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Preschool for California's Children

Promising Benefits, Unequal Access

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Policy Brief 04-3

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Preschool programs hold the promise of raising children's developmental proficiencies and their capacity to thrive at school. Previous research has shown that exposure to high-quality, carefully crafted preschool can boost early cognitive and language development among children from low-income families.[1] This claim has received ample empirical support across several studies conducted over the past three decades.

Yet much remains unknown, including how preschool programs of varying quality affect diverse groups of children. This is particularly important as several California counties embark on ambitious and costly efforts to widen children's access to preschool, and the state's demographic make-up becomes increasingly heterogeneous.

This brief focuses on the following questions:

- *Which families gain access to center-based programs?* What are participation rates of California children in different types of child care? At what ages do children enter center-based programs, on average, and how many hours per week do they attend?

- *What levels of developmental progress—in cognitive, social-emotional, and school readiness skills—do California children display as they enter kindergarten?* How do these developmental levels vary across social class and ethnic groups?

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Key Findings

Parents and policy makers are turning to preschools to better advance the school readiness and broader development of young children. This brief reports on which California children are more likely to gain access to preschool centers—broadly termed *center-based programs*—and whether attendance yields gains in early learning and social skills. We also detail sizeable gaps in the development of different groups of children as they enter kindergarten. These findings stem from a comprehensive new study of 2,314 children, representative of all California children entering kindergarten.

Access to Center-Based Programs

- Well over half of all California children attend center-based programs or Head Start preschools in the year prior to kindergarten (62%). About 14 percent of children are cared for by non-relatives—including babysitters or licensed family child-care providers, or through other informal arrangements—while about 25 percent are cared for by kin members. Three percent of children attend multiple child-care arrangements.

- Parents' own attributes and home practices strongly explain which children gain access to center-based programs. Children from families with higher incomes, more highly educated mothers, fewer children, stronger pre-literacy practices, and less social support from kin are more likely than their peers to attend center-based programs in the year prior to kindergarten.

continued on page 2

Key Findings (continued from page 1)

- Latino children are much less likely than White children to attend center-based programs in the year prior to kindergarten (38% versus 58%, respectively). Latino children who do attend, enter center-based programs one year later than Whites, on average.
- Among children who attend center-based programs, African American children participate for 20 hours per week on average, compared to 7 hours for Latino, 12 hours for Asian American, and 14 hours for White children.

Wide Gaps in Child Development

- Many California children arrive in kindergarten adequately prepared to function well in school. This finding, though, obscures serious difficulties that some groups of children experience in terms of cognitive, language, and social skills.
- Gaps in children's developmental proficiencies at kindergarten entry are powerfully explained by variation in parents' education and income levels, child characteristics, and pre-literacy practices at home—factors that vary in their intensity across families' social class and ethnic membership, and which must be taken into account before estimating effects of center-based programs.
- English-proficient Latino children are about three months behind White children, at age five, in their *pre-reading skills*. This early gap—already wide at entry to kindergarten—is equivalent to over 80 percent of the gap observed in reading skills among Latino children at fourth grade.

Likely Benefits of Center-Based Programs

- Overall, children who attend center-based programs are at least two months ahead cognitively of those who do not participate in these programs, after taking into account the prior factors that influence which children enroll in centers. This relationship is strongest for children from disadvantaged families, when it comes to basic skill acquisition.
- In addition, gains in cognitive proficiency among children who attend center-based programs are stronger for those who enter *before* age four; these children appear to be two months further ahead of their peers who enter centers *at* age four.
- Overall, the combined effects of early and sustained exposure to center-based programs appear to advance early learning by about four months and close—by over half on average—the gap in early cognitive skills apparent at age five among ethnic groups.
- Another way to gauge the likely benefits of center-based programs: Latino kindergartners score about 17 points below Whites on early language and pre-literacy assessments (100 point scale, termed normal curve equivalents). We estimate that 8-12 points of this gap could be erased if less-advantaged Latino and Black children entered center-based programs early and attended regularly.
- These positive effects from center-based programs hold for children from all income groups, while poor children show stronger effects in acquiring basic knowledge (such as, recognizing letters and numbers, and understanding events in storybooks).
- Small but significant decrements in social behaviors are associated with center enrollment among children attending many hours per day, replicating an earlier pattern observed in the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care.

Implications

The gains in cognitive proficiency exhibited by children who attend center-based programs provide promising support for current proposals to expand preschool access. Our findings suggest that participation in preschool may close as much as half of the gap in children's developmental proficiencies among socio-economic and ethnic groups, a disparity that is firmly established at entry to kindergarten.

Expansion efforts might prioritize low-income, Latino, and African American children, given discrepancies in access to center-based programs and the somewhat stronger benefits associated with their participation.

Our estimates of center-based program effects are based on exposure to programs of widely varying quality. Expanding exposure to *high-quality* centers would further strengthen the benefits of attendance. Attention to quality improvement is further suggested by the finding that long hours in a center may not yield gains in children's social behavior, or even slightly depress developmental trajectories.

- *Does exposure to center-based programs help to explain developmental gains in school-readiness skills displayed by children*, after accounting for the attributes of their parents and home practices?

Our study examines a representative sample of 2,314 California children who began kindergarten in 1998. Their families reflect the ethnic and social class diversity of California and reside across 327 zip codes.[2] Earlier estimates of center enrollment rates by social-class and ethnic groups have been based on smaller samples or limited census data.

This brief—the first in a series of reports—is organized into three sections. We begin by detailing *which children in California gain access* to center-based programs. We next discuss how children's levels of cognitive, social-emotional, and school readiness skills *vary widely at entry to kindergarten*. Then we estimate how these levels may be associated with *exposure to center-based programs*. Finally, we discuss how these findings help to inform options facing parents, early educators, and policy makers. The complete technical report is available on the PACE website [pace.berkeley.edu].

As you interpret the results below remember that children involved in this study attended centers of highly variable quality—not necessarily reflecting the quality levels intended by the new architects of "universal preschool." Our findings inform the issue of how much exposure to center-based programs—the age at which children enter centers and their weekly hours of attendance—is associated with beneficial effects. Both the quality and length of programs are pivotal issues in debates over how to build more effective preschool organizations.

BOX 1

Terminology: Is there a difference between a *preschool* and a *child-care center*?

The short answer is, no. In this brief, we use the term "center-based programs" to include both preschools and child-care centers. When the team—sent by the National Center for Education Statistics—interviewed parents and teachers, they listed a variety of terms to cover the spectrum of care arrangements based in organizations other than Head Start. The boundary between "preschool" and "center" is weak at best, and may not even exist in the minds of most parents.[3]

Through the 1950s, parents considered enrolling their children in enriched nursery schools or relied on less costly 'custodial' programs. Yet with the rise of Head Start preschools and full-time centers in affluent suburbs, the terms "preschool" and "center" have become synonymous. This conclusion was reached by 1990 when the federal government conducted a major survey of center directors.[4]

Remember that we are reporting on centers of typical quality, presently operating in diverse California communities. In this way, this study estimates the developmental effects of centers displaying average quality, rather than earlier studies which have focused on carefully controlled, high-quality preschools that may be difficult to replicate on a large scale.

The Early Childhood Longitudinal Study

The National Center for Education Statistics selected a large sample of schools nationwide during the 1998-99 school year, including 139 California schools with kindergarten classes (NCES, 1998). From these schools a representative sample of 2,314 kindergarten children and families was drawn.

NCES interviewed parents about their backgrounds and practices with their children. The research team directly assessed and asked teachers to gauge youngsters' cognitive and linguistic proficiencies, early knowledge of numbers and mathematical understandings, and school-readiness skills (see Box 2). We analyzed the California portion of this data set, called the Early Childhood Longitudinal Study—Kindergarten Sample (ECLS-K) which proved to be representative of the state's kindergartners.[5]

Disparities in Children's Access to Center-Based Programs

Almost half of all California children were enrolled in center-based programs or Head Start as their *primary child-care arrangement* in the year before kindergarten. *Primary arrangement* refers to the most prevalent type of non-parental care in which children participate. Sixty-two percent of California children had *some* exposure to center-based programs, including Head Start, during their pre-kindergarten year (Table 1).[6]

BOX 2

Different Kinds of Child Proficiencies

We focus on comprehensive measures of children's pre-reading and mathematical skills early in their kindergarten year, typically at five years of age. These sets of proficiencies were comprised of discrete forms of knowledge or cognitive understanding. For example, the pre-reading composite included basic literacy skills (letter and word recognition, print familiarity), vocabulary, and comprehension.

We find that exposure to center-based programs is associated differently with cognitive proficiencies than with social-emotional outcomes. Some groups—especially those from lower-income families—appear to benefit more from exposure to centers in terms of basic cognitive skills.

These enrollment rates appear higher than those reported recently by the California Research Bureau (Lopez & de Cos, 2004). These researchers estimated a 47% center enrollment rate for children three- to five-years-old and not yet attending kindergarten. Inclusion of three year-olds in the calculation contributed to the lower enrollment estimate. These children attend center-based programs less frequently than four-year-olds. In addition, these researchers relied on a single question on the 2000 census survey form that is imprecisely worded when it comes to child-care and preschool attendance (see also, O'Brien-Strain et al., 2003).

Center enrollment levels are generally lower in California than in other states—about seven to ten percentage points lower. The rates of relative care, non-relative care, and Head Start, in contrast, are approximately the same. The discrepancy may be explained in part, by the large share of Latino families in California, especially among households with young children. These families, depending on their social class and education levels, have historically enrolled their children in center-based programs at lower rates, compared to Whites and African Americans (Liang, Fuller, & Singer, 2000).

Varying Access by Family Income and Ethnicity

To better understand access to center-based programs, we examine how children differ in participation by their social class position and ethnic membership. Socioeconomic status (SES) refers to a family's social class, combining family income, parental job status, and perceived education levels.

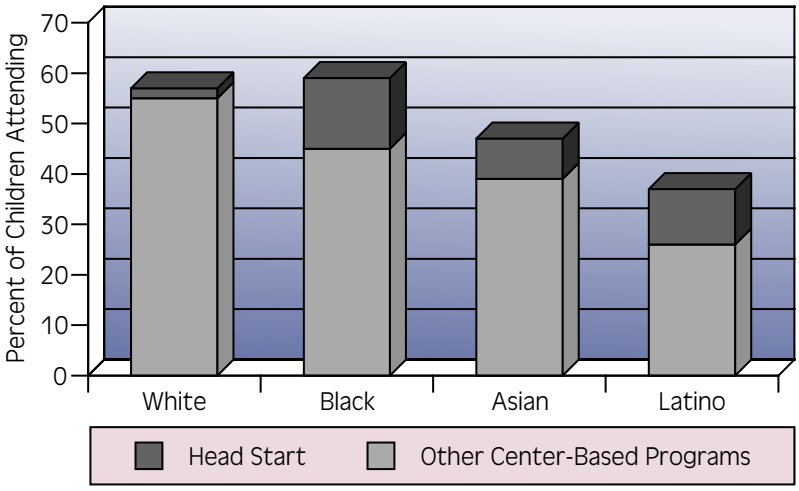
We also broke down the sampled California families into five SES groups—closely associated with income—each with an equal number of families, representing disadvantaged households (quintile 1, earning $17,038 on average annually), to the most affluent families (quintile 5, earning $118,570 per year on average).[7] The median family income for our sample in 1997 was almost $40,000. This income distribution was closely representative of the state as a whole, based on census data.[8]

Additionally, we examine children's participation in center-based programs, proficiency levels, and center-related developmental gains by ethnic group. Parents' reports of ethnicity were used to compare children designated as African American (or Black), Asian American, Latino, or non-Latino (White).[9]

TABLE 1 Percentage of children in four types of (non-parental) child care for California and other states

	California	All other states	National
Non-relative care			
Ever attended	32	34	34
Attended in pre-K year	14	16	15
Relative care			
Ever attended	44	41	41
Attended in pre-K year	25	23	24
Other center-based programs			
Ever enrolled	58	68	67
Attended in pre-K year	51	58	57
Head Start			
Ever attended	15	17	16
Attended in pre-K year	13	15	14

FIGURE 1 Percentage of *primary* enrollment in other center-based and Head Start programs by ethnicity



BOX 3

How big a difference in children's development? Fractions of standard deviations

Researchers use a common gauge for describing differences in proficiency levels, say between Latino and White youngsters. This is necessary since various child assessment tools with differing metrics are used across domains of child development and among studies.

This common yardstick is called an 'effect size' or simply a fraction of a standard deviation from the average proficiency level identified. A *standard deviation* (SD) from a mean test score is a convenient way to picture the array of children's test scores on either side of the average. So, if you can envision the classic normal curve of test scores, where most children are clustered around the average score, two-thirds of all children will score within one SD below or above the mean.

We report below how the difference in Latino children's pre-reading and English language skills, compared to White children at five years of age, equals almost 0.50 (one-half) of one standard deviation (SD). This is considered quite large. It equals the growth observed over three months of attendance in a kindergarten classroom. Or, it would approximate a 17-point difference between Whites and Latinos on a standardized test where 50 is the average and scores range between 0-100 points (properly termed, 'normal curve equivalents').

Access to center-based programs is highly related to a family's earnings and ethnic membership. Approximately 23% of low-income children attended Head Start;[10] another 26% of this group participated in other center-based programs in the year prior to kindergarten. In contrast, more than 80% of upper-middle class children—the top quintile of socioeconomic status—attended center-based programs, with those in-between more likely to participate in center-based programs as their family's social class increased.

Access to centers also varies by children's ethnicity. African American and White children are much more likely to attend center-based programs or Head Start as their *primary* care arrangement (59% and 58% did, respectively), compared to Latino (37%) and Asian American children (47%) in the year prior to kindergarten.

Disparities at Entry to Kindergarten

We focus largely on two domains of cognitive proficiency: pre-reading and language skills, and early knowledge of numbers and mathematical concepts. The first assessment includes a variety of items—given by a field researcher sitting with each child—including vocabulary, letter recognition, and understanding of the structure of children's story books.

These various items were combined to yield raw scores. English proficient Latino children, for example, scored 19.6 on this pre-reading scale, compared to 26.1 for Asian American children and 24.0 for Whites. The magnitude of differences in raw scores is difficult to interpret, which is why we rely on fractions of standard deviations (SDs) from the mean or average score (see Box 3).

Note that all children were assessed first to determine a minimal level of proficiency in English, prior to administering the complete battery of items related to pre-reading skills. About 18% of the children were excluded from the pre-reading assessment, given their limited English proficiency. Thus gaps in pre-reading skills that we report are conservative estimates. English and Spanish-speaking children were given the knowledge-of-numbers

and math battery. All children were also assessed by teachers for their social-emotional and school-readiness skills.

Many California children enter kindergarten eager and ready to learn. We analyze how children's developmental proficiencies vary among groups of children within California. Alternatively, it also would be useful to assess how the average California child looks at entry to kindergarten, compared to children in other states. The latter approach merits further research.

California policy makers and educators are pushing to close achievement gaps within the public schools. Yet, these disparities in children's learning are wide and correspond largely to parents' social-class position, education level, and ethnic membership. Figure 2 displays children's pre-reading and math proficiency by SES quintiles, ranging from the least to the most advantaged fifth relative to the mean score for all children.

The gap in children's pre-reading skills between low-income children (quintile 1) and those in the middle class (third quintile) is almost one-third of a standard deviation, or equal to normal rates of growth over two months of kindergarten. The gap between children in the poorest and most affluent fifth of families is almost one standard deviation, meaning the former group is entering kindergarten already six months—or two-thirds of the school year—behind the latter group. This chasm is even wider for children's early knowledge of numbers and mathematical concepts.

Similar patterns arise for children in different ethnic groups, as shown in Figure 3. Most dramatic is the discrepancy in mathematics proficiency between

FIGURE 2 Developmental differences for children from poor to affluent families in standard deviation units from average scores

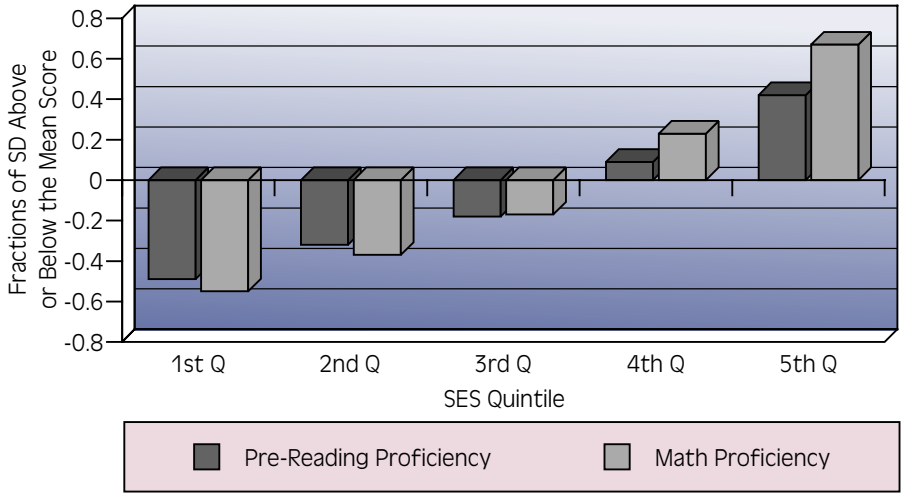
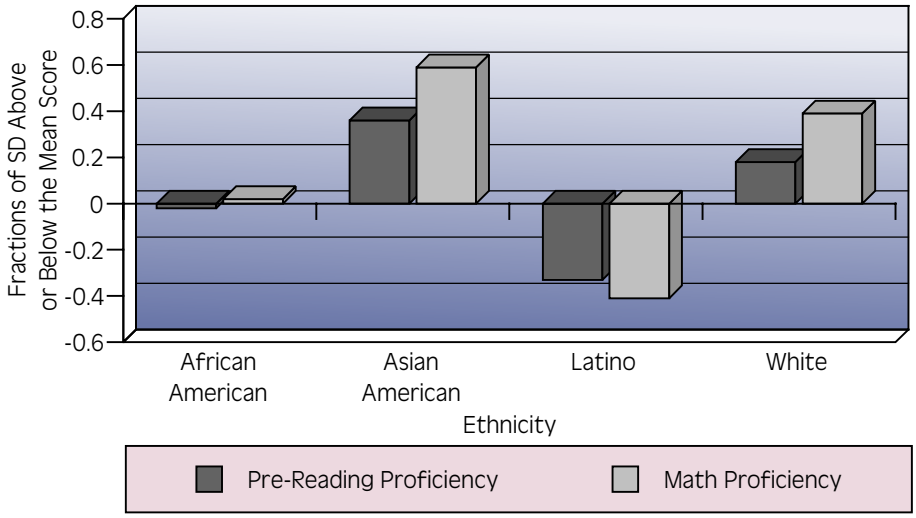


FIGURE 3 Developmental differences for children from different ethnic groups in standard deviation units from average scores



Asian American and Latino children. The gap between Latino and White youngsters is only slightly smaller, 0.82 SD at entry to kindergarten. This equals the amount of growth that children experience over five months in kindergarten, more than half of the school year.

Another way to picture the magnitude of this disparity is to compare it to the gap in math scores observed between 8th grade Whites and children of color. Data from the 2003 National Assessment of Educational Progress reveal a White-Latino math achievement gap of 0.92 SD in California.[11] So, almost 90% of the mathematics gap we observe in eighth grade is already apparent at entry to kindergarten.

Asian American children are about 0.70 SD (or four months) ahead of Latino children in pre-reading skills when they arrive in kindergarten. This is quite remarkable given that Asian American children enroll in center-based programs at lower rates and at older ages than other children. Research consistently indicates that Latino families are less likely than families of other ethnicities to engage in pre-literacy activities with their children.[12]

These trends are even more dramatic when we turn to children's early knowledge of numbers and math concepts. While African American children score very close to the overall mean (though still behind Asian American and White Children), Latino children are almost seven months behind Asian American children and about five months behind Whites.

We also can cluster these children according to their family social class (SES). As shown in Figure 4, proficiency in pre-reading scales increases according to social class. For low-income, disadvantaged children—the first and second income quintiles—between 10% and 15% of children were proficient or "intermediate"—that is, approaching proficiency. In sharp contrast, among middle-class children, at least one-quarter of them were assessed as proficient or "intermediate" and 38% to 45% of affluent children (in the top SES quintile) were deemed so.

Developmental Gains for Children Attending Centers

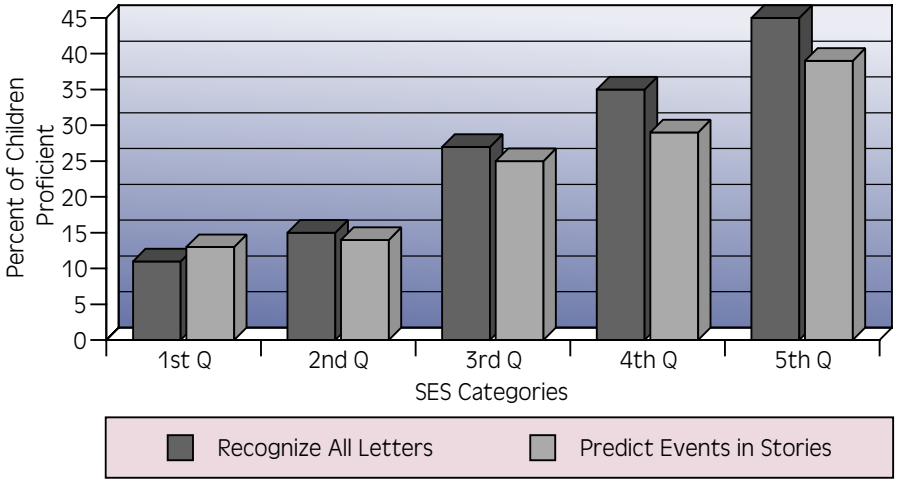
Participation in center-based programs is associated with developmental gains, as observed at entry to kindergarten. Moreover, these effects appear to be stronger with prolonged, moderate exposure. That is, children who entered center-based programs before the age of four and attend average amounts—about 15 to 23 hours per week—exhibit higher cognitive and school-readiness gains than those who start later. In this section, we estimate the added benefits of center attendance, after taking into account the prior effects attributable to parents' demographics, characteristics of the child (age, presence of a disability, etc.), and home practices.

First, it's important to recognize that several factors help to explain the likelihood that families selected center-based programs for their children (compared to those who chose home-based arrangements or Head Start programs). For example, children with more highly educated mothers are consistently more likely to attend center-based programs regardless of SES. In contrast, those with resident kith and kin are less likely than their peers with less social support to participate in center-based programs.

After taking into account the factors that explain which parents selected centers, participation in center-based programs remains significantly related to higher math and pre-reading proficiencies. Children who attend center-based programs as their *primary* form of non-parental care in general enter kindergarten about two months ahead in pre-reading (0.22 SD) and about one month ahead in early math (0.13 SD) proficiency, compared to children who do not attend center-based programs. In addition, stronger and significant effects for Black children were observed from general center-based programs, setting aside Head Start attendance for the present analysis.

Importantly, these positive effects from center exposure hold for children from middle-class as well as disadvantaged families. This extends promising center effects beyond earlier research which has detailed beneficial effects for poor children. These wider ranging effects may be related to the fact that California's middle class is now comprised of many Latino

FIGURE 4 Percent of children proficient on pre-reading scales by socioeconomic status



families. Just under half of all families in our third income quintile —the fifth of the families clustered on either side of the state's median household income—are Latinos. More research is required to understand how low-income versus middle class Latino families may display differing home practices and experience center-based programs differently.

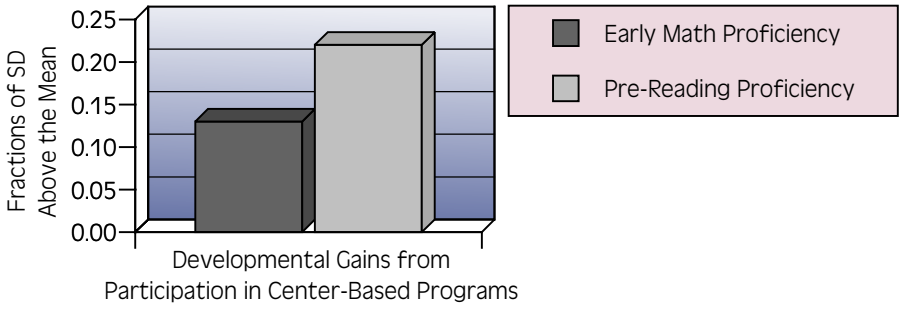
In terms of other effects of center-based programs, recent analyses using the entire national sample have shown a significant relationship between center exposure and lower repetition rates in kindergarten. The incidence of kindergarten repetition is so low in California that we were unable to detect an effect for our state sample.[13]

Does the Length of Exposure to Centers Matter?

Given that participation in center-based programs is linked to higher developmental proficiency levels, we would expect to see even stronger gains for children who attend center-based programs for longer periods of time, for more years or more hours per day. This turns out to be true, depending on the domain of development and how we measure exposure to center-based programs.

First, let's turn to our estimates of which parents enrolled their child prior to age four. The factors that appear to influence earlier entry to centers are similar to those that explained center selection (as the *primary* care arrangement in the year prior to kindergarten). In addition, Latino and Asian American children in the bottom two SES quintiles are significantly less likely than other children to enter center-based programs before age four.

FIGURE 5 Developmental gains exhibited by children whose primary arrangement is in a center-based program.



Children who entered center-based programs before age four—the majority of whom remained in these programs—showed higher pre-reading and language skills, as well as higher math proficiencies, compared to those starting at later ages. Earlier enrollment yields early learning gains equal to almost two and a half months in early math proficiency (0.35 SD) and about one and a half months in pre-reading (0.24 SD). Entering center-based programs at age three provides prolonged exposure to the benefits of such care.[14]

Overall, we are more confident that exposure—and early entry—to center-based programs predicts higher cognitive proficiencies for children in the lowest two SES quintiles. After we statistically take into account factors that influence which children gain access (and at what age), the age at entry into center-based programs remains significantly related to higher levels of child development. For children in the upper three SES quintiles, center-based program effects are somewhat less consistent although typically significant. Our second report will determine whether center-based program effects persist into the third grade and, if so, for which socioeconomic groups.

Concern over Social-Emotional Development

Exposure to center-based programs also can be gauged by the number of hours children spend there. Children who spend long hours in centers—more than 33 hours per week, or 10 hours more than the average for children whose primary source of care is center-based—display slightly, though significantly, more behavior problems. While the difference in behavior is statistically significant between children who have long exposure to center-based programs each day and those who do not, the former children's behavior does not reach clinically worrisome levels. Rather it indicates that these children are more likely to hit, kick, or act in a disruptive manner than are other children.

We are unable to discern whether this negative effect holds for high-quality centers, or is driven by low-quality centers. Regardless, this replicates results found with a national, largely middle-class sample of children enrolled in center-based programs (NICHD, 2000), and warrants further inquiry.

In summary, children who attend center-based programs exhibit cognitive benefits in kindergarten, although the effects on

BOX 4

Poor children display higher basic skills after attending center-based programs

Children growing up in low-income families are much less proficient in basic cognitive and school-readiness skills, compared to those from upper middle-class homes. The table reports the percentage of children who are 'proficient' or 'intermediate' at entry to kindergarten.

	Children in low-income families (Quintile 1)	Children in affluent families (Quintile 5)
Percentage of children who can:		
■ Name upper and lower case letters	11%	45%
■ Predict events in a storybook after hearing the story	13%	39%
■ Compare quantities of water or objects correctly	8%	24%

The good news is that children who attend center-based programs display higher proficiency on these kinds of tasks —and the positive relationship was strongest for children from the most disadvantaged families—after taking into account the variety of home background factors.

For example, children from the most disadvantaged families (the bottom quintile) were 1.3 times more likely to recognize letters, compared to children in the same SES group who did not attend center-based programs. Children from disadvantaged families who attended center-based programs were 75% more likely to predict events in storybooks after having been read to, compared to children in the same SES group who remained in home-based care.

social-emotional development are not positive. Specifically, children seem engaged in classroom activities, but may be slightly more aggressive than their peers who did not attend center-based programs. The positive effects of exposure to these programs appear to be maximized by prolonged participation, although at a moderate level of hours per week.

Closing the Gap in Early Learning

Another way to portray the magnitude of the positive center effect on cognitive proficiencies and school readiness is to start with the fact that the gap observed at entry to kindergarten, say between English-proficient Latino and White five-year-olds, equals over 80 percent of the disparity observed in the fourth-grade reading scores of these two groups, as discussed above. Early and sustained exposure to center-based programs appears to close about half the kindergarten gap. Another way to gauge the likely benefits of centers: English-proficient Latino kindergartners score about 17 points below Whites on early language and pre-literacy assessments, when placed on a 100 point scale (termed, normal curve equivalents). We estimate that up to 8-12 points of this gap could be erased if less advantaged children, including low-income Latinos and African Americans, entered centers early and attended regularly.

Limitations of Cross-Sectional Data—Future Research

These findings stem from *cross-sectional* data. That is, all information was collected from parents, teachers, and children at one point in time, early in the child's kindergarten year. Cross-sectional data cannot fully support causal claims. This is because an observed factor—say a mother's vocabulary or her level of affection toward the child—may influence the odds that her child enrolls in a center and directly shape the child's development. Since we cannot observe and take into account all parental attributes and home practices, cross-sectional data do not allow us to rule out this problem of "omitted variables," which can lead to the false impression that exposure to center-based programs is *causing* gains in child development, rather than simply being associated with them. This is why we emphasize that children's exposure to centers is variably *associated* with higher or lower levels of child development.

We have performed several statistical tests to rule out the possibility that the association between center exposure and accelerated child development is simply an artifact of this so-called selection bias. Even after taking into account the likelihood that certain kinds of parents select centers, and enroll their children at younger ages, we find a persistent and significant association between center exposure and child outcomes (see the technical report, *pace.berkeley.edu*).

The second report in this series of analyses will examine whether exposure to center-based programs helps to predict children's third-grade achievement levels, after taking into account

prior proficiency levels observed in kindergarten. This will allow us to advance causal arguments with greater certainty.

Implications

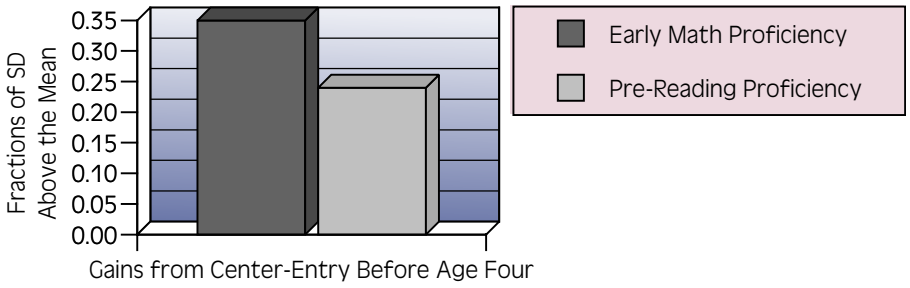
Young children appear to benefit from attending center-based programs. Parents may want to consider enrolling their youngsters in high-quality preschool programs to support the development of cognitive proficiencies and school-readiness skills. Moreover, children may benefit from starting such a program before age four, to gain prolonged exposure to preschool activities.

Lessons for Preschool Designers and Policy Makers

In California, children from all families—regardless of socioeconomic status—exhibit benefits from participating in preschool programs. Earlier studies have identified positive effects for low-income children. The larger share of Latino children from middle-class families in California compared to other states, who may benefit in particular from the exposure to pre-literacy activities in English, may contribute to this positive effect for middle-class children. Or, the positive effect may be associated with the higher-quality of programs they attend, relative to programs found in some poor communities. About 47 percent of the middle-class portion of our representative sample of California children (the third SES quintile) is comprised of Latino households.

Access to center-based programs remains widely unequal across communities. Admittedly families vary in their endorsement of center-based programs as preferable sources of non-parental care. However, with continuing evidence about the distinct benefits of center-based programs on children's cognitive proficiencies, providing more extensive access to families—particularly low-income or working-class families—is advisable.

FIGURE 6 Developmental gains exhibited by children who entered center-based programs before age four



Our findings also suggest that children benefit from prolonged exposure—starting before age four. Efforts to expand programs might consider extending access to younger children.

Fresh Policy Options

Efforts in Sacramento and several counties to expand access to quality preschool are gaining momentum, yet will likely develop with scarce public resources. So, trade-offs among policy options must be honestly confronted: Should preschools be built first in poor or middle-class communities? Should efforts focus on creating new enrollment slots or providing prolonged exposure to children currently enrolled—facilitating preschool entry before age four?

Our findings can inform this process of weighing policy options. For example, the general expansion of preschool programs—not targeted on lower-income families—would likely improve child development for most children. However, the achievement gap—with the scores of most children moving up—would likely be reinforced if the patterns revealed by our analysis persist into the future. That is, low-income children, in relative terms, would still be significantly behind their more affluent peers. Prioritizing low-income children and their communities for preschool expansion or quality improvement may help to close these early disparities in child development and raise average proficiency levels.

Education policy makers often focus on achievement gaps, as revealed in elementary school among different groups of children. Yet our findings corroborate earlier national evidence that gaps in early learning are discernible, and at times quite large, as children enter kindergarten. Prolonged participation in quality center-based programs appears to raise children's developmental trajectories, after taking into account a variety of parental attributes and home practices, and offers a promising approach to reducing disparities and improving the proficiencies of all children.

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Endnotes

[1] For reviews, see Shonkoff & Phillips, (2000) Loeb, Fuller, Kagan & Carrol (2004)

[2] The California sample of the ECLS-K data set is representative of the state as indicated by the census data: http://www.census.gov/prod/3/98pups/p60-200.pdf.

[3] Kisker, Hofferth, Phillips & Farquhar (1991).

[4] Kisker, Hofferth, Phillips & Farquhar (1991).

[5] For more information see: http://nces.ed.gov/ecls/KinderDataInformatin.asp.

[6] Approximately 62 percent of California children attended general center-based programs or Head Start in the year before kindergarten. As indicated in Table 1 from the addition of the general center-based program attendees (51 percent) and Head Start attendees (13 percent), a little less than two percent of these children attended both. Extrapolating estimates from the National Household Education Surveys in 1995 and 1999 suggests that 67 percent of four-year-olds nationally were in center-based programs, including Head Start in 1997. Table 45 of the 2000 Digest of Education Statistics: http://nces.ed.gov/programs/digest/d02/tables/PDF/table45.pdf. Using data from ECLS, we estimate that nationally 69.2 percent of kindergartners in the fall of 1998 were enrolled in center-based programs the year before kindergarten (the fall of 1997).

[7] The interim quintiles include: working class (quintile 2) with an average yearly income of $31,886; middle class (quintile 3) with a mean annual income of $50,935; upper middle class (quintile 4) with an average yearly income of $65,550.

[8] Details appear on: http://www.census.gov/prod/3/98pubs/p60-200.pdf

[9] Children designated as "other" or "multi-racial" comprised too small a group for analytic comparison.

[10] The children who attend Head Start correspond to those from families in the lowest quintile of income.

[11] Estimates were derived from the National Assessment of Educational Progress, http://nces.ed.gov/nationsreportcard/naepdata/search.asp.

[12] For review, see Bradley, Corwyn, Pipes-McAdoo, & Garcia Coll (2001).

[13] For analyses of center effects on these outcomes, see Magnuson, K., Meyers, M., Ruhm, C., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Journal of Educational Research, 41,* 115-157.

[14] The benefits of early entry to center-based programs are more consistently found for pre-reading proficiency than for early math proficiency.

References and Additional Reading

Bradley, R., Corwyn, R., Burchinal, M., Pipes McAdoo, H., & Garcia Coll, C. (2001). The home environments of children in the United States Part II: Relations with behavioral development through age thirteen. *Child Development, 72,* 1868-1886.

Jencks, C. & Phillips, M. (1998). *The Black-White Test Score Gap.* Washington, DC: Brookings Institution.

Kisker, E., Hofferth, S., Phillips, D., & Farquhar, E. (1991). A Profile of Child Care Settings: Early Education and Care in 1990, Vol. 1. Washington DC: United States Department of Education.

Loeb, S., Fuller, B., Kagan, S., & Carrol, B. (2004). Child care in poor communities: Early learning effects of type, quality, and stability. *Child Development, 75,* 47-65.

Lopez, E., & de Cos, P. (2004). Preschool and child care enrollment in California. Sacramento: California Research Bureau (CRB 04-003).

Magnuson, K., Meyers, M., Ruhm, C. & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Journal of Educational Research, 41,* 15-157.

O'Brien-Strain, M., Moye, L., & Sonenstein, F. (2003). *Arranging and Paying for Child Care.* San Francisco: Public Policy Institute of California (monograph).

Shonkoff, J. P. & Phillips D. A. (2000). (Eds.), *From Neurons to Neighborhoods: The Science of Early Childhood Development.* Washington, D.C.: National Academy Press.

APPENDIX 1

TABLE 2 Children's proficiency levels in kindergarten (raw scores)

Outcomes	All Children: Mean (SD) [n=2,081]
Academic	
■ Literacy	22.71 (9.50)
■ Math	18.40 (7.5)
■ General Knowledge	20.98 (7.31)
Social and Emotional	
■ Approaches to Learning	2.95 (0.66)
■ Self Control	3.02 (0.6)
■ Interpersonal	2.94 (.62)
■ Internalizing	1.53 (.53)
■ Externalizing	1.59 (.60)

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- Bridget Hamre, Rebecca Grove, and Justin Louie. ***Matching Funds for Retention Incentives for Early Care and Education Staff: Evaluation.*** Policy Brief 03-1, February 2003.

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