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Early Childhood Care and Education: Effects on Ethnic and Racial Gaps in School Readiness

Katherine A. Magnuson and Jane Waldfogel

Summary

The authors examine black, white, and Hispanic children's differing experiences in early childhood care and education and explore links between these experiences and racial and ethnic gaps in school readiness.

Children who attend center care or preschool programs enter school more ready to learn, but both the share of children enrolled in these programs and the quality of care they receive differ by race and ethnicity. Black children are more likely to attend preschool than white children, but may experience lower-quality care. Hispanic children are much less likely than white children to attend preschool. The types of preschool that children attend also differ. Both black and Hispanic children are more likely than white children to attend Head Start.

Public funding of early childhood care and education, particularly Head Start, is already reducing ethnic and racial gaps in preschool attendance. The authors consider whether further increases in enrollment and improvements in quality would reduce school readiness gaps. They conclude that incremental changes in enrollment or quality will do little to narrow gaps. But substantial increases in Hispanic and black children's enrollment in preschool, alone or in combination with increases in preschool quality, have the potential to decrease school readiness gaps. Boosting enrollment of Hispanic children may be especially beneficial given their current low rates of enrollment.

Policies that target low-income families (who are more likely to be black or Hispanic) also look promising. For example, making preschool enrollment universal for three- and four-year-old children in poverty and increasing the quality of care could close up to 20 percent of the black-white school readiness gap and up to 36 percent of the Hispanic-white gap.

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For children growing up in the United States, early childhood care and education have become an increasingly common experience. Almost every child entering kindergarten today has been in care of some form, and a growing share of kindergartners has attended preschool or received center care. On average, preschool and center care develop young children's early academic skills through enriching activities and sometimes direct instruction.¹ Yet the type and quality of the care that children receive varies widely. Hispanic children, for example, are less likely, and black children are more likely, than white children to be enrolled in a preschool or in center care.

Do children's differing experiences of early childhood care and education affect racial and ethnic gaps in school readiness? If so, do they widen the gaps or narrow them? In this article, we review research on the effects of child care and education on young children's school readiness and look at racial and ethnic differences both in who receives early childhood care and education and in the amount and quality of care.² All three types of evidence are important: for early childhood care and education to influence racial and ethnic gaps in school readiness, the enrollment, intensity, or effects of these programs must differ by race or ethnicity.

Early care and education might *widen* racial and ethnic gaps if children from racial and ethnic minority groups are less likely to be enrolled in beneficial programs, spend less time in them, attend lower-quality programs, or benefit less from them. Conversely, preschool experiences might *narrow* racial and ethnic gaps if children from minority groups are more likely to be enrolled, spend more

time in them, attend higher-quality programs, or benefit more.

In discussing racial and ethnic gaps, we focus on three groups: Hispanics, non-Hispanic whites (whites), and non-Hispanic African Americans (blacks). We note that these groups are socially constructed and heterogeneous categories that proxy for diverse ethnic and cultural groups.³ Hispanic describes first-generation immigrants, refugees from Cuba, and Puerto Ricans, all of whom face different circumstances in U.S. society, including socioeconomic resources.⁴ In the United States, the Hispanic and black categories serve as markers for minority status and its accompanying experiences of discrimination and disadvantage.⁵ Hispanic and black children face much higher rates of poverty, particularly persistent poverty, than do white children.

In this article, we first review the main types of early childhood care and education and their effects on school readiness. We then summarize trends in enrollment and in the quality of care for Hispanic, white, and black children. We conclude by considering how early childhood care and education might help to narrow racial and ethnic gaps in school readiness and by discussing the implications for public policy.

Main Types of Early Childhood Care and Education

Early childhood care and education programs come in many forms. We categorize these into three broad types: parental care, informal care (by a relative, nanny, or babysitter in the child's own home or in a babysitter's or family day care provider's home), and center care or preschool (day care center, nursery school, preschool, Head Start program, or prekindergarten).

We focus most on the third category because a host of studies has found that children who attend center care or preschool programs enter school more ready to learn. As noted, this category includes many different types of programs, and it is important to distinguish between them.

Most children in preschool or center care attend private programs, for which their parents pay fees. Low-income working parents may receive child care subsidies that offset some of the costs, and other families with working parents may also receive financial assistance through tax provisions, including the child and dependent care tax credit and the dependent care assistance plan.⁶ Some center care and preschool programs operate full-day and year-round; others, only part-time or during the school year.

Preschool attendance becomes more common as children approach school age. Approximately 60 percent of four-year-old children are in care during the year before they enter kindergarten, up from about 17 percent in care before their second birthday.⁷

The federal government does not regulate preschool programs, and state regulations vary widely in both stringency and enforcement.⁸ One way to assess the quality of center care is through “structural” indicators, such as more highly educated teachers, smaller classes, and lower children-to-staff ratios.⁹ Some studies suggest that caregiver education may be particularly important.¹⁰ Quality varies widely from one program to the next, but, on average, the quality of center care programs, as measured by structural indicators, is probably just “mediocre.”¹¹

A second, arguably better, way to measure child care quality is for trained observers to

rate the quality of the “process”—the warmth, responsiveness, and sensitivity of caregivers, as well as the physical environment and children’s activities.¹² Thus measured, few center-based programs are high in quality; a substantial proportion rank low in quality.¹³ The Cost, Quality, and Child Outcomes Study, conducted in 1993, found good or developmentally appropriate care in only 24 percent of centers serving preschool-age children. Quality was poor in 10 percent. Child-caregiver interactions were positive in less than half.¹⁴ The National Institute of Child Health and Human Development (NICHD) Study of Early Child Care found similarly low rates of positive child-caregiver interactions in center care.¹⁵

A small but growing share of children attend publicly funded preschools, most commonly Head Start and prekindergarten (other public programs exist, but they serve few children). Head Start, the largest publicly funded early education program, began in 1965 as part of President Lyndon B. Johnson’s War on Poverty. It serves children from families with incomes below the federal poverty threshold, as well as children with disabilities.¹⁶ Under Head Start, federal grants are provided to local community organizations that offer early education and comprehensive health, nutrition, and family services to three- and four-year-old children.¹⁷ In 2002 the federal government distributed \$6.3 billion to local Head Start grantees, who served an estimated 65 percent of eligible three- and four-year-olds, some 10 percent of all children in that age group.¹⁸

To receive funding, Head Start programs must meet twenty-four federal performance guidelines. Centers undergo an on-site review at least once every three years. In 2000 about 85 percent of reviewed centers met the

standards of adequate care. According to a recent study of Head Start, programs met or exceeded recommendations of the National Association for the Education of Young Children (NAEYC, a leading group of experts in the field) for class size and adult-to-child ratios. Judged by process quality, on average Head Start centers are on par with other types of center care.¹⁹ Nevertheless, only one-third of Head Start teachers hold four-

Most state programs target disadvantaged three- and four-year-old children and serve a small but growing share of children, with an estimated 14 percent of four-year-olds enrolled in public school-based prekindergarten programs in 2002.

year college degrees, and experts worry that low pay and low levels of provider education constrain program quality.²⁰

Prekindergarten programs, often funded through local school districts, are a more recent type of early education.²¹ As the name suggests, they provide a year (or two) of education before children enter kindergarten. Publicly funded programs rely mainly on state dollars, although local school districts may also use federal Title 1, disability, or other types of funds. Prekindergarten programs may operate in public schools, but some states also directly fund, and school districts may subcontract with, other programs to provide early education services. Typically,

prekindergartens offer some services beyond education, including meals and transportation, but few provide a full array of services such as health screenings.²²

Since 1990, state funding for prekindergarten has increased 250 percent, to approximately \$1.9 million in 2002, but state spending varies widely.²³ In 2000, thirty-nine states had prekindergarten initiatives, but only seven (Connecticut, Georgia, Illinois, Kentucky, Massachusetts, Ohio, and Oklahoma) made substantial per capita investments in them.²⁴ Most state programs target disadvantaged three- and four-year-old children and serve a small but growing share of children, with an estimated 14 percent of four-year-olds enrolled in public school-based prekindergarten programs in 2002.²⁵ Only two states, Georgia and Oklahoma, and the District of Columbia offer such programs to all children; they serve slightly more than half of their four-year-olds.

Structural quality indicators suggest that prekindergarten programs provide relatively high-quality care.²⁶ Most states set guidelines for class size and child-to-caregiver ratios that meet or exceed NAEYC recommendations. The average size of general education prekindergarten classes in public schools is well within NAEYC guidelines.²⁷ Of school-based prekindergarten teachers, 86 percent have four-year college degrees, more than twice the rate among center care and Head Start teachers. Teachers' pay is also more likely to be commensurate with that of elementary school teachers (82 percent receive public school teacher salaries) and considerably higher than that of other child care workers.²⁸ State-funded prekindergarten programs in private preschools, however, appear to have lower structural quality than programs in public schools.²⁹

Data on process quality in prekindergarten programs are in short supply. Because structural indicators are linked to process quality and are higher for prekindergarten than for other types of center care, prekindergarten classrooms could be expected to have higher process quality, too. Indeed, an evaluation of Georgia's universal prekindergarten found the classrooms to be of higher process quality than private preschool classrooms in that state and less likely than Head Start classrooms to be of poor quality.³⁰ But an evaluation of New Jersey's Abbott preschool program argues for caution, because it found classroom quality was lower than that in Georgia and lower than national estimates of center care quality.³¹ The lack of information on prekindergarten classroom quality makes any general conclusions about process quality unwarranted.

Effects of Early Childhood Care and Education on Children's School Readiness

Can early childhood care and education raise children's test scores and promote school readiness? Because space does not permit a comprehensive review of the literature, we summarize the best evidence on preschool and center care, as well as informal and parental care.

The best estimates of the effects of early childhood care and education come from random-assignment experimental studies. These compare children in a particular program with children who were not in the program but were otherwise equivalent on important background characteristics, thus assuring that any differences in children's academic outcomes must be due to their experiences in care. Random-assignment studies, however, are rare. And researchers who conduct them typically evaluate high-quality pro-

grams that serve only a few children, often at a single site, making it hard to generalize findings to large-scale programs or more diverse populations of children.

Many nonexperimental studies consider the effects of more typical early childhood care and education on children's school readiness by taking advantage of naturally occurring variation in child care arrangements. But these observational studies may identify effects that in fact reflect unobserved factors, such as socioeconomic status, that cause children to receive a particular type of care. Because the analyses often include only a few statistical controls for such factors, their findings, although more generalizable to other programs and children, typically do not provide convincing evidence that an effect has been *caused* by the child's experience in care.³²

Experimental Evaluations of High-Quality Model Programs

Over the past thirty years, researchers have conducted experimental evaluations of several high-quality model programs in compensatory early education. These model programs, which primarily enroll economically disadvantaged children, provide developmentally appropriate education, often in combination with health, nutrition, parenting education, and family support services. With highly trained teachers and low child-to-staff ratios, they offer quality far superior to most typical early education programs.

Not surprisingly, these programs enhance children's cognitive development and academic skills at school entry.³³ For example, in the Infant Health and Development Program (IHDP), which provided full-time high-quality center care to low birth weight children between birth and age three, the heav-

ier low birth weight children had IQ scores close to 4 points higher than their counterparts in the comparison group at ages five and eight.³⁴ Children from the most disadvantaged backgrounds, as measured by maternal education, gained the most.³⁵

The academic benefits of these model programs persist, although they fade over time. Children who in their first five years received high-quality care from the Carolina Abecedarian project continued to outperform a comparison group on IQ tests at ages eight and fifteen by just over one-third of a standard deviation.³⁶ Furthermore, exemplary programs reduce children's special education placement and grade retention.³⁷ Children who attended Perry Preschool, for example, received special education services for an average of 1.1 years, as against 2.8 years for comparison children.³⁸

Because most programs were developed to improve children's academic skills and cognitive development, few studies have considered whether they also improve children's social skills and behavioral problems. Indeed, only the IHDP has documented short-term positive effects on children's behavior.³⁹ But several long-term follow-up studies have found lower rates of juvenile delinquency and antisocial behavior, as measured by criminal activity.⁴⁰ It is not yet clear whether long-term declines in problem behavior follow from positive effects on young children's behavior or emerge later in childhood.

Head Start

Clearly, high-quality model early childhood programs can enhance the school readiness of disadvantaged children, but what about other types of programs? Has Head Start done the same for the disadvantaged or disabled children it serves? Answering this question is dif-

ficult because the program has never been evaluated by a random assignment study (although one is now under way). Researchers using nonexperimental designs must find an appropriate comparison group, and as Head Start enrollees became increasingly disadvantaged during the 1980s and 1990s, constructing an appropriate comparison group may have become even more difficult.⁴¹

A series of observational studies with data collected during the 1970s and 1980s found generally modest, short-term positive effects of Head Start participation on disadvantaged children's school readiness.⁴² For example, Valerie Lee and colleagues found that black children who attended Head Start gained 0.25 of a standard deviation more on a test of verbal skills by the end of first grade than did black children who attended no early education program.⁴³ Head Start also improved children's social competence.

The studies that have most successfully controlled for the disadvantaged background of the children enrolled in Head Start may be those that compare children who attended the program with their siblings who did not. Using this method, a series of parallel analyses across two large data sets finds that attending Head Start enhanced children's cognitive development. Six-year-old Head Start children scored close to 7 percentile points higher on a vocabulary test than their siblings who did not attend preschool.⁴⁴ The benefits appeared to persist through elementary school for white and Hispanic children, but not for black children.⁴⁵ Furthermore, follow-up analyses found that Head Start children engaged in less criminal activity as they grew older.⁴⁶

Thus, Head Start appears to have beneficial cognitive and behavioral effects for the chil-

dren it serves, though how large the effects are, how long they persist, and whether they vary by race and ethnic group remain unclear. Evidence from the random assignment study now under way should shed further light on these questions.

Quasi-Experimental and Observational Studies of Prekindergarten Programs

Do prekindergarten programs improve children's school readiness? In the absence of large-scale experiments, we cannot answer this question with certainty. Researchers have undertaken at least twenty evaluations of state prekindergarten programs, but many are so methodologically weak as to raise questions about their findings.⁴⁷ Several rigorous quasi-experimental and observational studies, however, suggest that school-based early education programs can enhance readiness.

The first of these studies evaluated the Chicago Child Parent Centers (CPC), a prekindergarten program provided by the Chicago public school system to predominantly African American children living in poor neighborhoods.⁴⁸ CPC, a part-day preschool for three- to four-year-olds, was staffed by teachers with college degrees and early childhood certification; it offered a follow-on program during the early elementary school years. The preschool program emphasized early language development, promoted parental involvement, and offered comprehensive services such as meals and health screenings. The follow-on program provided smaller classes and programming to keep parents involved in their children's schooling. Because the program was neighborhood based, the researchers were able to compare CPC children with children from poor communities that did not have CPC programs. Children who attended CPC during the year before kindergarten scored 0.64

of a standard deviation higher on an assessment of academic skills in the fall of kindergarten.⁴⁹ Accumulated evidence suggests that preschool contributed to lasting improvements in CPC children's reading and math achievement, as well as high school graduation.⁵⁰

More recently, researchers evaluated the Tulsa prekindergarten program, part of Oklahoma's universal prekindergarten initiative. Tulsa's program offers part- or full-day early

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education to any child who turns four by September 1; classes are held at local public schools, and teachers have at least a college degree. Taking advantage of the program's strict age cutoff for entry, evaluators compared children at kindergarten entry who had met the age cutoff and attended prekindergarten with those who had missed the age cutoff. Prekindergarten boosted children's language skills by 0.39 of a standard deviation, with the largest effects for Hispanic and black children who attended full-day.⁵¹

Observational studies also find positive prekindergarten effects on school readiness.

One such study evaluated Georgia's universal prekindergarten program, delivered by private providers and public schools.⁵² In our own analyses, we used national data from the Early Childhood Longitudinal Study—Kindergarten Cohort (ECLS-K). In this national sample of children entering kindergarten in 1998, the 17 percent who had attended prekindergarten scored 0.19 of a standard deviation higher on a reading and math skills assessment at school entry than otherwise comparable children who spent the previous year in exclusively parental care. The children who had attended prekindergarten also performed better at school entry than children who had attended other types of center care.⁵³ From their review of states' prekindergarten evaluations, William Gilliam and Edward Zigler conclude that although most studies are methodologically weak, evidence is accumulating that prekindergarten programs have positive short-term effects on children's academic skills.⁵⁴

The evidence on the effects on social skills and behavior is more mixed. The CPC studies have not explored effects on children's social skills or problem behavior at school entry, but have found lower levels of adolescent delinquency, as measured by arrest records. The Tulsa prekindergarten evaluation found no effect on children's behavior as they entered school. Our own work with the ECLS-K finds that children who attend prekindergarten have more problem behavior at school entry than do children in parental care.⁵⁵ Likewise, evaluations of state prekindergarten programs do not consistently find improved behavior at school entry, though, as noted, many of these studies are methodologically flawed.⁵⁶

Research on prekindergarten programs is still in its infancy, and much remains to be

learned. Few studies follow children long enough to know whether benefits to school readiness are likely to persist. In addition, few studies describe well the quality of prekindergarten programs being studied or identify program characteristics that might contribute to or hinder children's school readiness. Finally, whether prekindergarten has short- or long-term effects on children's behavior is unclear.

Observational Studies of Other Types of Early Childhood Care and Education

Most children do not attend model programs, prekindergarten, or Head Start. What do we know about the effects of privately funded preschools, nursery schools, and day care centers, as well as informal care and parental care? Most observational studies lump together several care arrangements into broad categories, providing estimates, for example, of the effects of center-based care or informal care.

Whereas estimating the effects of Head Start is complicated by the disadvantaged background of the children, evaluating center-based care is problematic because of the children's relatively *advantaged* family backgrounds. The best observational studies use various techniques to reduce bias from the characteristics of children that cause or coincide with center care enrollment. Methodological concerns notwithstanding, these studies find that attending center care at, for example, a day care center, nursery school, or preschool, particularly at ages three and four, promotes children's academic skills and cognitive development.⁵⁷ Center care during a child's first three years may also enhance cognitive development, particularly for disadvantaged children, although evidence is less consistent for infants and toddlers than for preschool-age children.⁵⁸

A particularly informative study, by Greg Duncan and colleagues, used data from the NICHD Study of Early Child Care to model changes in children's cognitive development as a function of time spent in child care.⁵⁹ By relying on intra-individual change to identify effects, the authors greatly reduced the likelihood of bias caused by the children's advantaged family backgrounds. They found that by attending center care at ages three and four, children gained between 0.22 and 0.33 of a standard deviation more on measures of academic achievement than children in parental or informal care. And children whose cognitive ability was lowest gained the most. Yet, they also found that attending center-based care from birth to age three was not consistently linked to higher academic achievement.⁶⁰

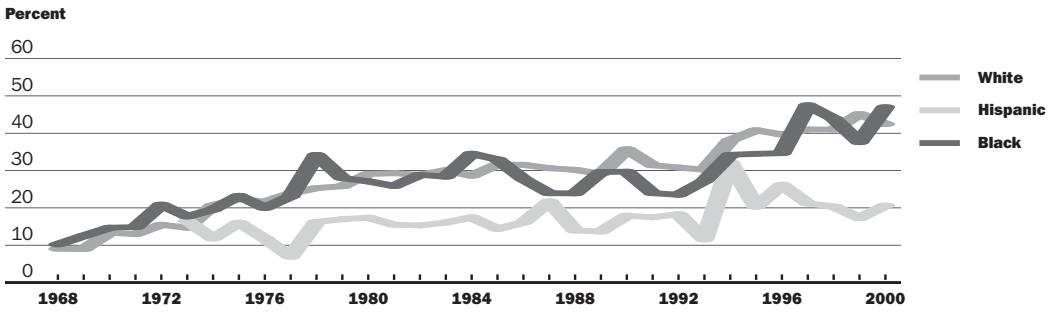
We and our colleagues have used data from the Early Childhood Longitudinal Study—Kindergarten Cohort of 1998–99 to analyze the effects of center care on children's reading and math skills.⁶¹ Children who attended center care (including prekindergarten) the year before entering school performed better on academic skills assessments than their peers. After controlling for a host of family background and other factors that might be associated with center care attendance, we found positive effects at school entry (effect sizes of about 0.14) that persisted into first grade (effect sizes of about 0.06). In most instances, the effects were largest (ranging from 0.16 to 0.23) for disadvantaged groups, measured by such indicators as family income, parental education, and family structure.

Center care may have some adverse effects. Observational studies link all types of nonmaternal care, including center care, with increased problem behavior and aggression in preschool and early school.⁶² Effects are

more pronounced for children who enter nonmaternal care at an early age, are in care for many hours, and attend center care. Although the links between center care and increased problem behavior are consistent, we are uncertain what to make of these findings, for several reasons. First, because all the evidence comes from observational studies, the links may not be causal. Second, the effects are relatively small. The NICHD study suggests that attending center care from birth to age fifty-four months would result in an increase of only 0.10 of a standard deviation in teacher reports of conflict, and most children in center care did not exhibit serious behavior problems or aggression.⁶³ Whether such small differences in children's behavior have any long-term implications for their well-being is unclear. Finally, researchers do not understand what explains the problem behaviors or how much effects may differ depending on program and child characteristics.

Some children attend no center care or preschool before starting formal education. They are cared for by their parents or informal caregivers, such as relatives, babysitters, nannies, or family day care providers. Informal child care is most prevalent during children's earliest years; it is the primary child care arrangement for about 38 percent of infants.⁶⁴ Again, studies of informal and parental care are limited by their reliance on observational, rather than experimental, data. Most find that, on average, informal care does not influence children's cognitive development or academic skills, though, as noted, it may be linked to increases in problem behavior. However, these average effects may mask considerable variability in effects because of differences in the quality of care. Research consistently links higher-quality informal care to better cognitive development and positive behavior.⁶⁵

Figure 1. Preschool Enrollment of Three-Year-Olds, by Race and Ethnicity, 1968–2000



Source: Current Population Survey.

In the cohort of children in kindergarten in 1998–99, about 17 percent had been in parental care the year before, and 12 percent had been in informal child care (including care by a relative, babysitter, or nanny).⁶⁶ In terms of school readiness, children in parental and informal child care fared similarly. Compared with children who attended some form of preschool, children who had only parental or informal care entered school with lower reading and math scores, but with better behavior and self-control, even after a host of child and family characteristics had been taken into account.

Racial and Ethnic Differentials in Enrollment in Early Childhood Care and Education

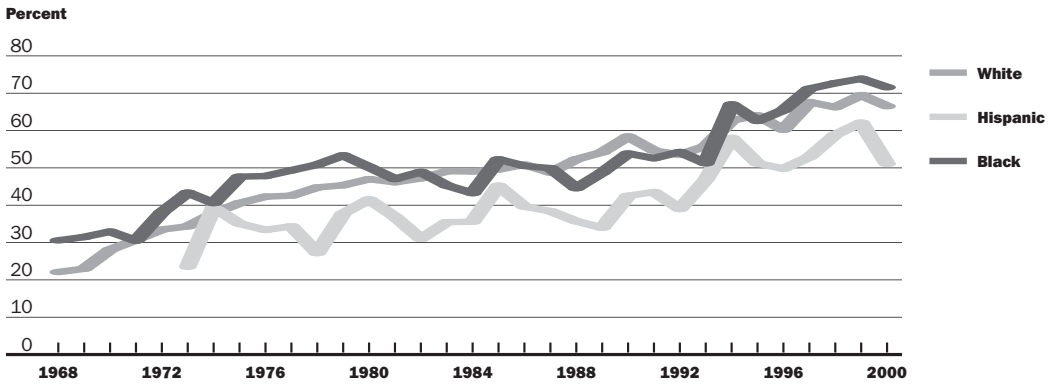
To consider how children’s experiences in early childhood care and education may be affecting racial and ethnic gaps in school readiness, we examine racial and ethnic differences in enrollment in different types of care. We start by comparing rates of Hispanic, black, and white children’s enrollment in center care or preschool programs over time, making use of data from the October Current Population Survey (CPS) from 1968 to 2000.⁶⁷ Despite minor changes in question wording over the period, the October CPS provides fairly consistent data on the enroll-

ment of three- to five-year-olds in center care and preschool (including nursery schools, Head Start, and prekindergarten).⁶⁸ We focus on enrollment trends for three- and four-year-olds, because kindergarten is now almost universal for five-year-olds.

In recent decades, preschool enrollment has grown steadily for three- and four-year-olds from all racial and ethnic groups (figures 1 and 2).⁶⁹ Yet racial and ethnic differences in enrollment are still evident. From the late 1960s through the early 1980s, black three- and four-year-olds were slightly more likely than their white peers to attend preschool. Starting in the mid-1980s, however, black children’s enrollment stagnated, while white children’s enrollment continued to increase. Trends since the mid-1990s suggest that black children may have regained their enrollment advantage. Rates of preschool enrollment for Hispanic children have remained consistently below those of other children. In 2000, only 23 percent of Hispanic three-year-olds were in preschool compared with 49 percent and 43 percent of their black and white peers, respectively. Gaps are also apparent for Hispanic four-year-olds.

In fact, racial and ethnic differences in enrollment in center care or preschool pro-

Figure 2. Preschool Enrollment of Four-Year-Olds, by Race and Ethnicity, 1968–2000



Source: Current Population Survey.

grams exist for young children in all age groups. Table 1 describes the care and education arrangements of children under age six in 1999.⁷⁰ As expected, young white children are somewhat less likely to be enrolled in center care or preschool than black children (panel A). Black children are more likely than white children to attend center care as their primary arrangement (33 percent versus 26 percent) or to attend any center care, whether as a primary or secondary arrangement (40 percent versus 30 percent). Again, Hispanic children are the least likely to be in center care (22 percent).

If one looks only at children with employed mothers (panel B), the patterns remain quite similar, suggesting that different rates of maternal employment do not explain the disparities in enrollment. Thus, the fact that black mothers are more likely to be employed full-time than white mothers is not the only reason why a greater share of black children is enrolled in center care.⁷¹ Even within families with employed mothers, black children are more likely to be in center care than white children.⁷²

As table 1 shows, the type of early childhood care and education also varies by family in-

come. Families with the highest incomes (at or above 200 percent of the poverty threshold) are most likely to use preschool or center care. Because child care subsidies and Head Start and prekindergarten programs are targeted to economically disadvantaged families, families in poverty are more likely to use center care than are those with incomes between 100 percent and 200 percent of the poverty threshold.

Although black children are more likely to be in center care than white children, they are not enrolled in the same types of programs. As noted, black and Hispanic children are more likely to be economically disadvantaged than white children, and thus are more likely to participate in publicly funded preschool programs. More than 20 percent of black and 15 percent of Hispanic three- and four-year-olds are enrolled in Head Start, compared with about 4 percent of white children.⁷³

These racial and ethnic differentials in participation suggest that Head Start probably has played an important role in equalizing rates of black and white children's participation in early education. Assuming that children attending Head Start centers would not receive any center care in its absence, then relative to white

Table 1. Share of Children under Age Six in Child Care, by Type of Child Care, 1999

Percent

Race/ethnicity and poverty status of children	Primary care arrangement						
	Maternal care	Paternal care	Relative care	Other nonrelative care	Family day care	Center-based care and education	Any center-based care and education ¹
Panel A: All Children							
All children	28	12	21	7	7	25	30
Race/ethnicity							
White	29	13	18	8	7	26	30
Hispanic	37	10	25	4	6	19	22
Black	17	9	30	5	7	33	40
Other	30	11	32	2	5	20	27
Poverty status							
Below 100% poverty	38	6	23	3	6	23	27
100–200% poverty	33	12	25	4	5	20	24
Above 200% poverty	23	13	19	9	8	28	33
Panel B: Children of Employed Mothers							
All children	5	19	27	11	9	29	37
Race/ethnicity							
White	5	21	22	13	9	30	38
Hispanic	5	20	37	7	12	19	25
Black	3	13	34	5	8	38	45
Poverty status							
Below 100% poverty	5	16	34	6	10	28	36
100–200% poverty	5	23	34	7	8	23	30
Above 200% poverty	4	19	23	13	9	32	39
Other	4	19	45	3	7	23	5

Source: Authors’ calculations of 1999 SIPP data. Distribution of children across primary care arrangements may not sum to 100 because of rounding of numbers.

1. Includes center-based care or education that was reported as a secondary care arrangement.

children gaps in enrollment might be as large as 9 percentage points for black children and 31 percentage points for Hispanic children.⁷⁴

What does this imply for Head Start’s effectiveness in narrowing the black-white achievement gaps? Answering this question requires an accurate estimate of Head Start’s effects on children, which to date have not been established. We offer an upper bound of the possible effects by using estimates from

the quasi-experimental study of the Chicago Child Parent Centers.⁷⁵ The estimate is likely to be an upper bound because the CPC had more highly qualified teachers than most Head Start centers.⁷⁶ Arthur Reynolds reported that the effect of participating in CPC for one year was 0.64 of a standard deviation increase in academic skills in the fall of kindergarten.⁷⁷ If Head Start boosts skills as much as CPC, then with 19 percent of black children in Head Start, black children’s skills

would be about 0.12 of a standard deviation lower, on average, if they did not attend Head Start or other early education programs. Since the black-white test score gap is estimated at close to 0.50 of a standard deviation, such a reduction implies that the black-white test score gap would be about 24 percent larger (at 0.62 of a standard deviation) in the absence of Head Start. The proportions of Hispanic and black children in Head Start are similar; it is therefore likely that the program also has reduced Hispanic-white test score gaps. In terms of lower bounds, we think it is likely that Head Start's effects are greater than zero and thus are fairly confident that the program has played an equalizing role.

Have other public preschool programs also affected racial and ethnic patterns of preschool enrollment or achievement gaps? Prekindergarten is more likely to be offered in schools with a large percentage of racial and ethnic minority children, which suggests that black and Hispanic children may be more likely than white children to attend publicly funded prekindergarten. However, precise national estimates of the number of black, Hispanic, and white children attending publicly funded prekindergarten programs are not available.⁷⁸

Racial and Ethnic Differences in the Intensity and Quality of Early Childhood Care and Education

Comparing racial and ethnic enrollment trends tells only part of the story. Other important pieces of evidence are the time spent in preschool and the quality of programs attended by white, black, and Hispanic children. Unfortunately, information on racial and ethnic patterns in hours and quality of center care is hard to find.

Lacking published estimates of the number of hours a week spent in preschool and cen-

ter care by children of different racial and ethnic groups, we turn to the ECLS-K data set for estimates of the average number of hours that children were in center care (including Head Start, prekindergarten, and preschool) during the year before kindergarten. Racial and ethnic differences are evident: both black and Hispanic children spent significantly more time in center care each week (thirty-one and twenty-three hours, respectively) than did white children (twenty hours). National data sets find similar patterns for hours spent by young children in all types of nonparental care.⁷⁹

Should one conclude that the longer time spent by black and Hispanic children in center care narrows the gap? Again, we are uncertain, because the answer should be based on precise estimates of the additional benefits derived from thirty hours of care rather than twenty hours, but none is available. Finding no evidence that minority children are spending *less* time in preschools than white children, however, we are confident that differences in the number of hours that children spend in center care are not widening achievement gaps.

As noted, the quality of child care can be measured by structural indicators, such as teacher certification and education, class size, and child-to-staff ratios, and by process measures, such as observations of interaction between caregivers and children.⁸⁰ Here, we use evidence on differences between the quality of care experienced by African American and white children from a study by Margaret Burchinal and Debby Cryer.⁸¹ One of their data sources, the Cost, Quality, and Outcomes (CQO) study, collected information on the quality of center care received by four-year-old children in four states (and thus was not nationally representative). It in-

cluded four different measures of quality of care, assessing teacher's interactions and responsiveness to children as well as the extent to which the program was child centered (rather than didactic). Across all measures, white children on average experienced higher-quality care than black children, but the differences were less pronounced for caregivers' responsiveness and sensitivity

Across all measures, white children on average experienced higher-quality care than black children, but the differences were less pronounced for caregivers' responsiveness and sensitivity than for other measures.

than for other measures. The difference on a summary measure of quality, which combined these indicators, was about 0.3 of a standard deviation.⁸²

Burchinal and Cryer present results from similar analyses for three-year-olds from the NICHD Study of Early Child Care, which followed a large (but not nationally representative) sample of children born in 1991. In contrast to the CQO study, this research included children in all types of care and education settings, not only center care. Consequently, differences in the quality of care may be caused not only by variations in quality within types of care, but also by the different distribution of children across types of care. The measure used by the NICHD study, the Observational Record of the Caregiving Environment (ORCE), captures the

quality of caregiver interactions with children, including their sensitivity and responsiveness. Again, black children experienced lower-quality care than white children; the gap was even larger than in the CQO study, at more than 0.7 of a standard deviation. Taken together, these studies suggest that black children may receive lower-quality care than white children, both within centers and across other types of care.

How Much Do Differences in Early Childhood Care and Education Matter for Racial and Ethnic Gaps in Readiness?

To sum up, racial and ethnic differences exist both in enrollment in early childhood care and education and in the quality of care received. Black children are more likely than white children to be enrolled in some form of preschool, although almost 20 percent of these are Head Start programs. Black children also may attend lower-quality preschool programs than their white peers. Although Hispanic children are much less likely than white children to be in preschool, they are also more likely than white children to be in Head Start. If Head Start programs are of lower quality or less academic in focus than other types of preschools, the high rates of black and Hispanic enrollment in Head Start may mean that these programs are doing less than they might to alleviate early achievement gaps.⁸³

How might early childhood care and education policies narrow racial and ethnic achievement gaps at school entry? First, funds might be targeted to promote the enrollment of racial and ethnic minority children in center care or preschool. Given the current low enrollment of Hispanic children relative to white children, such initiatives could be particularly effective in closing Hispanic-white school readiness gaps. Second,

additional funds might be used to increase the quality of the preschools that black and Hispanic children attend (including Head Start programs).⁸⁴ The magnitude of effects will depend on how much quality is improved and on the number of children affected.

How much might such changes in enrollment and quality narrow racial and ethnic test score gaps? We conducted some back-of-the-envelope estimates that, although rough, allow us to place some bounds on the likely share of the school readiness gaps that could be closed by changing current patterns of preschool enrollment or quality. We assume at the outset that the role of incremental changes in early child care and education is likely to be limited, given the many other influences on the school readiness gaps (documented in the other articles in this volume). We do not attempt to identify specific policies that might increase center care enrollment or quality or to model the effects of specific policies. Rather, we demonstrate how changes in early childhood care and education might narrow racial and ethnic gaps in school readiness.

Increasing Enrollment

We begin by considering the potential effect, by race and ethnicity, of five different changes in enrollment (table 2). Each scenario involves boosting the enrollment in preschool of three- to five-year-olds who are not now in Head Start, prekindergarten, or any other form of preschool. Clearly, the size of the benefit from increases in enrollment depends on how much preschool improves children's school readiness. For each scenario, we draw on the most reliable research to give three different estimates of preschool effects on children's reading scores at school entry: 0.15, 0.25, and 0.65 of a standard deviation.⁸⁵

In the first scenario, Hispanic children's enrollment rises from 40 percent to 60 percent to match that of white children. Depending on the size of the preschool effect, this scenario could narrow the Hispanic-white reading gap at school entry by 0.03 to 0.13 of a standard deviation. Given that the average Hispanic-white gap in reading at school entry is about 0.50 of a standard deviation, this amounts to closing between 6 percent and 26 percent of the gap.⁸⁶ (Although we use the estimate of 0.50 of a standard deviation throughout the remainder of our discussion, it is important to recognize that these figures will overstate the percentage reductions if racial and ethnic school readiness gaps are in fact larger.) In the second scenario, both Hispanic and black children's preschool enrollment rates increase to 80 percent, 20 percentage points above that of white children. Such changes would narrow the black-white gap by 0.02 to 0.10 of a standard deviation (about 4 percent to 20 percent of the gap) and the Hispanic-white gap by 0.06 to 0.26 of a standard deviation (about 12 percent to 52 percent of the gap), again depending on how much children benefit from preschool.

Although both of these scenarios reduce school readiness gaps, particularly that between Hispanic and white children, it may be difficult to implement race- or ethnicity-specific policies. For this reason, we also consider the effect of increases in preschool enrollments across all racial and ethnic groups. In the third scenario, the enrollment of all children living in poverty rises to 100 percent; in the fourth scenario, enrollment for all low-income children (under 200 percent of the poverty threshold) rises to 100 percent; and in the fifth scenario, enrollment is universal without regard to income. Initiatives that boost preschool enrollment without regard to racial or ethnic backgrounds (scenarios 3 to 5)

Table 2. Effects on Reading Scores at School Entry of Increasing Preschool Enrollment for Children Aged Three to Five Who Are Not in Head Start or Preschool

Standard deviation

Scenario	Preschool effect	Increase in population average			Decrease in gap	
		Blacks	Hispanics	Whites	Black-white	Hispanic-white
1. Boost Hispanic enrollment to the level of white enrollment (from 40% to 60%)	.15	-	.03	0	-	.03
	.25	-	.05	0	-	.05
	.65	-	.13	0	-	.13
2. Increase Hispanic and black enrollment to 80%, no change in white enrollment (60%)	.15	.02	.06	0	.02	.06
	.25	.04	.10	0	.04	.10
	.65	.10	.26	0	.10	.26
3. Preschool for all children below 100% of poverty; full enrollment	.15	.02	.03	.01	.01	.02
	.25	.04	.05	.02	.02	.03
	.65	.10	.12	.04	.06	.08
4. Preschool for all children below 200% of poverty; full enrollment	.15	.03	.06	.02	.01	.04
	.25	.06	.09	.03	.03	.06
	.65	.14	.25	.08	.06	.17
5. Preschool for all children; full enrollment	.15	.05	.10	.06	-.01	.03
	.25	.10	.14	.10	0	.04
	.65	.24	.38	.26	-.02	.12

Sources and notes: Estimates of the percentage of children in preschool are taken from National Center for Educational Statistics, *The Condition of Education 2002* (U.S. Department of Education, Office of Educational Research and Improvement, 2000). National rates of preschool attendance among all children, by race and ethnicity, are as follows: white, 59 percent; black, 63 percent; Hispanic, 40 percent. For poor children, the corresponding estimates are white, 46 percent; black, 60 percent; Hispanic 36 percent. For nonpoor children, the estimates are white, 60 percent; black, 66 percent; Hispanic, 42 percent.

Poverty rates were taken from the National Center for Children in Poverty. Estimates are based on the following poverty rates for 2002: children below 100 percent of poverty line: whites, 13 percent; blacks, 38 percent; Hispanics, 30 percent (Child Trends Database, "Children in Poverty," www.childtrendsdatbank.org/indicators/4Poverty.cfm [July 20, 2004]). Children below 200 percent of poverty line: whites, 25 percent; blacks, 58 percent; Hispanics, 62 percent (National Center for Children in Poverty, "Low-Income Children in the United States, 2004," www.nccp.org/pub_cpf04.html [July 20, 2004]).

would be less effective at closing racial and ethnic school readiness gaps than the more targeted initiatives (scenarios 1 and 2). In scenarios 3 to 5, the Hispanic-white gap would fall by between 0.02 and 0.17 of a standard deviation; but the black-white gap might either slightly increase (by up to 0.02 of a standard deviation) or slightly decrease (by up to 0.06 of a standard deviation).

Although boosting Hispanic or black preschool enrollment rates beyond that of white

children would be the most effective means of closing racial and ethnic gaps, the universal programs may offer benefits that our estimates do not capture. For example, if universal programs are of higher quality or if children benefit from attending preschools with peers of diverse socioeconomic backgrounds, then our estimates may be too low.⁸⁷

Improving Quality

What about improving the quality of center care that black and Hispanic children re-

Table 3. Effects on Reading Scores at School Entry of Improving Quality of Head Start and Preschool Programs for Children Aged Three to Five

Standard deviation

Scenario	Quality effect	Increase in population average			Decrease in gap	
		Blacks	Hispanics	Whites	Black-white	Hispanic-white
1. Increase quality of Head Start	.1	.02	.02	0	.02	.02
	.2	.04	.03	.01	.03	.02
	.3	.06	.05	.01	.05	.04
2. Increase quality of Head Start and other preschools for children below 100% of poverty	.1	.02	.01	.01	.03	.00
	.2	.05	.02	.01	.04	.01
	.3	.07	.03	.02	.05	.01
3. Increase quality of Head Start and other preschools for children below 200% of poverty	.1	.04	.02	.01	.02	.01
	.2	.07	.05	.03	.05	.02
	.3	.11	.07	.04	.07	.03
4. Increase quality of Head Start and other preschools for all children	.1	.06	.04	.06	.0	-.02
	.2	.13	.08	.12	.01	-.04
	.3	.19	.12	.18	.01	-.06

Notes: See sources and notes for table 2. Current levels of enrollment are assumed for all scenarios. Estimates of the number of children served by Head Start for scenario 1 are taken from data published by the Head Start Bureau, but the numbers of children in Head Start and preschool are taken from the National Household Education Survey (NHES), 1995. Thus it is not possible to compare directly scenarios 1 and 2, the effect of increasing the quality of Head Start and the effect of increasing the quality of all Head Start and preschools for poor children. Although the NHES indicates that only 36 percent of poor Hispanic children are in center care, the numbers from the Head Start Bureau suggest that 18 percent of all Hispanic children are in Head Start, and if Head Start primarily serves poor children this would imply that close to 60 percent of poor Hispanic children were in Head Start.

ceive?⁸⁸ We answer this question, again, by considering the effect of several different scenarios for quality improvement (see table 3). And, again, because these estimates will be sensitive to the extent to which quality influences children’s outcomes, we provide a range of estimates, reflecting the incremental effects of increased preschool quality on children’s reading skills of 0.1, 0.2, or 0.3 of a standard deviation. However, we note that to bring about such large increases in children’s outcomes would involve large increases in the process and structural measures of quality, in some cases over a full standard deviation increase in the quality of care.⁸⁹

The first scenario involves raising the quality of Head Start programs. Depending on the

size of the increased quality effects, this scenario would reduce the black-white school readiness gap by 0.02 to 0.05 of a standard deviation (4 percent to 10 percent of the gap) and narrow the Hispanic-white gap by 0.02 to 0.04 of a standard deviation (4 percent to 8 percent of the gap). The second scenario entails raising the quality of all preschool programs (including Head Start) for currently enrolled children. It would improve the achievement of black children somewhat more than scenario 1 because they have the highest rates of enrollment in center care. But reductions in black-white gaps would still be fairly modest, ranging from 0 to 0.07 of a standard deviation, depending on whether the quality increase were universal (scenario 4) or targeted to low-income children (sce-

Table 4. Effects on Reading Scores at School Entry of Improving the Quality of and Increasing Enrollment in Head Start and Preschool for Children Aged Three to Five

Standard deviation

Scenario	Quality effect	Increase in population average			Decrease in gap	
		Blacks	Hispanics	Whites	Black-white	Hispanic-white
1. Increase quality of Head Start and other preschools for children below 100% poverty with 100% enrollment	.1	.08	.08	.03	.05	.05
	.2	.11	.11	.04	.07	.07
	.3	.15	.14	.05	.10	.09
2. Increase quality of Head Start and other preschools for children below 200% poverty with 100% enrollment	.1	.11	.16	.05	.06	.10
	.2	.17	.22	.08	.09	.14
	.3	.23	.28	.10	.12	.18
3. Increase quality of Head Start and other preschools for all children with 100% enrollment	.1	.19	.25	.20	-.01	.05
	.2	.29	.35	.30	-.01	.05
	.3	.39	.45	.40	-.01	.05

Notes: See sources and notes for tables 2 and 3. All scenarios assume 100 percent enrollment and an effect of 0.25 before increase in quality.

narios 2 and 3). Because Hispanic children are less likely to experience center care, raising the quality of preschools without changing current enrollment patterns would do little to narrow the Hispanic-white gap and could even increase it (scenario 4).

The estimates in table 3 lead us to conclude that even large increases in the quality of center care would have only a small effect on the black-white school readiness gap and even less of an effect on the Hispanic-white gap. However, we note that raising the quality of preschools attended only by black and Hispanic children would result in slightly larger reductions in school readiness gaps.

Increasing Quality and Enrollment

The estimates thus far have shown what could result from initiatives that either increase enrollment or increase quality. How much more effective would initiatives be if they attempted to do both? In table 4, we

show estimates for three different scenarios that increase center care quality and enrollment at the same time. As in table 3, for each scenario we model the effects of a range of quality improvements, again with increases in center care and preschool effects ranging from 0.1 to 0.3 of a standard deviation.

In the first scenario, preschool enrollment of children in poverty becomes universal and the quality of programs they attend increases. We assume that before the increase in quality, preschool raised children’s school readiness by 0.25 of a standard deviation (our middle-ground estimate from table 2); with the quality improvement, preschool raises school readiness by 0.35, 0.45, or 0.55 of a standard deviation.⁹⁰ Universal enrollment in higher-quality care of children in poverty would narrow the black-white school readiness gap at school entry by 0.05 to 0.10 of a standard deviation (that is, 10 percent to 20 percent of the gap) and would narrow the Hispanic-

white gap by 0.05 to 0.09 of a standard deviation (10 percent to 18 percent of the gap). In the second scenario, enrollment in preschool becomes universal for children from families with household incomes below 200 percent of the poverty threshold. Such a change would narrow the black-white school readiness gap by 12 percent to 24 percent, and the Hispanic-white gap by 20 percent to 36 percent. The third scenario, universal enrollment and higher-quality care for all children regardless of family income, would do little to close racial and ethnic gaps, primarily because white children would also benefit from this change.

As table 4 shows, initiatives that substantially raise both enrollment in and the quality of center care for low-income children could narrow racial and ethnic school readiness gaps considerably, reducing black-white gaps by up to 24 percent and Hispanic-white gaps by up to 36 percent. In addition, table 2 indicates that race- or ethnicity-specific increases in enrollment—in particular, increasing the enrollment of Hispanic children but not that of white children—could also narrow school readiness gaps. Other changes would also improve black and Hispanic children's school readiness, but would not reduce racial and ethnic gaps much, because they would also improve white children's achievement. If raising black and Hispanic children's school readiness regardless of their relative levels of achievement is a goal, then these changes should be considered.

Implications for Policy

We draw two conclusions about the role of early childhood care and education in closing racial and ethnic gaps in readiness at school entry. First, public funding of early education programs is probably already reducing ethnic and racial gaps. Large shares of Hispanic and

black children are attending Head Start; as an upper bound, we estimate that the black-white test score gap at school entry might be as much as 24 percent larger in the absence of Head Start. Yet questions remain about the extent to which Head Start provides lasting academic benefits for children, particularly of differing ethnic and racial backgrounds, making conclusions about Head Start's role in reducing test score gaps speculative.

Second, the effects of incremental increases in enrollment or improvements in quality will depend on the specific changes adopted. For example, boosting the enrollment of Hispanic children in center care to meet or exceed the enrollment of white children would raise their test scores at school entry and narrow the gap between their scores and those of non-Hispanic white children. The overall effect could be quite large (because the gap in enrollment between Hispanic and white children is fairly large), but would depend on the quality of the preschools. Thus, our analysis affirms the wisdom of policies that specifically boost the enrollment of Hispanic children, starting at age three, for example, by funding early education programs in Hispanic neighborhoods.

Likewise, improving the quality of center care would modestly boost children's test scores. Such improvements in quality would do more to close black-white school readiness gaps than Hispanic-white gaps, because more black children are now enrolled than Hispanic children. Yet these effects would be fairly small for both groups, because quality improvements would also benefit white children attending preschool.

What about simultaneous increases in children's preschool enrollment and quality? Universal enrollment in higher-quality center

care or preschools for low-income children could close a substantial portion of school readiness gaps based on race and ethnicity, narrowing the black-white reading gap at school entry as much as 24 percent and the Hispanic-white reading gap as much as 36 percent. Such findings point to the potential for policies that raise enrollment in Head Start, prekindergarten, and other preschool programs for children in and near poverty, while substantially improving the quality of these programs.

In keeping with the focus of this issue, and given data limitations, in this article we have concentrated mainly on test scores as a measure of school readiness. But school readiness encompasses many aspects of development in addition to academic skills, including health, social skills, positive and problem be-

haviors, and motivation to learn.⁹¹ As noted, early childhood care and education programs may affect these other aspects of school readiness, positively or negatively, and such effects should also be taken into account.⁹²

Finally, we need to keep in mind that the benefits even of the best early childhood programs tend to fade over time. Preschool programs may need to be followed up with interventions for school-age children, as in the successful Chicago CPC program.⁹³ As others have observed, it is not realistic to expect a preschool program, however effective, to “inoculate” a child for life against the risk of low academic achievement.⁹⁴ But we can and should expect such programs to help narrow racial and ethnic differentials in young children’s academic skills, so that they enter school on a more even footing.

Endnotes

1. NICHD Early Child Care Research Network, "Early Child Care and Children's Development prior to School Entry: Results from NICHD Study of Early Child Care," *American Educational Research Journal* 39 (2002): 133–64.-
2. Few prior studies have explicitly considered these questions. For general discussions, see David Grissmer, Ann Flanagan, and Stephanie Williamson, "Why Did the Black-White Score Gap Narrow in the 1970s and 1980s?" in *The Black-White Test Score Gap*, edited by Christopher Jencks and Meredith Phillips (Brookings, 1998), pp. 182–226; Marcia K. Meyers and others, "Inequality in Early Childhood Education and Care: What Do We Know?" in *Social Inequality*, edited by Kathryn M. Neckerman (New York: Russell Sage Foundation, 2004).
3. Cynthia T. Garcia Coll and others, "An Integrative Model for the Study of Developmental Competencies in Minority Children," *Child Development* 67 (1996): 1891–914. The racial and ethnic categories and terms we use in this article reflect the terminology and categorizations used in the bulk of studies we review.
4. Alejandro Portes and Ruben Rumbaut, *Ethnicities: Children of Immigrants in America* (New York: Russell Sage Foundation, 2003). Unfortunately, few studies distinguish among Hispanic children based on characteristics such as immigration status or language ability, so this review is unable to make these important distinctions.
5. Garcia Coll and others, "An Integrative Model" (see note 3).
6. Child care subsidy programs reach only a small share of eligible children: in 1998, only about 15 percent of eligible low-income families.
7. Forum on Childhood Family Statistics, "America's Children in Brief: Key National Indicators of Wellbeing." Accessed from <http://childstats.gov>, on November 3, 2004.
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12. NICHD Early Child Care Research Network, "Child Care Structure → Process → Outcome" (see note 9); Elizabeth Votruba-Drzal, Rebecca L. Coley, and P. Lindsay Chase-Lansdale, "Child Care and Low-Income Children's Development: Direct and Moderated Effects," *Child Development* 75 (2004): 296–312.

13. See recent reviews in David Blau, *The Child Care Problem* (New York: Russell Sage Foundation, 2001); Helburn and Bergmann, *America's Child Care Problem* (see note 8); Smolensky and Gootman, *Working Families and Growing Kids* (see note 11).
14. Suzanne W. Helburn, ed., *Cost, Quality, and Child Outcomes in Child Care Centers: Technical Report* (University of Colorado at Denver, Department of Economics, Center for Research in Economic and Social Policy, 1995).
15. NICHD Early Child Care Research Network, "Early Child Care and Children's Development prior to School Entry" (see note 1); NICHD Early Child Care Research Network, "Child Care Structure → Process → Outcome" (see note 9).
16. In 2003, 12.5 percent of children in Head Start programs had disabilities.
17. A small number of children under the age of three are served by the Early Head Start program, which began in 1995.
18. These estimates are based on the number of funded Head Start slots and the U.S. poverty rates; see Janet Currie and Mathew Neidell, "Getting Inside the 'Black Box' of Head Start Quality: What Matters and What Doesn't," Working Paper 10091 (Cambridge, Mass.: National Bureau of Economic Research, 2003).
19. Zill and others, *Head Start FACES* (see note 10).
20. Carol H. Ripple and others, "Will Fifty Cooks Spoil the Broth?" *American Psychologist* 54 (1999): 327–43; Edward Zigler and Sally J. Styfco, "Head Start: Criticisms in a Constructive Context," *American Psychologist* 49 (1994): 127–32.
21. Private schools also offer such programs for a fee, but to simplify our discussions we use "prekindergarten" to refer to publicly funded programs.
22. Ripple and others, "Will Fifty Cooks Spoil the Broth?" (see note 20); Karen Schulman, Helen Blank, and Danielle Ewen, *Seeds of Success: State Prekindergarten Initiatives 1998–1999* (Washington: Children's Defense Fund, 1999).
23. "Quality Counts 2002: Building Blocks for Success," *Education Week* 21, no. 17 (January 10, 2002) (www.edweek.org/sreports/qc02/templates/article.cfm?slug=17exec.h21[June 27, 2003]).
24. "Quality Counts 2002" (see note 23); Schulman, Blank, and Ewen, *Seeds of Success* (see note 22); Ripple and others, "Will Fifty Cooks Spoil the Broth?" (see note 20).
25. William Gilliam and Edward Zigler, "State Efforts to Evaluate the Effects of Prekindergarten," mimeo, Yale University, 2004; Timothy Smith and others, *Prekindergarten in U.S. Public Schools* (U.S. Department of Education, National Center for Education Statistics, 2003).
26. Ripple and others, "Will Fifty Cooks Spoil the Broth?" (see note 20).
27. Smith and others, *Prekindergarten in U.S. Public Schools* (see note 25).
28. Blau, *The Child Care Problem* (see note 13).
29. Dan Bellm and others, *Inside the Pre-K Classroom: A Study of Staffing and Stability in State-Funded Prekindergarten Programs* (Washington: Center for the Child Care Workforce, 2002).

30. Gary Henry and others, *Report of the Findings from the Early Childhood Study* (Andrew Young School of Policy Studies, Georgia State University, 2003).
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33. Barnett, "Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes" (see note 32); Janet Currie, "Early Childhood Intervention Programs: What Do We Know?" *Journal of Economic Perspectives* 15 (2001): 213–38; Lynn A. Karoly and others, *Investing in Our Children: What We Do and Don't Know about the Costs and Benefits of Early Childhood Interventions* (Santa Monica, Calif.: RAND, 1998); Jane Waldfogel, "Child Care, Women's Employment and Child Outcomes," *Journal of Population Economics* 15 (2002): 527–48.
34. Cecilia McCarton and others, "Results at Age 8 Years of Early Intervention for Low-Birth-Weight Premature Infants: The Infant Health and Development Program," *Journal of the American Medical Association* 277 (1997): 126–32.
35. Jeanne Brooks-Gunn and others, "Enhancing the Cognitive Outcomes of Low Birth Weight, Premature Infants: For Whom Is Intervention Most Effective?" *Pediatrics* 89 (1992): 1209–15.
36. Frances A. Campbell and Craig T. Ramey, "Cognitive and School Outcomes for High-Risk African American Students at Middle Adolescence: Positive Effects of Early Intervention," *American Educational Research Journal* 32 (1995): 743–72; Craig T. Ramey and others, *Early Learning, Later Success: The Abecedarian Study* (Chapel Hill, N.C.: Frank Porter Graham Child Development Institute, 1999).
37. Barnett, "Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes" (see note 32); Karoly and others, *Investing in Our Children* (see note 33); Waldfogel, "Child Care, Women's Employment and Child Outcomes" (see note 33).
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45. Currie and Thomas, "Does Head Start Make a Difference?" (see note 44). But see also Garces, Thomas, and Currie, "Longer-Term Effects of Head Start" (see note 44), who find some evidence that Head Start might reduce crime among black children; and Lee and others, "Are Head Start Effects Sustained?" (see note 43), who find larger effects of Head Start on academic and social outcomes for black children than white children.
46. Currie and Thomas, "Does Head Start Help Hispanic Children?" (see note 44).
47. Gilliam and Zigler, "State Efforts to Evaluate the Effects of Prekindergarten" (see note 25).
48. Arthur J. Reynolds, "Effects of a Preschool Follow-On Intervention for Children at Risk," *Developmental Psychology* 30 (1994): 787–804.
49. Arthur J. Reynolds, "One Year of Preschool or Two: Does It Matter?" *Early Childhood Research Quarterly* 10 (1995): 1–31.
50. Reynolds, "Effects of a Preschool Follow-On Intervention for Children at Risk" (see note 48); Arthur J. Reynolds and others, "Long-Term Effects of an Early Childhood Intervention on Educational Achievement and Juvenile Arrest: A Fifteen Year Follow-Up of Low-Income Children in Public Schools," *Journal of the American Medical Association* 285 (2001): 2339–46.
51. William Gormley and Ted Gayer, "Promoting School Readiness in Oklahoma: An Evaluation of Tulsa's Pre-K Program," mimeo, Georgetown University, 2003.
52. Henry and others, *Report of the Findings from the Early Childhood Study* (see note 30).
53. Katherine A. Magnuson and others, "Inequality in Preschool Education and School Readiness," *American Educational Research Journal* 41 (2004): 115–57.
54. Gilliam and Zigler, "State Efforts to Evaluate the Effects of Prekindergarten" (see note 25).
55. Katherine A. Magnuson, Christopher Ruhm, and Jane Waldfogel. "Does Prekindergarten Improve School Preparation and Performance?" Working Paper 10452 (Cambridge, Mass.: National Bureau of Economic Research, 2004).
56. Gilliam and Zigler, "State Efforts to Evaluate the Effects of Prekindergarten" (see note 25).
57. Barnett, "Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes" (see note 32); Meyers and others, "Inequality in Early Childhood Education and Care" (see note 2); Smolensky and Gootman, *Working Families and Growing Kids* (see note 11).
58. Deborah Phillips and Gina Adams, "Child Care and Our Youngest Children," *Future of Children* 11, no. 1 (2001): 35–51.
59. This study included Head Start and prekindergarten as center-based care.

60. NICHD Early Child Care Research Network and Duncan, "Modeling the Impacts of Child Care Quality on Children's Preschool Cognitive Development" (see note 9).
61. Magnuson and others, "Inequality in Preschool Education and School Readiness" (see note 53). Unfortunately, data were not available on the quality of care children received so we were unable to explore its influence on school readiness.
62. Jay Belsky, "Developmental Risks (Still) Associated with Early Child Care," Emanuel Miller Lecture, *Journal of Child Psychology and Psychiatry and Allied Disciplines* 42, no. 7 (2001): 845–59; NICHD Early Child Care Research Network, "Does Amount of Time Spent in Child Care Predict Socioemotional Adjustment during the Transition to Kindergarten?" *Child Development* 74 (2003): 976–1005.
63. NICHD Early Child Care Research Network, "Does Amount of Time Spent in Child Care Predict Socioemotional Adjustment during the Transition to Kindergarten?" (see note 62).
64. Authors' calculation of 1999 SIPP data.
65. NICHD Early Child Care Research Network, "Early Child Care and Children's Development prior to School Entry" (see note 1); Phillips and Adams, "Child Care and Our Youngest Children" (see note 58).
66. These estimates and those that follow are from our analyses of the ECLS-K. For further details, see Magnuson and others, "Inequality in Preschool Education and School Readiness" (see note 53).
67. The October CPS began collecting data in 1964, but the microdata for 1964–67 are not readily available. The 2000 data were the most current available at the time the analysis was conducted.
68. From 1968 to 1984, the survey asked: "Is [name] attending or enrolled in school?" In 1985, the question was changed to read: "Is [name] attending or enrolled in regular school?" Then, in 1994, a prompt was added after the question, so that the full question now reads: "Is [name] attending or enrolled in regular school? (Regular school includes nursery school, kindergarten, or elementary school and schooling which leads to a high school diploma)." The October CPS and the National Household Education Survey find a similar share of three- to five-year-old children enrolled in preprimary school programs (for instance, both surveys find 68 percent in 1999). In contrast, two major child care surveys, the National Survey of American Families (NSAF) and the Survey of Income and Program Participation, find a lower share of three- to five-year-olds enrolled in center- or school-based programs; this is likely because these two surveys do not ask explicitly about school programs and also because they interview some families during the summer months, when such programs would be closed.
69. These figures chart the preschool enrollment of three- and four-year-olds, using data from the October Current Population Survey. See note 68 for more details.
70. Table 1 uses SIPP data. Rates of center care enrollment are lower than in the CPS, because infants and toddlers are less likely to experience nonparental care and more likely to experience informal child care than children aged three and four. Estimates of child care arrangements from various data sources should be compared with caution, because of differences in question wording, timing of data collection, and coding categories (see also note 68).
71. Office of the Assistant Secretary for Planning and Evaluation, *Trends in the Well-Being of America's Children and Youth: 2002* (U.S. Department of Health and Human Services, 2002).

72. It is beyond the scope of this article to consider whether racial and ethnic differences in parental employment have affected differentials in test scores, above and beyond any effects that may work through early childhood care and education. Parental employment could affect child development through several pathways, such as economic resources, parenting, and the home environment. For recent reviews on the effects of parental employment on child development, and discussion of how they may vary by racial and ethnic group, see Jack P. Shonkoff and Deborah Phillips, eds., *From Neurons to Neighborhoods: The Science of Early Childhood Development* (Washington: National Academy Press, 2000); Smolensky and Gootman, *Working Families and Growing Kids* (see note 11).
73. Authors' estimation of enrollment rates, using data from the Head Start Bureau and the 2000 decennial census. The calculation is based on the number of Head Start slots available, not the number of children served, which is larger because of turnover. Consequently, our estimates likely understate the number of children who have ever participated in Head Start.
74. These estimates are derived by subtracting each group's rate of attendance in Head Start from its October CPS rates of preschool attendance. For example, because 19 percent of black four-year-olds are in Head Start and CPS data indicate that 72 percent of black four-year-olds are in preschool, without access to Head Start (and without enrollment in other programs), their enrollment rate would be 53 percent. By comparison, only 5 percent of white four-year-olds are in Head Start, so without access to Head Start (and without enrollment in other programs) their enrollment rate would fall from 67 percent to 62 percent, resulting in a black-white enrollment gap of 9 percent (compared with black children's current enrollment advantage of 5 percent).
75. Reynolds, "Effects of a Preschool Follow-On Intervention for Children at Risk" (see note 48).
76. Per pupil expenditures in CPC and Head Start were comparable (in the early 1990s), and both programs emphasize parental involvement and deliver comprehensive services. See Reynolds, "One Year of Preschool or Two" (see note 49). It is also important to keep in mind that Reynolds's estimated effect sizes are considerably larger than estimates derived from Head Start studies. For example, Lee and others, "Are Head Start Effects Sustained?" (see note 43) find Head Start effects of 0.25 on verbal skills at school entry; Currie and Thomas, "Does Head Start Make a Difference?" (see note 44) find almost no lasting effects from Head Start on the academic skills of black children.
77. Reynolds, "One Year of Preschool or Two" (see note 49).
78. Smith and others, *Prekindergarten in U.S. Public Schools* (see note 25).
79. Calculations from the 1999 National Survey of American Families by the Urban Institute found the average numbers of hours spent in nonparental care by children under age three with employed mothers were as follows: twenty-two for white non-Hispanic children, thirty-two for black children, and twenty-one for Hispanic children. See Jennifer Erhle, Gina Adams, and Kathryn Tout, "Who's Caring for Our Youngest Children? Child Care Patterns of Infants and Toddlers," Occasional Paper 42 (Washington: Urban Institute, 2001). Data from the National Household Education Survey in 1995 found the average numbers of hours spent in center-based nonparental care by children under age six were as follows: twenty-eight for white non-Hispanic children, thirty-six for black children, and thirty-one for Hispanic children. See National Center for Educational Statistics, *Digest of Education Statistics, 2002* (Washington, 2003), table 44.
80. Smolensky and Gootman, *Working Families and Growing Kids* (see note 11).

81. Margaret R. Burchinal and Debby Cryer, "Diversity, Child Care Quality, and Developmental Outcomes," *Early Childhood Research Quarterly* 18 (2003): 401–26. Burchinal and Cryer also provide information on the quality of care received by Hispanic children, but sample sizes for this group are so small that we do not include them in our summary. In addition, they examine whether the measures of quality of care had equivalent effects across ethnic and racial groups. They conclude that these measures are equally reliable across groups and that higher quality care was linked to higher levels of cognitive and social skills among all groups. For a discussion of racial and ethnic differences in measuring the quality of child care, see Deborah L. Johnson and others, "Studying the Effects of Early Child Care Experiences on the Development of Children of Color in the United States: Toward a More Inclusive Research Agenda," *Child Development* 74 (2003): 1227–44.
82. Black children in the CQO sample were much more likely than white children to be poor (30 percent versus 6 percent) or working poor (32 percent versus 11 percent). See Burchinal and Cryer, "Diversity, Child Care Quality, and Developmental Outcomes" (see note 81).
83. Zigler and Styfco, "Head Start" (see note 20).
84. Although improving the quality of informal child care might reduce racial and ethnic gaps, it is much more difficult for policies to influence the quality of informal care given by, for example, babysitters or grandparents, than to improve formal child care.
85. The estimate of 0.15 is from Magnuson and others, "Inequality in Preschool Education and School Readiness" (see note 53). The estimate of 0.25 is from NICHD and Duncan, "Modeling the Impacts of Child Care Quality on Children's Preschool Cognitive Development" (see note 9). The estimate of 0.65 is from Reynolds, "Effects of a Preschool Follow-on Intervention" (see note 48).
86. See Greg Duncan and Katherine Magnuson's article in this volume.
87. Pam Sammons and others, *Measuring the Impact of Pre-School on Children's Cognitive Progress over the Pre-School Period* (Institute of Education, University of London, 2002).
88. We do not attempt to estimate how children may benefit from improvements in informal care, because it is difficult to construct effective policies to this end.
89. Burchinal and Cryer, "Diversity, Child Care Quality, and Developmental Outcomes" (see note 81); NICHD Early Child Care Research Network, "Early Child Care and Children's Development prior to School Entry" (see note 1).
90. If we estimate the effects of preschool or Head Start to be 0.65 (and increase the quality of care by 0.2), we find that the population effects would be larger; for example, closing 0.10 of the black-white gap and 0.11 of the Hispanic-white gap (compared with 0.07 for both gaps) for children under 100 percent of the poverty line. If we assume the estimated effects of preschool or Head Start care to be 0.15 (and increase the quality of care by 0.20), we find the population effects are smaller, resulting in slightly smaller reductions in the gap; for example, the black-white gap does not decrease, whereas the Hispanic gap would decrease by 0.06 (compared with 0.07) for children below 100 percent of the poverty line.
91. Shonkoff and Phillips, *From Neurons to Neighborhoods* (see note 72).
92. Zigler and Styfco, "Head Start" (see note 20).

93. Arthur J. Reynolds and Judy A. Temple, "Extended Early Childhood Intervention and School Achievement: Age Thirteen Findings from the Chicago Longitudinal Study," *Child Development* 69 (1998): 231–46.
94. Jeanne Brooks-Gunn, "Do You Believe in Magic? What Can We Expect from Early Childhood Intervention Programs?" *SRCD Social Policy Report* 17, no. 1 (2003); Zigler and Styfco, "Head Start" (see note 20).