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Barnett, W. Steven and Belfield, Clive R.

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W. Steven Barnett and Clive R. Belfield

Summary

Steven Barnett and Clive Belfield examine the effects of preschool education on social mobility in the United States. They note that under current policy three- and four-year-old children from economically and educationally disadvantaged families have higher preschool attendance rates than other children. But current programs fail to enroll even half of poor three- and four-year-olds. Hispanics and children of mothers who drop out of school also participate at relatively low rates. The programs also do little to improve learning and development.

The most effective programs, they explain, are intensive interventions such as the model Abecedarian and Perry Preschool programs, which feature highly qualified teachers and small group sizes. State preschool programs with the highest standards rank next, followed by Head Start and the average state program, which produce effects ranging from one-tenth to one-quarter of those of the best programs. Typical child care and family support programs rank last.

Barnett and Belfield point out that preschool programs raise academic skills on average, but do not appear to have notably different effects for different groups of children, and so do not strongly enhance social mobility. In such areas as crime, welfare, and teen parenting, however, preschool seems more able to break links between parental behaviors and child outcomes.

Increased investment in preschool, conclude Barnett and Belfield, could raise social mobility. Program expansions targeted to disadvantaged children would help them move up the ladder, as would a more universal set of policies from which disadvantaged children gained disproportionately. Increasing the educational effectiveness of early childhood programs would provide for greater gains in social mobility than increasing participation rates alone.

The authors observe that if future expansions of preschool programs end up serving all children, not just the poorest, society as a whole would gain. Benefits would exceed costs and there would be more economic growth, but relative gains for disadvantaged children would be smaller than absolute gains because there would be some (smaller) benefits to other children.

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W. Steven Barnett is director of the National Institute for Early Education Research, Rutgers University. Clive R. Belfield is assistant professor in the Department of Economics, Queens College, City University of New York.

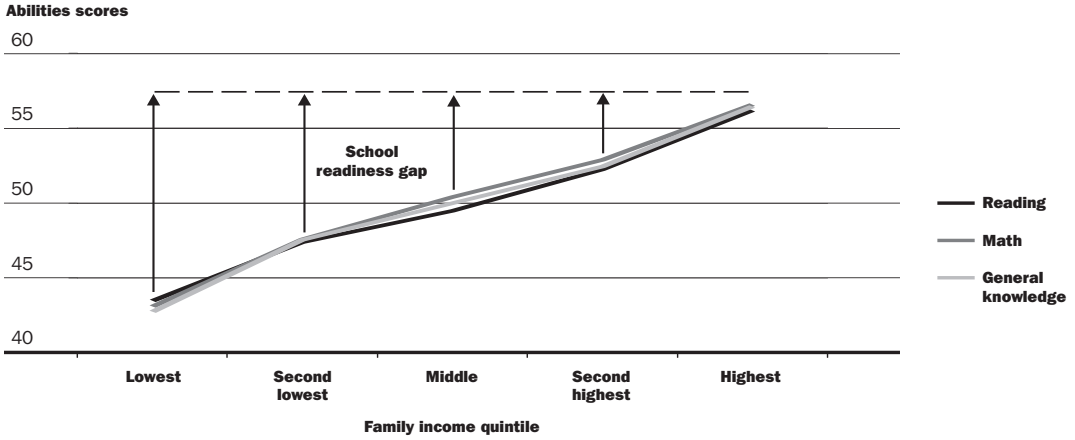
Investments in the skills of a nation's citizens can affect both the general level of their productivity and income and disparities in incomes and living standards among them. In this article we examine how current public investments in preschool education for U.S. children are affecting the skills of those children generally, as well as the extent to which those investments are reducing income-related disparities among them—not only during childhood but also when they are adults. We also consider how new investments in those programs might affect children's skills and increase social mobility.

Much research on preschool education and children's skills has been motivated by concerns about income-related disparities in young children's language and cognitive abilities, as well as other measures of their development, including socioemotional skills. Such disparities become evident in children as young as age three and appear to persist—indeed, may even widen—through the school years.[1] Researchers have examined various preschool education programs to learn which might best prevent or reduce these early disparities so that poor children can enter school with skills more nearly equal to those of more highly advantaged children. However, in recent years at least, researchers have paid less attention to an important related question: how preschool education can enhance social mobility by enabling disadvantaged children to achieve as adults greater socioeconomic success than did their parents.

That poor children begin their lives with lower skills than those of more privileged children is clear. Figures 1 and 2 present estimates of the link between preschool children's skills, both cognitive and social, and the income of their families; they suggest that skills rise evenly with family income. At present federal, state, and local governments in the United States fund a wide variety of early childhood education programs that serve many but not all children. Parents of more advantaged children often pay privately for various preschool programs for their children. Although existing publicly funded programs are demonstrably raising the skills of the children who participate in them, they clearly have not—as figures 1 and 2 show—broken the link between children's skills and family income. Would increased public investment in preschool education provide additional benefits for children in poverty and help to improve social mobility? If so, what form of investment would be most effective? Some observers argue in favor of limiting increased spending to programs that serve only poor children. Others favor creating a new, universal preschool program that would serve all children alike. A key empirical question related to the latter proposal is whether a quality preschool education program for all children would shift the entire slopes of figures 1 and 2 upward or would rotate the bottom of the slopes upward while the top remained anchored.

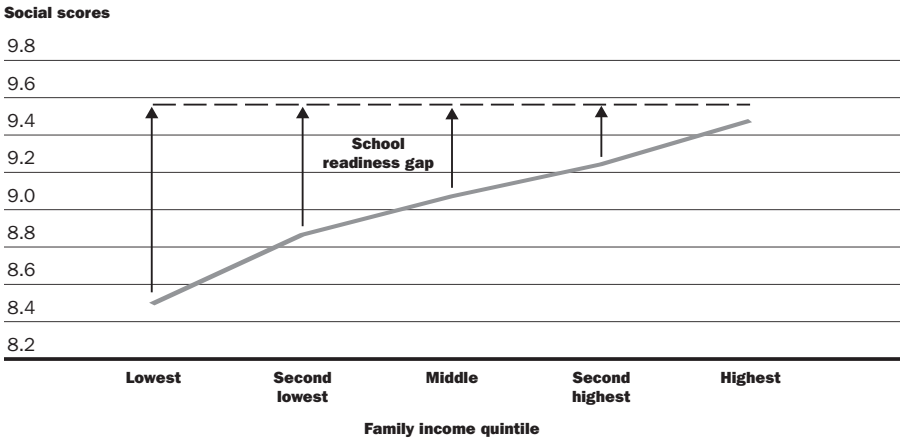
The extent to which preschool policies improve the abilities of all children or reduce disparities in learning and development will depend on the answers to several questions. First, to what extent do such policies alter the distribution of preschool education opportunities? Do they increase the participation of disadvantaged children from low-income and low-education families in effective programs? Do they affect the participation of more advantaged children? Second, to what extent are such programs educationally effective? A subsidiary question is the extent to which preschool programs may improve the abilities of disadvantaged children relative to those of

Figure 1. Abilities of Entering Kindergartners, by Family Income, National Data, Fall 1998 (reported by NIEER from ECLS-K)



Source: W. Steven Barnett, Kirsty Brown, and Rima Shore, "The Universal vs. Targeted Debate: Should the United States Have Preschool for All? *Preschool Policy Matters* 6 (New Brunswick, N.J.: NIEER, 2004).

Figure 2. Social Skills of Entering Kindergartners, by Family Income (NIEER Analysis of ECLS-K)



Source: See figure 1.

advantaged children. Third, to what extent do these early effects on children's learning and development contribute to their abilities as they grow older, and what aspects of public policy contribute to sustained effects? Is it possible that these early effects may not only be sustained throughout a lifetime but even be passed on to later generations as they affect parents' investments in children?

Participation in Early Childhood Programs

Early childhood programs fall into three broad types: early schooling for children from ages three to five, interventions and child care for children from birth to age two, and parenting education. The coverage of the latter two is limited. Before age three, children participate in interventions and center-based

care at quite low rates. The largest comprehensive child development program for children under age three (other than early interventions for children with disabilities) is the federal Early Head Start program, which served fewer than 62,000 children in 2003.[2]

Programs for parents also have quite limited participation. A few states—Minnesota, Missouri, and Arkansas—invest in these programs more than others, but even their funding remains limited. Some programs target economically disadvantaged families, others do not. The Parents as Teachers program served more than 325,000 children in 261,000 families in 2003–04, far more than any other parent program.[3] Our analyses of data from the National Household Education Survey (NHES) of 2001 found that just 12 percent of young children had parents who reported participating in a parenting education program or support group (9 percent for parenting education alone). Participation rates in parent programs did not differ significantly by family characteristics such as income and parental education.

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Among children nearing school age, on the other hand, participation in preschool education is increasing dramatically. In 1950 only 21 percent of five-year-olds were in school. By 1965, 70 percent of five-year-olds attended kindergarten, but only 16 percent of four-year-olds and 5 percent of three-year-olds were in school. Today kindergarten attendance is nearly universal and 65 percent of four-year-olds and 42 percent of three-year-olds attend school.[4] These figures, however, are based on parents' reports and thus necessarily on parents' views about what constitutes "school."

For parents of five-year-olds, "school" is almost entirely kindergarten, a preschool program that has some uniformity and is primarily provided in public schools. Three- and four-year-old children, however, attend a complex patchwork of public and private programs that go by a variety of names, including preschool, pre-kindergarten (pre-K), four-year-old kindergarten (4K), Head Start, child care, day care, and nursery school. These programs vary widely in educational intent. Parents of three- and four-year-olds typically report private child care provided in classrooms, but not child care in private homes, as school.

Kindergarten

Some children still do not attend kindergarten, which is not compulsory in most states. There is little research on why they do not attend, though the fact that only half-day programs are available in some communities may be a factor for working families. Only in the past twenty years has full-day kindergarten become common, with 63 percent of children who attend kindergarten participating in a regular school day of about six hours. The others attend half-day for two and a half to three hours, frequently in double shifts, some in the morning and some in the afternoon. The distribution of full-day kindergarten is uneven. Of the nine states that require it, all are in the Southeast.[5] Full-day attendance is much more common for African American children (76 percent) than

for white (56 percent), Hispanic (60 percent), or Asian children (57 percent).[6] It is also more common among children in poverty (63 percent) than among others (55 percent).[7]

Public Preschool Education

At ages three and four children attend a variety of public preschool programs. For children in poverty, the federal government provides Head Start. State and local education agencies also provide preschool education programs. In addition, federal and state governments subsidize child care, and many children attend private child care centers with and without public subsidies. These programs vary in their goals, resources, standards and regulation, and length of day and year.

Head Start serves about 900,000 children, the vast majority at ages three and four. It serves 12 percent of children at age four, and serves just over half of those children for two years starting at age three. Although Head Start targets children in poverty, self-reported household income data on program participation indicate that by the second half of the school year about half the children served are not poor but "near poor."[8] The reasons why the targeting is less than exact include allowable exceptions to poverty in the eligibility rules, changes in families' economic circumstances after enrollment, and probably some children enrolling who do not meet the eligibility criteria. It also seems likely that some of this apparent difference is due to Head Start's use of family income rather than household income to determine eligibility. Although the overwhelming majority of Head Start children are from lower-income families, it is incorrect and misleading to simply subtract Head Start enrollment from the total number of three- and four-year-olds whose household income falls below the poverty line to determine how many poor children are not served. The fact that poverty is a moving target presents a serious challenge for education programs that aim to serve all poor children.[9]

State and local governments support two types of preschool education programs. First, every state serves young children with disabilities in the public schools, though the percentage served varies substantially.[10] States can serve children with developmental delays in these programs, as well as those with identified disabilities. Second, the District of Columbia and forty-one states also fund preschool education for other children (though in a few cases this is only through supplements to Head Start). Most of these programs target children in poverty or otherwise at elevated risk for poor achievement later. Oklahoma and Georgia have for several years sought to provide preschool education to all four-year-olds, and Oklahoma has essentially achieved that goal. Florida moved to join them in 2005, and other states have taken steps in that direction. While state preschool special education programs serve children at ages three and four, most of the states' general preschool education programs focus primarily or entirely on four-year-olds.

These publicly funded preschool education programs are sometimes based in the public schools and sometimes in private programs. In 2004–05 state preschool programs served 6 percent of four-year-olds in special education and 17 percent of four-year-olds, most of them disadvantaged, in general programs, although precise demographic descriptions of the children are not available. The corresponding figures for three-year-olds are 4 percent in special education and 3 percent in other state preschool programs. Additional

children attend preschool programs in local public schools using local or federal funds, but no one tracks their numbers nationally.[11]

Child Care and Private Preschool Education

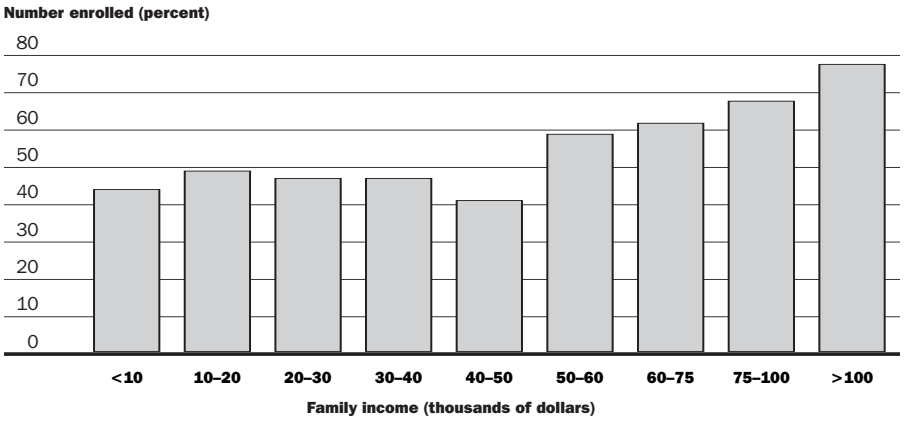
Children also attend preschool programs paid for publicly through federal and state child care funds and privately by parents. State educational standards for these programs are minimal. The only reliable data on the number of children enrolled in all public and private programs are provided by parental reports in national surveys and the decennial census. These data do not allow reliable breakdowns by type of program or funding source, because parents report virtually any classroom as educational regardless of teacher qualifications and educational practices, and many children attend multiple programs or programs that blend funding streams. Publicly funded child care programs generally do not enroll children for an entire school year because enrollment is contingent on family income and parental employment, which fluctuate over time. Thus, while an average of 1.73 million children receive services (57 percent in centers) subsidized by the Child Care Development Fund (CCDF) each month—roughly 225,000 at age three and 225,000 at age four in fiscal year 2004—this does not mean that all of them receive services continuously during the calendar or school year.[12]

At the national level one can roughly estimate the number of children in child care and local public or private preschool programs by subtracting from parent-reported total enrollment the number of children in major public education programs (Head Start, special education, and regular state preschool). At age four, about 66 percent of children attend a center-based program of some sort. The major public education programs account for 34 percent, leaving 32 percent in private programs or locally funded public school programs. At age three, 39 percent attend a center-based program, and subtracting the 14 percent in major public education programs leaves about a quarter of the population (25 percent) in child care and local private or public preschool. Thus, most three- and four-year-old children in a classroom are not in one of the major public preschool education programs and most of this residual group is not receiving a direct child care subsidy (13 percent of three- and four-year-olds receive a CCDF subsidy, but not all are in centers).[13]

Program Participation by Family Background

Data from the National Household Education Survey can be used to estimate preschool program participation (public and private combined) by various family background characteristics and to explore the determinants of program participation.[14] There are striking differences in participation by income, parental education, ethnicity, and region. From figure 3, it is apparent that preschool participation declines as income falls until a point just below median income. Thereafter, participation levels off or even rises as income falls. It seems reasonable to infer from this graph that existing public programs are already substantially increasing preschool program participation rates among economically disadvantaged children. NHES data on enrollment at age four in 1991 and 2001 indicate a substantial increase over time for children whose mothers are high school dropouts (36 percent to 49 percent), but these children continue to participate in preschool programs at lower rates than do children of high school graduates (65 percent) and college graduates (70 percent).[15] Clearly there is room for further equalization of access to preschool.

Figure 3. Preschool Participation, by Income, 2001



Source: W. Steven Barnett and Donald Yarosz, "Who Goes to Preschool and Why Does It Matter?" *Preschool Policy Matters* 7 (New Brunswick, N.J.: NIEER, 2004).

Preschool participation rates also vary by ethnicity. African American children have the highest rates, with rates for white non-Hispanic children and Asians only slightly lower. Hispanic children have by far the lowest rates. Rates vary by ethnicity partly because the South provides many public programs and the West provides few. Once family background characteristics and regions are taken into account, participation rates for Hispanic children are not significantly lower than for white non-Hispanic children. Rates for African American children remain somewhat higher even after such adjustments.[16]

Overall, current U.S. public policy increases preschool participation at ages three and four for children from economically and educationally disadvantaged families relative to others, largely through major public education programs. But current programs fail to enroll even half of the children in poverty at ages three and four, or half of the children whose mothers are high school dropouts, even at age four. There is thus tremendous room for public policies to increase enrollment of the most disadvantaged children in preschool education programs. Moreover, the programs that do serve such children—child care and even some public education programs—do little to improve their learning and development. Public policies could also do much more to increase participation rates of children from families up to about the median income. Smaller but still substantial increases in enrollment are possible for all but the wealthiest and best educated.

Influence of Early Childhood Programs on Child Development and Adult Outcomes

How do current programs affect children's eventual educational attainment, earnings, family formation, and propensity to commit crime? And how much more effective might other policies be? Many researchers have examined the effects of various early childhood education programs, with the vast majority focusing on short-term effects on learning and development.

There are literally hundreds of studies of the immediate and short-term effects of child

care and early interventions, and their findings have been conveniently summarized in both quantitative meta-analyses and traditional literature reviews.[17] Across these studies, the average initial effect on cognitive abilities is about 0.50 standard deviations, roughly equivalent to 7 or 8 points on an IQ test with a 100-point scale and a standard deviation of 15. Average effects on self-esteem, motivation, and social behavior are also positive, though somewhat smaller. In what follows, we review the best evidence to summarize what is known about how various programs—family support, child care, Head Start, public preschool, and several very intensive educational interventions (which have yet to be implemented on a large scale)—affect children's skills.

Family Support Programs

Although some studies produce larger estimates, the most reliable research—randomized experimental trials—estimates that family support programs improve both cognitive and social development by perhaps 0.10 standard deviations.[18] Randomized trials of many home-visiting programs have failed to find consistent effects on child development, probably because very few of these programs are intensive enough to produce significant cognitive benefits for children.[19] Similarly, randomized trials of comprehensive services delivered in "two-generation" models—so called because they serve both children and parents—have disappointing findings, again because they do not provide substantial direct services to children.[20]

These findings support two conclusions about program effectiveness, both of which are consistent with other reviews of the research.[21] First, influencing child development indirectly through parents appears to be relatively ineffective. Second, a program's effect on child development varies with the frequency and duration of the intervention provided. Even the most intensive family support program devotes far fewer hours to parents than child-directed interventions devote to children. In addition, the costs of such programs, particularly those intensive enough to produce even modest benefits, are substantial, thus likely making them less cost-effective than other preschool programs.[22]

Despite the modest effects of most home-visiting programs on children's cognitive development, one very intensive program has substantially improved the home environment and development of young children. David Olds and colleagues found in a series of randomized trials that a program of home visits by nurses to economically disadvantaged new mothers reduced the number and improved the timing of pregnancies and births after the first child and also reduced the children's need for medical care for injuries and ingestions.[23] Other popular medically oriented programs with similar goals, however, have not been similarly effective in randomized trials.[24] Olds's nurse home-visiting program has also been found to improve modestly both the children's cognitive development (effect size of 0.15 using the population standard deviations for the tests) and parents' report of behavior problems.[25]

Child Care and Early Education

Of all the preschool programs available to directly serve children, only center-based programs in which children attend classrooms or individual tutoring sessions improve cognitive development. The type and quality of activities in these programs vary tremendously. In the best programs children are systematically, regularly, and frequently engaged in a mix of teacher-led and child-initiated activities that enhance the development of language, knowl-

edge of concepts and skills, problem-solving abilities, self-regulation and other socio-emotional skills, attitudes, values, and dispositions. In the worst programs, where little is planned, children wander aimlessly, with few interesting and thought-provoking interactions, activities, or materials, and teachers are unresponsive to their interests or needs. To the surprise of no one, the better programs have the better outcomes.

Studies find that typical center-based child care (as opposed to home or other types of care) improves cognitive abilities by about 0.10–0.33 standard deviations. Most estimates are in the 0.10–0.15 range for cognitive and language development.[26] Evidence is mixed on whether effects are larger when care begins before age three.[27] Some nonexperimental studies have found that child care can increase antisocial behavior at school entry, with effect sizes of about 0.08–0.20. The evidence is mixed with respect to whether effects are larger for disadvantaged children than for those from more advantaged homes.[28] Some studies have found that higher program quality, measured in various ways, may lead to small improvements (0.04–0.08) in cognitive and language ability and in behavior.[29] Most child care programs, however, facing minimal government requirements and poor funding, are not designed to improve child development.

By contrast, Head Start, the federal government's largest comprehensive child development intervention, is specifically designed to improve children's cognitive, social, emotional, and physical development, as well as to support their parents in a variety of ways. An excellent recent randomized trial estimates, however, that one year of Head Start has fairly small effects, from less than 0.10 to 0.24 for standardized measures of language and cognitive abilities.[30] This finding echoes that of an Early Head Start randomized trial in which cognitive and language effects were about 0.10 or smaller.[31] Randomized trials of both Head Start and Early Head Start find small decreases (about 0.10) in antisocial behavior. They find no evidence of negative effects on social and emotional development. (The Head Start study did not estimate the effect of Head Start relative to no program, but over and above whatever experiences children received otherwise.)

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The best short-term evidence on the effects of preschool programs sponsored by public schools comes from relatively rigorous studies of the Chicago Child-Parent Centers and the universal preschool program in Tulsa, Oklahoma. These studies have found initial effects on standardized tests of cognitive and language abilities ranging from 0.38 to 0.79, depending on the measure. The Chicago Child-Parent Center study found a positive effect on social adjustment in school; the Tulsa study did not look at social development.

The Tulsa study can be directly compared with the Head Start randomized trial on three tests; in each case, the Tulsa effects are

several times as large.[32] As with the Head Start study, the Tulsa study estimates effects over and above the experiences that children can get outside the state program, here including Head Start and child care. And the Tulsa study, like the Head Start study, lasted only one year; effects might be larger if the program lasted longer. But clearly, caution is warranted in comparing these two studies.

There is relatively little basis for estimating the effects of intensive educational interventions on children from middle-income or highly advantaged families.

The Head Start study involves many more children in more diverse circumstances, and the comparison addresses only one program goal (children's cognitive development). It is plausible that the Tulsa and Chicago programs produced larger gains because their teachers were far more highly qualified than Head Start teachers and were also paid much higher salaries. Whereas Head Start requires only that half of its teachers have a two-year degree, Tulsa and Chicago required certified teachers with a four-year-college degree. The Tulsa findings were recently replicated in an evaluation of state-funded preschool programs for four-year-olds in five states, all of which require certified teachers (Oklahoma, New Jersey, South Carolina, Michigan, and West Virginia).[33]

Researchers using data from the Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K), a national sample of children entering kindergarten in 1998, have found smaller effects for prekindergarten for disadvantaged children—0.16 to 0.28—perhaps reflecting the poorer performance of state-funded preschool programs overall (many have weaker standards than the Chicago or Tulsa program). The ECLS-K data suggest even smaller effects for child care, where regulations typically require little more than a high school diploma for teachers.[34]

Randomized trials of North Carolina's Abecedarian preschool program and Michigan's Perry Preschool program find that these more intensive interventions involving disadvantaged children up to the age of school entry improve cognitive and language abilities from 0.75 to 1.50 standard deviations—twice the effect of the better state preschool programs and eight times to ten times the effect of Early Head Start and Head Start.[35] These effects suggest a dose-response relationship, in which high teacher quality, small class sizes and high teacher-pupil ratios, and the amount of education given are all implicated.[36]

The Perry Preschool study found positive effects on social behaviors similar to most studies of such effects in the first years of school. In contrast, the Abecedarian study, which examined intensive education through full-day child care over five years, found negative, though transitory, effects on social behavior at school entry. Across studies of early education intervention, intensive research programs, and large-scale public programs, including Head Start, short-term effects average 0.25 to 0.40 for self-esteem, problem behavior, and other social behaviors.[37]

There is relatively little basis for estimating the effects of intensive educational interventions on children from middle-income or

highly advantaged families. Few researchers have addressed the topic at all, and even fewer have done so in a rigorous way. The only randomized trial of a preschool program for a highly advantaged population (average IQ was 2 standard deviations above the mean) had a very small sample, limiting its ability to detect effects. Nevertheless it found modest improvements in early academic abilities, at least for boys.[38] The Tulsa study and the later five-state evaluation of preschool education provide some insights, as Oklahoma and West Virginia both serve the general population, not just disadvantaged children, and the other three states also serve populations with some socioeconomic variation. Both studies find that effects are somewhat larger for disadvantaged children.

Long-Term Effects

Though early child care and education have positive initial effects on cognitive abilities, those effects tend to decline over time and in many studies are negligible several years after children leave the programs.[39] The fade-out is most salient for general cognitive abilities, or aptitude, as measured by IQ and similar measures. Only the longest-lasting, most intensive educational interventions (year round, full day over many years), like the Abecedarian program, seem able to produce permanent gains in general cognitive abilities, and these appear considerably smaller than initial gains.[40] Gains on subject-specific cognitive abilities (reading, math, and so forth) seem to be longer lasting, and while these more enduring gains are smaller than the initial gains, they do not appear to fade as often or as much as IQ gains.

Although there is essentially no research on the very long-term effects of typical U.S. child care on educational achievement and attainment, there are many studies of the long-term effects of large-scale public preschool education programs and intensive educational interventions on educational achievement and school progress.[41] Estimated effects on achievement have been highly variable because of differences in research methods and procedures.[42] In the more rigorous studies, which tend to examine the more intensive educational programs, effects on achievement ranged from 0.50 to 0.75 into the high school years. The Chicago Child-Parent Centers study suggests smaller than average long-term achievement gains from large-scale public programs. For Head Start, the initial gains would suggest even smaller long-term achievement gains. Although some studies have found long-term educational gains from Head Start, the effects tend to vary by ethnicity. The lack of such variation in other studies raises questions about these estimates.[43]

Full evidence on long-term effects is reported in tables 1 and 2. Studies that use cumulative school records data to look at grade repetition, special education placements, and high school graduation provide perhaps the strongest basis for comparing the long-term effects of different programs. They find uniformly positive and statistically significant effects on school progress and placement—effects that have been causally linked to program effects on knowledge and skills.[44]

In an earlier review, Steven Barnett combined data from long-term studies of preschool program effects on grade repetition and special education to compare the effects of intensive interventions, Head Start, and public school programs.[45] Intensive interventions had twice the effect in reducing grade repetition (twenty-four studies) and four times the effect in reducing special education placement (twenty studies) of Head Start and

Table 1. Effects of Early Childhood Interventions on Education

Change (percent except as indicated)

Intervention and educational outcome	Effect
Special education placement	
Abecedarian (ABC)	–48
Perry Preschool	–43
Chicago Child-Parent Centers	–32
Head Start	–28
Public School and Head Start[a]	–29
Retained in grade	
Abecedarian	–47
Perry Preschool	–13
Chicago Child-Parent Centers	–33
Early Childhood Longitudinal Study-Kindergarten Cohort	Negative effect (reduces)
Public School and Head Start[b]	–30
High school dropout likelihood	
Abecedarian	–32
Perry Preschool	–25
Chicago Child-Parent Centers	–24
High school completion	
Head Start: white children	20 percentage point increase
Head Start: African American children	No clear effect
College progression	
Abecedarian enrollment in four-year college	3 times as likely
Perry Preschool	No clear effect
Head Start: white children	28 percentage point increase
Head Start: African American children	No clear effect

Sources: Clive Belfield and others, "Cost-Benefit Analysis of the High/Scope Perry Preschool Program Using Age 40 Follow-Up Data," *Journal of Human Resources* 41 (2006): 162–91; W. Steven Barnett, "Does Head Start Have Lasting Cognitive Effects? The Myth of Fade Out," in *The Head Start Debates*, edited by Edward Zigler and Sally Syfco (Baltimore, Md.: Brookes Publishing Co., 2004); W. Steven Barnett and Leonard Masse, "Comparative Benefit-Cost Analysis of the Abecedarian Program and Its Policy Implications," *Economics of Education Review* (in press); Arthur Reynolds and others, "Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers," *Educational Evaluation and Policy Analysis* 24, no. 4 (2002): 267–303; Eliana Garces, Duncan Thomas, and Janet Currie, "Longer-Term Effects of Head Start," *American Economic Review* 92 (2002): 999–1012; Janet Currie, "Early Childhood Programs," *Journal of Economic Perspectives* 15 (2001): 213–38; Centers for Disease Control and Prevention, "Community Interventions to Promote Healthy Social Environments. Early Childhood Development and Family Housing," *Morbidity and Mortality Weekly Report* 51 (2002); Judy Temple, Arthur Reynolds, and Wendy Miedel, "Can Early Intervention Prevent High School Drop-Out? Evidence from the Chicago Child-Parent Centers," *Urban Education* 35 (2000): 31–56.

a. Nine-study average.

b. Ten-study average.

public school programs. Notably, many studies that have looked at these strong indicators of school failure have very similar findings. Given the small size of several of the experimental studies, including Perry Preschool and Abecedarian, the frequent replication of their findings in these other studies strengthens confidence in their results.

Although fewer studies have looked at effects on high school graduation, researchers consistently find positive effects for Head Start, public school programs, and more intensive interventions. It is difficult to feel comfortable with generalizations from so few studies, though grade repetition and special education placement (which have been studied much more often) are strong predictors of dropping out of school. However, the estimated effects of the three intensive programs are quite consistent: a 15 to 20 percentage point increase in high school graduations (not GEDs or other substitutes), from around 50 percent to around 67 percent. The estimated effect on high school graduation in the Chicago study was about 10 percentage points, roughly half that of the Perry Preschool and Abecedarian programs. A few studies have focused on Head Start, with inconsistent results: one finds high school graduation rates increased for girls by 15 percentage points, another finds a 20 percentage point increase for whites only. Such gains seem improbable, given the very small initial effects found in the national impact study.

The Abecedarian study, but not the Perry Preschool study, found gains in college enrollment. It is difficult to know how to interpret this finding. The Perry Preschool sample was much more educationally disadvantaged than the Abecedarian sample. It may have been that college was just too far beyond their reach, given their starting abilities,

Table 2. Effects of Early Childhood Interventions on Adolescent and Adult Behaviors

Percent except as indicated

Intervention and behaviors	Control or comparison group	Group receiving early childhood program
Teenage parenting rates		
Abecedarian	45	26
Perry Preschool	37	26
Chicago Child-Parent Centers	27	20
Well-being		
Health problem (Perry Preschool)	29	20
Drug user (Abecedarian)	39	18
Needed treatment for addiction (Perry Preschool)	34	22
Abortion (Perry Preschool)	38	16
Abuse/neglect by age 17 (Chicago Child-Parent Centers)	9	6
Criminal activity		
Number of felony violent assaults (Perry Preschool)	0.37	0.17
Juvenile court petitions (Chicago Child-Parent Centers)	25	16
Booked or charged with a crime (Head Start)		12 percentage points lower
Net earnings gain from participating in early childhood programs		
Abecedarian	$35,531	
Perry Preschool Program	$38,892	
Chicago Child-Parent Centers	$30,638	
Head Start	No effect	

Sources: Belfield and others (see table 1); Masse and Barnett (see table 1); Arthur Reynolds and others (see table 1); Garces and others (see table 1); Currie (see table 1); Centers for Disease Control and Prevention (see table 1).

whereas the Abecedarian children were close enough that the boost they received made college possible for a significant share.

Although relatively few in number, most studies that assessed long-term effects on social behavior found positive (though not always statistically significant) effects, and no study reported increased aggression beyond first grade.[46] Five studies of educational interventions that investigated long-term effects on social behavior found beneficial effects on classroom behavior, social adjustment, and crime.[47] These include two of the three studies that linked elevated aggression with full-time child care that began in infancy.[48] The third, the Abecedarian study, found no long-term effect on crime and delinquency, though rates were relatively low for both groups.[49] The strongest effects on crime were found in the Perry Preschool study, where baseline rates for the control group were quite high: the number of arrests was cut by 50 percent. In the Chicago study, the number of arrests by age eighteen was cut by 40 percent, while the share of people ever arrested was cut by a third (or 8 percentage points), from 25 percent to 17 percent. Data on Head Start are limited to two studies: one finds a 12 percentage point reduction in crime for African Americans only; the other, a 10 percentage point reduction for girls only.[50]

There is little research on the effects of preschool programs on later fertility behavior.

The model programs show strong effects, and family support interventions have reported direct effects on fertility behavior of the mothers. Effects are reported in table 2.

Finally, direct effects have been found on employment and earnings. One study found that Head Start raised earnings, but only for white children whose parents were high school dropouts. The model program effects, shown in table 2, may be considered upper bounds on the earnings gain from state-funded preschool.

A reasonable conclusion is that auspices per se have little to do with program effectiveness, once goals, standards, and resources are taken into account.

Program Design and Effectiveness

From the evidence reviewed so far, it should be clear that some preschool programs are more effective than others. A rough ranking from least to most educationally effective under current policies is typical child care and family support programs, Head Start and many state preschool programs, state preschool programs with high standards (far from all of them), and intensive educational interventions. On average, state preschool programs differ little from Head Start in their effects on child development, but states with lower standards likely have worse outcomes and those with higher standards, better outcomes. A reasonable conclusion is that auspices per se have little to do with program effectiveness, once goals, standards, and resources are taken into account. The pattern is clearest for short-term outcomes, where the most data are available. It is less clear for long-term effects on educational attainment and adult social and economic outcomes, where fewer data are available. It does not seem plausible that programs with very weak initial effects would have proportionately larger effects on adult outcomes than on short- and medium-term outcomes.

Given the limits of the data, it appears best to produce a range of estimates of the programs' effects on cognitive and social-emotional development. An upper bound would be effects of the size produced by the Perry Preschool and Abecedarian programs. One then might expect high-quality interventions in public preschool programs to produce effects of half that size. Less educationally intensive public programs, including Head Start *under current policies,* would be likely to produce effects of one-quarter or less, and possibly only one-tenth, of those of Perry and Abecedarian. Regarding effects on children who are not disadvantaged, based on the meager evidence we consider two different scenarios. One is that effects are half those estimated for disadvantaged children. The other is that effects on the educational attainment of advantaged children are essentially zero. Given the small effects of child care, if programs effectively target disadvantaged children, then effects on other children are irrelevant.

In designing policy proposals to improve preschool programs, it should be kept in mind that the most effective educational interventions were more intensive in two senses. First, they had highly qualified, well-paid teachers and high ratios of teachers to children. Second, some provided a large number of hours of intervention over two to nearly

five years. The Perry program provided one teacher (not an assistant) for every six or seven students. Although it operated only half-day during the school year (and most, but not all, children attended for two years), teachers visited each child at home weekly. The Abecedarian program had a teacher and an aide for every twelve children and operated for up to ten hours a day, fifty weeks a year, over almost five years. This pattern can hardly be considered surprising and is consistent with other evidence. It posits that more highly educated, better prepared, better supervised, and better compensated teachers are more effective.[51] Smaller class sizes and better teacher-student ratios result in better teaching and more individual attention, which produce larger gains in achievement and school success.[52] Finally, more hours of effective interventions produce larger effects.

The Effects of Early Childhood Education on Social Mobility

The above evidence on access and outcomes suggests the following conclusions about the extent to which preschool, as it now stands, affects social mobility by breaking down the links between parental socioeconomic status and behaviors and children's status and behaviors.

Although current public programs move in the direction of equalizing preschool opportunities across races and income levels, they fall considerably short of their goal. Preschool opportunities are not close to equal for Hispanic children. Nor are preschool opportunities equal when mother's education is considered, or when the quality of the different programs is accounted for, or when children aged three as well as four are included. Furthermore, Head Start funding is so limited that it precludes serving most of the eligible population, and public preschool program coverage varies greatly from state to state. Thus many opportunities exist for expanding preschool, but the form of that expansion is critical, as we discuss below.

In addition, broader questions might be raised about the extent to which current preschool programs integrate social groups. Given the separation of children in Head Start and other compensatory programs, preschool programs do not appear to be structured so as to allow disadvantaged children to benefit from long-term exposure to other children. And where preschool programs are tied to local public schools, residential patterns may also limit socioeconomic integration.

Preschool Outcomes and Social Mobility

Preschool may enhance social mobility if it affects children of different races or income levels in different ways. Based on the observed effects of preschool, one might expect increased social mobility across various domains. One domain is earnings: if preschool raises incomes most for those in the lowest earning deciles, then it may increase social mobility. As table 2 shows, model programs do yield reasonable earnings advantages of approximately $30,000 (in current dollars), a little less than 10 percent of the lifetime earnings of a high school dropout. Current public programs, however, are not as effective as these model programs, and $30,000 is the advantage compared to control groups with no preschooling (that is, it is the effect of the preschooling, not the difference in effect on earnings for different groups). The second domain is education, the focus of most research. Preschool does indeed raise achievement. However, current programs are unlikely to have strongly different effects on educational attainment for different groups of children.[53]

The effects of preschool in other domains, however, appear more conducive to social mobility. For example, disadvantaged children are more likely to engage in crime, be on welfare, and become teenage parents; they are also more likely to report ill health.[54] Here there is more scope for preschool to break the link between family behaviors and child outcomes.

In those areas where preschool may raise social mobility the most—criminal tendency, welfare receipt, and fertility—it may also benefit the children of the preschoolers.

For welfare participation, children may be "scarred" by their parents' receipt of welfare: family receipt of welfare may cause poorer labor market outcomes, break down social norms against welfare support, or increase awareness of welfare eligibility, all of which would perpetuate welfare dependency for individuals and within families. Researchers cannot precisely identify welfare heritability, but they generally find that when parents, particularly African American women, receive welfare, their children are more likely to receive welfare.[55] Preschool programs may therefore raise social mobility by reducing welfare reliance heritability, although the size of the effect is questionable (not least because welfare is increasingly time limited).

Recent evidence also indicates reasonably strong "heritability" of criminal activity, particularly for men. Among noncriminals, 6 percent have fathers who were arrested; among criminals the figure is 15 percent. In the specific case of partner violence, the National Youth Survey shows a strongly positive correlation between family violence and later partner violence.[56] A full meta-analysis, however, finds that "violent origins have only a weak-to-moderate effect on the risk of later partner violence."[57] Most families report zero crime by the parent and zero crime by the offspring. This means that the second-generational elasticity of crime is hard to estimate. Given the limited number of families that appear to transmit crime from one generation to another, preschool's overall effects on this link cannot but be small. But to the extent that crime rates are much higher in some communities than others, preschool programs might have more of an equalizing effect by reducing crime rates in higher-crime-rate communities.

Preschool may have its strongest differential effect on fertility. The first-generation effect is to reduce teenage parenting, which is correlated with low economic well-being.[58] Given that teenage parenting rates are higher for women with low education and low income and for African American and Hispanic women, preschool should have relatively greater benefits for poor and minority children.[59] (Women who participated in the Perry Preschool program as children were also considerably less likely to have an abortion, suggesting that preschool enhances parenthood planning.) There may also be second-generation effects.

Second-Generation Effects of Preschool

In those areas where preschool may raise social mobility the most—criminal tendency, welfare receipt, and fertility—it may also benefit the children of the preschoolers. Given the diffuse benefits of preschool, and

the reasonably strong heritability of behaviors and circumstances, these second-generation effects may be a key to social mobility.[60]

The effects on fertility and crime, in particular, may spill over into the second generation. Research has documented that teenage parenting and single parenting adversely affect children's attainment.[61] Children of teenage parents are much less likely to graduate from high school, and a child in a two-parent family accumulates on average 0.43 more years of schooling than a child in a single-parent family.[62] Given conventional estimates of the returns to a year of education, the benefits from residing in a two-parent household are the equivalent of a 2–4 percent increase in annual earnings. Two-parent family status and smaller family size also reduce criminal activity, while children of teenage parents are more likely to engage in crimes such as assault.[63] The effects appear to be significant, if only because any reduction in criminal activity conveys substantial economic benefits.

Other second-generation effects are probably weaker. There may be some effect on second-generation earnings, to the extent that preschool weakens the link between parents' and children's incomes.[64] Finally, preschool may affect educational attainment across generations. Both mother's and father's education are statistically significant influences on a child's graduation and years of schooling.[65] One extra year of parental schooling is associated, on average, with 0.29 years of offspring attainment.[66]

Although these arguments are plausible, there is no direct evidence on the benefits to subsequent generations from either state or model preschool programs. (Because the sample sizes in the model programs are so small, it is typically not possible to identify second-generation effects.)[67] Moreover, because such benefits would be a long time in the future, they would need to be discounted (valued less relative to immediate benefits). Applying a social discount rate of 3.5 percent, we find that any monetary gain for a child is worth half that of a gain in the same domain to the actual participant. So, even with perfect heritability, the effects on social mobility are half as strong for the second generation.

In summary, there is some evidence that direct and indirect heritability effects are significant, though there is insufficient research from which to generalize to an anticipated effect of participation in early childhood education programs. A recent simulation model, however, suggests that these effects are meaningful.

Diego Restuccia and Carlos Urrutia generate a four-period model of parent-child investments to determine social mobility across generations, contingent on increased public spending on elementary and secondary education, and separately, on higher education.[68] In their policy simulations, they find that increased spending on elementary and secondary education (which can include prekindergarten and kindergarten) raises social mobility. The logic is relatively straightforward. Increased public spending on the early years of schooling—in the model, the increased spending is used for a universal program of preschooling for all children, regardless of family background—eases the burden of borrowing for educational investments for poorer families (although it also motivates some wealthier parents to switch from private to public schools). The children of poorer families will then go on to college, and although they will drop out at relatively high rates, the children who finish will increase the number of college graduates from low-

income backgrounds. In the model, intergenerational earnings and education correlations both fall as a result. Assuming an increase in public spending on early education of $90 billion—sufficient to fund preschool for all children for approximately two years—earnings correlations across generations should fall from 0.40 to 0.36 (a perfect correlation would be 1, no correlation at all would be 0) and education correlations across generations should fall from 0.35 to 0.28.

Because many low-income and minority children are already enrolled in Head Start and other programs, another way to raise social mobility would be to upgrade the existing program.

Relative to other educational investments in the model, these effects are substantial. Spending on higher education in the model, for example, has zero or even a negative effect on these earnings correlations: subsidies awarded to a college student do not greatly affect the student's ability to graduate from college.[69] However, in this model the spending on early education would do little to raise educational attainment (college enrollment and completion) for the lowest income quintile. Its main effect would be to equalize college enrollment rates for the three middle quintiles of family income.

Targeted or Universal Preschooling?

The above discussion assumes a trend toward universal preschooling, or at least that any program expansion would be distributed in the same way as the present system. In part, that assumption reflects widespread political support for universal programs and the practical challenges of more accurately targeting programs to the disadvantaged. A universal program should still reduce inequalities, because it benefits low-income and minority children more than it does advantaged children, but the effects (especially at current quality levels) on relative socioeconomic position may not be strong.

In theory, programs targeted at the most disadvantaged children would increase social mobility the most. A targeted program would obviously generate benefits for those who enrolled. Indeed, existing public preschool programs do raise social mobility. But many children who would enroll in a new targeted program would either be white non-Hispanic or Hispanic or be in the lower-middle quartile of income distribution. Thus Hispanic children might gain more than African American children (who have much higher preschool participation rates), and children in poverty would not benefit much more than children in families with higher but still modest incomes. Moreover, it may not be easy to identify the enrollees who might benefit most from a targeted program (particularly children of mothers who are high school dropouts) and exhort them to participate.[70] Screening, regulating, and monitoring eligibility would also raise unit costs. With imperfect targeting, many disadvantaged children would miss out on programs. If the challenges of targeting could be overcome, however, social mobility effects might be greater.

Because many low-income and minority children are already enrolled in Head Start and other programs, another way to raise social mobility would be to upgrade the exist-

ing program. Janet Currie and Matthew Neidell have found that increased spending on Head Start does appear to enhance outcomes.[71] Also, state programs (most of which are funded at rates below Head Start) might be upgraded. Here the challenge is to get sufficient resources for high-quality targeted programs. Another option is to expand Head Start and state programs to serve all children for two years, which would generate stronger effects. At present most children attend such programs for only one year.

The dilemma is the old efficiency-equity trade-off. A targeted program would have a greater impact on social mobility, but it would not generate as high a public return on investment as a universal program.[72] If a program targeted to the lowest quintile is only 50 percent accurate—that is, if half of the participants are not from the lowest quintile—then it would generate smaller returns than a universal program (even as the average benefits from such a program would be significantly lower). Universal programs are also much more likely to garner political support, as well as generate spillover benefits such as better school discipline. And any fiscal savings these programs yield will be passed on to taxpayers. Thus a useful strategy for increasing social mobility might be to target within a universal system by providing more intensive programs, with smaller classes and longer hours, to disadvantaged children. However, the amount of extra resources needed to yield sufficient social mobility cannot be easily specified.

Conclusions

U.S. preschool programs are effective across a wide set of outcomes. But participation rates are lower for children with lower incomes and low parental education, for Hispanics, and for those residing in the western states than for other children. Together, these facts suggest that increased investment in preschool could raise social mobility. Program expansions targeted to disadvantaged children would help them move up the ladder, as would a more universal set of policies from which disadvantaged children gained disproportionately. Increasing the educational effectiveness of these programs would provide for greater gains in social mobility than would increasing participation rates alone. At the same time, expectations of what can be accomplished on this front should be modest.

Under current policies, preschool participation rates are not vastly different across races and income levels. Future expansions may end up serving all children, not just the poorest. In this scenario, society as a whole would gain. Benefits would exceed costs, and there would be more economic growth and thus more upward mobility, but not necessarily substantially greater opportunities for those at the bottom of the economic ladder.

Notes

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7. Jill Walston and Jerry West, *Full-Day and Half-Day Kindergarten in the United States: Findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99* (Washington: National Center for Education Statistics, 2004), p. 73. There are some surprising differences between this study and the Current Population Survey in estimates of full-day kindergarten attendance by ethnicity and other background characteristics of the children.

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11. Ibid.

12. Administration for Children and Families, "FFY 2004 CCDF Data Tables and Charts (Preliminary Estimates)" (2005), www.acf.hhs.gov/programs/ccb/research/04acf800/list.htm (accessed April 13, 2006).

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15. Barnett and Yarosz, "Who Goes to Preschool?" (see note 4).

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52. Harry McGurk and others, *Staff-Child Ratios in Care and Education Services for Young Children* (London: HMSO, 1995); Jean Layzer, Barbara Goodson, and Marc Moss, *Life in Preschool—Volume One of an Observational Study of Early Childhood Programs for Disadvantaged Four-Year-Olds: Final Report* (Cambridge, Mass.: Abt Associates, 1993); Susan Kontos, Carollee Howes, and Ellen Galinsky, "Does Training Make a Difference to Quality in Family Child Care?" *Early Childhood Research Quarterly* 12 (1997): 351–72; Ann Smith, "Quality Child Care and Joint Attention," *International Journal of Early Years Education* 7, no. 1 (1999): 85–98; Charles Achilles, Patrick Harman, and Paula Egelson, "Using Research Results on Class Size to Improve Pupil Achievement Outcomes," *Research in the Schools* 2, no. 2 (1995): 23–30; Harold Wenglinsky, "How Money Matters: The Effect of School District Spending on Academic Achievement," *Sociology of Education* 70, no. 3 (1997): 377–99; Fred Mosteller, "The Tennessee Study of Class Size in the Early School Grades," *Future of Children* 5, no. 2 (1995): 113–27; Jeremy Finn, Susan Gerber, and Jayne Boyd-Zaharias, "Small Classes in the Early Grades, Academic Achievement and Graduating from High School," *Journal of Educational Psychology* 97, no. 2 (2005): 214–23; Ellen Frede, "Preschool Program Quality for Children in Poverty," in *Early Care and Education for Children in Poverty: Promises, Programs, and Long-Term Outcomes*, edited by W. Steven Barnett and Sarane Boocock (SUNY Press, 1998), pp. 77–98.

53. See Stacey Dale and Alan Krueger, "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables," *Quarterly Journal of Economics* 98 (2002): 1491–527. Magnuson and Waldfogel simulate the effects on achievement from expanding early childhood education programs to clarify how wider access or upgraded preschooling can redress inequities. Expanding enrollment of black and Hispanic children to 80 percent (that is, one-third higher than the rate for white children) would close the initial gap by 4–20 percent (12–52 percent) for black (Hispanic) children. Expanding enrollments to cover all children below the poverty line would reduce the black-white (Hispanic-white) gap by at most 12 percent (16 percent). In additional simulations, upgrading all types of

preschooling has no effect on gaps across ethnic groups; improving the quality of Head Start reduces racial gaps by at most 10 percent (8 percent) for black (Hispanic) children. Katherine Magnuson and Jane Waldfogel, "Early Childhood Education: Effects on Ethnic and Racial Gaps in School Readiness," *Future of Children* 15, no. 1 (2005): 169–96.

54. Long-term health effects may be significant. Single motherhood is associated with higher rates of physical abuse and child neglect, and parental income has a strong impact on child health. See Christina Paxson and Jane Waldfogel, "Parental Resources and Child Abuse and Neglect," *American Economic Review* 89 (1999): 239–44; Anne Case, Darren Lubotsky, and Christina Paxson, "Economic Status and Health in Childhood: The Origins of the Gradient," *American Economic Review* 92 (2003): 1308–34.

55. Peter Gottschalk, "Is the Correlation in Welfare Participation across Generations Spurious?" *Journal of Public Economics* 63 (2003): 1–25; David Green and William Warburton, "Tightening a Welfare System: The Effects of Benefit Denial on Future Welfare Receipt," *Journal of Public Economics* 88 (2004): 1471–93. But the correlation may be muted, as the extent of welfare receipt scarring is debatable: scarring effects appear weak, and welfare payments are increasingly becoming time limited (most new EITC claimant families lose eligibility within two years).

56. Chris Lackey, "Violent Family Heritage, the Transition to Adulthood, and Later Partner Violence," *Journal of Family Issues* 24 (2003): 74–98.

57. Sandra Stith and others, "The Intergenerational Transmission of Spouse Abuse: A Meta-Analysis," *Journal of Marriage and the Family* 62 (2000): 640–54; Jenny Williams and Robin Sickles, "An Analysis of the Crime as Work Model: Evidence from the 1958 Philadelphia Birth Cohort Study," *Journal of Human Resources* 37 (2002): 479–509.

58. Rebecca Maynard, "The Costs of Adolescent Childbearing," in *Kids Having Kids: Economic Costs and Social Consequences of Teen Pregnancy*, edited by Rebecca Maynard (Washington: Urban Institute Press, 1996).

59. Preschooling does not have a strong effect on "steady-state" family size. It delays or reduces childbearing, by raising the opportunity cost of time spent on child care and lowering the probability of unplanned parenthood; but it raises childbearing, because of its association with higher incomes. Typically, the opportunity cost and planning effects are slightly greater than the income effect.

60. Terrie Moffitt, "Adolescence-Limited and Life-Course-Persistent Antisocial Behavior—A Developmental Taxonomy," *Psychological Review* 100 (1993): 674–701; Casey Mulligan, "Galton versus the Human Capital Approach to Inheritance," *Journal of Political Economy* 107 (1999): S184–224.

61. They also adversely influence children's test scores: being born to a teen mother reduces children's test scores at age six by 0.07 effect sizes; independently, a two-parent family is associated with test scores that are 0.1 effect size higher. See Roland Fryer and Steven Levitt, "Understanding the Black–White Test Score Gap in the First Two Years of School," *Review of Economics and Statistics* 86 (2004): 447–64.

62. Robert Haveman, Barbara Wolfe, and Elaine Peterson, "Children of Early Childbearers as Young Adults," in *Kids Having Kids: Economic Costs and Social Consequences of Teen Pregnancy*, edited by Rebecca Maynard (Washington: Urban Institute Press, 1996); Christian Belzil and Jorgen Hansen, "Structural Estimates of the Intergenerational Education Correlation," *Journal of Applied Econometrics* 18 (2003): 679–96.

63. Heather Antecol and Kelly Bedard, "Does Single Parenthood Increase the Probability of Teenage Promiscuity, Substance Abuse, and Crime?" Working Paper, University of California, http://econ.ucsb.edu/~kelly/youth.pdf; Cesar Rebellon, "Reconsidering the Broken Homes/Delinquency Relationship and Exploring Its Mediating Mechanism(s)," *Criminology* 40 (2002): 103–35; Jennifer Hunt, "Teen Births Keep American Crime High," Working Paper 9632 (Cambridge, Mass.: National Bureau of Economic Research, 2003).

64. Based on sixteen studies of intergenerational earnings correlations, an increase in parental income of $1,000 raises offspring income by approximately $340. See Mulligan, "Galton versus the Human Capital Approach" (see note 60). The intergenerational earnings elasticity between fathers and sons is 0.4; that is, if the father's earnings are 10 percent above the average for his generation, his son's earnings will be 4 percent higher than the average for his own generation. See Gary Solon, "Intergenerational Income Mobility in the United States," in *Handbook of Labor Economics,* vol. 3A, edited by Orley Ashenfelter and David Card (Amsterdam: North-Holland, 1999).

65. Robert Haveman and Barbara Wolfe, "The Determinants of Children's Attainment: A Review of Methods and Findings," *Journal of Economic Literature* 33 (1995): 1829–77.

66. See Mulligan, "Galton versus the Human Capital Approach" (see note 60). Income effects on offspring attainment are similarly strong; and a two-parent family is associated with higher attainment by 0.43 years; Belzil and Hansen, "Structural Estimates" (see note 62).

67. Perry Preschool program participants had an average of 2.4 children by age forty-two. There are data on whether the first or second child has ever been arrested, repeated a grade, or been on welfare, and if the child is currently employed. There is no clear evidence of offspring advantages across these dimensions. However, sample sizes are very small.

68. Diego Restuccia and Carlos Urrutia, "Intergenerational Persistence of Earnings: The Role of Early and College Education," *American Economic Review* 94 (2004): 1354–78.

69. This result accords with other research that finds investments in youth to be less efficient than investments in young children. See Steve Cameron and James Heckman, "The Dynamics of Educational Attainment for Black, Hispanic, and White Males," *Journal of Political Economy* 109 (2001): 455–99. Our primary focus is on the efficacy of early investments per se, rather than on their efficacy relative to other interventions.

70. Families will have to invest resources, even if the program is publicly provided. Even with zero fees, some families do not enroll, so presumably the costs and inconvenience of enrollment must outweigh the benefits. It is possible that there is an informational problem: families do not appreciate the benefits of preschooling. However, the more likely explanation is that pre-K is not convenient for many families or that even relatively small direct expenses (such as transportation) are too much.

71. Janet Currie and Matthew Neidell, "Getting Inside the 'Black Box' of Head Start Quality: What Matters and What Doesn't," *Economics of Education Review* (2006, forthcoming).

72. W. Steven Barnett, "Maximizing Returns from Prekindergarten Education," Education and Economic Development, Federal Reserve Bank of Cleveland (November 2004), www.clevelandfed.org/Research/EdConf2004/Nov/PapersPresntns.cfm.