

ACF/OPRE Report

Head Start Children Go to Kindergarten

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INTRODUCTION

Head Start is a national program that aims to promote school readiness by enhancing the social and cognitive development of children through the provision of educational, health, nutritional, social, and other services to enrolled children and families. The Head Start program provides grants to local public and private nonprofit and for-profit agencies to provide comprehensive child development services to economically disadvantaged children and families; the Office of Head Start places special emphasis on helping preschoolers develop the reading and mathematics skills they need to be successful in school. The program also seeks to engage parents in their children's learning and to promote their progress toward their own educational, literacy, and employment goals (Administration for Children and Families [ACF] 2009).

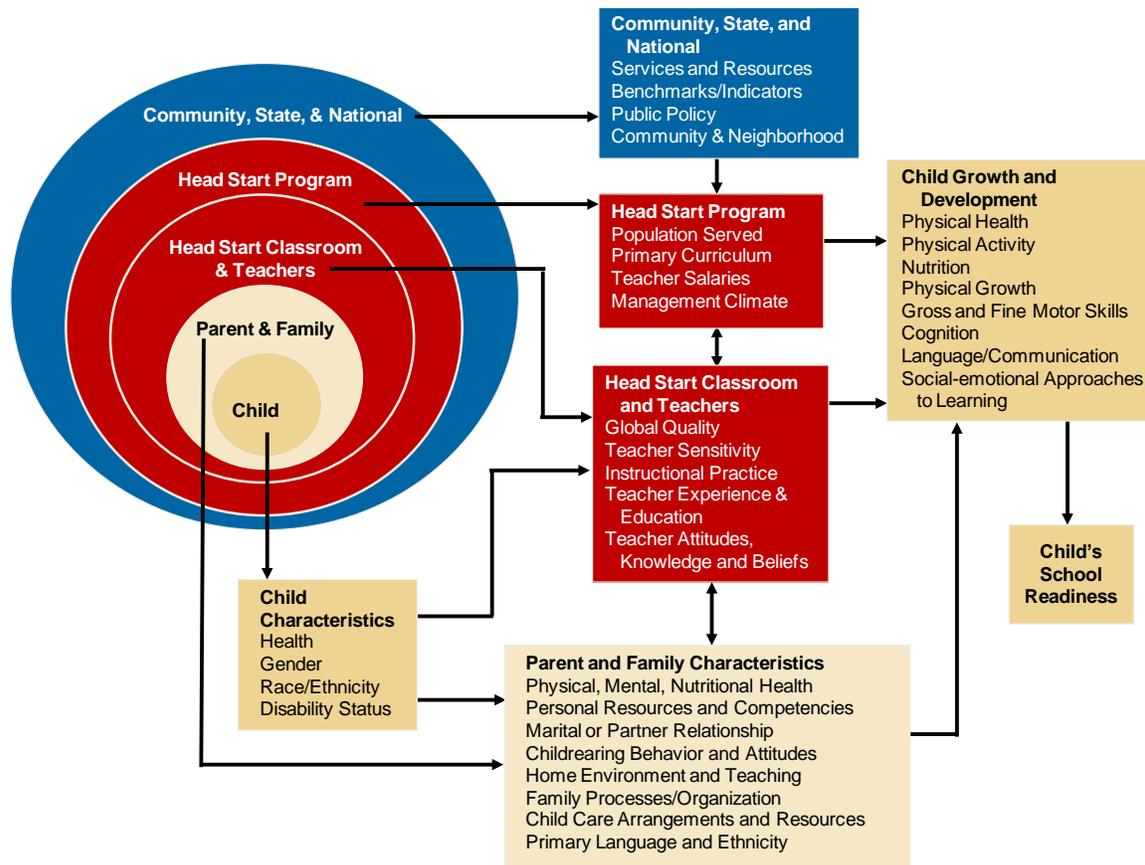
The Head Start Family and Child Experiences Survey (FACES), sponsored by the U.S. Department of Health and Human Services, Administration for Children and Families (ACF), was first launched in 1997 as a periodic longitudinal study of program performance. Successive nationally representative samples of Head Start children and their families, classrooms, and programs provide descriptive information on the population served; staff qualifications, credentials, beliefs, and opinions; classroom practices and quality measures; and child and family outcomes. FACES includes a battery of direct child assessments across multiple domains. It also includes interviews with the child's parents, teachers, and program managers, as well as direct observations of classroom quality. (For background information on FACES 2006, see West et al. 2007, Tarullo et al. 2008 and West et al. 2008.)

This report is the fourth in a series that uses data from the FACES 2006 cohort to describe the population of 3- and 4-year-olds who entered Head Start for the first time in fall 2006, their

families, and their classrooms. Guided by the FACES conceptual framework (Figure 1), earlier reports documented the diversity in the Head Start population in terms of demographic and socioeconomic characteristics, the skills that children have when they first enter the program, and the gains in these skills over one or two years of program participation. The *Beginning Head Start* report highlighted some of the demographic changes that have occurred in the Head Start population with increasing numbers of 3-year-olds being served, growing Hispanic/Latino enrollments, and 27 percent of children entering Head Start with home languages other than English (Tarullo et al. 2008). In fall 2006, children entered Head Start with language, literacy, and math skills that were lower than their same-age peers. These children attended Head Start classrooms that were likely to have an experienced teacher who had at least an associate's (AA) degree.

The report *A Year in Head Start* showed that children made progress in a range of cognitive and noncognitive skills during their first year in Head Start, with children making the greatest gains relative to their same-age peers in letter-word knowledge (Aikens et al. 2010). Some groups of children made more progress than others overall, or in closing the gap with their same-age peers. For example, children who were 4 years old when they first entered Head Start made more progress toward norms in receptive vocabulary, early writing, and early math skills during their first year in the program than children who were 3 years old when beginning Head Start. Three-year-olds made more progress toward norms than 4-year-olds in letter-word knowledge. Children were enrolled in Head Start classrooms that, on average, met professional standards for group size and child-to-staff ratio and were in the adequate range on a standard measure of classroom quality (the Early Childhood Environment Rating Scale-Revised [ECERS-R]; Harms, Clifford, and Cryer 2005).

Figure 1. Conceptual Framework



Three-year-olds represent a growing share of the total population served by Head Start (Tarullo et al. 2010) and the majority of first-time Head Start enrollees (Tarullo et al. 2008). However, while 88 percent of 3-year olds completed one year of Head Start, only 58 percent completed two years before moving on to kindergarten.¹ The report *A Second Year in Head Start* profiled the group of children and families who attended Head Start for two years. There were some minor differences in the characteristics of children who stayed for a second year as compared to those who only attended one year. Children who completed two years were more likely to be White and less likely to be African American. They were more likely to live with both parents and to have a non-English home language than children who spent only one year in the program. The group who stayed for a second year made progress relative to their peers in receptive vocabulary

and early literacy skills such as letter-word knowledge and early writing. By the end of their second year in the program they scored at or above norms in letter-word knowledge and early writing, although they were still below norms in their receptive vocabulary and early math skills. Head Start teachers reported that these children demonstrated more social skills and fewer problem behaviors by the end of their second year in Head Start.

The current report describes the group of children who first entered Head Start in fall 2006 either as a 3- or 4-year-old, completed one or two years in the program, and attended kindergarten the year after graduating from Head Start. As in the earlier reports, we profile the demographic characteristics of this group and describe their home and family life, drawing comparisons where appropriate to the characteristics of the population of children and

families when they first entered Head Start or after completing one year in the program. New to this report is a description of the schools and kindergarten classrooms Head Start graduates attend. We describe broad characteristics of their schools such as size, student body composition, and school type. We describe children's kindergarten classrooms and teachers, including information on characteristics such as the length of the school day (full- versus half-day kindergarten), class size, child-to-staff ratio, and teachers' experience and degrees. We once again document children's gains in a broad set of skills from program entry to Head Start graduation and to the end of the kindergarten year, and investigate the associations between children's skills when entering and leaving Head Start, their skills at the end of Head Start, and their progress through the spring of their kindergarten year.

The findings in the report are intended to answer five research questions:

1. What are the child/family demographics and home environment characteristics of children who complete Head Start and enroll in kindergarten? How involved are their parents in their schools and education?
2. What are the characteristics of the schools and kindergarten programs children attend after completing Head Start? What are the characteristics of their kindergarten classrooms and teachers?
3. What developmental gains do children make during Head Start and beyond? How do their skills compare to those of their peers.
4. Are children's school readiness skills at the end of Head Start related to developmental outcomes at the end of kindergarten? Are there cross-domain relationships between children's language, literacy, math, and social-emotional skills?
5. What child/family and Head Start characteristics relate to children's development at the end of Head Start and the gains they make from the time they enter Head Start through the spring of kindergarten? Does their growth in school readiness skills vary by their skills when first entering Head Start?

The remainder of the report is organized into six sections. First, we provide background on the study methodology and sample. Second, we offer information on children's characteristics, family demographics, and home life, including language background, educational environment of the home, family routines, and socioeconomic risk status. We include information on parents' involvement with their children's elementary schools, the level of satisfaction with their children's schools, and parents' beliefs about how well Head Start prepared their children for kindergarten. Third, we describe the schools Head Start children attend for kindergarten, their kindergarten classrooms, and their teachers. We include information on the background of the children in their classrooms as well as educational experiences in the classroom. Fourth, we chronicle children's developmental progress from the time they completed Head Start through the end of kindergarten, considering whether these outcomes vary by gender, race/ethnicity, or risk status.² Fifth, we explore the associations between children's school readiness skills as they complete Head Start and their developmental outcomes at the end of kindergarten. Sixth, we investigate associations of child/family and Head Start characteristics with children's development at the end of Head Start and their developmental progress from Head Start entry to the end of kindergarten. We also explore the relationship of children's relative skills at program entry (that is, low, average, or high ability) to their development progress during this time period.

METHODS

FACES 2006 and earlier FACES cohorts provide information at the national level about Head Start programs, centers, classrooms, and the children and families they serve. A sample of Head Start programs was selected from the 2004-2005 Head Start Program Information Report (ACF 2010);³ approximately two centers per program and three classrooms per center were selected for participation. Within each classroom, nine newly enrolled 3- and 4-year-old children, on average, were randomly selected for the study.⁴ Beginning in fall 2006, data were collected from entrance into the Head Start

program, through one or two years of program participation, with followup in the spring of kindergarten. At each round of data collection, children in the study were administered a battery of direct child assessments, their parents were interviewed in person or by phone, and their teachers were interviewed in person or asked to complete a web survey.⁵ Children's teachers were also asked to complete a set of ratings about them using either a web-based or a paper instrument.⁶ More details on the study design and its implementation can be found in the FACES 2006 data file user's manual (West et al. 2010) and earlier FACES 2006 reports (Aikens et al. 2010; Tarullo et al. 2008).

FACES draws samples of 3- and 4-year-old children who are entering Head Start for the first time and are expected to attend Head Start for one or two years before moving on to kindergarten. As a result, the kindergarten followup for this cohort occurred over a two-year period: spring 2008 for entering 4-year-olds and spring 2009 for entering 3-year-olds.⁷ Data were collected over a four-month period (March–June). Data collection teams assessed the children in their homes and interviewed their parents by phone or in person.⁸ Children's kindergarten teachers were asked to complete a set of ratings for all the FACES children in their classroom using either a web-based or paper instrument.⁹ For this report, we use data from the direct child assessments, parent interviews, and teacher ratings. We supplement the data from these sources with data from two national school universe surveys.

Child assessments were completed for 89 percent of the 2,096 children who were enrolled in kindergarten in spring 2008 or spring 2009, and 93 percent of their parents were interviewed.^{10,11} A teacher rating form was completed for 68 percent of the children.¹² Data from the direct child assessments are used here to report on children's cognitive and physical outcomes at the beginning of their first year in Head Start, after they have completed one or two years in the program, and in the spring of kindergarten. Parent and teacher ratings provide information about children's social skills, approaches to learning, problem behaviors, and

academic and nonacademic accomplishments at these same time points. Assessor ratings, which are completed at the end of the direct child assessments, are another source of information about children's social-emotional outcomes. We use parent interview data to describe children's backgrounds and home environment. Teacher survey responses and school universe data provide information on children's elementary schools, classrooms, and teachers.

Direct child assessments. The spring kindergarten battery of direct child assessments, like the one used in early rounds of data collection, included a set of standardized preschool-elementary assessments designed to measure children's cognitive (language, literacy, and mathematics) and physical (height and weight) outcomes through an untimed, one-on-one assessment of each child. We describe the actual measures used below, where we report on children's development at the different time points.

The procedures used to administer the direct child assessments in the spring of kindergarten were the same as those used in spring 2007.¹³ The direct assessment began with a language screening to determine whether children from households where English was not the primary spoken language should be assessed in English or in Spanish, or administered only the English receptive language assessment, along with being weighed, and measured. If a child had been assessed in English in one of the prior rounds, he or she was assessed in English. Assessments were administered in the same way as in earlier rounds. The child was shown hardcopy stimulus and response pages, and questions were asked and directions given orally by trained assessors. For example, the stimulus and response pages from the Peabody Picture Vocabulary Test-Fourth Edition (PPVT-4) (Dunn and Dunn 2006) and Woodcock-Johnson Tests of Achievement-Third Edition (WJ III) (Woodcock et al. 2001) measures were used. Computer-assisted personal interviewing (CAPI) was used when administering the assessments to facilitate the movement from one measure to the next without assessors having to calculate starting or stopping points (that is, basals and

ceilings). Assessors read the questions and instructions from a computer screen and the child responded by pointing to the correct answers on the assessment easel or by giving a verbal response. Assessors entered the child's responses into a laptop computer using software that ensured that all basal and ceiling rules were followed. During the kindergarten followup the child assessments were administered in the child's home.¹⁴

Parent interviews. FACES 2006 used a computer-assisted interview to collect information from children's parents in a variety of areas, including the characteristics of households (such as household income, number of adult household members, languages spoken in the home) and household members (including age, race/ethnicity, and relationship to study child).¹⁵ Information was also collected on aspects of the child's home and school life, children's child-care arrangements, parents' involvement and satisfaction with their children's schools, and parents' ratings of their children's social skills, problem behaviors, and language, literacy, and mathematics accomplishments.

Teacher survey and teacher child reports. Children's kindergarten teachers were asked to complete a two-part web survey. Part one included questions about the school where they teach and where the FACES child is enrolled. It also asked teachers a number of questions about their kindergarten classroom (such as whether it is a full- or half-day classroom) and their instructional practices. Teachers were also asked about their backgrounds, credentials, and teaching experience. Part two asked teachers to rate each FACES child in their classroom on a set of items that assessed the child's accomplishments, cooperative classroom behavior, behavior problems, and approaches to learning. Teachers also provided reports of children's health, developmental conditions, and absences during the school year.

Assessor ratings. At the end of the one-on-one testing session with each child, the assessor completed a set of rating scales evaluating the child's behavior in the assessment situation, including his or her approaches to learning and any problem behaviors. FACES 2006 used four

subscales from the Leiter-R Examiner Rating Scales: (1) attention, (2) organization/impulse control, (3) activity level, and (4) sociability.

School universe data. The data used to describe children's schools come from the teacher survey and one additional source: school administrative records. Using information provided primarily by children's parents during the parent interview, we identified the schools attended by the children in the study and retrieved data about these schools from school administrative records collected and disseminated by the U.S. Department of Education's National Center for Education Statistics (NCES). Information about the public schools attended by FACES children comes from the Common Core of Data (CCD); information on private schools comes from the Private School Universe Survey (PSS).¹⁶

Population estimates. The statistics found in this report are estimates of key characteristics of the population of children who entered Head Start for the first time in fall 2006, completed one or two years in the program, and were attending kindergarten in the spring of 2008 or 2009, as well as information about their parents, families, schools, and teachers.¹⁷ The data used to report on child, family, school, and classroom/teacher characteristics and child outcomes are reported at the child level and weighted to represent this population.¹⁸ Unless otherwise noted, all differences, correlations, and coefficients cited in the report are statistically at the $p < .05$ level.¹⁹

CHILD AND FAMILY DEMOGRAPHICS, PARENTING, AND THE HOME ENVIRONMENT

Head Start serves a diverse population of low-income children and their families. In recognition of the important role that family plays in a child's development, Head Start has made the family a cornerstone in its framework, and the FACES 2006 Parent Interview collected a wealth of information on the family and household environment of Head Start children. This section presents key findings for the population of children who entered Head Start in fall 2006, completed one or two years of the program, and were enrolled in kindergarten in spring 2008 or 2009. The baseline household demographic

characteristics of this population (measured at Head Start entry) are briefly compared to those of the larger population who entered Head Start in fall 2006. The home learning environment, family health behaviors, social support, and child care arrangements during the kindergarten year are then described, and changes between the Head Start year and the kindergarten year are highlighted. Finally, the section describes parents' involvement in and satisfaction with kindergarten.

Characteristics of Head Start Children in Kindergarten and Families

In fall 2006, approximately 458,000 children enrolled for the first time in 14,400 Head Start centers across the U.S. About 69 percent of these (317,000 children) completed one or two years of Head Start and were enrolled in kindergarten in spring 2008 or spring 2009. The child and family demographic characteristics of this group look very much like those of the group who first entered Head Start in the fall in many ways—including children's gender, household size, parents' education and employment, poverty, public assistance receipt, and family risk factors. Just over half (51 percent) of Head Start graduates enrolled in kindergarten are male. Household size averages about five people, including two adults and three children. Just over 60 percent of children's mothers and 53 percent of their fathers completed high school, and half of children's mothers and 86 percent of their fathers are employed full or part time. About 58 percent of children live in households with incomes below the federal poverty level and 22 percent are in households that receive TANF benefits. About 45 percent have more than one of the family risk factors measured in FACES.²⁰ These figures (all measured at Head Start entry) for Head Start graduates enrolled in kindergarten are similar to those for the full population who entered Head Start in fall 2006, as reported in Tarullo et al. (2008).²¹

There are a few differences, however, although some of them are small. Fewer children who entered Head Start at age 3 had completed Head Start and were enrolled in kindergarten, compared to children who entered Head Start at

age 4. Compared to the group of children who entered Head Start in fall 2006, children who completed one or two years of Head Start and enrolled in kindergarten are less likely to be African-American (27 percent of the kindergarten group, compared to 33 percent of all Head Start entrants), more likely to be Hispanic/Latino (39 percent, compared to 35 percent), and more likely to live in a household where Spanish is the primary language (26 percent, compared to 23 percent). Children who completed a year or two of Head Start and enrolled in kindergarten are also more likely to be living with both biological or adoptive parents (52 percent), compared to the larger group of children who entered Head Start in fall 2006 (46 percent), and less likely to live in a single-parent household.²² They are also slightly less likely to receive Supplemental Nutrition Assistance Program (SNAP) benefits (51 percent, compared to 53 percent).

The Learning and Health Environment in the Home

This subsection presents key findings related to home learning activities, household routines, nutrition, and family health behaviors during the kindergarten year for children who entered kindergarten after completing one or two years of Head Start. Comparisons are drawn between these children's home learning and health environments during their last year of Head Start (spring 2007 for children who were 4 years old at Head Start entry and spring 2008 for those who entered the program at age 3) and the kindergarten year (spring 2008 or 2009, respectively).

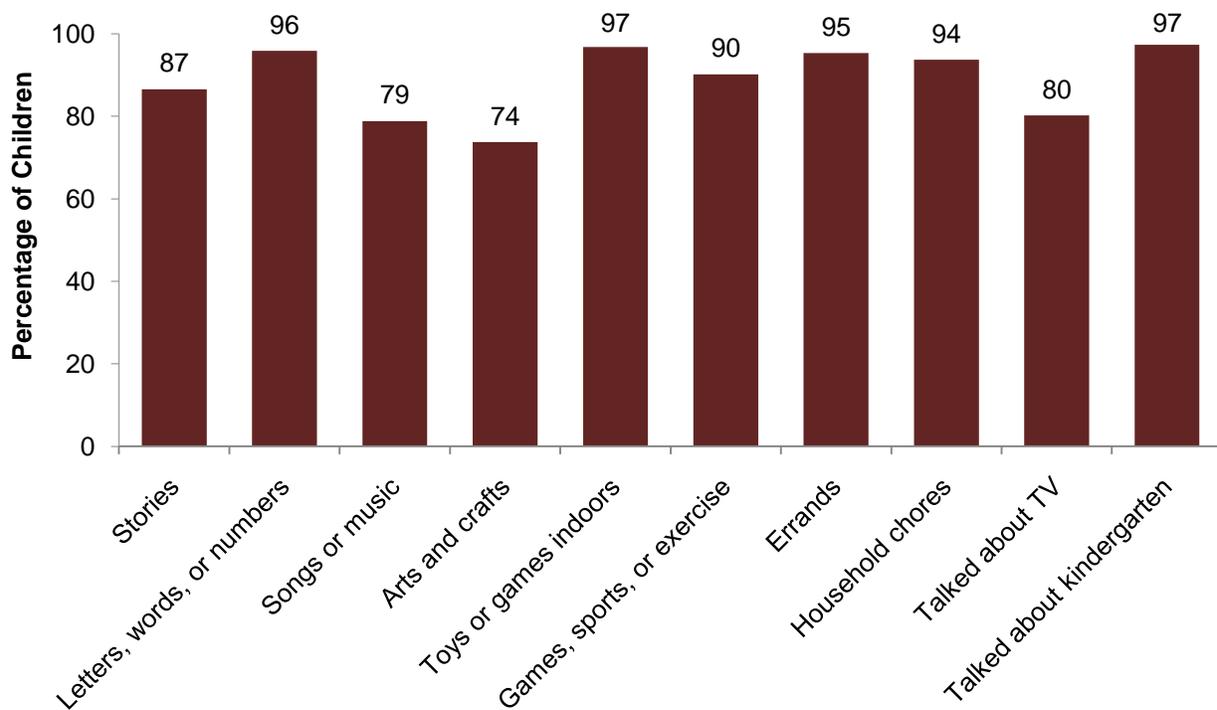
Home learning activities. Children participate in a variety of learning activities with their families, both in and outside of the home. One common activity is being read to by a parent or other family member. Slightly more than 80 percent of children enrolled in kindergarten after completing Head Start are read to by a family member three or more times a week, including 43 percent who are read to every day. The frequency of reading varies significantly by subgroup. White children are read to by family members more frequently than are African American and Hispanic/Latino children; 86

percent of White children are read to at least three times during the week, compared to 77 percent of African American children and 79 percent of Hispanic/Latino children.²³

Besides reading, the most common weekly household learning activities are talking about what happened in kindergarten; playing with toys or games indoors; teaching letters, words, or numbers; involving children in errands and household chores; and playing a game, sport, or exercising together (Figure 2). For each of these

activities, at least 90 percent of children’s families had engaged in the activity with their child in the past week. The most common activities in which families had engaged in their communities in the past month involve taking the child with them to a playground or park, to the shopping mall, and to church activities, and talking about family history or ethnic heritage (Figure 3). For each of these activities, at least half of children had participated with their families in the past month.

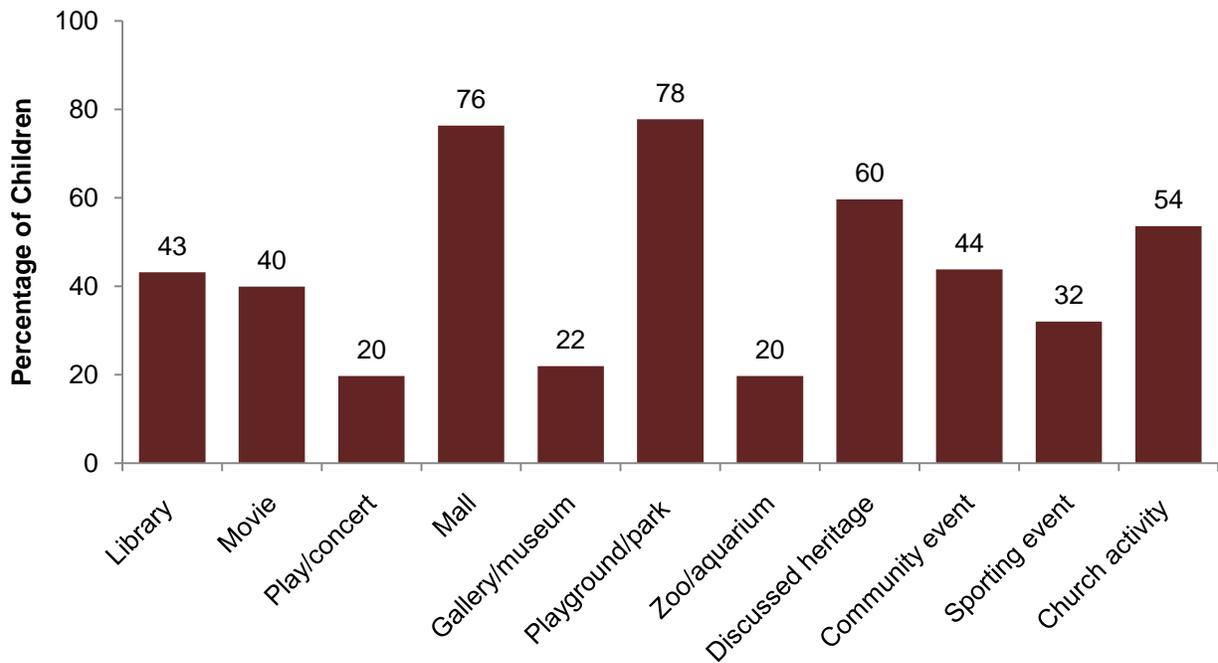
Figure 2. Family Members’ Activities with Child in Past Week: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Figure 3. Family Members' Activities with Child in Past Month: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

The most common family learning activities remained the same in the kindergarten year as they were in the prior year for the population of Head Start graduates who entered kindergarten. However, the prevalence of a few specific activities shifted. More families worked on arts and crafts during kindergarten than they did during the child's last year of Head Start, while fewer taught songs or played counting games after leaving Head Start. During the kindergarten year, children were more likely to visit a library with a family member and to talk with a family member about their family's history and ethnic heritage than they were the year before. They were less likely to visit a playground or park or to attend an event sponsored by a community group. Although these changes were statistically significant, their magnitude was small (between four and six percentage points).

Household routines and discipline. Parents' interactions with their children at home, including the rules and routines that parents establish for

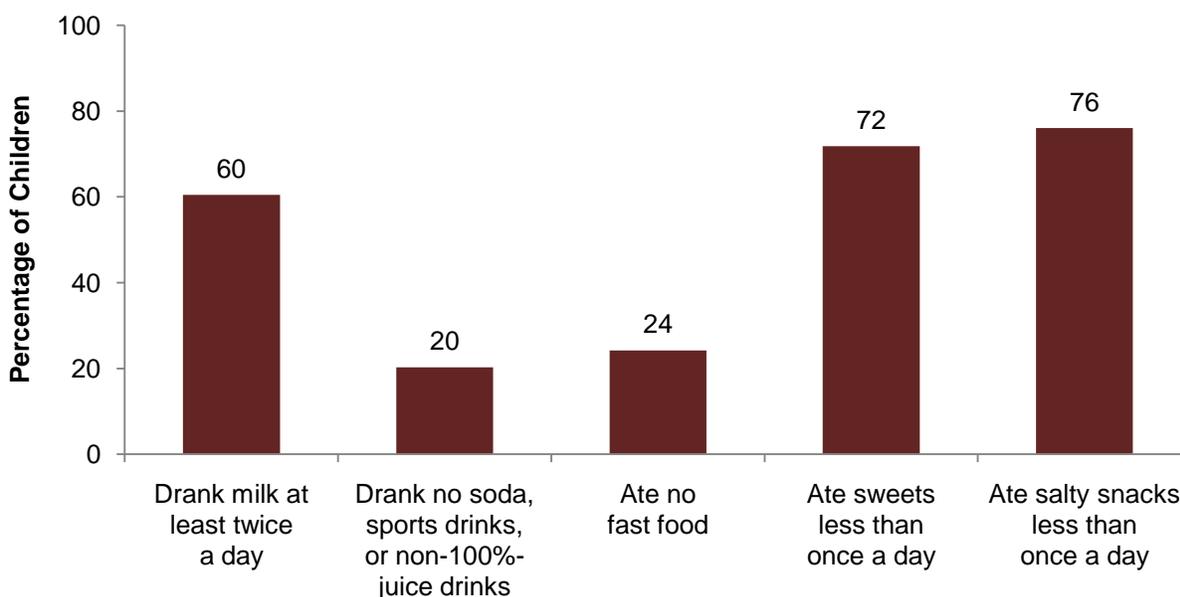
their children, set the stage for socialization at school. Studies have found that time spent eating meals together as a family is associated with fewer behavior problems (Hofferth and Sandberg 2001) and that dinner table conversation supports literacy development (Beals and Snow 2006). Half of children's parents report that they eat dinner as a family every night, and another 25 percent eat dinner together five or six times a week.

Ninety percent of children have a regular bedtime, an increase from 87 percent during the previous year. About 62 percent of children were disciplined using "time out" in the week prior to the parent interview, and 18 percent were spanked during that week. Both of these disciplinary practices were reported less often during the kindergarten year than in the previous year, when 66 percent of children's parents used "time out" and 26 percent used spanking.

Child nutrition and health care. Parental encouragement of good nutritional choices at home can contribute to children’s developing healthy habits and help combat childhood obesity. FACES asked parents to report on the foods their child consumed over the past week, concentrating on types of foods that are particularly salient for young children, such as milk, soda, salty snacks, sweets, and fast food. Figure 4 shows their reported consumption relative to thresholds that indicate healthier, more nutritional choices in these areas.²⁴ Based on parent reports regarding the past week, most

children eat relatively few salty or sweet snacks in a given day (76 and 72 percent, respectively, did so less than once a day), and 60 percent drink milk at least twice a day. Almost one-quarter (24 percent) consume no fast food, and one-fifth do not drink soda or other sweetened beverages. The only nutritional pattern to change significantly between the Head Start year and the kindergarten year was the percentage of children who drank milk at least twice a day, which fell from 70 percent to 60 percent.

Figure 4. Child Nutrition in Past Week: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

The inclusion of health and wellness services in Heads Start’s comprehensive mission reflects the recognition that health care practices influence children’s development. Almost all children enrolled in kindergarten after completing Head Start (95 percent) had had a regular medical check-up in the past year, and 91 percent had seen a dentist during that time. These percentages represent a decline, from 98 percent and 94 percent, respectively, a year earlier.

Most children have some type of health insurance (95 percent). Medicaid is the most common type, followed by private insurance. Many parents reported having multiple types of health insurance for their child. Health insurance coverage varies significantly by ethnicity. In particular, Hispanic/Latino children are less likely to have health insurance than are children in other racial/ethnic groups.

Parent health behaviors and mental health.

Family health behaviors and the health status of children's caregivers can affect a child's health, well-being, and development. Almost one-third (32 percent) of children enrolled in kindergarten after completing Head Start have a parent who does not have health insurance. More than one-fifth (22 percent) have a parent who smokes tobacco, and about one-third (32 percent) live in households where someone smokes.

The mental health of parents can affect their well-being and the quality of their interactions with their children. Self-reported depressive symptoms among parents are measured using the CES-D Depression Scale (short form; Radloff 1977). The average score among parents is 5.3, which is in the "mildly depressed" range, similar to the prior year. Although the majority of parents do not report symptoms of depression, nine percent of children's parents report symptoms of severe depression, and another eight percent report symptoms of moderate depression. The parents of Hispanic/Latino children are less likely than other parents to report symptoms of moderate or severe depression. The average number of depressive symptoms reported by parents of Hispanic/Latino children is 3.7, compared to 6.7 and 6.1 for parents of White and African American children, respectively.

Social Support, Child Care, and Parent Involvement in Kindergarten

This subsection presents key findings on social support received by families, child care arrangements before or after kindergarten, and parents' involvement in and satisfaction with kindergarten. As in the previous subsection, the focus is on experiences during the kindergarten year for the population of children who entered kindergarten after completing one or two years of Head Start. Changes in the experiences of

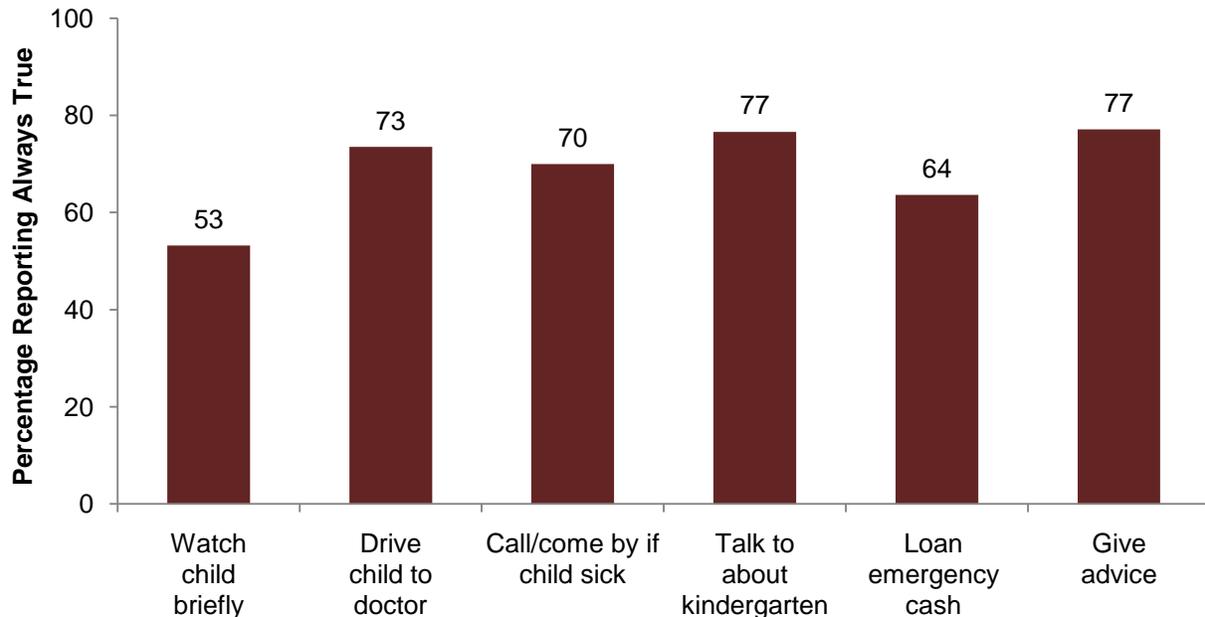
this population between the last Head Start year and the kindergarten year are also highlighted.

Social support. FACES asked parents about the types of social support they receive from various sources. As shown in Figure 5, the majority of children's parents (77 percent) report always being able to find someone to talk to when they need advice or if their child is having problems at kindergarten, but fewer (53 percent) said that it was always easy to find someone to watch their child while they run an errand.

Parents were also asked who provides social supports; they most often reported that family members are "very helpful" (89 percent) in terms of raising the child. Kindergarten staff members are the next most commonly reported source of support (58 percent), followed by friends (50 percent). Professionals other than kindergarten staff (such as counselors or social workers and other child care providers) are reported to be very helpful by 35 percent of parents.

Parents report more social support in the kindergarten year than they did in the spring of their child's last year in Head Start. For each type of social support except one (advice), a significantly larger percentage of parents reported always being able to get help. For example, the percentage reporting that family or friends would provide a loan in an emergency increased from 60 percent in the Head Start year to 64 percent in the kindergarten year. In addition, the percentages reporting finding friends and professionals (other than Head Start or kindergarten staff) very helpful increased significantly between the two years—from 44 and 25 percent, respectively, to 50 and 35 percent. However, the percentage of children's parents reporting kindergarten staff as very helpful was almost identical to the percentage that had found Head Start staff very helpful in the prior year.

Figure 5. Social Support Parents Receive: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

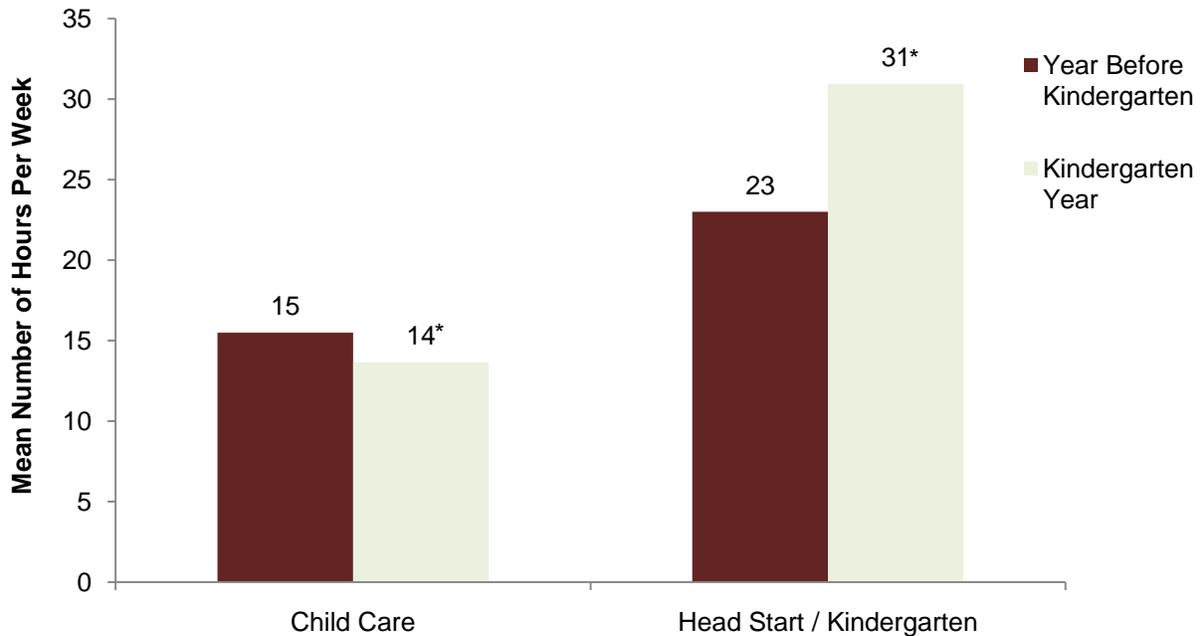
Child care beyond kindergarten. Children spend an average of 31 hours per week in their kindergarten program. One-third of them are cared for by someone other than their parents before or after kindergarten, spending an additional 14 hours per week, on average, away from their parents (Figure 6). On average, children spend a total of 36 hours in nonparental care each week.²⁵

Children spend more time in kindergarten programs (eight hours more per week, on average) than they spent in Head Start programs the previous year, and spend less time (about two fewer hours) in child care during the kindergarten year than the prior year.²⁶ The percentage of children in care before or after kindergarten is also lower than the percentage in care before or after Head Start the prior year (41 percent). These changes are

related to the fact that 82 percent are in full-day kindergarten programs (according to teacher reports), while just 45 percent attended full-day Head Start programs the previous year.

However, the relative prevalence of different types of child care has not changed. Care by a relative remains the most common type of child care, received by 21 percent of all children (and by 62 percent of those in any type of before- or after-school care). Eight percent of children are cared for in a center-based program in addition to kindergarten, and four percent are cared for by a nonrelative in a home-based setting. Child care usage varies significantly by subgroup. African American children are more likely to be in before- or after-school care than are other children, and particularly more likely to be cared for by a relative (not shown).

Figure 6. Time Spent in Child Care,^a Year Before and in Kindergarten Year



Source: Spring 2007, Spring 2008, and Spring 2009 FACES Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

^a Among those in care.

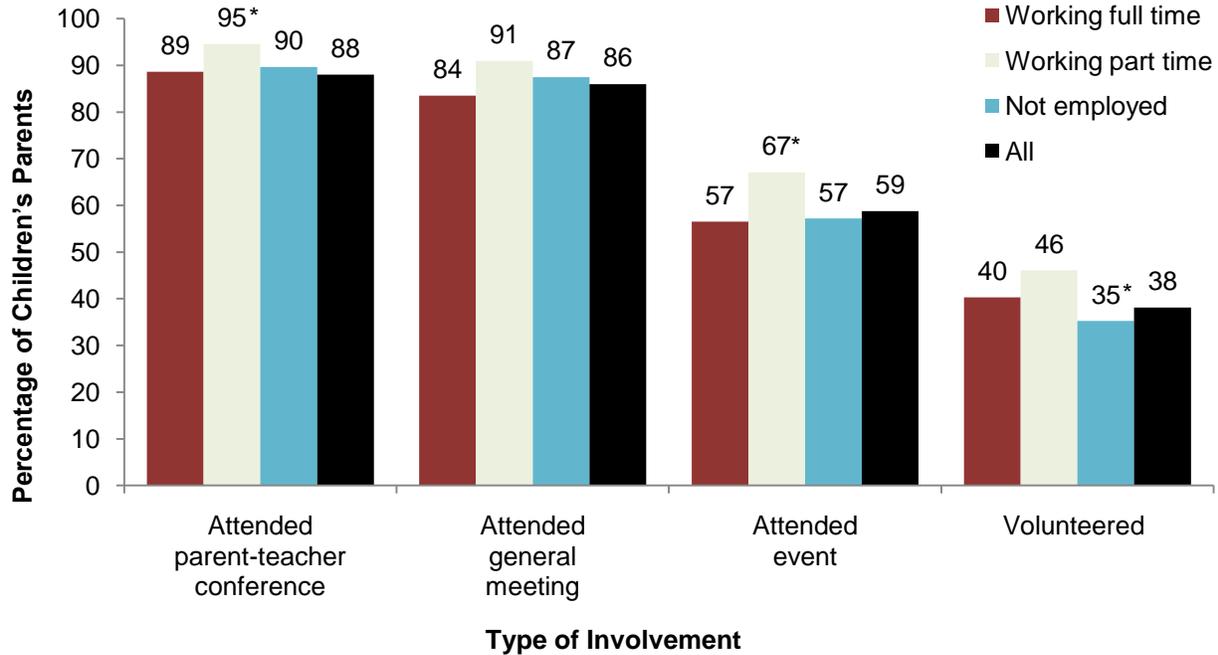
*Asterisk indicates that the difference between the years is statistically significant at the $p \leq .05$ level.

Parent involvement in kindergarten and parent satisfaction. Parents are involved in their children's schools and kindergarten programs in a wide variety of ways. As shown in Figure 7, the most common types of involvement are attending a parent-teacher conference (88 percent) or a general school meeting (86 percent), such as an open house, a back-to-school night, or a meeting of a parent-teacher organization. Fewer parents attend school or class events (59 percent) or volunteer or serve on a committee at the school (38 percent).

Parent involvement varies significantly by subgroup. Parents of Hispanic/Latino children and those who primarily speak a language other than English to their children at home are less

likely to volunteer at the school than are other parents. Mothers with at least a high school diploma are more likely to attend events and volunteer at their child's kindergarten than are those without a diploma. Mothers who are employed (full or part time) are more likely to volunteer at their child's kindergarten than are those who are not working (Figure 7). Among working mothers, those employed full time are less likely than those employed part time to attend meetings and events at their child's school. These patterns of parental involvement by subgroup are similar to those found in the broader population, based on the 2003 National Household Education Surveys (NHES) (Vaden-Kiernan and McManus 2005).

Figure 7. Parent Involvement at Child’s School, by Mother’s Employment: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

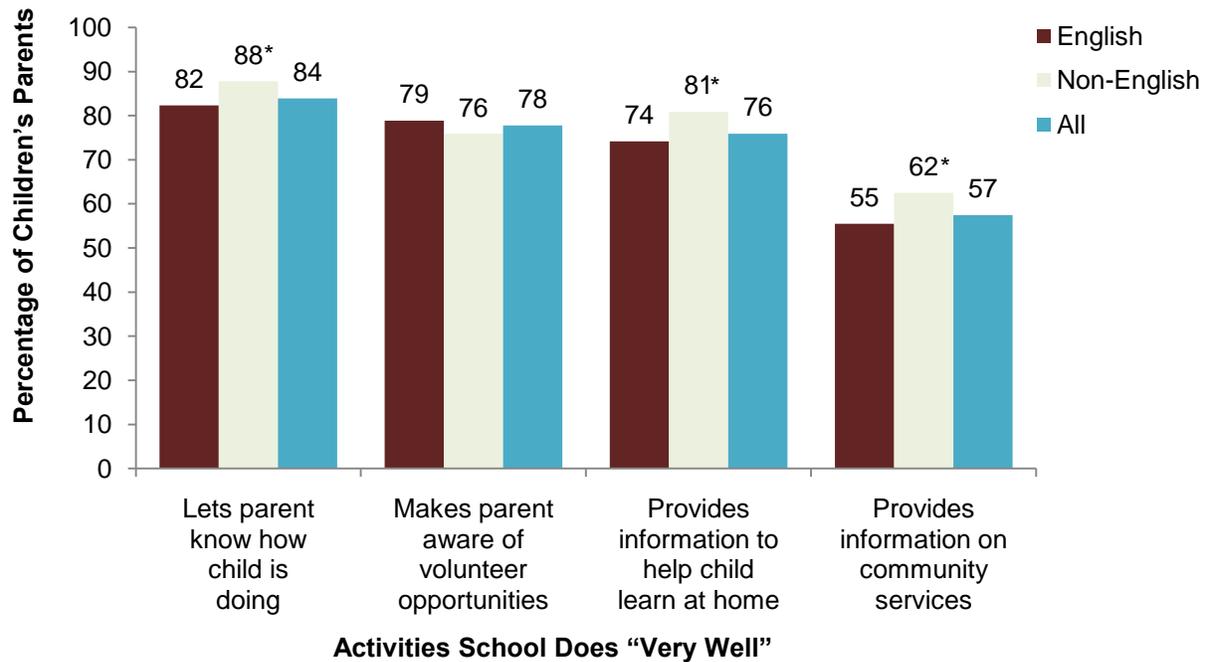
*Asterisk indicates that the percentage involved is statistically different for that group than for all other groups at the $p \leq .05$ level.

Parents report high levels of satisfaction with most aspects of their child’s kindergarten. More parents feel that the school does “very well” in areas directly related to their child’s schooling, such as letting them know how their child is doing in school and making them aware of volunteer opportunities at the school, than feel that the school does “very well” in other areas, like providing information about community services (Figure 8). Parents who primarily speak a language other than English to their children at home tend to report greater satisfaction than other parents with how well the school performs in most areas. The sole exception is in making parents aware of volunteer opportunities at the school—there are no statistically significant differences by language group on this topic. In addition to questions about satisfaction with kindergarten, parents were asked how satisfied they are with what Head Start had done to prepare the child and family for school. About

86 percent of parents report being very satisfied with Head Start’s preparation.

Although questions about parent involvement and satisfaction with kindergarten were not directly comparable to those asked about Head Start in the previous year, parents were also involved in those programs in a variety of ways. The most common type of involvement—attending parent-teacher conferences—was reported by 86 percent of parents during the Head Start year. As noted in the *A Year in Head Start* report, parents also reported high levels of satisfaction with Head Start, particularly regarding child-related aspects such as helping the child grow and develop, providing a safe program, and preparing the child for kindergarten, each of which was reported as “very satisfactory” by over 80 percent of parents (Aikens et al. 2010).

Figure 8. Parent Satisfaction with Child’s Kindergarten, by Primary Home Language: Spring Kindergarten



Source: FACES Spring 2008 or 2009 Parent Interview.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

*Asterisk indicates that the difference between the groups is statistically significant at the $p \leq .05$ level.

Summary

The child and family demographic characteristics of children who entered kindergarten after completing one or two years of Head Start look very much like those of the larger group who first entered Head Start in fall 2006 in many ways—including children’s gender, household size, parents’ education and employment, poverty, public assistance receipt, and family risk factors. However, there are a few differences. Compared to the larger group of children who entered Head Start in fall 2006, those who completed Head Start and entered kindergarten were more likely to have been 4 years old at Head Start entry, less likely to be African American, more likely to be Hispanic/Latino, and more likely to live in a household where Spanish is the primary language. Children who completed a year or two

of Head Start and enrolled in kindergarten were also more likely to be living with both parents at Head Start entry, compared to the larger group of children who entered Head Start in fall 2006.

Analyses examined the home learning environment, family health behaviors, social support, and child care arrangements during the kindergarten year; changes in these between the Head Start year and the kindergarten year; and parents’ involvement in and satisfaction with kindergarten. Key highlights include:

- Children participate in a variety of learning activities with their families, both in and outside of the home. Slightly more than 80 percent are read to by a family member at least three times a week.
- Three-quarters of children’s parents report that they eat dinner as a family at least five

nights a week, and 90 percent of children have a regular bedtime.

- Health insurance and routine visits to health care providers are widely reported (each by more than 90 percent of children's parents).
- Parents report receiving more social support from a variety of sources in the kindergarten year than they did in the spring of their child's last year in Head Start.
- Children spend an average of 36 hours a week away from their parents, including kindergarten and child care. Children spend more time in kindergarten programs than they spent in Head Start programs and spend less time in child care than during the previous year.
- Parents are involved in their children's schools and kindergarten programs in a wide variety of ways, most commonly attending parent-teacher conferences and general school meetings. Parents report high levels of satisfaction with most aspects of their child's kindergarten, particularly in areas directly related to their child's schooling.

SCHOOLS AND KINDERGARTEN CLASSROOMS HEAD START CHILDREN ATTEND

In line with Head Start's ultimate goal of fostering children's school readiness, the FACES 2006 followup at the end of kindergarten allows fuller understanding of how well Head Start prepares children and their parents for participation in school. Knowing more about the schools, classrooms, teachers, and educational experiences in the kindergarten year provides a picture of the school setting for which Head Start programs are preparing children. Understanding the nature of Head Start children's kindergarten experiences may also help to inform Head Start programs about potential challenges children face to achieve school success, and areas of curricular focus to guide program practice. In this way, Head Start can work toward continual quality improvement to best serve children while they are in the program and help them to sustain gains once they graduate. In this section, we describe the characteristics of the schools and classrooms that Head Start children attend for kindergarten.

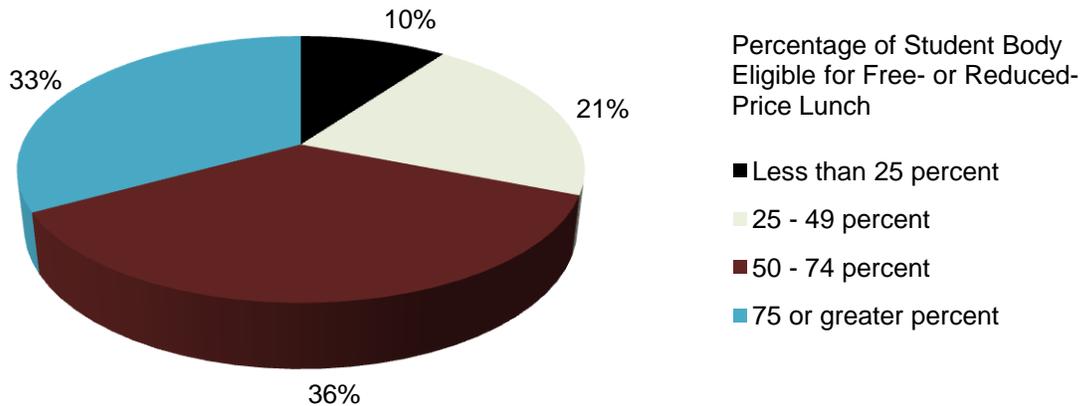
Kindergarten School Characteristics²⁷

Nearly all Head Start children attend kindergarten in a public school (99 percent). Among those who do, a small percentage attend a charter or magnet school (4 percent and 5 percent, respectively). The children generally attend kindergarten in elementary schools (66 percent) but may also be in schools that include middle or high school grades (30 percent).²⁸

Head Start children go on to attend kindergarten in schools with high concentrations of disadvantaged students. Most children attend schools eligible to receive Title I funds. Schools may be eligible to provide services at different levels. Local education agencies target funds to public schools with the highest percentage of students from low-income families (which may vary across agencies). In those cases, Title I services must focus on individual students who are failing, or most at risk of failing, to meet state academic standards (93 percent of Head Start children attend such schools). However, in cases of high concentrations of disadvantage (that is, where at least 40 percent of students at the school are from low-income families), Title I funds can be used to fund school-wide programs that benefit all students. Approximately 84 percent of Head Start children in FACES 2006 attend such schools. Nationally, approximately 66 percent of all public elementary schools receive Title I funding (Strizek et al. 2006). In addition, more than two-thirds (69 percent) of children who completed Head Start attend schools where at least half of the student body is eligible for free- or reduced-priced lunch, including one-third of children in schools with 75 percent or more of the student body eligible for free- or reduced-priced lunch (Figure 9).

Nationally, an average of 46 percent of all children in public elementary schools are eligible for free- or reduced-priced lunch (Strizek et al. 2006). Almost one-half (46 percent) of Head Start children attend kindergarten in schools with a student body that includes at least 75 percent minority students, whereas 25 percent of children attend schools with less than 25 percent minority enrollment. In comparison, on average, 42 percent of all children in public elementary schools are considered minority group members (Strizek et al. 2006).

Figure 9. Children Attending Schools with Different Percentages of Students Eligible for Free- or Reduced-Price Lunch: Spring Kindergarten



Source: Common Core of Data 2007-2008, Private School Survey 2007-2008, U.S. Department of Education, Institute for Education Sciences, National Center for Education Statistics.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Kindergarten Program Characteristics

FACES gathered information from kindergarten teachers on the school's transition activities, the program type that the child attended (full-day versus half-day), and classroom composition in terms of number of children, race/ethnicity, poverty status, and language. Kindergarten teachers were asked whether their schools provided different activities that are intended to ease the transition from preschool to school. The most common activities reported (at approximately 80 percent each) are phoning or sending information to parents, having parents and children visit the kindergarten program, and offering an orientation for parents prior to the start of the school year. Nearly 40 percent of children who completed Head Start attend schools that offer the opportunity for children and their parents to spend time in a kindergarten classroom prior to the school year. Other types of transition activities (though reported by few teachers) include having shorter days at the beginning of the school year or having teachers visit children's homes at the beginning of the school year.

Based on teacher report, 82 percent of Head Start children attend a full-day kindergarten program. This is higher than national estimates despite an increase from 56 to 75 percent over

the past decade.²⁹ Children's kindergarten classes have about 20 children on average, with a child-to-staff ratio of approximately 12-to-1. Fourteen percent of children who completed Head Start attend kindergarten classrooms with class sizes greater than 24. These estimates are slightly higher than professional standards, which suggest a ratio of 10:1 for groups of 20 and an upper limit of 24 children for this age group (National Association for the Education of Young Children 2008; Zinth 2010).

Children who completed Head Start attend kindergarten classrooms that on average have about one-quarter to one-third each of White, African American, and Hispanic/Latino classmates. On average, children are in classrooms where one-fifth of their classmates have limited English proficiency as reported by the kindergarten teacher.

These children attend kindergarten with classmates who are similar to them in terms of race/ethnicity and language. For the most part, children attend kindergarten classrooms where more than one-half of their classmates share the same racial/ethnic background. For example, children who are White are in classrooms where on average 78 percent of the class includes children who are White; this pattern also is seen for children who are African American (67

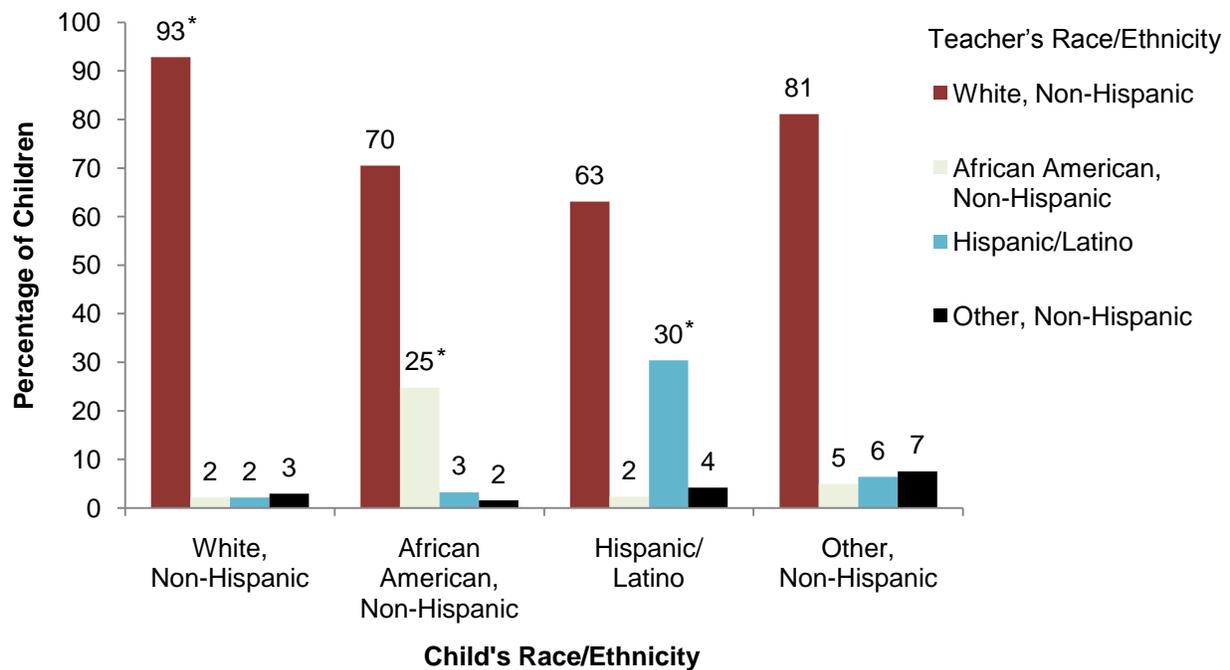
percent same-race peers) and children who are Hispanic/Latino (60 percent same-ethnicity peers). Children whose primary home language is English are in classrooms with about 10 percent of classmates with limited English proficiency. However, children whose primary home language is not English are in classrooms with almost five times more classmates with limited English proficiency, averaging 48 percent of their classmates.

Kindergarten Teacher Characteristics

Most children have kindergarten teachers who are female (97 percent), and about half of children have teachers that are between the ages of 30 and 49. Overall, 74 percent of children's teachers are White, 9 percent are

African American, and 14 percent are Hispanic/Latino. On a national scale, 84 percent of kindergarten teachers in 1998 were White, 6 percent African American, and 6 percent Hispanic/Latino (Germino-Hausken et al. 2004). More recent statistics for elementary teachers and school teachers in general show that between 82 and 84 percent are White, 7 to 8 percent are African American, and 7 percent are Hispanic/Latino (Coopersmith 2009; Strizek et al. 2006). Children who are African American are more likely than other groups of children to have a kindergarten teacher who is also African American (25 percent; Figure 10). Similarly, children who are Hispanic/Latino are more likely to have a kindergarten teacher who is also Hispanic/Latino (30 percent) than are other groups of children.

Figure 10. Kindergarten Teacher's Race/Ethnicity, by Child's Race/Ethnicity: Spring Kindergarten



Source: Fall 2006 FACES Parent Interview, Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

*Asterisk indicates that teacher's race/ethnicity is significantly different for children in this racial group compared to children in all other groups at the $p \leq .05$ level.

In terms of teachers' education, virtually all Head Start graduates have kindergarten teachers who report having at least a bachelor's degree, and 48 percent of these children have kindergarten teachers with a graduate or professional degree. Most children's kindergarten teachers (60 percent) identify elementary education as their field of study, and another 20 percent indicate that they concentrated on early childhood education. Children's kindergarten teachers vary in the number of years they have been teaching; 62 percent of children have teachers with 10 or more years of teaching experience, and 32 percent of children have teachers with 10 or more years experience teaching kindergarten specifically. The latter matches 1998 national estimates of kindergarten teachers, with 36 percent of teachers having 10 or more years experience teaching kindergarten (Germino-Hausken et al. 2004).

Kindergarten teachers' experience and education background vary by children's race/ethnicity. In particular, children who are African American are more likely than children who are White to have teachers with less than three years of teaching experience (11 percent versus 6 percent), and less likely to have teachers with 20 or more years of experience (26 percent versus 35 percent, respectively). Children who are Hispanic/Latino are also less likely than children who are White to have teachers with 20 or more years of experience in general (27 percent versus 35 percent) or teaching kindergarten (7 percent versus 13 percent). In addition, children who are Hispanic/Latino are less likely to have teachers with a graduate degree than children who are White (44 percent versus 55 percent).

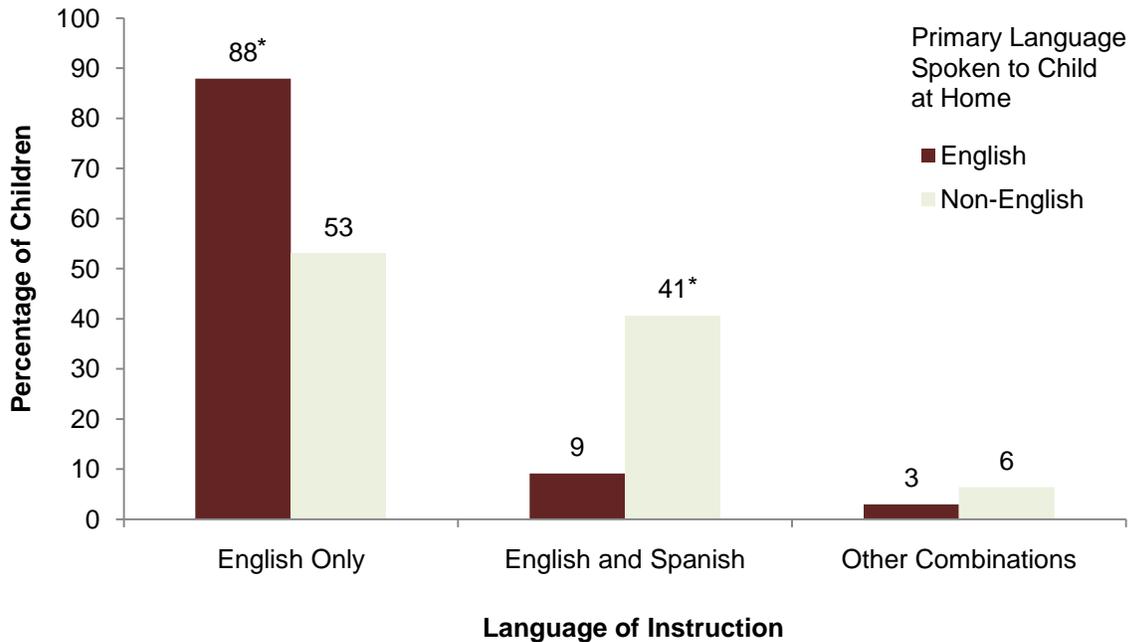
The Educational Environment of the Kindergarten Classroom

Kindergarten teachers also reported on the educational environment of the classroom in terms of instruction and activities. Given that a large and growing percentage of Head Start

children are dual language learners (DLLs), FACES 2006 asks kindergarten teachers about the language(s) used for instruction. About one-quarter (22 percent) of children who completed Head Start went on to attend kindergarten classrooms where English was not the only language of instruction, with 19 percent experiencing a combination of English and Spanish instruction. The language used for instruction in kindergarten classrooms differs by the primary language spoken at home to the child (Figure 11). Children who are DLLs are about equally as likely to be in kindergarten classrooms where English is the only language of instruction as in classrooms where English is used in combination with another language. About one percent of children who are DLLs attend classrooms where Spanish is the only language of instruction. Children whose primary home language is English are more likely to be in classrooms where English is the only language of instruction and less likely to be in classrooms where instruction is conducted in both English and Spanish than are children who are DLLs.

FACES 2006 also asks teachers questions about how kindergartners spend their time at school (Figure 12). Nearly all children who complete Head Start spend time each day in kindergarten on reading/language arts and mathematics. However, children spend nearly twice as much time per week on reading/language arts as on mathematics (seven hours versus four hours, respectively).³⁰ Social studies and science are taught less frequently. About one-half of children receive instruction in social studies and science daily or almost daily, but instructional time in these subjects averages about one hour per week. National district averages across the elementary school years follow a similar pattern, with eight hours weekly for reading and language arts, five hours for mathematics, and three hours each for social studies and science (Center on Education Policy 2007).

Figure 11. Kindergarten Classroom Language of Instruction by Primary Language Spoken to Child at Home: Spring Kindergarten



Source: Fall 2006 FACES Parent Interview, Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire.

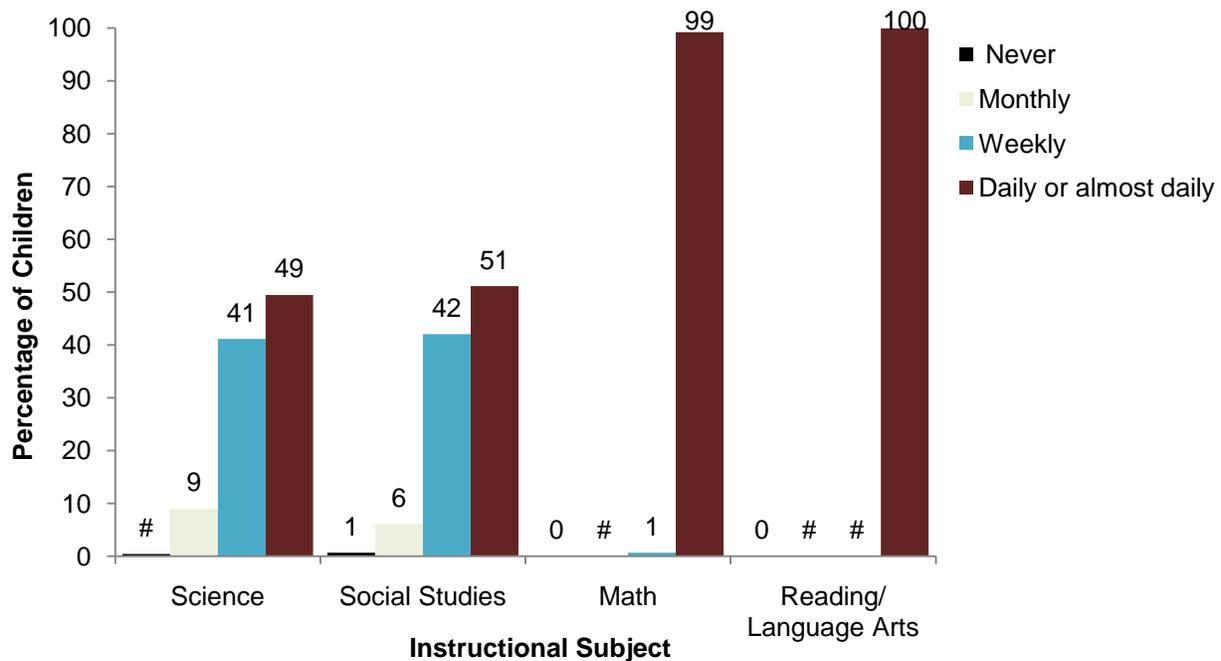
Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

*Asterisk indicates that the language of instruction experienced is significantly different for children from English and non-English homes at the $p \leq .05$ level.

In addition to asking kindergarten teachers about instructional time by subject domain, FACES 2006 asked teachers to report on the types and frequency of learning activities in early reading and language in their classrooms. The most common activities, reported by at least 90 percent of children’s kindergarten teachers as occurring daily or almost daily, are working on letter naming, practicing writing letters, discussing new words, working on phonics, listening to the teacher read stories where children see the print, learning about conventions of print, and writing their own name. Compared to other reading and language arts

activities, smaller percentages of children’s teachers report having children “listen to teacher read stories where they don’t see the print” or “learn about common prepositions” on a daily basis (55 and 54 percent, respectively). These patterns resemble experiences in Head Start, but with increases in rhyming and phonics activities, reported as occurring daily or almost daily in kindergarten (Aikens et al. 2010). Compared to a national sample of kindergartners in 1998, similarly high numbers of children (56 to 91 percent) experience such activities daily (Walston and West 2004).

Figure 12. Frequency of Kindergarten Instructional Time: Spring Kindergarten



Source: Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Estimate rounds to zero.

Teachers also report frequent mathematics-related activities in their classrooms. Almost all children are in kindergarten classrooms where counting out loud is a daily or almost daily activity. The next highest frequency mathematics activities occurring on a daily or almost daily basis include working with counting manipulatives (73 percent) and playing mathematics-related games (59 percent). A small percentage of children “work with rulers or other measuring instruments” on a daily basis (9 percent); they do this more typically on a monthly basis (63 percent). As compared to experiences in Head Start, the frequency of counting out loud is similar; however, more Head Start teachers reported engaging in other mathematics activities daily or almost daily (for example, 52 percent report using a ruler, 82 percent using counting manipulatives; Aikens et al. 2010). Compared to a national sample of kindergartners in 1998, the frequency of mathematics activities varied, with children who

had completed Head Start more often working with counting manipulatives in kindergarten relative to the national sample (73 percent daily or almost daily versus 22 to 36 percent daily) but less often engaging in calendar activities (53 percent daily or almost daily versus 93 to 94 percent daily; Walston and West 2004).

Children attend kindergarten classrooms that have several interest centers. Most children (90 percent or more) have access to a reading area, writing center, pocket chart for activities related to calendar or weather, mathematics area, and puzzle and block area. Less frequently seen in children’s kindergarten classrooms are science or nature areas (44 percent of children) and water or sand tables (27 percent).

About half of the children attend kindergarten classrooms where the group is reported as behaving well or exceptionally well (38 and 10 percent, respectively). Eleven percent of

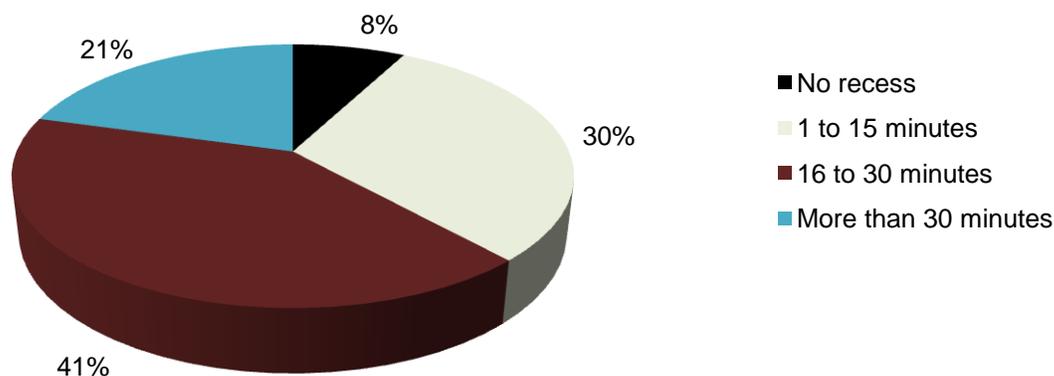
children attend classrooms where student misbehavior is a frequent problem.

Children's Physical Activity in Kindergarten

Childhood obesity has become an important policy issue at the national, state, and local levels. For the first time, FACES 2006 measured children's height and weight and added questions about activity in the home, Head Start, and kindergarten settings. Schools may contribute to reducing the rate of obesity by offering children opportunities to participate in physical activities through recess and physical education. According to kindergarten teacher report, overall, 8 percent of children have no opportunity for daily recess and 21 percent have more than 30 minutes of daily recess (Figure 13). Nationally, 7 percent of public schools have first graders who did not experience recess at all and another 5 percent do not offer it daily. Among those schools providing recess, 27 percent have more than 30 minutes per day

(Parsad and Lewis 2006). The amount of time children have for recess varies by the kindergarten program type, as reported by kindergarten teachers. Children in full-day programs are more likely not to have daily recess than those in half-day programs (6 versus 14 percent, respectively). However, children in full-day kindergarten programs are given more opportunity in terms of minutes per day, with about 70 percent experiencing 16 or more minutes. In contrast, the modal category for children in half-day programs is 1 to 15 minutes of recess (63 percent). In terms of physical education, 8 percent of children do not have physical education while 19 percent have it daily; most commonly, children experience physical education once or twice a week (52 percent). Compared to a national sample of public schools, 1 percent did not have physical education while 18 percent of schools offer it daily, averaging two days a week (Parsad and Lewis 2006).

Figure 13. Percentage of Children Experiencing Daily Recess Time, as Reported by Kindergarten Teachers: Spring Kindergarten



Source: Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Summary

Generally, Head Start graduates go on to attend kindergarten in Title I public schools with high concentrations of disadvantaged students. Most of these schools offer a variety of activities to ease children's transition from preschool into kindergarten, such as having parents and children visit the kindergarten program. Large numbers of these children attend full-day kindergarten programs with class sizes meeting recommended professional standards. Their classmates are similar to them in terms of racial/ethnic and language background, and their kindergarten teachers are often experienced, with 10 or more years of teaching experience and having at least a B.A. Daily or almost daily children experience a host of reading and language arts activities (such as letter naming and discussing new words) and mathematics activities (such as counting out loud or with manipulatives). They also have access to several kinds of interest areas such as reading, writing, and puzzles. In terms of physical activity at school, about one-fifth of children who completed Head Start have recess 30 minutes or more a day, and one-fifth experience physical education daily.

CHILD OUTCOMES IN HEAD START AND KINDERGARTEN, AND TRAJECTORIES OF GROWTH

In this section we describe the cognitive, social-emotional, and health and physical development of children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009. In the area of children's cognitive development, we primarily provide descriptive information on the skills of children who were assessed in English at the end of Head Start and the end of kindergarten.³¹ We then turn to a discussion of children's social-emotional development at these two time points. We conclude with a description of children's health and developmental needs in the spring of the kindergarten year. Throughout this section, we first describe the outcomes for all children and then provide descriptive information by important subgroups, including children's age at

entry to Head Start, gender, race/ethnicity, and number of family risks.³² We report on children's skills on norm- and criterion-referenced measures, using raw scores, *W* scores, item response theory-based (IRT) scores, and standard scores. Standard scores provide information on children's performance relative to same-age peers. These scores have a mean of 100 and a standard deviation of 15. An increase in a child's standard score signifies that the child is making progress relative to peers. In contrast, raw, *W*, and IRT scores allow for measurement of change or growth in performance on the same scale over time. They are an indicator of absolute rather than relative performance.

After providing descriptive information on children's outcomes, we describe findings from two sets of multivariate analyses. The first set presents associations between children's school readiness skills at the end of Head Start and their developmental outcomes at the end of kindergarten. We examine the associations between the same skills (for example, PPVT-4 vocabulary) at the end of Head Start and kindergarten. We also examine relationship of skills in one area (for example, early mathematics) with skills in other areas (behavior problems). The second set depicts children's cognitive and social-emotional trajectories from Head Start entry through the end of kindergarten. These analyses also describe the relationship between these trajectories and child, family, and Head Start classroom (and program) characteristics. Finally, we conclude the section by describing the relationship between the diversity in children's skills as they enter the Head Start program and their growth trajectories.

Child Cognitive Development

Instruments used. To assess children's skills and knowledge, norm- and criterion-referenced measures of language, literacy, and mathematics development were directly administered to children. Across rounds, to measure children's receptive vocabulary in English and Spanish, the battery included the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4) (Dunn and Dunn 2006) and the Test de Vocabulario Imagenes Peabody (TVIP)

(Dunn et al. 1986).³³ The battery also measured children's letter-word knowledge and skills in applied problems and writing, using the Letter-Word Identification, Applied Problems, and Spelling subtests from the Woodcock-Johnson III Tests of Achievement (WJ III; Woodcock, McGrew, and Mather 2001) and the Batería III Woodcock-Muñoz (Batería III; Woodcock et al. 2004).³⁴ To assess mathematics skills, it included a supplemental set of mathematics items from the Early Childhood Longitudinal Study, Birth and Kindergarten Cohorts (ECLS-B and ECLS-K) mathematics assessment (U.S. Department of Education 2002b; Najarian et al. 2010).³⁵ Items were also included to tap children's understanding of story and print concepts.³⁶ In the spring of the kindergarten year only, the direct assessment battery included the Word Attack subtest of the WJ III and Batería III, which measured a child's knowledge of letter-sound correspondence using unfamiliar printed words.

Language screening. In fall 2006, the direct child assessment began with a screening to determine whether children who primarily spoke a language other than English at home should be assessed in English or in Spanish, or administered only the PPVT-4 and weighed and measured. Two subtests from the Pre-LAS 2000 (Duncan and DeAvila 1998)—Simon Says and Art Show—were used as screening tools. Children whose home language³⁷ was English were administered the cognitive assessment battery in English regardless of their scores on the language screener. If a child made five consecutive errors on both Simon Says and Art Show and primarily spoke Spanish at home, he or she was administered the PPVT-4 and then routed to the Spanish-language cognitive assessment. A child who made five consecutive errors on both Simon Says and Art Show and did not primarily speak English or Spanish was administered only the PPVT-4 and was weighed and measured. Children whose primary home language was not English but who passed the screener received the cognitive assessment battery in English.

In subsequent rounds (spring 2007, spring 2008, and spring 2009), an adapted version of the

screening procedure was used. All children were administered the Simon Says task of the Pre-LAS 2000. Following this task, those who primarily spoke English at home and who had passed the language screener in the previous round were routed to the English version of the assessment. All other children were administered both Simon Says and Art Show and, as in fall 2006, performance on both tasks was used to determine whether these children should be assessed in English or in Spanish, or administered only the PPVT-4 and weighed and measured.³⁸

Children assessed in English.³⁹ At the end of their Head Start experience, children score below norms on measures of language, literacy, and mathematics development although they score close to norms in letter-word knowledge at this time point (97.7). However, across areas, children make progress toward norms between the end of Head Start and the spring of the kindergarten year. In fact, children gain almost 6 standard score points in English receptive vocabulary,⁴⁰ 10 points in letter-word knowledge, 12 points in early writing (that is, WJ III Spelling), and 7 points in applied problems during this period. By the end of kindergarten, they score above the national average in letter-word knowledge (107.2), early writing (107.4), and word attack skills (113.5).⁴¹ Although children make progress toward norms in their receptive vocabulary and applied problems, they still score about one-third of a standard deviation below norms in these areas (93.4 and 95.4, respectively) in spring of the kindergarten year.

Cross-cohort comparisons⁴² show that patterns of children's gains between Head Start exit and the end of kindergarten are similar across the FACES 2000 and 2006 cohorts. Children made progress toward norms in FACES 2000 in English receptive vocabulary and applied problems, with the largest gains in early writing. As in FACES 2006, despite these gains, FACES 2000 children still scored behind same-age peers in receptive vocabulary and applied problems (94.5 and 94.6, respectively) in the spring of the kindergarten year.

On criterion-referenced measures,⁴³ children make progress across developmental areas

between the end of Head Start and the end of kindergarten. For example, on the ECLS mathematics items, while two-thirds (66 percent) of children are able to demonstrate number and shape skills at the end of Head Start, nearly all are able to do so at the end of kindergarten (96

percent). Similarly, nearly all first-time kindergartners nationally (99 percent) are able to demonstrate these skills at the end of kindergarten (U.S. Department of Education 2002a).

Table 1. Mean Standard Scores for Children Taking the Assessment in English: Head Start Exit, Spring Kindergarten, and Head Start Exit–Kindergarten Change

Scales (standard scores)	Number of cases	Head Start Exit	Spring Kindergarten	Head Start Exit–Spring Kindergarten Change
		Mean	Mean	Mean
PPVT-4	1629	87.8	93.4	5.6*
WJ III: Letter-Word Identification	1630	97.7	107.2	9.5*
WJ III: Spelling	1641	95.9	107.4	11.5*
WJ III: Applied Problems	1611	88.9	95.4	6.5*
WJ III: Word Attack	1621	NA	113.5	NA

Source: Spring 2007, 2008, and 2009 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

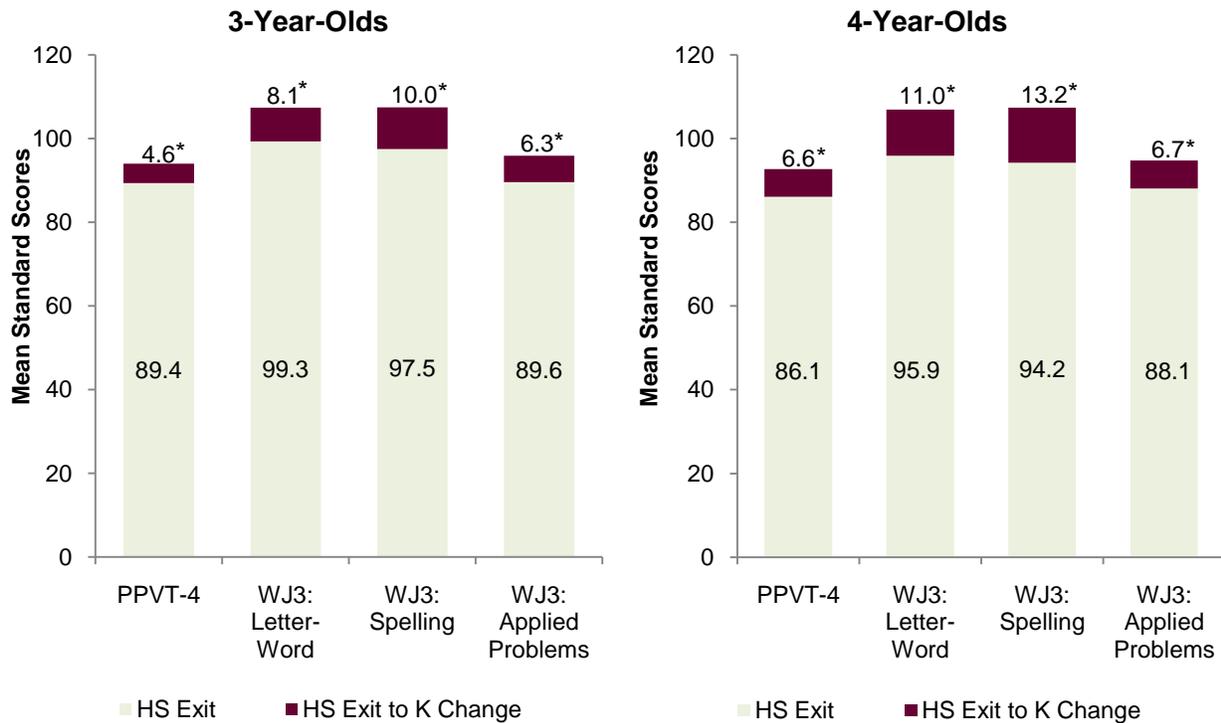
*Asterisk indicates a significant difference in scores between Head Start exit and the spring of kindergarten at the $p \leq .05$ level.

NA = Not available

Age. At the end of their Head Start experience, regardless of age at Head Start entry, children score below norms on measures of English vocabulary and mathematics development, with both 3- and 4-year-olds scoring at least two-thirds of a standard deviation below norms in these areas. Notably, however, children who entered the program at age 3 score closer to same-age peers in receptive vocabulary at this time point compared to those who entered at age 4 (89.4 versus 86.1). In addition, unlike children who entered at age 4, they score near norms in the areas of letter-word knowledge (99.3 versus 95.9) and early writing (97.5 versus 94.2) at this time point (Figure 14).

Across areas, both 3- and 4-year-old children make progress toward norms between the end of Head Start and the end of kindergarten, with both groups of children scoring above norms in letter-word knowledge (107.4 and 107.0, respectively), early writing (107.5 and 107.4), and word attack skills (113.3 and 113.7) at the end of kindergarten. There are differences in the patterns of children’s Spanish receptive vocabulary, with children who entered the program at age 3 showing declines in this area between Head Start exit and the end of kindergarten (-7.0 standard score points), and those who entered as 4-year-olds making progress relative to peers (+7.9 points).⁴⁴

Figure 14. Mean Standard Scores by Age for Children Taking the Assessment in English: Head Start Exit to Spring Kindergarten Change



Source: Spring 2007, 2008, and 2009 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

*Asterisk indicates a significant difference in scores between Head Start exit and the spring of kindergarten at the $p \leq .05$ level.

On criterion-referenced measures, both groups of children make progress across developmental areas between the end of Head Start and the end of kindergarten. For example, while about two-thirds of 3- and 4-year-old children are able to demonstrate number and shape skills at the end of Head Start (67 and 65 percent, respectively), nearly all are able to do so at the end of kindergarten (96 and 95 percent, respectively).

Gender. Both boys and girls score below national norms on measures of language and mathematics development at the end of their Head Start experience. At the end of Head Start, girls score closer to same-age peers than do boys across areas. For example, girls score at or near norms in the areas of letter-word

knowledge (99.7) and early writing (98.6) at this time point. However, all children make progress toward norms between the end of Head Start and the end of kindergarten, with both boys and girls scoring above norms in letter-word knowledge (106.7 and 107.7, respectively), early writing (106.5 and 108.4), and word attack skills (113.5 and 113.6) at the end of kindergarten. While boys and girls both make significant gains in early writing, the gains boys make during this time (+13.1 standard score points) close the gap with girls, and boys score similarly to them by the end of kindergarten.

Both boys and girls make progress across developmental areas on criterion-referenced measures. In fact, while 68 percent of girls are able to demonstrate number and shape skills at

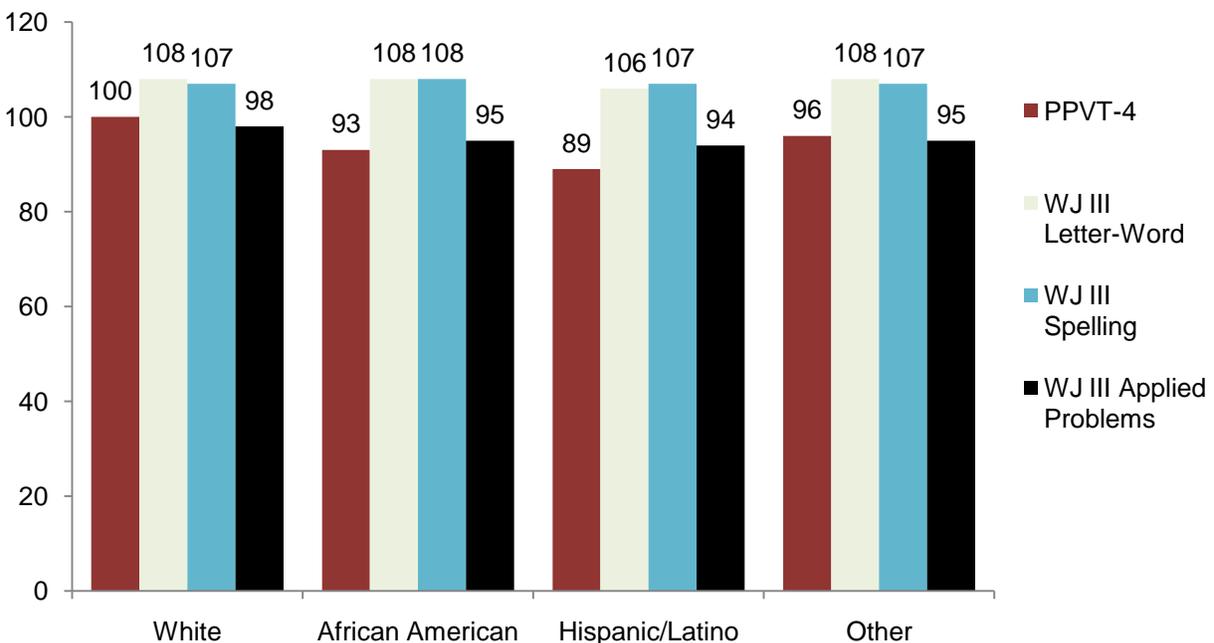
the end of Head Start, 96 percent are able to do so at the end of kindergarten. The percentage increases from 64 percent to 95 percent for boys.

Race/ethnicity. At the end of Head Start, many children score below norms on measures of language and mathematics development. However, performance across areas varies by race/ethnicity. For example, African American and Other race children score at or near norms in the area of letter-word knowledge (101.1 and 98.1, respectively), while Hispanic/Latino children score near norms in early writing at this time point (97.6). Across areas, children, regardless of race/ethnicity, make progress toward norms between the end of Head Start and the end of kindergarten, with all groups scoring above norms in letter-word knowledge, early writing, and word attack skills at the end of kindergarten. However, only White children

score at or near norms in receptive vocabulary (100.0) and early mathematics (98.2) at the end of kindergarten. Although Hispanic/Latino children demonstrate gains in English receptive vocabulary between the end of Head Start and the spring of the kindergarten year (+7.4 standard score points), they are still performing behind children from all other racial/ethnic groups and national norms in this area at the end of kindergarten (88.6 versus a range from 92.7 to 100.0; Figure 15).

On criterion-referenced measures, children make progress across developmental areas. For example, while at least two-thirds of children are able to demonstrate number and shape skills on the ECLS mathematics items at the end of Head Start, nearly all are able to do so at the end of kindergarten. This pattern is true regardless of race/ethnicity.

Figure 15. Mean Standard Scores by Race for Children Taking the Assessment in English: Spring Kindergarten



Source: Spring 2007, 2008, and 2009 FACES Direct Child Assessment.

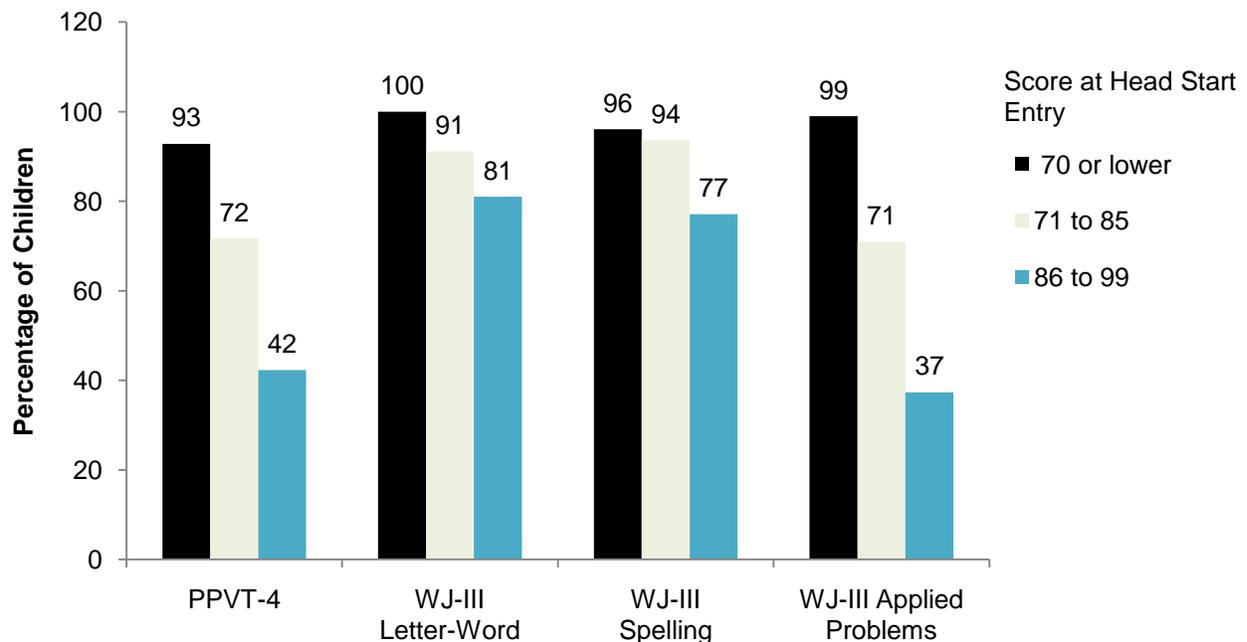
Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Family risk. At the end of Head Start, children from families with different numbers of family risks all score below national norms on measures of language and mathematics development. Children with none and those with one family risk score near norms in the areas of letter-word knowledge (99.4 and 98.8, respectively) and early writing (98.1 and 97.4, respectively) at the end of one or two years of Head Start. Across areas, children make progress toward norms between the end of Head Start and the end of kindergarten, with all children scoring above norms in letter-word knowledge, early writing, and word attack skills at the end of kindergarten. Only children with none of the family risks score near norms in receptive vocabulary (98.3) and applied problems (99.0) in the spring of kindergarten, however. Only children with two or more family risks make progress relative to peers in their Spanish receptive vocabulary (+2.0 standard score points).

On criterion-referenced measures, like the ECLS math, children make progress regardless of number of family risks. While at least 69 percent of children with no or one family risk are able to demonstrate number and shape skills at the end of Head Start, nearly all (96 percent) are able to do this at the end of kindergarten. The percentage increases from 61 percent to 95 percent for children with two or more risks.

Children’s Progress in Spring of Kindergarten by Entering Skill Level. Across developmental areas, many children make progress relative to peers during Head Start and the year following Head Start, regardless of their skills at program entry (Figure 16). For example, only 10 percent of those who enter with English receptive vocabulary skills of at least two standard deviations below norms have skills that remain that low in the spring of kindergarten.

Figure 16. Children Entering Below Norms Who Make Progress Relative to Peers in Spring of Kindergarten



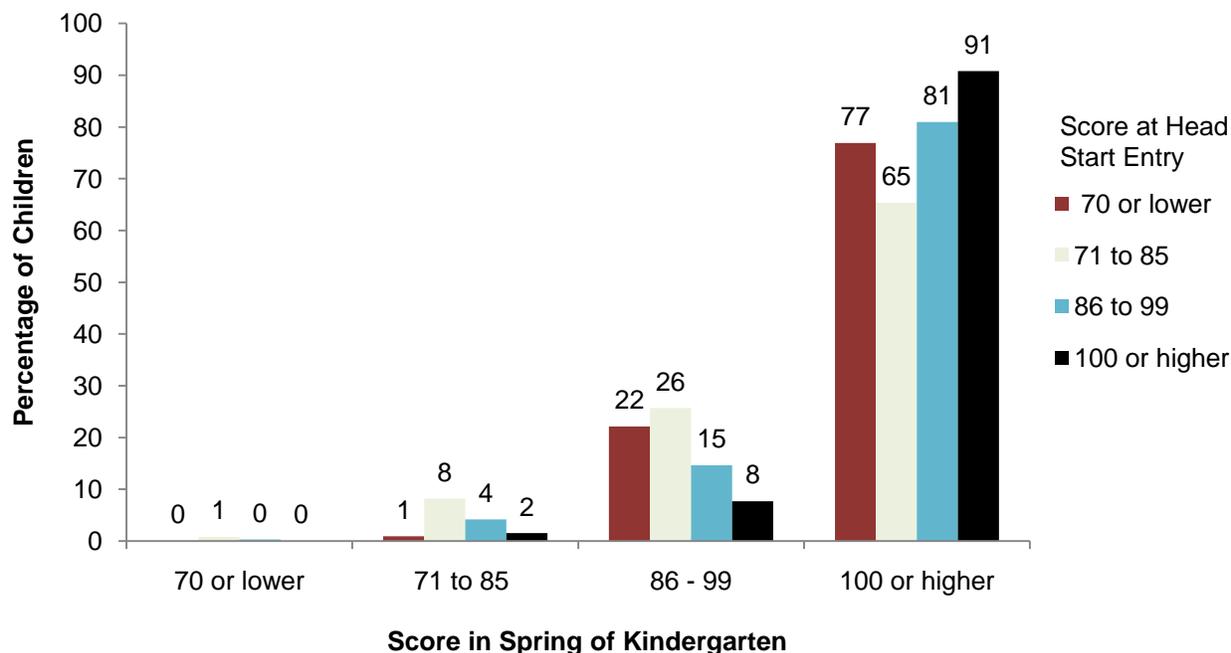
Source: Fall 2006 and Spring 2007, 2008, and 2009 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Few children who enter Head Start scoring below norms in this area, however, make enough progress to score at or above norms by the spring of kindergarten. Progress towards norms is particularly evident in the areas of children's letter-word knowledge and early

writing. For example, at least two-thirds those scoring below norms at Head Start entry score at or above norms in letter-word knowledge by the spring of kindergarten, including those who scored more than two standard deviations below norms at entry (Figure 17).

Figure 17. Children's Spring Kindergarten Letter-Word Standard Score by Their Head Start Entry Score



Source: Fall 2006 and Spring 2007, 2008, and 2009 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Language Development of DLLs. As described previously, FACES 2006 assesses the receptive vocabulary of children from Spanish-speaking households in English and in Spanish, providing an opportunity to understand the language development of this group of children both in English and in their home language. There is, of course, variability in the vocabulary skills of DLLs from Spanish-speaking households, particularly based on their performance on the language screener. On average, however, they move away from norms in the area of Spanish receptive vocabulary and score about 4 points lower between the end of Head Start and spring of kindergarten (83.8 [Head Start exit] and 79.6 [spring of

kindergarten]). About one-third of those who score more than two standard deviations below norms at entry score at similarly low levels in the spring of kindergarten. Although they experience losses in their Spanish receptive vocabulary skills during this time period, they also experience gains of 9.2 standard score points in their English receptive vocabulary, progressing from average scores of 78.3 (Head Start exit) to 87.5 (spring of kindergarten). Forty-four percent of those who score more than two standard deviations below norms in this area at entry score between one and two standard deviations of norms in the spring of kindergarten, and another 41 percent score within one standard deviation of norms.

Child Social-Emotional Development and Approaches to Learning

FACES 2006 provides multiple perspectives on children's positive and challenging behaviors that may affect their ability to learn and interact with peers and adults. Using items taken from the Behavior Problems Index (Peterson and Zill 1986), the Personal Maturity Scale (Entwisle et al. 1997), and the Social Skills Rating Scale (Gresham and Elliott 1990), Head Start and kindergarten teachers reported on children's social skills, such as making friends easily and waiting one's turn in games or other activities, as well as on problem behaviors in the classroom, such as their being very restless and unable to sit still or disrupting ongoing activities. They also assessed children's approaches to learning, such as their attitudes toward learning new things, motivation to perform well, and attention/persistence on learning activities. The approaches to learning measure was the Preschool Learning Behaviors Scale (PLBS; McDermott et al. 2000; McDermott et al. 2002).

Parents also reported on children's social skills and problem behaviors in the home

environment. Finally, using the Leiter-Revised Examiner Rating Scale (Roid and Miller 1997), assessors rated children's behaviors during the direct child assessment in such areas as attention, organization and impulse control, activity level, and sociability. Assessor ratings are the only social-emotional rating data in FACES 2006 that can be compared with normative data.

On average, Head Start and kindergarten teachers' reports of children's social skills at the end of Head Start and in spring of the kindergarten year do not differ, respectively (Table 2).⁴⁵ With the exception of children's attention/persistence behaviors, teachers also do not differ in their ratings of children's approaches to learning between those time points. Head Start and kindergarten teachers do, however, differ in their ratings of children's problem behaviors. In particular, kindergarten teachers report higher rates of problem behaviors than do Head Start teachers (6.8 versus 5.2 out of a possible 36), including hyperactive (2.9 versus 2.1 out of 12) and withdrawn behaviors (1.7 versus 1.3 out of 12).

Table 2. Mean Teacher-Reported Social-Emotional Scores for Children: Head Start Exit and Spring Kindergarten

Scales	Number of Cases	Head Start Exit	Spring Kindergarten
		Mean	Mean
Social Skills	1348	18.5	18.0
Total Behavior Problems	1355	5.2	6.8*
Aggressive Behavior	1354	1.2	1.4
Hyperactive Behavior	1355	2.1	2.9*
Withdrawn Behavior	1354	1.3	1.7*
PLBS – Total ^a	1354	53.5	52.6
PLBS – Attitude toward Learning ^a	1354	52.6	52.9
PLBS – Competence Motivation ^a	1354	53.3	52.4
PLBS – Attention/Persistence ^a	1354	53.7	51.8*

Source: Spring 2007, 2008, and 2009 FACES Teacher Child Report.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Head Start teachers rated children's social skills and problems in Head Start, while their kindergarten teachers rated them at the end of kindergarten. Kindergarten and Head Start teachers may have different expectations for children's skills and behaviors, thereby influencing their ratings.

*Asterisks indicate a significant difference in scores between Head Start exit and the spring of kindergarten at the $p < .05$ level.

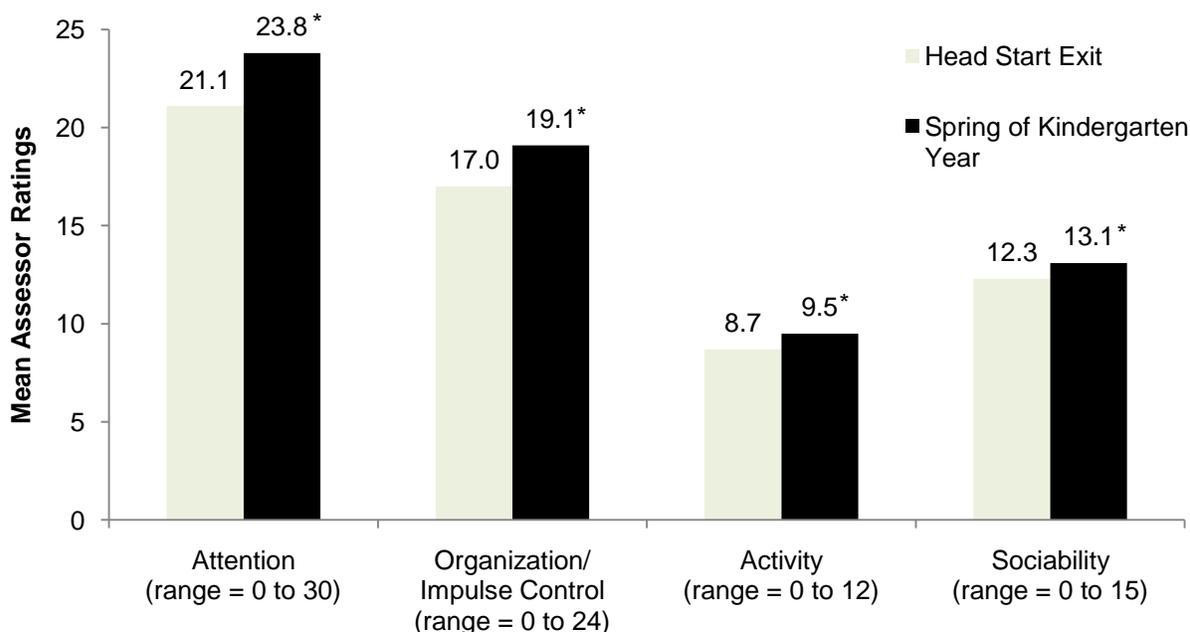
Despite differences in Head Start and kindergarten teacher ratings of children's problem behaviors, on average the ratings remain at low levels at the end of kindergarten. That is, on average, teachers rated many items asking about children's behavior problems as being "not true."

Parents report that children demonstrate more social skills and positive approaches to learning at the end of kindergarten than they did at the end of Head Start (12.8 versus 12.5 out of a possible 16). At both time points, children are rated by parents on the high end of the scale and as having strong social skills. Also, there are not differences in parents' report of children's problem behaviors between the end of Head Start and end of kindergarten. At both time

points, they rate children as having few problem behaviors (5.3 and 5.3 out of a possible 24).

Finally, based on children's behavior during the direct assessment, between the end of Head Start and the end of kindergarten, assessors rate children as demonstrating better social/cognitive skills, including better attention (23.8 versus 21.1 out of a possible 30), organization and impulse control (19.1 versus 17.0 out of 24), activity levels (9.5 versus 8.7 out of 12), and sociability (13.1 versus 12.3 out of 15; Figure 18). In fact, children make statistically significant progress toward norms in terms of their social/cognitive skills by the end of kindergarten (+5.2 standard score points).⁴⁶ Thus, relative to same-age peers, children's skills in this area increase by about one-third of a standard deviation.

Figure 18. Children's Assessor-Reported Social-Emotional Development



Source: Spring 2007, 2008, and 2009 FACES Teacher Child Report.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

*Asterisk indicates a significant difference in scores between Head Start exit and the spring of kindergarten at the $p \leq .05$ level.

Age. Looking at children's age at program entry, teachers, parents, and assessors do not report differences by age in children's social-emotional development between the end of Head Start and spring of kindergarten.

Gender. Generally, teachers, parents, and assessors do not report differences by gender in children's social skills and problem behaviors between the end of Head Start and spring of kindergarten. The two exceptions are children's competence motivation and attention/persistence with tasks. While teachers do not differ in their reports of these behaviors in girls between the end of Head Start and end of kindergarten, kindergarten teachers rate boys as demonstrating less positive skills in these areas at the end of kindergarten than did their Head Start teachers at the end of Head Start.

Race/ethnicity. Teachers, parents, and assessors report few differences by child race/ethnicity in children's social-emotional development between the end of Head Start and spring of kindergarten. Only among White children do Head Start and kindergarten teachers differ in their reports of children's social skills, approaches to learning, competence motivation, and attention/persistence. Across these areas, kindergarten teachers report White children as demonstrating fewer skills at the end of kindergarten. In addition, kindergarten teachers report higher rates of problem behaviors, including withdrawn behaviors, among White, African American, and Hispanic/Latino children, but they do not report this for Other race children. Otherwise, teachers report similar patterns of behaviors by the end of kindergarten across children, regardless of race/ethnicity.⁴⁷

Unlike parents of all other race/ethnicity subgroups of children, there are not differences in the prevalence of African American children's parent-reported social skills/positive approaches to learning between the end of Head Start and the end of kindergarten. Finally, based on children's behavior during the direct assessment, between the end of Head Start and the end of kindergarten, assessors rate all but the Other race children as demonstrating better social/cognitive skills, including better attention,

organization and impulse control, activity levels, and sociability.

Family risk. As with other subgroups, there are few differences in the prevalence of teacher- and parent-reported social skills and problem behaviors between the end of Head Start and spring of kindergarten by family risk. Children with one or more risks do have a greater incidence and reporting of withdrawn behavior problems and less attention/persistence with tasks by the end of kindergarten, as reported by kindergarten teachers; Head Start and kindergarten teachers do not report differences in these behaviors for children with no family risks. Only among children with two or more risks are there differences in the prevalence of parent-reported social skills/positive approaches to learning by the end of kindergarten. There are not differences in the prevalence of children's assessor-reported social/cognitive skills between the end of Head Start and spring of kindergarten by number of family risks.

Child Health and Physical Development

At the end of kindergarten, teachers report that 6 percent of children have a disability. The majority of these children (68 percent) are reported as having speech or language impairments; about one-third are described as having behavioral and emotional impairments (31 percent). One-third have more than one impairment or disability. Approximately two-thirds of those with an identified disability have an Individual Education Plan (IEP). Notably, at the end of kindergarten, a smaller percentage of children are reported by teachers as having a disability than were identified when the children first entered the Head Start program (11 percent; Tarullo et al. 2008) as well as at the end of their first year in the program (15 percent; Aikens et al. 2010). Similar patterns of decline in IEP/IFSP status were reported in the Pre-Elementary Education Longitudinal Study (PEELS), which found that 20 percent of children's IEP/IFSP statuses were declassified between the prekindergarten and kindergarten year. Most commonly, those with speech/language impairments were declassified (Carlson et al. 2008).

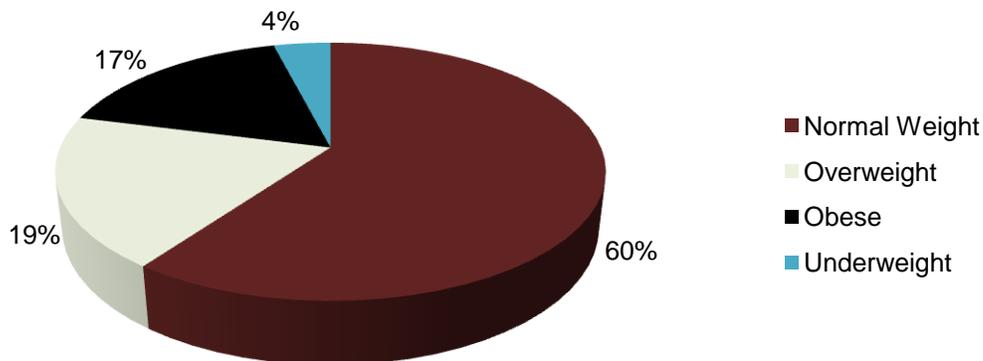
According to kindergarten teachers, similar percentages of White (7 percent), African American (7 percent), and Other race (8 percent) children have an identified disability, but approximately half as many Hispanic/Latino children have one (4 percent). Similar percentages of White (42 percent) and African American children (45 percent) with an identified disability have an IEP or IFSP, while all or nearly all Other race (100 percent) and Hispanic/Latino children (90 percent) have an IEP or IFSP. Larger percentages of White children (48 percent) are reported to have more than one disability or impairment, followed by African American (31 percent), Hispanic/Latino (26 percent), and Other race children (21 percent).

Based on age norms provided by the Centers for Disease Control and Prevention (CDC), at the end of kindergarten children have an average Body Mass Index (BMI)⁴⁸ that is above average for their age and gender group (that is, higher than the 50th percentile). In fact, close to 17 percent of children are obese at the end of kindergarten, and another 19 percent are overweight (Figure 19).⁴⁹ While a similar percentage (18 percent) of preschoolers in the ECLS-B were obese in 2005-2006 (Anderson and Whitaker 2009), a slightly smaller percentage (15 percent) of low-income preschoolers nationally were obese in 2008 (CDC 2009).⁵⁰ In the spring of the kindergarten

year, Hispanic/Latino (21 percent) and African American children (18 percent) are more likely to be obese than White (11 percent) and Other race children (10 percent). Nationally, obesity rates among preschoolers differ by race/ethnicity, with a higher prevalence among American Indian, Hispanic/Latino, and African American children (Anderson and Whitaker 2009).

Finally, 81 percent of children are rated as having excellent or very good health by their parents in the spring of the kindergarten year. Similarly, a majority of parents of first-time kindergartners nationally report their child's health to be excellent or very good (83 percent; U.S. Department of Education 2000). As with Head Start, only a small percentage of children are reported as having fair or poor health at the end of kindergarten. Parents report differences in their children's general health status by race/ethnicity and family risk. Fewer parents of Hispanic/Latino children (76 percent) report their child is in excellent or very good health than do parents of White (85 percent), African American (83 percent), and Other race children (85 percent). Similarly, fewer parents of children with two or more family risks (77 percent) report their child to be in excellent or very good health than do parents of children with no family risks (85 percent) or one risk (84 percent).

Figure 19. Child BMI Categories, Spring Kindergarten



Source: Spring 2008 and 2009 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

Summary

At the end of their Head Start experience, children score below norms across developmental areas, including language, literacy, and mathematics development. However, they score close to norms in their letter-word knowledge at program exit. Across areas, they make statistically significant gains relative to peers by the end of their kindergarten year, scoring above norms in the areas of letter-word knowledge, early writing, and word attack skills at that time point.⁵¹ They remain below norms in English receptive vocabulary and applied problems at the end of the kindergarten year.

Head Start and kindergarten teachers do not differ in their reports of children's social skills, and with the exception of children's attention/persistence behaviors, they also do not differ in their reports of children's approaches to learning. However, kindergarten teachers rate children as having more problem behaviors than do Head Start teachers. At the end of kindergarten, six percent of children have an identified disability, with the majority of these reported to be speech or language impairments. More than one-third of children are overweight or obese at the end of kindergarten. Patterns within subgroups are similar to other estimates for preschoolers nationally. Finally, on average, parents generally report children to be in excellent or very good physical health.

Associations Between Children's School Readiness Skills at the End of Head Start and Kindergarten Developmental Outcomes

Early education experiences may influence later developmental outcomes, with skills gained during preschool and kindergarten linked to achievement one to six years in the future (Duncan et al. 2007; McWayne et al. 2004). We examined the associations between children's school readiness skills at the end of Head Start and their developmental outcomes at the end of kindergarten, controlling for child/family, Head Start, and kindergarten characteristics. In particular, we investigated the potential of cross-domain influences (for example, an association between mathematics skills at the end of Head

Start and kindergarten literacy skills, and associations between behavior and achievement). The regression analyses, similar to descriptive findings, are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.⁵²

We estimated models of children's developmental status at the end of kindergarten; children's status at the end of Head Start was included as predictor variables representing school readiness skills. Kindergarten outcomes included language and literacy (PPVT-4, Woodcock-Johnson III [WJ III] Letter-Word Identification, WJ III Word Attack), math skills (WJ III Applied Problems, ECLS mathematics), and social-emotional development (kindergarten teacher ratings of children's social skills and problem behaviors).⁵³ The school readiness skills measured at the end of Head Start included language and literacy, math, and social-emotional development. School readiness measures parallel the kindergarten outcomes (with the omission of Word Attack, which was assessed for the first time in the spring of kindergarten). An additional social-emotional rating to tap school readiness included children's approaches to learning (Preschool Learning Behavior Scale [PLBS] competence/motivation).⁵⁴ For each outcome, the analysis included all school readiness skills in order to examine the association of a skill using the same measure over time (for example, PPVT-4 vocabulary) as well to examine cross-domain relationships with different skills. To examine the association of school readiness skills and kindergarten developmental outcomes net of other factors, we included several child/family, Head Start, and kindergarten characteristics as background controls, such as child gender, maternal education, Head Start program type, and kindergarten class size.⁵⁵

Below, we describe bivariate correlations between school readiness skills at the end of Head Start and kindergarten outcomes individually, as well as results of the multiple regression analyses, to see if school readiness skills are related to outcomes net of other

characteristics. To compare results across the different measures, regression results are presented as effect sizes (ES)—the change in the outcome in standard deviation units associated with an increase of one standard deviation in the school readiness skill. We present findings that are considered both statistically significant and practically meaningful ($p < 0.05$ and a correlation or ES value of at least 0.10).

Children's School Readiness Skills at the End of Head Start and Cognitive Outcomes in Kindergarten

As in the descriptive reporting, only children with valid assessment scores are included in the analyses (for example, children who did not establish a basal on the PPVT-4 were excluded). The children included in these analyses had scores on the measures at both time points. Children's cognitive outcomes (language, literacy, and mathematics) at the end of kindergarten correlate significantly with all school readiness skills at the end of Head Start. When we consider the school readiness skills simultaneously with other child/family, Head Start, and kindergarten characteristics, the associations between school readiness skills and outcomes vary, and we see cross-domain influences between literacy and mathematics.

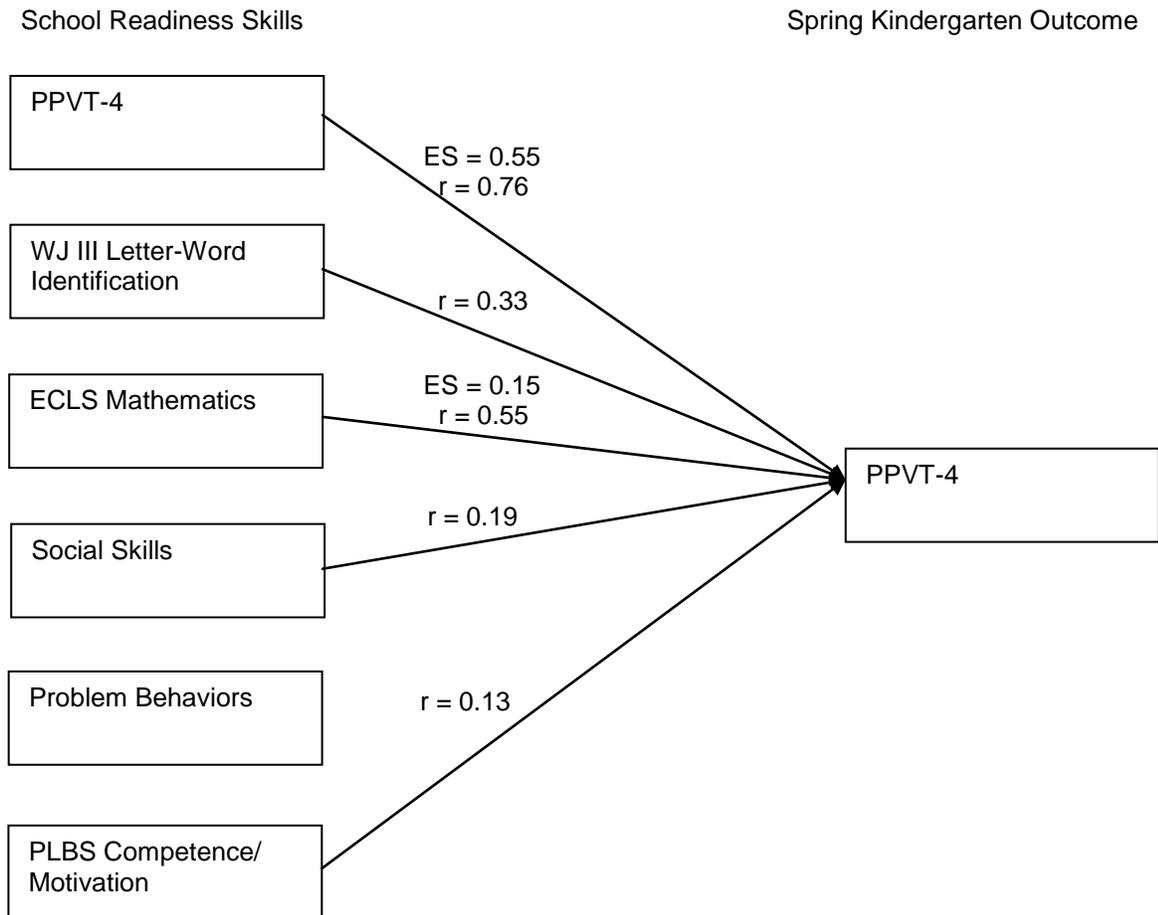
Language and literacy outcomes. Bivariate analysis showed that school readiness skills for language, literacy, mathematics, and social-emotional behavior at the end of Head Start correlate significantly with children's language and literacy outcomes at the end of kindergarten. When we consider the school readiness skills simultaneously with child/family, Head Start, and kindergarten characteristics, the parallel skill is consistently associated with the language and literacy outcome assessed. We also find cross-domain associations, with mathematics school readiness skills influencing all language and literacy outcomes. However, for social-emotional development at the end of

Head Start we find only one such association. We now provide additional detail on each relationship.

For the PPVT-4 in kindergarten, bivariate correlations with school readiness skills at the end of Head Start range from 0.13 (for PLBS competence/motivation) to 0.55 (for ECLS mathematics); the correlation between PPVT-4 scores at the two time points is 0.76. When children's school readiness skills are combined in a multiple regression model, vocabulary, letter-word identification, ECLS mathematics, and social skills are significantly associated with vocabulary at the end of kindergarten. Accounting for child, family, Head Start, and kindergarten characteristics, school readiness skills of vocabulary (ES = 0.55)⁵⁶ and ECLS mathematics (ES = 0.15) are positively associated with children's vocabulary at the end of kindergarten (Figure 20). For example, a child with higher ECLS mathematics scores at the end of Head Start demonstrated higher PPVT-4 scores at the end of kindergarten.

For WJ III Letter-Word Identification in kindergarten, bivariate correlations with school readiness skills range from -0.18 (for problem behaviors) to 0.35 (for PPVT-4); the correlation between letter-word identification scores at the two time points is 0.52. When children's school readiness skills are combined, letter-word identification, ECLS mathematics, social skills, and competence/motivation ratings are significantly associated with letter-word skills at the end of kindergarten. Accounting for child, family, Head Start, and kindergarten characteristics, school readiness skills of letter-word identification (ES = 0.37) and ECLS mathematics (ES = 0.28) are positively associated with letter-word identification at the end of kindergarten (Figure 21). In other words, on average, children with higher literacy and ECLS mathematics scores at the end of Head Start performed better on letter-word identification at the end of kindergarten.

Figure 20. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Vocabulary

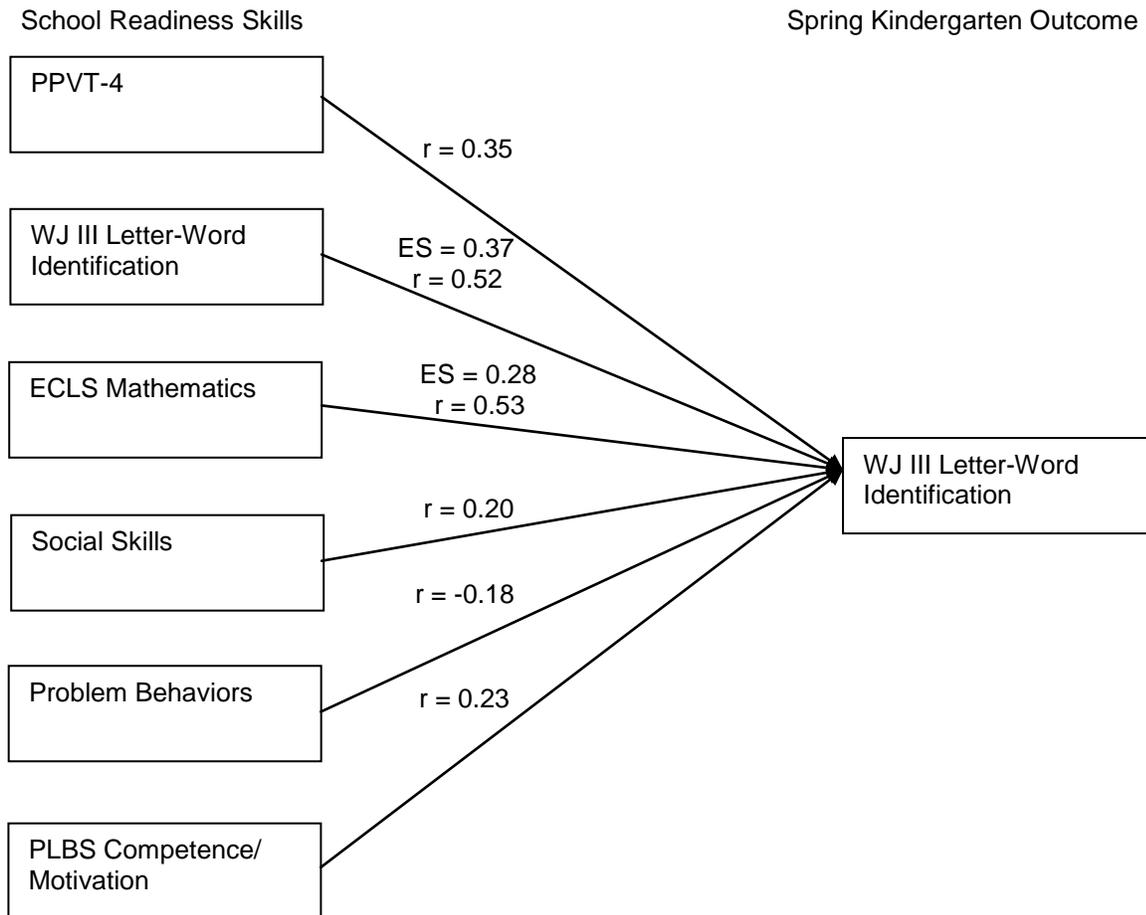


Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

n = 1749 to 1802 for bivariate correlations, n = 643 in multiple regression
 ES = effect size

Figure 21. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Letter-Word Identification



Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

$n = 1743$ to 1797 for bivariate correlations, $n = 673$ in multiple regression
 ES = effect size

For WJ III Word Attack in kindergarten, bivariate correlations range from -0.19 (for problem behaviors) to 0.46 (for ECLS mathematics). Initially, when examining all school readiness skills together, letter-word identification and ECLS mathematics were significantly associated with word attack skills at the end of kindergarten. Accounting for child, family, Head Start, and kindergarten characteristics, the pattern persists; school readiness skills of letter-word identification (ES = 0.24) and ECLS mathematics (ES = 0.30) are positively related to word attack at the end of kindergarten (Figure 22). Additionally, both social skills (ES = -0.15) and problem behaviors (ES = -0.23) are negatively associated with word attack skills, such that greater occurrence of either social skills or problem behaviors links to lower word attack skills.

It is surprising to find a negative relationship between word attack scores and social skills, especially given that the relationship with problem behaviors is in the expected direction. The WJ III Word Attack is the only outcome that shows a significant relationship with social skills; otherwise, teacher reports of social skills in Head Start do not relate to teacher reports of social skills in kindergarten (see below) or show any other cross-domain influences for the outcomes included here. Consequently, this finding may reflect that social skills as rated by Head Start teachers mean something different in the Head Start environment than they do in kindergarten, which may place different demands and expectations on children; Head Start ratings of social skills thus may not correlate with behaviors that influence good word attack skills later on.

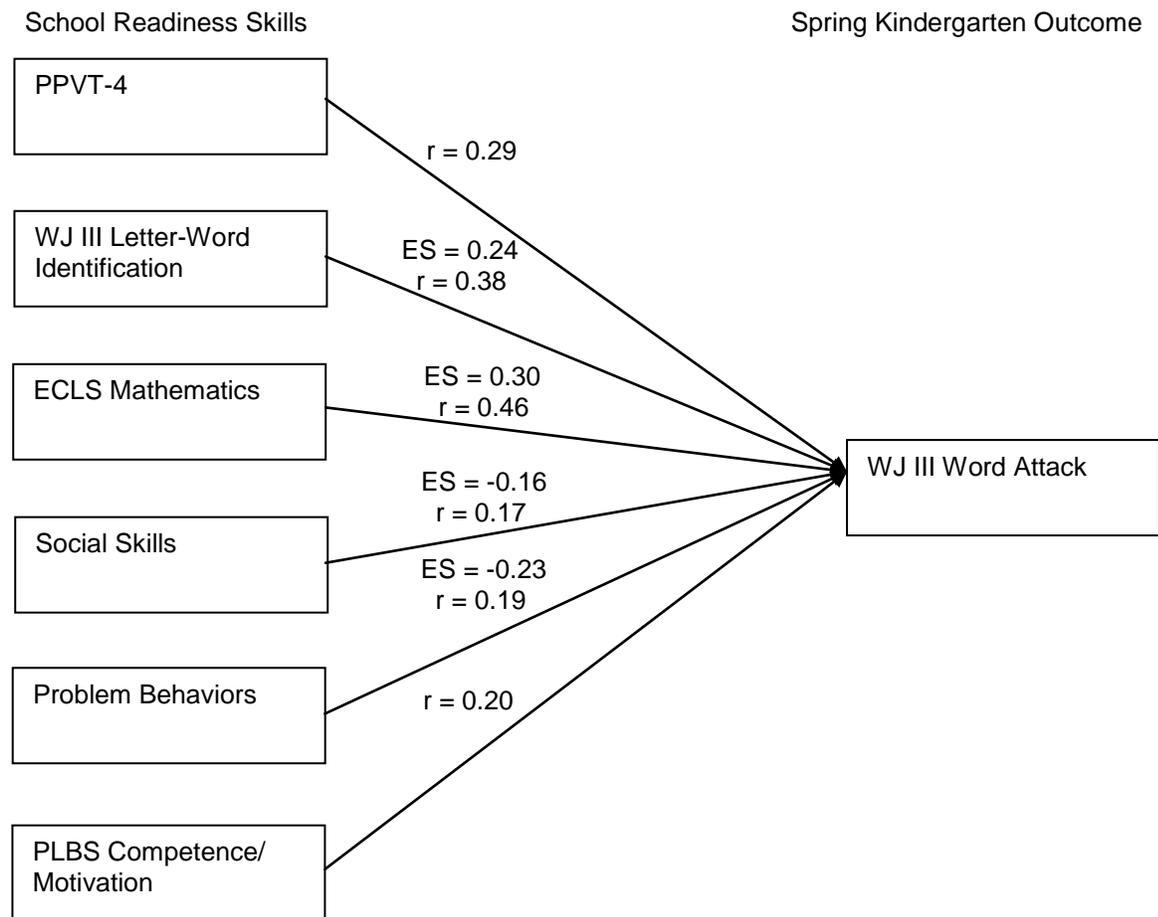
Mathematics outcomes. Children's school readiness skills at the end of Head Start correlate significantly with math outcomes at the end of kindergarten. When we consider the school readiness skills simultaneously with other child/family, Head Start, and kindergarten characteristics, the parallel mathematics measure predicts kindergarten math performance. We find cross-domain

associations for letter-word identification skills, but not for social-emotional skills.

For WJ III Applied Problems in kindergarten, bivariate correlations with school readiness skills range from -0.17 (for problem behaviors) to 0.45 (for PPVT-4); the correlation between WJ III Applied Problems scores at the two time points is 0.51.⁵⁷ When children's school readiness skills are combined, vocabulary, letter-word identification, and applied problems are significantly associated with applied problems skills at the end of kindergarten. Accounting for child/family, Head Start, and kindergarten characteristics, school readiness skills of letter-word identification (ES = 0.11) and applied problems (ES = 0.34) at the end of Head Start remained associated with applied problems skills at the end of kindergarten (Figure 23). Thus, similar to literacy outcomes, another cognitive domain may influence later skills, with children who demonstrate higher letter-word skills at the end of Head Start also showing higher applied problems skills at the end of kindergarten.

The ECLS mathematics assessment tapped a broader skill set (for example, geometry, patterns, measurement) than applied problems did. Bivariate correlations of school readiness skills with ECLS mathematics in kindergarten range from -0.21 (for problem behaviors) to 0.48 (for PPVT-4); the correlation between ECLS mathematics scores at the two time points is 0.67. When children's school readiness skills are combined in a multiple regression model, vocabulary, letter-word identification, mathematics, and social skills are significantly associated with mathematics at the end of kindergarten. Accounting for child, family, Head Start, and kindergarten characteristics, the school readiness skills of letter-word identification (ES = 0.11) and ECLS mathematics (ES = 0.55) still relate with ECLS mathematics at the end of kindergarten (Figure 24). As in the case of applied problems, there are no significant associations with social-emotional skills once covariates are included in the model.

Figure 22. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Word Attack

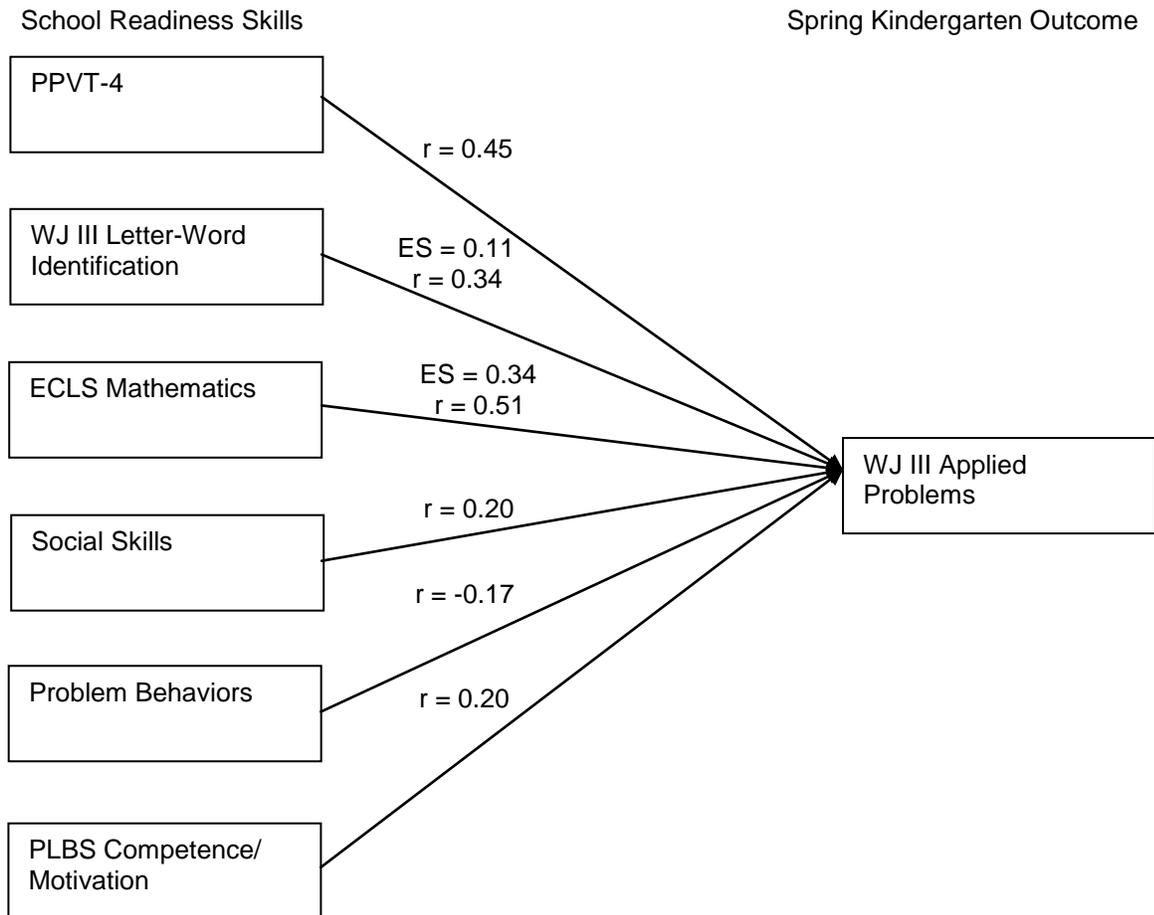


Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

n = 1710 to 1765 for bivariate correlations, n = 673 in multiple regression
 ES = effect size

Figure 23. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Applied Problems

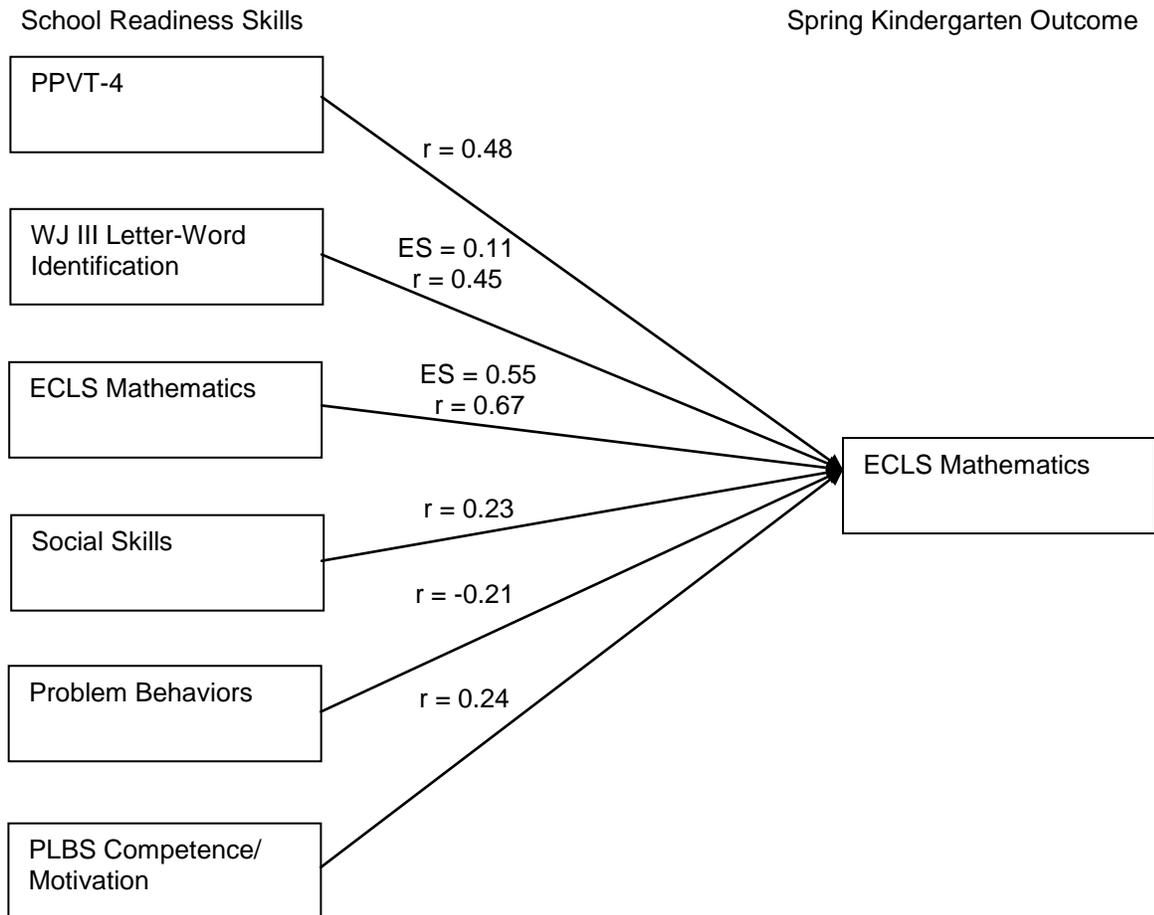


Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

$n = 1743$ to 1796 for bivariate correlations, $n = 578$ in multiple regression
ES = effect size

Figure 24. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Mathematics



Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

n = 1744 to 1799 for bivariate correlations, n = 619 in multiple regression
 ES = effect size

Children's School Readiness Skills and Social-Emotional Outcomes in Kindergarten

As in the descriptive reporting, only children with completed teacher ratings at both time points are included in the analyses. Head Start teachers completed ratings for children's social-emotional development at the end of Head Start and kindergarten teachers provided ratings of social-emotional outcomes at the end of kindergarten.⁵⁸ Children's social-emotional outcomes at the end of kindergarten correlate significantly with all school readiness skills at the end of Head Start. When we consider the school readiness skills simultaneously with other child/family, Head Start, and kindergarten characteristics, the associations between school readiness skills and outcomes vary, with more cross-domain associations found for problem behaviors than for social skills.

Social skills. Bivariate correlations between children's school readiness skills at the end of Head Start and teachers' ratings of social skills at the end of kindergarten range from -0.36 (for problem behaviors) to 0.25 (for ECLS mathematics); the correlation between social skills ratings at the two time points is 0.28. When children's school readiness skills are combined in a multiple regression model, vocabulary, letter-word identification, mathematics, and Head Start teachers' ratings of problem behaviors are significantly associated with kindergarten teachers' ratings of social skills. Accounting for child/family, Head Start, and kindergarten characteristics, only one significant association remains: The level of problem behaviors at the end of Head Start ($ES = -0.31$) is negatively associated with social skills at the end of kindergarten (Figure 25). That is, children who demonstrated more frequent problem behaviors according to Head Start teachers were rated by kindergarten teachers as having lower social skills, indicating that problem behaviors may be viewed more similarly by Head Start and kindergarten teachers and have

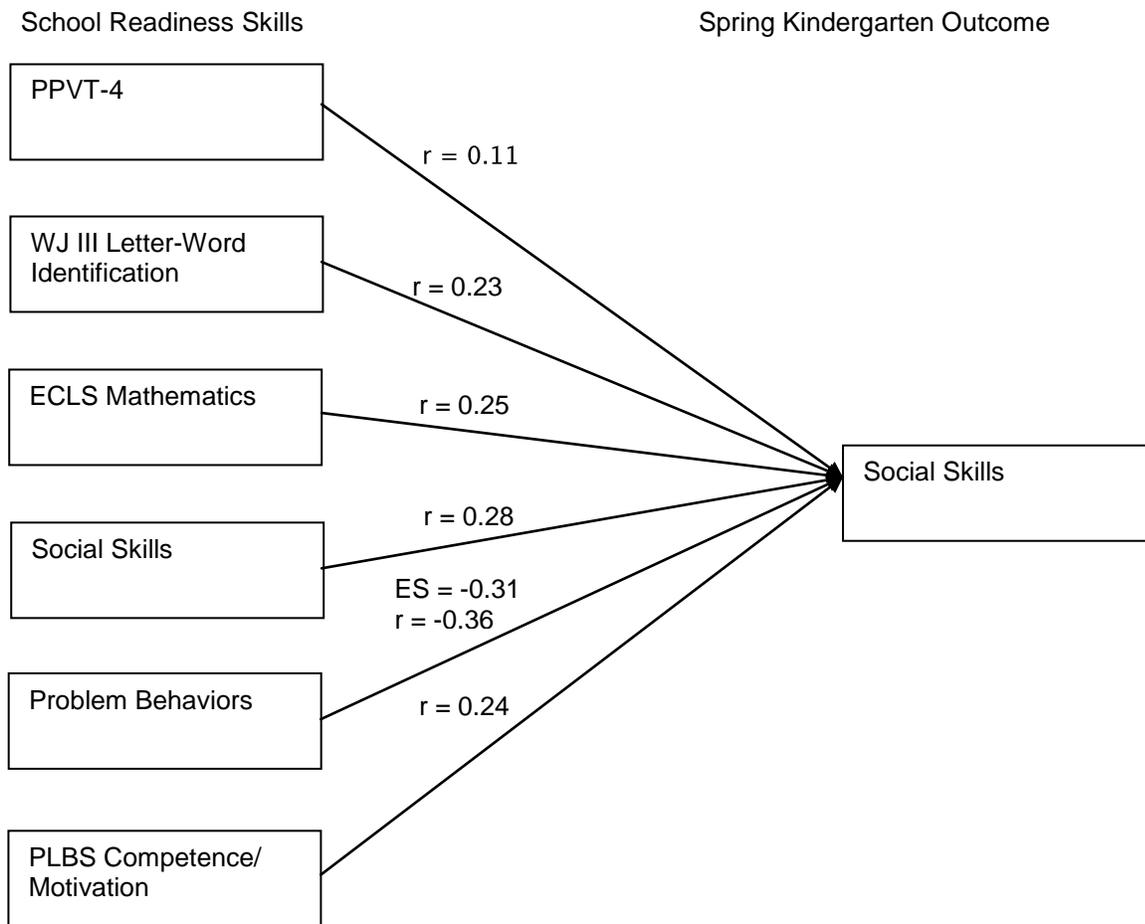
a negative influence on perceptions of social skills.

Problem behaviors. Bivariate correlations between school readiness skills at the end of Head Start and teacher ratings of kindergarten problem behaviors range from -0.10 (for PPVT-4) to -0.32 (for social skills); the correlation between problem behaviors ratings at the two time points is 0.44. When children's school readiness skills are combined in a multiple regression model, vocabulary, letter-word identification, and mathematics as well as Head Start teachers' ratings of problem behaviors and competence/motivation are significantly associated with kindergarten teachers' ratings of problem behaviors at the end of kindergarten. Accounting for child/family, Head Start, and kindergarten characteristics, school readiness skills of mathematics ($ES = -0.13$) and the level of problem behaviors at the end of Head Start ($ES = 0.41$) are related to problem behaviors at the end of kindergarten (Figure 26). For example, children with lower mathematics skills at the end of Head Start on average were reported by their kindergarten teachers as demonstrating problem behaviors more frequently.

Summary

This analysis explored the relationship between children's school readiness skills at the end of Head Start and their outcomes at the end of kindergarten, controlling for a variety of child/family, Head Start, and kindergarten characteristics. Not surprisingly, findings indicate that children's kindergarten outcomes are most strongly associated with the same skill measured at the end of Head Start—except in the case of social skills. In this case, this finding may be particularly important given that the persistence of problem behaviors over time indicates the need to identify the behaviors and intervene early.

Figure 25. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Teacher Ratings of Social Skills

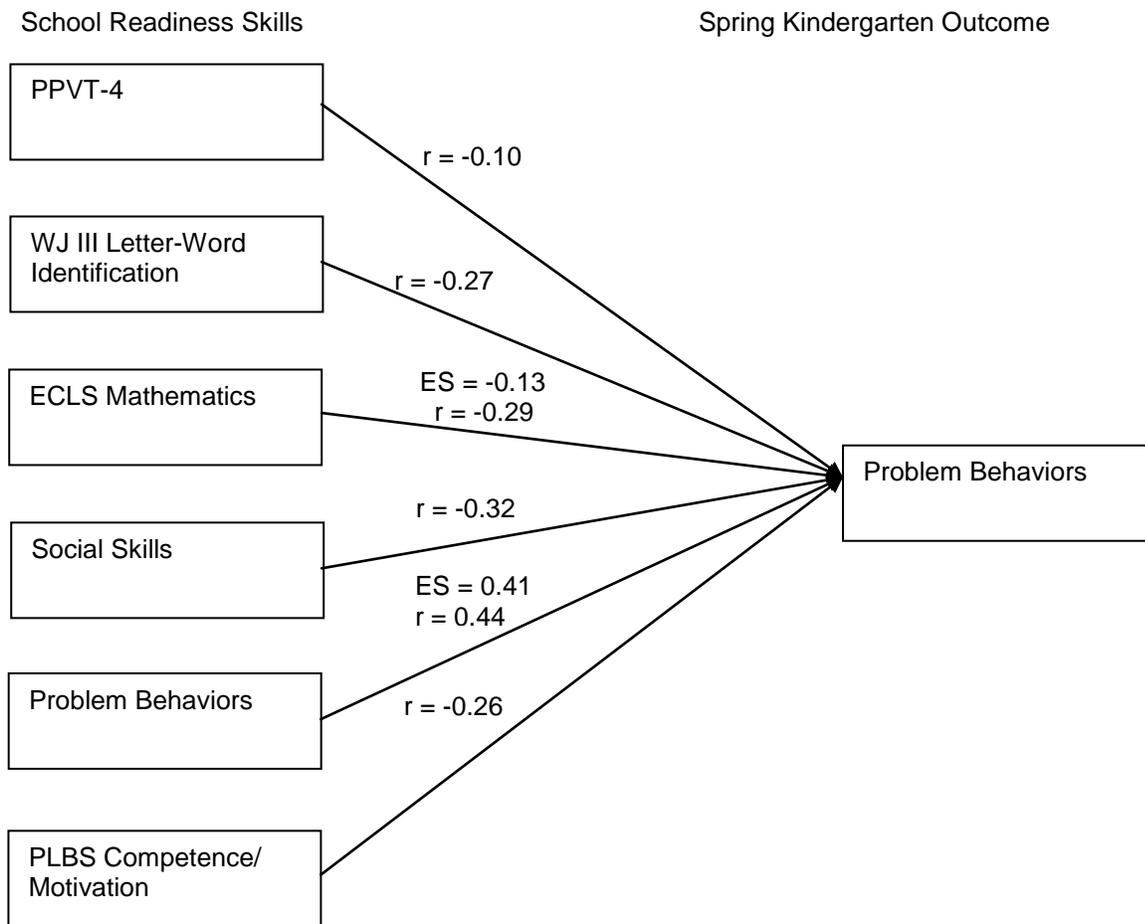


Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Bold lines with reported effect sizes reflect significant associations from the multiple regression analyses. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

n = 1347 to 1386 for bivariate correlations, n = 641 in multiple regression
ES = effect size

Figure 26. Bivariate Correlations and Multiple Regression Effect Sizes Between School Readiness Skills at Head Start Exit and Spring Kindergarten Teacher Ratings of Problem Behaviors



Source: Spring 2007, Spring 2008, or Spring 2009 FACES Direct Child Assessment; Fall 2006 and Spring 2007 or Spring 2008 FACES Parent Interview; Fall 2006 and Spring 2007 or Spring 2008 FACES Head Start Teacher Interview; Spring 2007 or Spring 2008 FACES Head Start Teacher Child Report; Spring 2007 FACES Classroom Observation; Spring 2008 or Spring 2009 FACES Kindergarten Teacher Questionnaire and Teacher Child Report.

Note: Estimates presented are significant at $p \leq .05$ and reflect a difference of at least 0.10 magnitude. Statistics are weighted to represent all children who entered Head Start for the first time in fall 2006, who completed one or two years of Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.

$n = 1354$ to 1393 for bivariate correlations, $n = 643$ in multiple regression
 ES = effect size

Multiple cross-domain relationships also exist. School readiness mathematics skills at the end of Head Start positively predicted kindergarten language and literacy skills (PPVT-4, WJ III Letter-Word, and WJ III Word Attack). In turn, school readiness literacy skills positively predicted mathematics skills (WJ III Applied Problems and ECLS mathematics). Mathematics skills at the end of Head Start negatively predicted kindergarten teachers' ratings of problem behaviors, while the level of problem behaviors at the end of Head Start negatively predicted later literacy (WJ III Word Attack). Among the outcome variables, only models predicting social skills did not show any cross-domain influences of school readiness skills. In one unexpected finding, social skills at the end of Head Start were found to associate negatively with Word Attack scores in kindergarten. This was the only significant finding for social skills at the end of Head Start across all outcomes; it may reflect that Head Start teachers' rating of good social skills differ from kindergarten teachers in ways that relate to the skills children need to do well in word attack (a new area for kindergarten). Given that problem behaviors at the end of Head Start relate to social skills at the end of kindergarten in expected ways, these findings together may support a hypothesis that the different environments in which the ratings occur are important, based on differing teacher expectations and classroom demands.

Associations of Child/Family and Head Start Characteristics with Children's Developmental Trajectories

In this section we describe findings from two-level hierarchical linear models (HLM) that examine the relationships of child/family and Head Start characteristics with children's development at the end of Head Start and their developmental progress from Head Start entry to the end of kindergarten. We also describe findings from models examining the relationship of children's relative abilities at program entry (that is, lower, average, or higher ability) to their outcomes and developmental progress during this time period.⁵⁹ Similar to the descriptive findings, the analyses are weighted to represent all children who entered Head Start for the first time in fall 2006, completed one or two years of

Head Start, and were enrolled in kindergarten in spring 2008 or spring 2009.⁶⁰ Descriptive tables depicting children's mean skills and behaviors at Head Start entry, at the end of Head Start, and in the spring of the kindergarten year are included in the related set of tables (Malone et al. 2010).

Outcomes in the models included language and literacy (PPVT-4, Woodcock-Johnson III [WJ III] Letter-Word Identification), mathematics (WJ III Applied Problems, ECLS mathematics),⁶¹ and social-emotional development (teacher ratings of children's social skills and behavior problems).⁶² The child/family variables included the child's exposure to Head Start (one versus two years), gender, race/ethnicity, primary language spoken to the child at home, poverty ratio, joint book reading at least three times weekly, number of books in the home, maternal education, and parent depressive symptoms. All child/family variables were derived from the fall 2006 data wave, when the children were first entering the Head Start program. The Head Start classroom/program variables included mean peer abilities at Head Start entry, variation in peer abilities at Head Start entry,⁶³ and indicators representing the child's Head Start experience. The latter indicators included whether (1, 2) the child's Head Start classroom had Early Childhood Environment Rating Scale-Revised (ECERS-R) Teaching and Interactions and Provisions for Learning scores of at least "good" quality (5 or higher), (3) the child's Head Start classroom had Classroom Assessment Scoring System (CLASS) Instructional Support scores of at least "middle" quality (3 or higher), (4) the child always had a Head Start teacher with at least a bachelor's degree, and (5) the child always attended a full-day Head Start class.⁶⁴

To compare results across the different measures, results are presented as effect sizes (ES). These are interpreted as the change in the outcome or amount of annual growth associated with an increase of one standard deviation in the child/family or classroom/program characteristic. We present findings that are considered both statistically significant and practically meaningful ($p < 0.05$ and effect size values of 0.10).

Children's Language, Literacy, and Mathematics Outcomes

As in the descriptive reporting, only children with valid assessment scores are included in the analyses (for example, children who did not establish a basal on the PPVT-4 were excluded from the appropriate models). Below, we describe the results of the hierarchical linear models. First, we describe the relationships of child/family characteristics to children's outcomes, followed by those examining Head Start characteristics.⁶⁵ We first describe models examining children's cognitive (language, literacy, and mathematics) outcomes, followed by those focused on children's social skills and problem behaviors. For each outcome, we describe separately the relationships of child/family and Head Start characteristics to children's development at the end of Head Start and their progress from Head Start entry to the end of kindergarten.

Child/Family Characteristics. Children's cognitive outcomes at the end of Head Start are associated with a number of child and family characteristics. For example, children from homes where a language other than English is primarily spoken to them have lower English receptive vocabulary scores at the end of Head Start (ES = -0.50).⁶⁶ Compared to White children, African American children have lower receptive vocabulary scores (ES = -0.16) at the end of Head Start but higher letter-word identification scores (ES = 0.28). While maternal education is unrelated to receptive vocabulary, it is positively associated with applied problems (ES = 0.21 to 0.31)⁶⁷ at the end of Head Start. Boys have lower letter-word knowledge (ES = -0.21), applied problems (ES = -0.19) and ECLS mathematics scores (ES = -0.15) at the end of Head Start than do girls. Across cognitive measures, at the end of Head Start, children who entered the program as 4-year-olds and were enrolled for one year have lower scores than those who entered as 3-year-olds and were enrolled for two years (ES = -0.16 to -0.28).

Looking at children's growth from Head Start entry to the end of kindergarten, family

resources are associated with more growth. For example, households above 130 percent of the poverty line demonstrate more growth in receptive vocabulary (ES = 0.01).⁶⁸ Maternal education (that is, having at least a vocational degree) is associated with more growth in applied problems (ES = 0.01) and ECLS mathematics scores (0.01), and boys demonstrate more growth in ECLS mathematics (ES = 0.01). In contrast, those who entered the program at age 4 and were enrolled for one year show less growth in receptive vocabulary (ES = -0.03), letter-word knowledge (ES = -0.02), applied problems (ES = -0.01), and ECLS mathematics scores (ES = -0.04) between Head Start entry and the end of kindergarten.

Head Start Characteristics. Peer abilities are related to children's outcomes at the end of Head Start on several measures. For example, mean peer abilities within the Head Start classroom is positively related to children's receptive vocabulary (ES = 0.47), letter-word knowledge (ES = 0.57), applied problems (ES = 0.48), and ECLS mathematics scores (ES = 0.64), suggesting that higher abilities among classmates at Head Start entry are associated with better performance at the end of Head Start. Meanwhile, variation in peer abilities within classrooms is positively related only to children's receptive vocabulary (ES = 0.40), meaning that the more variation in the skills of other children in the classroom at Head Start entry, the greater children's skills in this area at the end of the program. Higher quality teaching and interactions (as measured by the ECERS-R) is positively associated with children's applied problems skills at program exit (ES = 0.22).

Few characteristics are associated with children's monthly cognitive progress from Head Start entry to the end of kindergarten. Across measures, mean peer abilities is negatively related to children's monthly progress (ES = -0.01 to -0.02). While these characteristics are associated with higher scores at the end of the program, those in entering classrooms with higher skilled peers progress at lower rates from Head Start entry to the end of kindergarten.

Children's Social-Emotional Outcomes

As in the descriptive reporting, only children with completed teacher ratings across time points are included in the analyses. Head Start teachers completed ratings for children at Head Start entry and at the end of Head Start; kindergarten teachers provided ratings of social-emotional outcomes at the end of the kindergarten year. The models used z-scored summative scores.

Child/Family Characteristics. As with children's cognitive outcomes, children's social-emotional outcomes at the end of Head Start are associated with certain child and family characteristics. For example, teachers rate boys as having fewer social skills (ES = -0.36) and more behavior problems than girls (ES = 0.46). In contrast, Head Start teachers rate Hispanic/Latino (ES = 0.36) and Other race children (ES = 0.29) as having more social skills than White children and Hispanic/Latino children as having fewer problem behaviors (ES = -0.51). They also rate children whose parents read to them at least three times a week as having more social skills (ES = 0.14).

Children with household incomes of at least 50 percent of poverty (ES = 0.01 to 0.02),⁶⁹ as well as African American (ES = 0.02) and Hispanic/Latino (ES = 0.02) children show greater gains per month in their social skills from Head Start entry to the end of kindergarten. Conversely, Hispanic/Latino children show greater reductions in their behavior problems during this period (ES = -0.02). Children who entered the program as 4-year-olds and were enrolled for one year show greater reductions in their social skills (ES = -0.01) and greater increases in their problem behaviors (ES = 0.01) than children who entered at age 3 and were enrolled for two years.

Head Start Characteristics. Both social skills and language ability of peers may influence classroom dynamics in ways that can affect a child's behavior. Looking first at children's social skills and controlling for other variables, average peer social skills (ES = 0.51) are associated with higher ratings on the individual child's social skills at the end of Head Start. In addition, the

variations in peer receptive vocabulary (ES = 0.22) and mean peer receptive vocabulary (ES = 0.14) are positively associated with the individual child's social skills rating. Finally, behavior problem ratings at the end of the program are related only to average peer social skills: higher levels of average peer social skills are associated with lower individual child behavior problem ratings (ES = -0.36). In other words, teachers rate children as having fewer behavior problems at the end of Head Start in classrooms in which the average child is rated higher on social skills. Behavior problem ratings are also associated with variation in peer receptive abilities (ES = -0.17). They are not associated with mean peer receptive vocabulary or with variation in peer social skills.

Turning toward children's growth per month from Head Start entry to the end of kindergarten, average peer social skills are associated with changes per month in children's social skills (ES = -0.03) and problem behaviors (ES = 0.01)—but in counterintuitive directions. The social skills of those in entering classrooms with higher average peer social skills do not progress at higher rates from Head Start entry to the end of kindergarten. In addition, greater variation in peer social skills is associated with more reductions in kindergarten teacher-reported behavior problems (ES = -0.02).

Children's Entering Abilities

Finally, models assessing the relationship of child/family and Head Start characteristics to children's receptive vocabulary, letter-word knowledge, and applied problems skills and development were estimated, adding in whether children's entering abilities were of lower, medium, or higher levels (as compared to peers).⁷⁰ Across models, having lower entering skills is associated with having lower skills at the end of Head Start (ES = -0.53 to -1.22), as well as higher growth per month between Head Start entry and the end of kindergarten (ES = 0.01 to 0.04). This suggests that while the skills of children who enter with lower abilities increase at higher rates, they do not catch up to those of their peers who enter with higher skills.

Summary

Analyses examined the relationships of child/family and Head Start characteristics with children's development at the end of Head Start and their developmental progress from Head Start entry to the end of kindergarten. Several characteristics—both child/family and Head Start—are related to children's skills as they exit the program and the developmental progress they make during and following Head Start. In some instances, children who enter the program with lower skills show greater developmental progress, although their skills still remain below peers at Head Start exit. For example, while boys have lower exiting skills in mathematics, they show more progress in this area over time.

Not surprisingly, material and social resources in the home are positively associated with children's language (for example, household income-to-poverty ratio) and mathematics (for example, maternal education) outcomes. In addition, as we see in the descriptive analyses, Hispanic/Latino children have higher teacher-reported social skills and fewer problem behaviors. They also show more gains in social skills and reductions in problem behaviors from Head Start entry to the end of kindergarten.

Peer abilities play a role in children's cognitive skills as they exit the program. In fact, peer cognitive ability is positively related to children's language, literacy, and mathematics outcomes as they exit the program, although children in classrooms with peers with stronger skills do not progress at higher rates than other children. The social skills of children's peers are also related to children's social skills and problem behaviors at Head Start exit, in expected directions. Higher ECERS-R Teaching and Interactions scores are associated with children's applied problems outcomes at the end of Head Start.

REFERENCES

Administration for Children and Families. "About the Office of Head Start." Available at [<http://www.acf.hhs.gov/programs/ohs/about/index.html>]. Accessed July 2009.

Administration for Children and Families. "Head Start Program Information Report (PIR)." Available at <http://eclkc.ohs.acf.hhs.gov/pir>. Accessed July, 2010.

Aikens, Nikki, Louisa Tarullo, Lara Hulseley, Christine Ross, Jerry West, and Yange Xue.. "ACF-OPRE Report: A Year in Head Start: Children, Families and Programs." Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation, 2010.

Anderson, S. E., and R. C. Whitaker. "Prevalence of Obesity Among U.S. Preschool Children in Different Racial and Ethnic Groups." *Archives of Pediatric and Adolescent Medicine*, vol. 163, no. 4, 2009, pp. 344-348.

Beals, D. E., and C. E. Snow. "Mealtime Talk That Supports Literacy Development." *New Directions for Child and Adolescent Development*, vol. 111, 2006, pp. 51-66.

Carlson, Barbara, and Jerry West. "Analyzing Nonresponse Bias Among Kindergarten Teachers in the Head Start Family and Child Experiences Survey (FACES)." Paper presented at the 2010 Joint Statistical Meetings, Vancouver, British Columbia, July 2010.

Carlson, E., T. Daley, A. Bitterman, J. Riley, B. Keller, F. Jenkins, J. Markowitz. "Changes in the Characteristics, Services, and Performance of Preschoolers with Disabilities from 2003-04 to 2004-05, Wave 2 Overview Report from the Pre-Elementary Education Longitudinal Study." Rockville, MD: Westat, 2008. Available at [<http://www.peels.org>]. Accessed July 2010.

Center on Education Policy. "Choices, Changes, and Challenges: Curriculum and Instruction in the NCLB Era." Washington, DC: Center on Education Policy, 2007.

- Centers for Disease Control and Prevention. "Obesity Prevalence Among Low-Income, Preschool-Aged Children — United States, 1998–2008." *Morbidity and Mortality Weekly Report*, vol. 58, no. 28, 2009, pp. 769-796.
- Coopersmith, Jared. "Characteristics of Public, Private, and Bureau of Indian Education Elementary and Secondary School Teachers in the United States: Results From the 2007-08 Schools and Staffing Survey." NCES 2009–324. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2009.
- Denton Flanagan, Kristin, and Cameron McPhee. "The Children Born in 2001 at Kindergarten Entry: First Findings From the Kindergarten Data Collections of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)." NCES 2010–005. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2009.
- Duncan, Greg, Chantelle J. Dowsett, Amy Claessens, Katherine Magnuson, Aletha C. Huston, Pamela Klebanov, Linda Pagani, Leon Feinstein, Mimi Engel, Jeanne Brooks-Gunn, Holly Sexton, Kathryn Duckworth, and Crista Japel. "School Readiness and Later Achievement." *Developmental Psychology*, vol. 43, no. 6, 2007, pp. 1428–1446. Duncan, Sharon E., and Edward A. DeAvila. *Preschool Language Assessment Survey 2000 Examiner's Manual: English Forms C and D*. Monterey, CA: CTB/McGraw-Hill, 1998.
- Dunn, L.M., D.E. Lugo, E.R. Padilla, and L.M. Dunn. *Test de Vocabulario en Imagenes Peabody*. Circle Pines, MN: American Guidance Service, 1986.
- Dunn, Lloyd, and Doug Dunn. *Peabody Picture Vocabulary Test. Fourth Edition*. Circle Pines, MS: American Guidance Service, 2006.
- Entwisle, Doris R., Karl L. Alexander, and Linda Steffel Olson. *Children, Schools, and Inequality*. Boulder, CO: Westview Press, 1997.
- Germينو-Hausken, Elvira, Jill Walston, and Amy H. Rathbun. "Kindergarten Teachers: Public and Private School Teachers of the Kindergarten Class of 1998–99." NCES 2004–060. Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2004.
- Gresham, F. M., and S. N. Elliot. *Social Skills Rating System*. Circle Pines, MN: American Guidance Service, 1990.
- Harms, Thelma, Richard M. Clifford, and Debby Cryer. *Early Childhood Environment Rating Scale—Revised (ECERS-R)*. New York: Teachers College Press, 2005.
- Hofferth, S.L., and J. F. Sandberg. "How American Children Spend Their Time." *Journal of Marriage and the Family*, vol. 63, no. 2, 2001, pp. 295-308.
- Jacobson Chernoff, Jodi, Kristin Denton Flanagan, Cameron McPhee, and Jennifer Park. "Preschool: First Findings from the Preschool Follow-up of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)." NCES 2008–025 Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2007.
- Malone, Lizabeth, Lara Hulsey, Nikki Aikens, Jerry West, and Louisa Tarullo. Administration for Children and Families. "ACF–OPRE Report: Data Tables for FACES 2006. Head Start Children Go to Kindergarten." Washington, DC: U.S. Department of Health and Human Services, 2010.
- McDermott, P.A, N.M. Leigh, and M.A. Perry. "Development and Validation of the Preschool Learning Behaviors Scales." *Psychology in the Schools*, vol. 39, 2002, pp. 353-365.

- McDermott, P.A., L.F. Green, J.M. Francis, and D.H. Stott. "Preschool Learning Behaviors Scale." Philadelphia, PA: Edumetric and Clinical Science, 2000.
- McWayne, Christine M., John W. Fantuzzo, and Paul A. McDermott. "Preschool Competency in Context: An Investigation of the Unique Contributions of Child Competencies to Early Academic Success." *Developmental Psychology*, vol. 40, no. 4, 2004, pp. 633–645.
- Najarian, Michelle, Kyle Snow, Jean Lennon, and Susan Kinsey. "Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Preschool–Kindergarten 2007 Psychometric Report." NCES 2010–009. National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC, 2010.
- National Association for the Education of Young Children. "Teacher-Child Ratios within Group Size." 2008. Available at [http://www.naeyc.org/files/academy/file/Teacher-Child_Ratio_Chart_9_16_08.pdf]. Accessed July 2010.
- Parsad, Basmat., and Laurie Lewis. "Calories In, Calories Out: Food and Exercise in Public Elementary Schools, 2005." NCES 2006–057. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2006.
- Peterson, J., and N. Zill. "Marital Disruption, Parent-Child Relationships, and Behavior Problems in Children." *Journal of Marriage and the Family*, vol. 48, 1986, pp. 295-307.
- Radloff, L. S. "The CES-D Scale: A Self-Report Depression Scale for Research in the General Population." *Journal of Applied Psychological Measurement*, vol. 1, no. 3, 1977, pp. 385-401.
- Roid, G. H., and Miller, L. J. *Examiners Manual: Leiter International Performance Scale-Revised*. Chicago: Stoelting Co, 1997.
- Strizek, Gregory A., Jayme L. Pittsonberger, Kate E. Riordan, Deanna M. Lyter, and Greg F. Orlofsky. "Characteristics of Schools, Districts, Teachers, Principals, and School Libraries in the United States: 2003-04 Schools and Staffing Survey." NCES 2006–313 Revised. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2006.
- Tarullo, Louisa, Nikki Aikens, Emily Moiduddin, and Jerry West. "ACF–OPRE Report: A Second Year in Head Start Report: Characteristics and Outcomes of Children Who Entered the Program at Age Three." Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation, 2010.
- Tarullo, Louisa, Jerry West, Nikki Aikens, and Lara Hulse. "Beginning Head Start: Children, Families, and Programs in Fall 2006." Washington, DC: U.S. Department of Health and Human Services, 2008.
- U.S. Department of Education, National Center for Education Statistics. "America's Kindergartners: Findings from the Early Childhood Longitudinal Study-Kindergarten Class of 1998-99, Fall 1998." NCES 2000–07. Washington, DC: National Center for Education Statistics, U.S. Department of Education, 2000.
- U.S. Department of Education, National Center for Education Statistics. "Children's Reading and Mathematics Achievement in Kindergarten and First Grade." NCES 2002–125. Washington, DC: National Center for Education Statistics, U.S. Department of Education, 2002a.

- U.S. Department of Education, National Center for Education Statistics. "Early Childhood Longitudinal Study—Kindergarten Class of 1998–99 (ECLS-K), Psychometric Report for Kindergarten Through First Grade." NCES 2002–05. Washington, DC: National Center for Education Statistics, U.S. Department of Education, 2002b
- U.S. Department of Education, National Center for Education Statistics. "The Condition of Education 2004." NCES 2004–077. Washington, DC: U.S. Government Printing Office, 2004.
- U.S. Department of Education, National Center for Education Statistics. "Common Core of Data (CCD)." Available at [<http://nces.ed.gov/ccd>]. Accessed August, 2010a.
- U.S. Department of Education, National Center for Education Statistics. "Private School Universe Survey (PSS)." Available at [<http://nces.ed.gov/surveys/pss>]. Accessed August, 2010b.
- Vaden-Kiernan, N., and J. McManus. "Parent and Family Involvement in Education: 2002–03" NCES 2005–043. Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2005.
- Walston, Jill T., and Jerry West. "Full-day and Half-day Kindergarten in the United States: Findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99." NCES 2004–078. Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2004.
- West, Jerry, Nikki Aikens, Barbara Carlson, Cassandra Meagher, Elizabeth Malone, Anne Bloomenthal, Annalee Kelly, Kristina Rall, and Rita Zota. "Head Start Family and Child Experiences Survey: 2006. User's Manual." Washington, DC: U.S. Department of Health and Human Services, 2010.
- West, Jerry, and Emily Moiduddin. "Children in Head Start: Who Stays and Who Leaves?" Poster presented at Head Start's 10th National Research Conference, Washington, DC, June 2010.
- West, J., L. Tarullo, N. Aikens, S. Sprachman, C. Ross, and B. Carlson. "FACES 2006 Study Design." Washington, DC: U.S. Department of Health and Human Services, 2007.
- West, J., L. Tarullo, N. Aikens, and L. Hulsey. "Study Design and Data Tables for FACES 2006 Baseline Report." Washington, DC: U.S. Department of Health and Human Services, 2008.
- Woodcock, R. W., A. F. Muñoz-Sandoval, K. McGrew, N. Mather, and F. Schrank. *Batería III Woodcock-Muñoz*. Itasca, IL: Riverside Publishing, 2004.
- Woodcock, R. W., K. McGrew, and N. Mather. *Woodcock-Johnson III Tests of Achievement*. Itasca, IL: Riverside Publishing, 2001.
- Zinth, Kyle. "Class-Size Policies." Denver, CO: Education Commission of the States, 2010. Available at [http://www.ecs.org/clearinghouse/85/21/85_21.pdf]. Accessed July 2010.

ENDNOTES

¹ See West and Moiduddin 2010 for a comparison of 3-year-olds who stay in the program for two years versus those who leave after one year.

² It is important to note that changes in children's skills and development during kindergarten reflect a range of influences in children's lives, including child-level characteristics such as maturation and health status, as well as community, school, classroom, peer, and family influences.

³ Migrant and Seasonal Worker programs (MSHS), American Indian and Alaska Native (AI/AN) programs, programs in Puerto Rico and other U.S. territories, and programs not directly providing services to 3-, 4-, and 5-year-olds (such as Early Head Start) were excluded from the frame. The Office of Head Start provided information about any defunded (or soon-to-be defunded) programs before sampling and these programs were deleted from the sample frame. Thirteen programs affected by Hurricanes Katrina and Rita in August 2005 were unable to provide information for the 2004–2005 PIR data and thus were not eligible for sample selection.

⁴ Children who were 3 years old and attending their first year of Head Start were sampled at a higher rate to ensure comparable sample sizes between 3-year-olds and 4-year-olds at the end of the kindergarten year, given the longer follow-up time for this younger group.

⁵ A computer-assisted personal interview was conducted with Head Start teachers. Kindergarten teachers were asked to complete a web-survey.

⁶ In fall 2006, interviews were conducted with the directors of the programs and centers in the sample and with education coordinators. In spring 2007, children's Head Start classrooms were observed.

⁷ A small number of children who were sampled as 3-year-olds were enrolled in kindergarten in spring 2008. These children are not included in the analytic sample for this report.

⁸ Parent interview cases were first attempted by phone, then in person during the study team's site visit week, and by phone after that week. Sixty-five percent of completed parent interviews were conducted by phone.

⁹ Teachers completed 73 percent of the teacher child rating forms using the web instrument.

¹⁰ To be eligible for the kindergarten round of data collection, a child had to be enrolled in kindergarten and must have been enrolled in Head Start the previous spring.

¹¹ These are all weighted marginal response rates, not accounting for prior stages of sampling and participation. The cumulative weighted response rates, which take into account the response rate for prior stages of the sample (such as, program, center, and child response rates), as well as fall 2006 consent rates, are by definition lower. The cumulative child response rate is 72 percent. The corresponding cumulative response rates associated with completing the child assessments, parent interviews, and teacher ratings are 64 percent, 67 percent, and 49 percent, respectively.

¹² Children whose kindergarten teachers responded and did not respond are different on a number of characteristics, but these differences do not translate into meaningful differences in the profiles of the children whose kindergarten teachers responded when compared to all the children eligible for the kindergarten data collection (Carlson and West, 2010). From this we can infer that we suffer little bias due to kindergarten teacher nonresponse when analyzing key child-level measures at kindergarten, especially when nonresponse-adjusted weights are used.

¹³ See West et al. (2010) for more information on the direct child assessment battery and its administration.

¹⁴ In earlier rounds, the child assessments were administered at children's Head Start programs.

¹⁵ The preferred respondent for the kindergarten interview was the child's biological mother or the fall 2006 and/or spring 2008 respondent.

¹⁶ More information about these two sources is available from the NCES (<http://nces.ed.gov/ccd> and <http://nces.ed.gov/survey/pss>).

¹⁷ See Malone et al. 2010 for the full set of statistics found in this report.

¹⁸ Weights are used to compensate for the differential probabilities of selection at the sampling stage (for example, 3-year-olds were sampled at a

higher rate than 4-year-olds) and to adjust for eligibility at later rounds and for the effects of nonresponse.

¹⁹ Not all statistically significant differences found in the accompanying set of data tables (Malone et al. 2010) are described in the report. Some differences and coefficients, although statistically significant, are very small and may not always be practically meaningful (for example, those with less than a five percentage point difference and an effect size smaller than .10).

²⁰ Number of family risks is based on three family characteristics: whether the child resides in a single parent household, whether the household income is below the federal poverty threshold, and whether the mother has less than a high school diploma.

²¹ Information on the characteristics of children and their families in fall 2006 can be found in *Beginning Head Start: Children, Families and Programs in Fall 2006* (Tarullo et al. 2008), and information on their characteristics in spring 2007 can be found in *A Year in Head Start: Children, Families and Programs* (Aikens et al. 2010).

²² Information on the basic characteristics of children and families, including household composition and SNAP receipt, is derived from the fall 2006 data collection.

²³ The percentage of Hispanic/Latino children read to by a parent or other family member three or more times a week increased significantly between fall and spring of the Head Start year, but has not changed significantly since then.

²⁴ The nutritional thresholds shown in Figure 3 were determined a priori, based on conversations with a member of an Office of Head Start expert panel.

²⁵ This average is based on all Head Start graduates in kindergarten, regardless of whether they are in other child care in addition to kindergarten. Among those who are in child care before or after kindergarten, the average number of hours spent in nonparental care each week is 45.

²⁶ The number of hours reported in Figure 6 has been rounded. The number of hours in care before rounding were 13.7 (kindergarten) and 13.7 (kindergarten).

²⁷ For the characteristics of children's kindergarten schools (school type, student body composition), data are drawn from the Common Core of Data 2007-2008 or the Private School Survey 2007-2008 (U.S. Department of Education, National Center for Education Statistics 2010a, 2010b).

²⁸ Elementary schools were defined as having a highest grade of grade 1 through 5. Middle or high schools were schools with a highest grade of grades 6 through 12.

²⁹ Denton Flanagan and McPhee 2009; Walston and West 2004; U.S. Department of Education, National Center for Education Statistics 2004.

³⁰ Mean number of hours is calculated based on two survey items: (1) frequency of activity during a week and (2) how many minutes the activity took place. Please see Malone et al. 2010 for details on variable construction.

³¹ We are unable to provide information on the developmental progress of children who changed their language of assessment between the end of Head Start and the spring of kindergarten, as these children receive different assessment measures at each wave. In addition, given the small number of children assessed in Spanish in the spring of kindergarten (n =30 in spring 2008 and n=2 in spring 2009), we do not describe outcomes for children taking the Spanish assessments. Instead, we describe the English and Spanish receptive vocabulary of children from Spanish-speaking households.

³² The number of risks is based on three characteristics of children's living circumstances, whether: (1) the child resides in a single-parent household, (2) the household income is below the federal poverty threshold, and (3) the child's mother has less than a high school degree.

³³ All children, regardless of home language or performance on the Pre-LAS, received the English receptive vocabulary measure, the PPVT-4. The TVIP, a measure of children's Spanish receptive vocabulary, was administered to children whose primary home language was Spanish, regardless of performance on the Pre-LAS. Thus, children whose parents spoke Spanish to them at home received the receptive vocabulary component of the battery in English (PPVT-4) as well as in Spanish (TVIP).

³⁴ The English assessment used the Woodcock-Johnson III subtests and the Spanish assessment used the Bateria III Woodcock-Muñoz subtests.

³⁵ FACES used 23 mathematics items from the ECLS–B in fall and spring of the Head Start year(s) and an additional seven items from the ECLS–K in kindergarten.

³⁶ For children receiving the Spanish version of the direct child assessment, a Spanish translation of the ECLS math and Story and Print concepts tasks was used.

³⁷ For purposes of the direct assessment, home language was based on information provided on parent consent forms.

³⁸ While many children in FACES 2006 are from homes where a language other than English is spoken, many pass the English language screener and are assessed in English at Head Start entry. These proportions increase as children grow older and gain greater proficiency in English. For example, at Head Start entry, about half of children from homes where a language other than English is spoken pass the language screener and are routed into the English version of the direct assessment. By the spring of 2007 (n=167), far fewer are unable to be assessed in English; these numbers drop even more in later rounds (n=30 in spring 2008 and n=2 in spring 2009).

³⁹ Some children were administered the cognitive assessments in Spanish (or not at all) in fall 2006 and then in English in subsequent rounds. Similarly, some children were unable to achieve a basal on the PPVT-4 in the fall but were able to do so in subsequent rounds. Data in this section reflect the performance of children assessed in English at the end of the Head Start program as well as in spring of the kindergarten year who have valid scores at both occasions (for example, children who established a basal on the PPVT-4 at both waves), regardless of language of assessment, child performance, or availability of valid scores in fall 2006. A separate set of tables (Malone et al. 2010) presents the mean scores for children assessed in English in the fall, at the end of Head Start, and at the end of the kindergarten year. In this set of tables, children's mean scores are slightly lower (for example, 1 to 2 standard score points lower). We do not report findings from this latter set of tables.

⁴⁰ Unless specified otherwise, receptive vocabulary refers to English receptive vocabulary.

⁴¹ The Woodcock-Johnson III norms were developed using Census population projections for 2000. These norms were updated in 2005, as reflected in the Woodcock-Johnson III NU norms, to take into account differences in the U.S. population estimates that were used to establish the Woodcock-Johnson III norms. The Woodcock-Johnson III NU norms changed the weights assigned to different segments of the population that are used to prepare standard scores. No new standardization data were collected for this re-norming effort. The Woodcock-Johnson III NU norms are more precise as a result of the new norms (also, a new method is used to estimate standard scores—Bootstrap method). The publisher recommends using these, but warns against comparing Woodcock-Johnson III norms to Woodcock-Johnson III NU, and switching standardized scores when measuring change and growth. To retain continuity with past FACES cohorts and some earlier FACES 2006 reporting, we use the Woodcock-Johnson III norms in this report.

⁴² Cross-cohort comparisons should be interpreted with caution. In FACES 2000, 3-year-old children were not assessed in all areas; this changed in later FACES cohorts. In addition, Woodcock-Johnson scores in FACES 2000 were drawn from the Woodcock-Johnson Psycho-Educational Battery-Revised edition (WJ R), while Woodcock-Johnson scores in FACES 2006 were drawn from the Woodcock-Johnson Tests of Achievement-Third edition (WJ III). Finally, regardless of performance on the language screener, all children in FACES 2006 were administered the PPVT-4 measure of English receptive vocabulary.

⁴³ Measures of criterion-referenced performance include raw and W or IRT-based scores. W scores allow for measurement of change or growth in performance on the same scale over time. Like raw scores, W scores are an indicator of absolute rather than relative performance. W scores are available for the WJ III and PPVT-4. ECLS math items are also scaled to reflect the number of items answered correctly or the percentage of children demonstrating mastery of skills or skill sets.

⁴⁴ These scores are for children who passed the language screener threshold and took the remainder of the assessment in English at each wave.

⁴⁵ Head Start teachers rated children's social skills and problems in Head Start while their kindergarten teachers rated them at the end of kindergarten. Kindergarten and Head Start teachers may have

different expectations for children's skills and behaviors, influencing their ratings.

⁴⁶ FACES 2006 uses four subscales from the Leiter-R Examiner Rating Scale—(1) attention, (2) organization/impulse control, (3) activity level, and (4) sociability. Scores on the items in these four subscales are combined to create cognitive/social scale raw and standard scores.

⁴⁷ T-tests indicate that kindergarten teachers report Hispanic/Latino children as having more social skills and fewer problem behaviors than White and African American children.

⁴⁸ Body Mass Index (BMI) is the ratio of an individual's weight to height and can be used as an indicator of overweight and obesity status (<http://www.cdc.gov/healthyweight/>). Calculation of BMI is specific to gender and age.

⁴⁹ The Centers for Disease Control and Prevention (CDC) sets the criterion of *overweight* as being when a child's BMI score is from the 85th to 94th percentile for his or her age and gender, and of *obese* as being when the child's BMI is at or above the 95th percentile. In some earlier FACES reports, the two categories have been labeled as *at risk of overweight* and *overweight*, respectively. Here, we use the more recent terminology used by the CDC.

⁵⁰ The ECLS-B preschool wave was intended to assess children in the fall, when most children would be about 48 through 57 months of age. However, the age at time of testing in the ECLS-B preschool wave ranged from approximately 42 months to 65 months (Jacobson Chernoff et al. 2007).

⁵¹ Gain scores are not available for the Word Attack subtest. It is only administered in the spring of the kindergarten year.

⁵² We used ordinary least squares (OLS) regressions, assuming children's outcomes are independent of other children in the sample given that, as children move from Head Start to kindergarten, they are no longer clustered within classrooms or schools.

⁵³ The language, literacy, and mathematics outcomes were measured using equal-interval W-scores or IRT scores to look at absolute progress rather than relative to peers and to facilitate interpretation of variation across scores. The ECLS Mathematics scores are IRT scores on a metric of

number of items in the assessment battery. To aid interpretability of estimates in effect size terms, all categorical variables were dummy coded, and all continuous variables were z-scored.

⁵⁴ The PLBS learning behavior measure of children's attention and persistence was not included as a school readiness predictor given high correlation with behavior problems at the same time point ($r = -0.87$). Since we included problem behaviors as an outcome, we focused on the level of behavior problems at the end of Head Start as a school readiness skill.

⁵⁵ We estimated four models for each of the outcomes of interest. In Model 1, we included the school readiness skills of children at the end of Head Start. In Model 2, we added child and family characteristics. In Model 3, we added Head Start characteristics. In Model 4, we added kindergarten characteristics. The child and family characteristics included child age at the time of spring kindergarten assessment (as well as the time interval between assessments), gender, race/ethnicity, primary household language, and maternal education at Head Start entry, and poverty status, maternal depressive symptoms, joint book-reading, and number of books in the home at Head Start exit. We selected time points for background characteristics based on how likely they are to shift over time (that is, household income and maternal depression may be more likely to change across one or two years than characteristics such as maternal education or household language). The Head Start characteristics included Head Start exposure (that is, one year for the 4-year-old cohort versus two years for the 3-year-old cohort) and the mean and variation in peer abilities and peer social skills at the end of Head Start. The peer measures reflect aggregate scores for all children in the Head Start classroom. Peer abilities reflect the same measure as the outcome investigated, except for WJ III Word Attack, social skills, and problem behaviors. For WJ III Word Attack, peer ability is measured by the mean and variation in WJ III Letter-Word Identification scores. For social skills and problem behavior outcomes, peer ability is measured by the mean and variation in PPVT-4 scores. We also include a series of dichotomous variables to describe the child's Head Start classroom experiences. Head Start experience indicators included whether the child's Head Start classroom had Early Childhood Environment Rating Scale-Revised (ECERS-R) Teaching and Interactions and Provisions for Learning scores of at least "good quality" (5 or higher), the child's Head Start classroom

had Classroom Assessment Scoring System (CLASS) Instructional Support scores of “middle” quality (3 or higher), the child always had a teacher with a bachelor’s degree (for example, fall 2006, spring 2007, and spring 2008), and the child always attended a full-day Head Start classroom. An index collapsing these indicators was not found to be significant. For the final model step, the kindergarten characteristics included teacher education (graduate degree versus not), program type (full-day versus half-day), class size, percentage of kindergarten class with limited English proficiency, percentage of kindergarten class eligible to receive free- or reduced-price lunch, and the teacher rating of kindergarten classroom behavior.

⁵⁶ Effect sizes characterize the strength of a relationship in standard deviation terms. An effect size of 0.55 means that on average children who score one standard deviation higher on the PPVT-4 at the end of Head Start than children and go on to then score about half a standard deviation higher on the PPVT-4 at the end of kindergarten. Based on our sample, this would equal about 7.3 points on the Growth Scale Value (GSV) or *W*-scale.

⁵⁷ The analyses presented here include two measures of mathematics as outcomes: WJ III Applied Problems and ECLS Mathematics. The correlations between these two measures at the end of Head Start was quite high ($r = 0.89$). Thus, we opted to use only one measure of math skills at the end of Head Start as a predictor in each model to avoid collinearity problems. For all outcomes except Applied Problems, we included ECLS Mathematics as the school readiness predictor because it measures a broader set of skills (early mathematics, geometry, patterns, measurement) than WJ III Applied Problems. In the model for Applied Problems in kindergarten, we used the same measure from the end of Head Start as the school readiness predictor to measure the same skills over time.

⁵⁸ The models used z-scored summative scores of social skills or problem behaviors to aid in the interpretation of coefficients across measures in terms of effect sizes.

⁵⁹ In our models, developmental outcomes are nested within children, recognizing that individual children’s outcomes over time are not independent of each other. The analyses of children’s cognitive development focus on the child assessment measures conducted in English. The analyses are weighted at the child levels in the HLM models.

⁶⁰ The exact sample size varies by outcome and variables included in the model.

⁶¹ Analyses using the PPVT-4 include all children with a valid score, because all children were administered the PPVT-4 regardless of home language or language of assessment. However, analyses for the WJ III subtests and the ECLS only include children assessed in English.

⁶² As in the regression analyses, the language, literacy, and mathematics outcomes were measured using equal-interval *W* scores or IRT scores, and all outcomes were z-scored. The z-scored *W* scores are a marker of absolute, rather than relative, progress. The ECLS mathematics scores are IRT-scale scores on a metric of number of items in the assessment battery. In addition, to aid interpretability of estimates in effect size terms, all categorical variables were dummy coded, and all continuous variables were centered at the sample mean. The estimated models included time-invariant variables, having identical values across waves for each child. For example, child/family variables were derived at Head Start entry and indicators representing the child’s Head Start experience were used along with peer characteristics at Head Start entry. Variables were entered in the estimated models to predict the intercept parameter—which in these models was set to the end of Head Start, or the spring of the prekindergarten year. Thus, coefficients in the models should be interpreted as the relationship of a given variable, controlling for other variables in the model, to children’s skills and development at the end of their Head Start experience. Variables were also entered to predict the slope parameter, with coefficients interpreted as children’s growth per month from Head Start entry to the end of kindergarten.

⁶³ Peer outcomes (ability, social skills) are represented by variables that reflect aggregate outcomes for all FACES sample children in the classroom. For all cognitive outcomes, models included the mean peer ability and variation in peer ability on that particular outcome. For social-emotional outcomes, models included mean and variation in peer abilities on the PPVT-4 and in children’s social skills. We include PPVT-4 scores in these latter models, because both social skills and language ability of peers may influence classroom dynamics in ways that can affect a child’s behavior.

⁶⁴ Initially, kindergarten covariates were included in the models (that is, teacher education, program type, class size, percentage of limited English

proficient (LEP, or dual language learners)) and free or reduced-price lunch classmates, and teacher-reported classroom behavior). However, these covariates were dropped from the analyses, because they were unrelated to children's trajectories and allowed for more parsimonious models.

⁶⁵ We estimated two models for each child outcome. In Model 1 we included child/family characteristics. In Model 2 we added Head Start classroom/program characteristics. In all models we included children's developmental outcomes in level 1. The level 2 model included child/family and/or Head Start characteristics. Here, we report the findings from Model 2, which includes both child/family and Head Start characteristics.

⁶⁶ Effect sizes characterize the strength of a relationship in standard deviation terms. An effect size of 0.50 means that children from homes where a language other than English is primarily spoken score about half a standard deviation lower than peers on English receptive vocabulary at the end of Head Start. Based on our sample, this would equal about 6.6 points on the Growth Scale Value (GSV) or W scale.

⁶⁷ In all models, dummy coded variables for whether the child's mother had (1) a high school diploma or GED and (2) at least a vocational degree were entered, with less than a high school degree serving as the referent group. Here, we report the effect sizes for these two educational levels, respectively.

⁶⁸ Unlike the findings described thus far—for the relationship between child, family, and Head Start characteristics and children's cross-sectional outcomes at a single time point—these effect sizes reflect the magnitude of the relationship between these characteristics and children's growth per month. While the effect sizes for growth were calculated in monthly terms, our threshold for reporting converts the effect sizes to annual terms. That is, in the text we only discuss effect sizes of magnitudes of at least 0.01 (monthly) or 0.10 (annually). An effect size of 0.01 means that children above 130 percent of poverty gain about one-hundredth of a standard deviation more than those at 50 percent of poverty monthly (or more than one-tenth of a standard deviation annually; $0.01 \times 12 = 0.12$) in the areas of English receptive vocabulary between Head Start entry and the end of kindergarten. Based on our sample, this would equal about 1.6 points on the Growth Scale Value (GSV) or W scale.

⁶⁹ In all models, dummy coded variables for whether the child's family had a household income (1) between 50 and 100 percent of poverty, (2) 101 to 130 percent of poverty, and (3) above 130 percent of poverty were entered, with less than 50 percent of poverty serving as the referent group. Here, we report the effect sizes for these three income levels, respectively.

⁷⁰ For each outcome, ability groups were defined in equal thirds, with the lower ability group represented by those in the bottom third in that particular area, those in the middle ability group represented by the middle third, and those in the higher ability group represented in the top third.

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