School dropout: T < C at age 21 College attendance: T > C at age 21 Employment status: T = C at age 21 Average age first child born: T > C at age 21
Houston Parent Child Development Center (Johnson and Walker, 1991) <sup>c</sup>	Home visits Full-day child care Center-based program for parents	Entry: 1 to 3 years Exit: 3 to 5 years	Achievement tests: T = C Grades: T = C Bilingual education: T < C Special education: T = C Grade retention: T = C
Infant Health and Development Project (McCarton et al., 1997) <sup>d</sup>	Home visits Full-day child care	Entry: birth (home visits) 1 year (care) Exit: 3 years	IQ: T > C ages 3, 5, 8 Behavioral problems: T < C ages 3, 5; T = C age 8 Math achievement: T > C age 8 Grade retention: T = C age 8 Special education: T = C age 8 General health: T = C age 8
Milwaukee Project (Garber, 1988)	Full-day child care Job and academic training for mothers	Entry: 3 to 6 months Exit: 5 years	IQ: T > C at grade 8 Achievement tests: T = C Grades: T = C Special education: T = C Grade retention: T = C
Early Training Project (Gray et al., 1983)	Home visits Summer part-day preschool program	Entry: 4 to 5 years Exit: 6 years	IQ: T = C at age 17 Achievement tests: T = C Special education: T < C, grade 12 Grade retention: T = C High school graduation: T = C
High/Scope Perry Preschool Project (Schweinhart et al., 1993) <sup>d</sup>	Home visits Preschool program	Entry: 3 to 4 years Exit: 5 years	IQ: T > C at ages 5, 7; T = C at ages 8, 14 Achievement tests: T > C at ages 9, 14 High school GPA: T > C Special education: T = C, grade 12 Grade retention: T = C, grade 12 High school graduation: T > C Postsecondary education: T = C age 27 Arrests: T < C at age 27 Employment: T > C age 19, T = C age 27 Monthly earnings: T > C at age 27 Receive public assistance: T < C age 27 Teen pregnancies: T = C at age 19
Institute for Developmental Studies (Deutsch et al., 1983)	Home visits Part-day preschool program Parent center school (K-3)	Entry: 4 years Exit: 9 years	Special education: T = C Grade retention: T = C

*Notes:* <sup>a</sup>See Barnett (1995) and Karoly et al. (1998) for more detailed information about studies described in this table.

<sup>b</sup>Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group. Outcomes listed as T > C or C > T were statistically significant at the 5 percent level. Treatment groups range in initial size from 20 to 312, and control groups from 20 to 191.

<sup>c</sup>Most recent published document. See Barnett (1995) for description of other studies.

<sup>d</sup>Most recent published document. See Karoly et al. (1998) for description of other studies.

are the Early Training Project, the Carolina Abecedarian Project, the Perry Preschool Project, and the Milwaukee Project. (The Infant Health and Development Project also used a randomized design and had low attrition, but followed children only to age eight.)

The first conclusion that can be drawn from these studies was alluded to above: Only the Milwaukee Project found any long-term effect on IQ. However, the Early Training, Carolina Abecedarian, and Perry Preschool Projects all found positive effects on measures of scholastic success, which strongly suggests that boosting IQ is not the only way to affect this important outcome.

The Early Training Project was the least intensive intervention of this group. It served four and five year-olds, and involved weekly home visits during the year in addition to a ten-week part-day preschool for either two or three summers. It showed dramatic reductions in use of special education at age 12: 5 percent of the treatment group compared to 29 percent of the controls. Although there were no statistically significant differences between treatments and controls in achievement test scores, grade retention, or high school graduation, the differences in the latter two outcomes were in the right direction. For example, 68 percent of the treatment group graduated compared to only 52 percent of the controls. The lack of statistical significance is likely to be due to the small sample size: 44 treatments compared to 21 controls.

The Carolina Abecedarian Project involved a somewhat larger group of 57 treatments and 54 controls. At birth, children were randomized into a treatment group that received enriched center-based child care services emphasizing language development for eight hours per day, five days a week, 50 weeks per year, from birth to age five, and a control group that did not receive these services. The teacher/student ratio ranged from 1:3 to 1:6 depending on the child's age. At school entry, the children were again randomized into two groups. One received no further intervention, and the other had a "Home-School Resource Teacher" who provided additional instruction, a liaison between parents and school, and who also served as a community resource person for the family (Campbell and Ramey, 1994, 1995).

At age 15, the Carolina Abecedarian Project found that the children who had received the preschool intervention had higher scores on achievement tests (especially reading) and reductions in the incidence of grade retention and special education, regardless of whether or not they had been assigned a Home-School Resource Teacher once they entered school. Retention in grade and being placed in the special education "track" are viewed by educators as predictors of dropping out of school. In addition, they create additional costs to society which have to be weighed against the costs of providing the early intervention. In contrast, the effects of the Home-School Resource Teacher were generally either small or statistically insignificant.

The investigators have now completed a follow-up assessment of the Abece-

darian children at age 21.<sup>4</sup> Of the original 111 infants, 104 were assessed. At age 21, the children who received the preschool intervention had higher average test scores and were twice as likely to still be in school or to have ever attended a four-year college.

The most famous of these interventions is the Perry Preschool Project, which involved 58 children in the treatment group and 65 controls. The intervention involved a half-day preschool every week day plus a weekly 90-minute home visit, both for eight months of the year, for two years. Teacher/student ratios were 1 to 6, and all teachers had master's degrees and training in child development (Schweinhart et al., 1993). The intervention had positive effects on achievement test scores, grades, high school graduation rates, and earnings, as well as negative effects on crime rates and welfare use (as of age 27).

Studies of model early intervention programs do not show universally positive results. In particular, studies with nonrandomized designs frequently find insignificant or even wrong-signed effects. However, I believe it is a fair reading of the evidence to say that well-designed studies of intensive educational interventions show that it is possible for intervention to make a positive difference in children's lives.

### **What is the Evidence Regarding Large-Scale Publicly Funded Programs Like Head Start?**

As anyone who has eaten cafeteria food knows, a recipe that works well for a small group may not translate well to a larger setting. There is a large gap between the model programs for early childhood education and the large-scale publicly funded interventions that are currently in place. This section reviews the evidence regarding the effects of large-scale, publicly funded programs like Head Start.

Head Start is run at the local level, but local operators are subject to federal quality guidelines. These guidelines specify that Head Start is to provide a wide range of services in addition to providing a nurturing learning environment; for example, Head Start is required to facilitate and monitor utilization of preventive medical care by participants, as well as to provide nutritious meals and snacks. Head Start also provides child care services that are of much better quality than what is commonly available to low-income parents, a service that is likely to be of increasing importance in this era of welfare reform when mothers are expected to work.

The program is not an entitlement, but is funded by appropriation, which means that when funds run out, eligible children cannot be served. However, Head Start has served as a model for state preschools targeted to low-income children in

<sup>4</sup> The following discussion is taken from the Executive Summary of the Carolina Abecedarian Project which is available on the investigators' website, (<http://www.fpg.unc.edu/verity>).



states such as California (U.S. General Accounting Office, 1995), and also for new (voluntary) universal preschool programs in Georgia and New York. The Children's Defense Fund (1999) reports that as of the 1998-99 school year, 724,610 children were participating in state-funded enriched preschool programs. Thus, the number of children in state-funded early education initiatives is roughly equal to the 800,000 participants in Head Start. Overall, in 1995, 31 percent of America's three year-olds, 61 percent of four year-olds, and 90 percent of five year-olds received some form of center-based care or attended kindergarten (National Center for Education Statistics, 1996).

The successful model programs discussed in the previous section were funded at higher levels than a typical publicly funded program. For example, in 1998 it cost \$5021 to keep a child in a part-day Head Start program for 34 weeks a year, implying that it would cost approximately \$10,000 to send a child for two years. The part-day Perry Preschool intervention cost \$12,884 per child (in 1999 dollars) for a program that lasted eight months a year over two years. Since 20 percent of the children participated only for one year, the figures imply that the cost per child was approximately \$7000 per year, so that Head Start costs approximately 71 percent of what Perry Preschool cost (Karoly et al., 1998).

The Administration for Children, Youth, and Families estimates that it would cost \$2394 to extend the Head Start program to full-year care, and an additional \$1615 to extend it to full-day/full-year care. Taking these figures together, it would cost approximately \$9000 per child per year to have a child in a full-year, full-day Head Start program (Bourdette, 1999). While a formal cost/benefit analysis of the Carolina Abecedarian project has not been conducted (one is currently underway), the preschool component of the intervention (which was full-day) cost about \$15,000 per child, per year, and this part of the intervention lasted five years.<sup>5</sup> Fewell and Scott (1999) report that the IHDP program also cost about \$15,000 per year per child, though 20 percent of the costs were in the form of transportation expenses. These figures suggest that a full-year, full-day Head Start program would cost roughly 60 percent of what these model programs cost.

Since the model programs offered more intensive services with smaller group sizes and more highly trained personnel, it is reasonable to expect that they would have larger effects than Head Start or similar public programs. The reviews of early childhood education studies in Barnett (1995) and Karoly et al. (1998) list 22 studies of the effects of Head Start programs, as well as similar programs funded under Title 1 of the Federal Elementary and Secondary Education Act of 1965.

<sup>5</sup> Children entered the preschool component of the program between 1972 and 1983. Ramey, Campbell and Blair (1998) state that on average the preschool component of the program costs about \$6000 per year in 1978 dollars, which is approximately \$15,000 in 1999 dollars. It is not completely clear that the Consumer Price Index is the right deflator to use in making this adjustment, however, since the bulk of child care costs are for labor and wages of less skilled workers fell over this period. Steven Barnett of Rutgers University is currently preparing a cost/benefit evaluation of the Abecedarian program.

Title 1 provides about \$8 billion per year to school districts with disadvantaged students, but makes few stipulations regarding how the funds can be spent.

It is surprising that there has never been a large-scale, randomized trial of a typical Head Start program, although plans for such a trial are now underway at the U.S. Department of Health and Human Services.<sup>6</sup> Moreover, few existing studies have attempted to follow children past the elementary grades. Table 2 provides an overview of selected studies, focusing on those which are most recent and prominent and on those which have made especially careful attempts to control for other factors that might affect outcomes.<sup>7</sup>

The most recent federally sponsored study of Head Start is FACES which stands for Family and Child Experiences Survey (Zill, Resnick and McKey, undated). Unfortunately this study took a short-term perspective and had no control group. The study focused on documenting improvements in the skills of Head Start children over the course of a year in the program. The children showed gains in social skills over the course of a year in Head Start. However, there was no control group and these gains could not be compared to any national norms, so it is unclear what to make of the finding; after all, surely one would expect all preschool children to improve their social skills over the course of a year? The cognitive gains of the Head Start children were assessed by comparing the Head Start children to national norms. These findings were consistent with those of many other studies which have documented short-term gains to some cognitive skills, particularly to verbal skills.

The Educational Testing Service's Longitudinal Study of Head Start began by conducting a spring canvas of all the children in a neighborhood who would be eligible to enter Head Start in the fall (Lee et al., 1990). The children who actually attended Head Start had lower scores on average than those who did not, although much of the difference could be accounted for by family characteristics. The children were followed into second grade, and it was found that Head Start attendance had positive effects on both verbal test scores and measures of social adjustment such as impulse control. Unfortunately, it was not possible to follow the children further to see whether these effects were sustained.

The Chicago Child-Parent Centers is an early intervention that began with an enriched preschool program, and followed up with an enriched curriculum for

<sup>6</sup> A randomized evaluation of Early Head Start is currently being conducted by Mathematica Policy Research. Early Head Start is an experimental program offering Head Start-like services to children between zero and three and their parents. The evaluation will be important not only for the light it sheds on this program, but because it has the potential to demonstrate the feasibility of an experimental evaluation of Head Start. Recently released findings are at (<http://www2.acf.dhhs.gov/programs/hsb/EHS>) (U.S. Department of Health and Human Services, 2001).

<sup>7</sup> McKey et al. (1985) offers a meta-analysis of many of these Head Start studies. They argue that while the effects generally do not reach statistical significance in individual studies, the studies taken together suggest positive effects on schooling attainment, school attendance, health care utilization, and social development. Here, I take a different approach by focusing on those studies that I judge to be most methodologically sound.

*Table 2*  
**Large-Scale Public Early Childhood Programs<sup>a</sup>**

<i>Program Name</i>	<i>Study Design</i>	<i>Age of Participation</i>	<i>Outcomes<sup>b</sup></i>
Chicago Child-Parent Center and Expansion Program (Fuerst & Fuerst, 1993)	Compared former CPC children with non-CPC children from same feeder schools	Entry: 3–4 years Exit: 9 years	Achievement tests: T > C grade 2 T = C grade 8 High school graduation: T > C
Chicago Child-Parent Center and Expansion Program (Reynolds et al., 2000) (Temple et al., 2000)	Compared former CPC children with similarly poor children eligible for CPC but it was not offered in neighborhood	Entry: 3–4 years Exit: 9 years	School dropout: T < C at age 20 High school completion: T > C at age 20 Delinquency and crime: T < C at age 17 Grade retention: T < C at age 15 Special education: T < C at age 18 Proficiency skills test: T > C at ages 14/15
ETS Longitudinal Study of Head Start (Lee et al., 1990) <sup>c</sup>	Compared attenders with children who attended other or no preschools at grade 3	Entry: 4 years Exit: 5 years	Achievement tests: T > C grade 1 T = C in grades 2, 3
Head Start Family and Child Experiences Survey (Zill et al., 1998)	Studied gains made by Head Start children at age 4 or older	Entry: 3–4 years Exit: 4–5 years	Achievement tests: T > C Other gains cannot be compared to any control
NLSCM Head Start (Currie & Thomas, 1995, 1999)	Compared difference between attended and nonattended siblings with difference between preschool and nonpreschool siblings at various grades	Entry: 3–5 years Exit: 5–6 years	Achievement tests: T > C (whites & Hispanics only) Grade retention: T > C (whites & Hispanics only) Immunization rates: T > C Child height-for-age: T = C
PSID Head Start (Garces et al., 1999)	Compared Head Start participants to non participants between ages 18 and 31.	Entry: 3–4 years	Grade retention: T = C High school graduation: T > C (whites only) Teen pregnancy T = C Welfare T = C Arrests T < C (blacks only) College T > C (whites only)

*Notes:*

<sup>a</sup>See Barnett (1995) and Karoly et al. (1998) for more detailed information about studies described in this table. None of these evaluations were randomized.

<sup>b</sup>Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group. Outcomes listed as T > C or C > T were statistically significant at the 5 percent level. Treatment groups range in initial size from 182 to 1915, and control groups from none to 3502.

<sup>c</sup>Most recent published document. See Barnett (1995) for description of other studies.

school-aged children up to age nine. This intervention is similar to providing a Head Start-like preschool program and then improving the school subsequently attended by the Head Start children. Reynolds (1998) followed a sample of children who had all participated in the preschool and kindergarten components of the program through 7th grade. Some participated after kindergarten (the treatments) and some did not (the controls). In addition, some attended schools in which the extended program was offered for two years, while some attended schools in which it was offered for three years. Reynolds finds significant reductions in the rates of grade retention, special education, and delinquency in the treatment group, as well as higher reading scores. He uses several different statistical methods to control for the possibly unobserved characteristics of the (non-randomly assigned) treatment and control children.<sup>8</sup> His results are robust to the use of different methodologies.

In other studies of the Chicago Child-Parent Center population, Temple et al. (2000) follow the children to the end of high school and find that the program reduced high school dropout rates by 24 percent, and that the size of the effect grows with the time that children spent in the program. Reynolds et al. (2000) look at several additional outcomes including delinquency, crime, and a skills test and find beneficial effects of the program on all of the outcomes they examine. They include a simple cost-benefit analysis which suggests that a dollar spent on the program saved \$3.69 in future costs to government.

The National Longitudinal Survey of Youth, which has followed a nationally representative group of people who were between the ages of 14 and 21 in 1978, began following the children born to women in NLSY in 1986. Currie and Thomas (1995) use this data to evaluate Head Start. They attempt to control for unobserved characteristics of children by comparing siblings who participated in Head Start to those who did not. The idea is that by using siblings as the controls, any shared characteristics of family background will be controlled. As discussed above, unobserved characteristics such as the parents' views on the importance of education are likely to contaminate estimates of program effects if they are not accounted for.

The Currie and Thomas (1995) evaluation is one of very few to have included significant samples of the 60 percent of Head Start children who are not African-American. The estimates of gains for African-American children parallel those of studies in which subjects were randomly assigned, which lends them additional credibility: initial gains in vocabulary and reading test scores "faded out" while the

<sup>8</sup> Reynolds (1998) uses three different methods. First, he conducts an analysis of the initial differences in test scores between the two groups, and finds that most of it can be explained by observable characteristics; that is, there do not appear to be large pre-existing unobservable differences between the treatments and the controls. Second, he estimates a model in which selection into the treatment group is controlled for by including the inverse Mill's ratio from a first-stage selection equation. In this model, it is assumed that the characteristics of each school site affected selection into the treatment group without having additional direct effects on child outcomes. A third approach is to compare children in schools which offered the treatment for two years to those in schools that offered it for three.

children were still in elementary grades. For white children, in contrast, there were persistent gains in test scores, as well as reductions in grade repetition. It is worth emphasizing that the initial gains in test scores were the same for whites and blacks—thus, the real difference was not in the initial impact of the Head Start program but in what happened to the children after they left.

In conjunction with results from Reynolds' work on the Chicago Parent-Child program and with evidence that Head Start children often go on to attend poor schools (Lee and Loeb, 1995) these results suggest that the fading out of Head Start gains among African-American children may be due not to deficiencies in the Head Start program but to problems of subsequent school quality. Currie and Thomas (2000) find that black children who attended Head Start go on to attend schools of lower quality than other black children. However, the same is not true among whites. Moreover, when we stratify by an indicator of school quality, gaps in test scores between Head Start and other children are very similar for blacks and whites. Hence, the effects of Head Start may fade out more rapidly among black students, at least in part because black Head Start children are more likely to attend inferior schools subsequently.

We are not aware of any published study that follows Head Start participants into adulthood. It may be difficult to conduct such a study using random assignment given the fact that one would have to rely on the cooperation of parents and subjects over a very long time period. One alternative is to use retrospective information about Head Start participation collected from individuals participating in existing large-scale, longitudinal data sets. For example, a supplement to the Panel Study of Income Dynamics fielded in 1995 asked whether people had participated in Head Start as children. Although there are undoubtedly errors in recall in this retrospective data, the time trends in overall reported participation rates in the PSID match very well with administrative data.

Using these data, Garces, Thomas and Currie (2000) show that when Head Start participants are compared to siblings who did not attend, participation in Head Start is associated with a significantly increased probability of completing high school and attending college among whites, and with decreases in the probability that African-Americans have ever been charged or convicted of a crime. The evidence also suggests that there are positive spillovers from older children who attended Head Start to their younger siblings, so that simple sibling comparisons tend to understate the positive effects of Head Start.

In summary, the evidence in support of favorable long-term effects of public programs is much less conclusive than the evidence showing positive effects of model programs, mostly because there have been very few well-designed studies of longer-term effects. The Advisory Committee on Head Start Research and Evaluation has recently recommended that the Department of Health and Human Services conduct an evaluation that relies on random assignment of children in sites in which funds are insufficient to serve all eligible children; that is, if some children are to be denied access to services in any case, the committee recommends

that this be done randomly so that the effects of Head Start can be assessed.<sup>9</sup> The evaluations are to focus on the intermediate outcome of school readiness. Longer-term follow-up of treated children would be very useful, but raises many practical problems to do with tracking substantial numbers of individuals over long periods of time.

### **Getting Inside the Black Box of Program Design**

Questions of fairness inevitably arise when the government provides services to some groups and not others. If the government were to provide an enriched child care experience to all poor children who desired it (as it would if Head Start were fully funded), it would raise the question of whether to exclude near-poor children, or middle-class children, who might also benefit. Thus, an important question for policymakers seeking to know where to draw the line is whether the benefits of early intervention are greater for more disadvantaged children. The available evidence suggests that they are.

For example, *all* of the children in the Carolina Abecedarian project were deemed to be at risk of mental retardation. Within this group, the investigators found positive effects that were twice as large for children from the poorest and least educated families as they were for the other children. The Infant Health and Development Project listed in Table 1 took low birthweight children between 12 and 36 months and placed them in an enriched full-day child care setting. This intervention found positive effects on math scores only for a group of relatively high birthweight children within their low birthweight sample. But within this group, the children of the poorest and least educated mothers gained the most.

Hispanic children present an interesting comparison group for studies of Head Start, since they suffer disproportionately from poverty and may also face language barriers. Currie and Thomas (1999) find that gains in test scores associated with Head Start are at least as great for Hispanic children as for non-Hispanic whites. They also find that among first-generation Hispanic children, the effects of Head Start were largest among children of mothers who had been interviewed in Spanish, suggesting that at least some of the positive effect of the program is due to increased preschool exposure to “mainstream” language.

Evidence from broader studies of child care quality is also relevant to the discussion of whether early intervention programs should be targeted to disadvantaged children. For example, the Cost, Quality, and Outcomes (CQO) Study surveyed children and staff in 401 centers in four states, and has followed them through second grade. This study found that after controlling for a limited set of variables—maternal education, gender, and ethnicity—higher quality care was

<sup>9</sup> As of this writing, the report is available on the web at (<http://www.acf.dhhs.gov/programs/hsreac/oct99/textrpt.htm>).

associated with more positive cognitive and social outcomes, and that these effects were greatest for children whose mothers had the least education (Cost, Quality and Child Outcomes Study Team, 1995, 1999).

The National Institutes of Child Health and Human Development Study of Early Child Care is following 1,364 children in 10 sites around the country. After adjusting for a broad array of observable characteristics, the study has found that low quality care is associated with “insecure attachment” of children to their mothers, but only among children whose mothers are less sensitive to their needs to begin with (NICHD Early Child Care Research Network, 1999a). Insecure attachment of children to their mothers is of interest because it has been associated with future behavior problems and with a lower willingness of children to explore their environments. At a biochemical level, insecurely attached infants exhibit higher cortisol levels in response to stressful events, which may lead to permanent changes in the way that the brain deals with stress (Gunnar, 1996).

These findings suggest that the payoff to early intervention is greatest for the most disadvantaged children. They also suggest that factors such as being at risk of abuse or neglect, lack of maternal education, and limited English-language proficiency should be taken into account when defining “disadvantage,” rather than focusing only on family income.

### **What is a Quality Preschool Program?**

The quality of preschool programs is of particular concern given that in many cases, the alternative to high quality preschool is not home care, but lower quality child care. The NICHD Early Child Care Study found that most infants were placed in some sort of nonmaternal care by four months of age (NICHD Early Childcare Research Network, 1997). While more educated mothers are still more likely to work than mothers in the lower-income families served by Head Start, this reality may be changing with welfare reform.

Several different scales have been developed for assessing the quality of child care and preschool. These scales generally have two components, one that evaluates “structure” and one that evaluates “classroom process.” Structure refers to such measurable attributes as the teacher/pupil ratio, class size, and teacher/administrator background and experience.<sup>10</sup> Classroom process refers to less easily quantifiable qualities such as the nature of teacher/child interactions, the layout of classroom materials, and whether the activities are “developmentally appropriate.”

Perhaps unsurprisingly, the two types of measures tend to be correlated. The NICHD Study of Early Child Care found that child care situations with better “structures” as measured by safer, cleaner, more stimulating environments and

<sup>10</sup> For example, the Early Childhood Environment Rating Scale, Revised Edition, consists of 43 items including ratings of interactions between children and staff; interactions among children and discipline; curriculum items such as teaching of numbers; health and safety items; ratings of space and furnishing; and ratings of personal care routines. See <http://www.fpg.unc.edu/~ecers/ratingscales.html>.

better child-staff ratios also tended to be better in terms of “classroom process”—that is, caregivers who were more sensitive to the children and provided more cognitively stimulating care (NICHD Early Child Care Research Network, 1999b). However, the study also found that the combination of family income, maternal vocabulary, home environment and maternal cognitive stimulation were stronger predictors of children’s behavior problems and cognitive development than any characteristics of the child care they were in (NICHD Early Child Care Research Network, forthcoming). Children in high quality centers have fewer behavior problems and better cognitive and language development than children in poorer centers, but it is not clear to what extent this is due to unobserved aspects of family background which are associated with being placed in higher quality care.

### **Is Head Start a Quality Program?**

One of the most interesting findings of the FACES study discussed above is that Head Start centers have been found to be of higher quality on average than other preschool programs (Resnick and Zill, undated), though they are of lower quality than the model programs discussed above. The better-than-average rating of Head Start centers in the FACES study appears to reflect the fact that there are very few really bad Head Start programs. In contrast, the Cost, Quality, and Outcomes Study Team (1999, p. 1) found that 11 percent of the sites they surveyed offered care that did not meet minimum levels of quality and that only one in seven child care centers “provides a level of quality that promotes healthy development.” In combination with data about the number of children in Head Start and in similar state-sponsored programs which presumably do generally meet quality standards, the CQO study results suggest that a considerable portion of the quality center-based child care available to preschool children is publicly funded.

However, the quality of Head Start should not be regarded as uniform, either. For example, the FACES study found that Head Start classroom quality was higher in programs with higher family incomes and in those with fewer minority families. Some Head Start programs have also been criticized for failing to provide the language-rich environment necessary to prepare children for learning to read in early grades (for example, Abell Foundation, 2000). Zigler and Styfco (1994) argue that funds are insufficient to allow for meaningful enforcement of Head Start program standards, which may be one reason for the variation in quality. Still, it is interesting that the sheer existence of these standards, even with little enforcement, seems to be associated with a minimum level of quality higher than the minimum observed in the private sector.

### **Regulation of Child Care Quality**

Probably the most important aspect of quality for an early education program is the nature of the interaction between the teacher and the child. In general, didactic teaching methods and punitive strategies for dealing with children are associated with less favorable outcomes (Phillips and Stipek, 1993). Obviously, this



aspect of child care quality is difficult to regulate. However, small group sizes, better teacher training, and other regulable aspects of quality can make positive interactions more likely.

The fact that even rather loose regulation of these observable aspects of quality by Head Start appears to be effective in eliminating poor quality programs suggests that additional regulation of private sector child care quality might be beneficial. However, in the absence of increased public provision of child care, increased regulation of private child care centers could drive up costs, which could have the paradoxical effect of pushing more children into unregulated informal care arrangements that may be even more highly variable in their quality (Hotz and Kilburn, 1996; Currie and Hotz, 2000).

### **Is There an Optimal Age for Intervention?**

A White House Conference on Early Childhood in 1997 highlighted research suggesting that the first three years are a “critical period” for brain growth and learning, and hence for early intervention. However, it is not easy to make the leap between scientific research regarding brain development and public policy. There is no one-to-one correspondence between brain growth and increases in capabilities (Bruer, 1999; Gopnik, Meltzoff, and Kuhl, 1999). In addition, it would be misguided to interpret this research as evidence that intervention after age three is futile. Critical periods of brain development have only been established for a few specific functions such as vision and language, and they may extend well into the elementary school years.

Nevertheless, the first three years are an extremely important period for the development of mental health and social functioning. Animal studies involving rats and primates have shown that individuals subject to continuously high levels of stress at early ages experience changes in the parts of the brain that regulate stress hormones, as well as in areas of the brain responsible for learning and memory. There is evidence that human infants subject to severe stress (because of abuse, or cold and distant caregivers) have similar abnormalities in the ambient levels of stress hormones. High levels of these stress hormones have been associated with an inability to pay attention and a lack of self-control in humans. When these highly stressed infants are given warm, sensitive alternative caregivers, they experience reductions in the levels of stress hormones, at least temporarily. Hence, the evidence suggests that children at risk of abuse or neglect could gain special benefits from spending time with alternative, nurturing caregivers (Gunnar, 1998).

Some experts believe that to have any effect, intervention must be continued at least into the early grades. However, the available evidence on this point is sparse and conflicting.

As discussed above, the design of the Carolina Abecedarian project allowed researchers to assess the separate effects of the birth to age five intervention, and the subsequent intervention at school age. This study found that the intervention from birth to five was much more effective than the later intervention (Campbell

and Ramey, 1994, 1995). On the other hand, the Infant Health and Development Project, which treated children with center-based care from 12 to 36 months, had no effect on grade repetition or special education (by age eight) although it did have a positive effect on mathematics scores among the “heavier” low birthweight babies, as noted previously. Evaluations of the Chicago Child-Parent Centers suggest that following up on a Head Start-like intervention into the early grades has a more positive effect than Head Start alone, while on the other hand, the Perry Preschool Project produced dramatic effects with only a two-year preschool intervention of high quality.

Thus, the available evidence does not identify an optimal age for intervention. It does suggest being wary of claims that a short intervention delivered at any particular age is a “magic bullet” that will counterbalance the effects of a childhood of deprivation, or that intervention for four and five year-old children is too late.

## **The Costs and Benefits of Early Intervention**

Most studies of early childhood education programs do not report costs and benefits. The Perry Preschool Project is an important exception to this rule, and analyses of this program have been widely quoted to argue that early interventions can pay for themselves in terms of reduced costs to society later on. For example, a New York State Board of Regents’ (1993, p. 2) background paper in support of expanded early childhood education services uses the evidence from the Perry program to state: “Investing \$1 in quality early education saves \$7 by reducing later grade retention and special education placement and increasing high school graduation rates.”

Besides the obvious caveat that Perry Preschool is not representative of the average early intervention program, there are other problems involved in taking the dollar figure produced by a particular cost-benefit study and applying it more generally. First, the rate at which society is willing to trade off future benefits for current benefits (the discount rate) will affect the estimated value of the benefit. Similarly, benefits may appear larger or smaller depending on what is counted. The existing analyses of Perry Preschool do not attempt to put a dollar value on all of the benefits of the program. They focus on the narrower question of whether the program produced cost savings to the government.<sup>11</sup> Note that if early intervention programs do produce cost savings, then any deadweight losses due to the funding of these programs via taxation would presumably be even greater in the absence of such programs. Thus, such losses are ignored in the calculations below.

A complete cost/benefit analysis would also consider not only whether all of the benefits of a particular program were greater than its costs, but whether the

<sup>11</sup> See Karoly et al. (1998) for a re-examination of the costs and benefits of Perry Preschool and for a fuller discussion of the issues involved in making these calculations.

benefits of a particular program were greater than those of alternative programs aimed at improving child outcomes, a complication which is again ignored. A final caveat is that it is risky to extrapolate from studies conducted 20 or 30 years ago to those in effect today, especially considering that the problems of the children served (single parenthood, parental drug use, neighborhood crime) may now be more severe.

Clearly, cost/benefit analysis should not be regarded as an exact science. Nonetheless, some back-of-the envelope calculations pertaining to the costs and benefits of Head Start are presented in Table 3. Table 3 does not attempt to lay out a complete cost/benefit analysis. Rather, the approach taken is to start with some relatively easily measured benefits of Head Start in the short and medium term, and then calculate the fraction of the program's costs that are repaid via these benefits.

The first panel of Table 3 presents an estimate of the cost of sending 1000 children to a regular part-day, part-year Head Start program for two years. Federal costs per child are published annually by the Administration on Children, Youth, and Families. However, the program guidelines require some matching by local Head Start agencies, though this may be in-kind. In what follows, I assume that the local match is worth the mandated 20 percent of what is spent by the federal government.<sup>12</sup>

The second panel of Table 3 begins with short-term benefits, by which I mean those that accrue to children and families while they participate in the program. In this era of welfare reform, in which low-income mothers of young children are generally expected to work, it is worth stating the obvious fact that Head Start provides child care. Table 3 provides two different valuations of the child care provided by Head Start. The first uses the hourly cost of "mediocre" child care. The justification for using this number is that society can perhaps be thought of as having made a commitment to poor mothers that it will pay for child care of at least mediocre quality if they work. The Child Care Quality and Outcomes Study Team (1995, p. 44) reported that the average cost of providing mediocre care was \$2.11 per child hour, which implies an annual value of \$1,435 per child for the part-day, part-year care provided by Head Start. Valued this way, the child-care benefit provided by Head Start pays back 23 percent of the federal and local cost of providing the program.

This calculation of short-term child care benefits as a share of costs looks even more favorable if Head Start is converted to a full-time program. As discussed above, the Administration for Children, Youth, and Families estimates that Head Start could be converted to a full-day, full-year program at a cost of approximately

<sup>12</sup> Head Start may also increase participation in other programs such as Medicaid and the Child and Adult Care Food Program (which subsidizes meals and snacks for children in day care). It is difficult to estimate how much participation in these programs would increase, or what benefits increased participation might bring. Moreover, other child care programs are also likely to increase expenditures under Medicaid and CACFP. I do not include these costs or benefits in Table 3.

Table 3

**The Costs and Benefits of Head Start<sup>a</sup>**

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Costs of sending 1,000 children to a regular part-day, part-year Head Start for two years:

Federal cost	\$10,152,381 (5,200,000 + 5,200,000/1.05).
Local cost	\$2,030,476 (assumes 20% local matching. Much local matching is in-kind, so the proper valuation of it may be unclear).

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*Short-Term Benefits*

Improved health and nutrition, prevention of abuse and neglect, benefits to other members of family including parents and siblings.

Child Care I: (part-day, part-year valued at cost of "mediocre" child care) \$1,435 per child per year ( $\$2.11 \times 20$  hours per week  $\times 34$  weeks per year). Total benefit = \$2,801,667.

Child Care II: (full-day, full-year valued at mean of what employed mothers actually pay) Between \$2240 and \$4029 per child per year (The average employed mother spends \$80.57 per week conditional on spending anything, but only 55.6% of employed mothers of preschool children report making payments for child care).<sup>b</sup> Total benefit between \$4,373,033 and \$7,866,143.

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*Medium-Term Benefits<sup>c</sup>*

Preventing special education.

Assumptions: rate of special education is approximately 12%, and is reduced by a similar amount as grade repetition. Thus, 28 fewer children are placed in special education. Special education costs approximately \$8000 per year more than regular education and once placed in this track, children are unlikely to rejoin the mainstream. Children are assumed to leave school after 11 years. Discount rate of 5%. Total cost saving =  $\$1,855,245 = (28 \times \{8000/(1.05)^3 + \dots + 8000/(1.05)^{14}\})$ .

Preventing grade repetition.

Assumptions: rate of grade repetition is approximately 20% and is reduced by 28%. Thus, 56 fewer children (out of the 1,000) repeat a grade. Cost of a year of elementary education = \$6000. Most children who repeat, repeat kindergarten or first grade. Discount rate is 5%. 40% of children do not receive benefits in terms of prevention of grade repetition. Total cost saving =  $\$174,149 = [.6 \times (56 \times 6000/(1.05)^3)]$ .

Any other continuing benefits to children and families of getting off to a good start.

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*Long-Term Benefits*

Possible improvements in schooling attainment and wages, and reductions in crime, teen pregnancy, etc.

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Notes: <sup>a</sup>All costs and benefits discounted to when the child was age 3, and presented in 1999 dollars.

<sup>b</sup>See Blau (2000).

<sup>c</sup>Estimates of effects of Head Start on grade repetition are based on Currie and Thomas (1995). Currie and Thomas do not examine the probability of special education placement, but many of the studies listed in Table 2 do. Estimates of the costs of special education and grade repetition, and of the number of children in special education are thanks to Caroline Minter Hoxby and Julie Berry Cullen.

\$9000 per child, per year. Thus, if we continue to assume a two-year program, discounting the second year at 5 percent, and a 20 percent local match, the cost of sending 1000 children to Head Start for two years would rise to about \$21 million. The short-term benefits of Head Start in terms of the child care provided would also rise. If we use the \$2.11 per child hour figure, for 40 hours rather than 20 hours per week, and 50 weeks rather than 34 weeks, then the value of the child care provided rises to \$8,240,197 and the child care benefit would account for 39 percent of the cost of the Head Start program.

A second way to value the child care provided by Head Start is to use the amount that employed mothers actually spend. Blau (2000) reports that in 1993, the average employed mother spent \$80.57 (in 1999 dollars) per week on child care while working, if she made any payment. At this rate, and assuming that most mothers work full-time, the child care provided by a full-day, full-year Head Start would be worth \$4029 per child, per year. Only 55.6 percent of employed mothers of preschool children report making payments for child care, so this number overstates willingness to pay. Still, care provided free by relatives or friends is not without value, so the value of child care must lie between \$2240 (55.6 percent of \$4029) and \$4029. These figures imply that the child care provided by a full-day Head Start program would pay back 21 to 37 percent of the costs of the program. Thus, a range of different valuation methods all suggest that the child care provided by Head Start is of substantial value in itself.

Other short-term benefits of a Head Start program in terms of the improved health and well-being of both children and their families may be substantial. Children benefit from improved health and nutrition, and from being in a safe and nurturing environment. Benasich, Brooks-Gunn and Clewell (1992) show that mothers can also benefit from early intervention programs in terms of measures such as self-esteem, mental health, parenting skills, and even employment. However, it is difficult to place a dollar amount on these benefits and I have not attempted to do so.

The third panel of the table extrapolates from some of the work discussed above to estimate "medium-term" benefits of Head Start in terms of the prevention of special education and grade repetition in early grades. As a rough estimate, based on a number of the studies listed in Table 2, say that Head Start can reduce the need for children to be placed in the special education track and reduce the incidence of grade repetition for some groups by 28 percent.

Since special education is substantially more expensive than regular schooling, and since children who enter special education are likely to stay in that track, the potential cost savings are great. Assume that the rate of special education for this group of 1000 students would be 12 percent without a Head Start program, but would decline to 9.2 percent with the program. Special education costs approximately \$8000 per year more than regular education, and once placed in this track, children are unlikely to rejoin the mainstream. Thus, assume that the cost savings from reducing the need for special education last for 11 years of school (allowing

for some high school dropouts) and is discounted at a 5 percent rate. The total cost savings are about \$1.8 million, which would account for approximately 15 percent of the federal and local costs of Head Start.

Preventing grade repetition generates much smaller savings. Assume that the rate of grade repetition for this group would originally be about 20 percent. Based on the findings of Currie and Thomas (1995), who did not find that Head Start had any effects on grade repetition for black Head Start children, assume that the program affects grade repetition for only 60 percent of the participants. However, for this group, grade repetition is reduced by 28 percent. Most of the children who repeat a grade repeat kindergarten or first grade, and the cost of a year of elementary education is about \$6000. If we assume further that all children stay in school until graduation and that the discount rate is 5 percent, then the cost savings from reducing grade repetition for our hypothetical group of 1000 children are on the order of \$170,000, which is less than 2 percent of the total cost. In reality, Head Start may prevent high school dropouts, which would mean that Head Start children would spend more years in school even accounting for decreased grade repetition.

There may be other medium-term and longer-term benefits to Head Start. For example, a more positive attitude towards schooling and avoidance of grade repetition and special education could lead to higher ultimate schooling attainment and wages even if it has no immediate effect on test scores (Heckman, 1999). The rosiest scenario is one in which Head Start has positive long-term effects on wages and tax payments, while decreasing crime and teen pregnancy. The benefits of the Perry Preschool program have been valued at \$25,437 (in 1996 dollars, using a discount rate of 4 percent) per child in terms of increased tax payments, reductions in educational and welfare payments, and reductions in crime per child (Károly et al., 1998). Given the short- and medium-term benefits discussed above, Head Start would pay for itself if it yielded long-term benefits that were even a quarter as large as those of Perry Preschool.

In summary, the available evidence suggests that the short- and medium-term benefits could easily offset 40 to 60 percent of the costs of large-scale, publicly funded early intervention programs such as Head Start. Thus, even relatively small long-term benefits of such a program may be sufficient to offset the costs of public investment.

## **Directions for Research and Policy**

Head Start is a popular and highly visible program. Federal appropriations for it grew during both the Bush and Clinton administrations. Given all of the discussion and hope surrounding the program, the quality of the research on the subject is somewhat disappointing, especially when it comes to examining the effects on long-term outcomes. Still, all studies are not created equal, and better studies do

tend to find larger and more significant effects of Head Start. But more studies of large-scale public programs like Head Start need to be done, preferably with large sample sizes, randomization, and a focus on long-term follow-up.

In my view, the evidence regarding short- and medium- term benefits of Head Start is compelling enough to suggest that it would be good public policy to fund Head Start fully so that all poor children could participate, and to extend it to be a full-day, full-year program. It would also be a good idea to extend eligibility to some groups of children who are not poor but are vulnerable to educational failure for other reasons: children at risk of abuse or neglect; children of high school dropouts; and children with limited English-language proficiency.

The available evidence sheds less light on the wisdom of establishing a universal public preschool program. Such a program would be costly and would provide a large child care subsidy to many middle- and upper-income families, rather than targeting benefits primarily towards the neediest children. However, such a program might enjoy greater popular support than one targeted only to needy children. Opponents of universal preschool programs point out that public school systems are struggling to meet their current educational mandates, and are ill-equipped to extend their mission to preschool (for example, Olsen, 1999). The success of Head Start offers an alternative vision for the establishment of a universal preschool program which is separate from the public school system, yet subject to a degree of public oversight.

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