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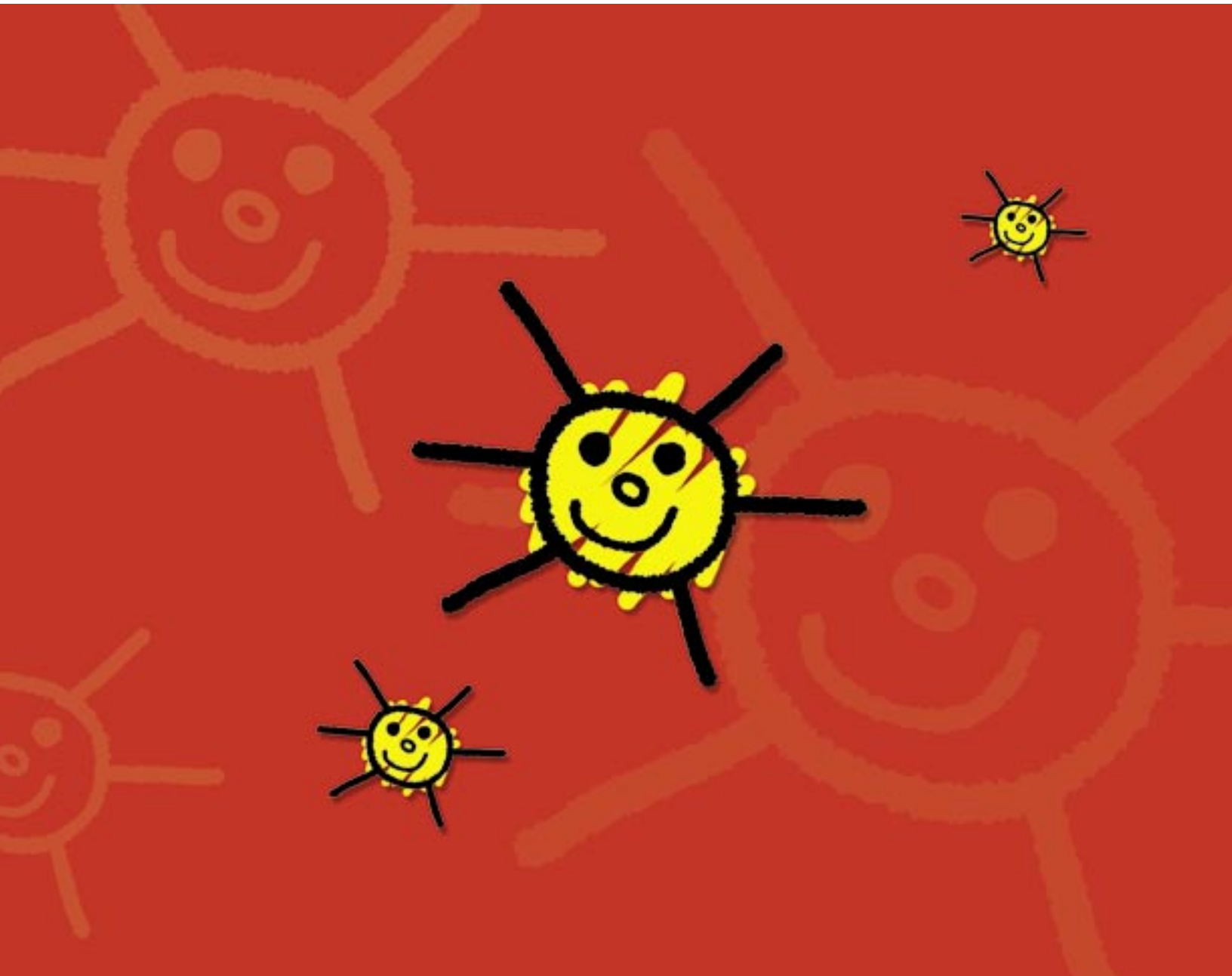
Early Childhood Longitudinal Study

Fifth Grade

Findings From the Fifth Grade Follow-up of the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K)

E.D. TAB

U.S. Department of Education
Institute of Education Sciences
NCES 2006-038



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Foreword

This E.D. TAB presents findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) spring 2004 data collection, which included five survey components: direct student assessments, parent interviews, self-administered questionnaires from principals and teachers, and abstracts of student records. This report is based on the collection of data from over 9,700 students and their parents, teachers, and schools.

The data used in this report are from the ECLS-K Longitudinal Kindergarten—Third Grade Public-Use Data File and the Fifth-Grade Restricted-Use Data File. Both of these data files are available to researchers for their own use in electronic codebook (ECB) format on CD-ROM (US Department of Education NCES 2004-089 and NCES 2006-033).

We hope that the information provided in the report will be useful to a wide range of interested readers. Further, we hope that the results reported here will encourage researchers and others to make full use of the ECLS-K data for analysis, or to help answer questions about children's development during the elementary school years.

Mark Schneider
Commissioner
National Center for Education Statistics

Acknowledgments

We wish to recognize the more than 20,000 parents and children who participated during the first 6 years of the study. We thank the teachers and administrators of the more than 4,500 schools we visited across the United States for allowing us to work with their children and parents, and for providing us with information about their students and schools. We are especially appreciative of the assistance we received from the chief state school officers, district superintendents and staff, and private school officials.

We also thank Jerry West, formerly the Program Director of the Early Childhood and Household Studies Program of the National Center for Education Statistics (NCES) and currently with Mathematica Policy Research, Inc., for his leadership and dedication to the ECLS-K project. We appreciate the support provided by Amy Rathbun and Jill Walston of the Education Statistics Services Institute (ESSI) in the planning and development of the ECLS-K and this report. We also recognize the efforts of the ECLS-K project staff, past and present (presented in alphabetical order, by organization): Jonaki Bose and Karen Manship, formerly with NCES; Frank Avenilla, DeeAnn Brimhall, and Sandy Eyster of ESSI; Emily Rosenthal and Alexa Van Brunt, formerly with ESSI; the entire ECLS-K project team at Westat (the main contractor in support of the ECLS-K), Don Rock, and Judy Pollack, ETS.

We appreciate the review comments provided by (alphabetically): Ruth Atchison, ESSI; Lisa Bridges, IES; Kevin Bromer, ESSI; David Miller, ESSI; Stephen Mistler, ESSI; Larry Ogle, NCES; Val Plisko, NCES; Michelle Robinson, ESSI; Marilyn Seastrom, NCES; Alison Slade, ESSI; Anne Sweet, IES; Todd Thomas, ESSI; and Andrew White, NCES.

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A special thank you to Kendra Chandler Webb (age 9, 1994), who designed the ECLS logo.

Contents

List of Tables

Appendix B Tables

Introduction

The Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) is following a nationally representative cohort of children from kindergarten and into the later grades. The ECLS-K focuses on children's school experiences beginning with kindergarten. It is a multi-source, multi-method study that includes interviews with parents; collection of data from principals and teachers; and direct assessments of children. The ECLS-K has been developed under the sponsorship of the National Center for Education Statistics (NCES), part of the U.S. Department of Education's Institute of Education Sciences.[1]

The purpose of this E.D. TAB is to introduce new NCES survey data through the presentation of selected descriptive information. The E.D. TAB is purely descriptive in nature. Readers are cautioned not to draw causal inferences based solely on the bivariate results presented in this E.D. TAB. It is important to note that many of the variables examined in this report are related to one another, and complex interactions and relationships have not been explored here. The variables examined here are also just a few of the variables that can be examined in these data and were selected to demonstrate the range of information that helped shape the design and now is available from the study. The selected findings are examples of comparisons that can be made using the data and are not designed to emphasize any particular issue. Release of the E.D. TAB is intended to encourage more in-depth analysis of the data, using more sophisticated statistical methods.

This E.D. TAB presents findings from the fifth-grade ECLS-K data collection.[2] Findings are based on a sample of 9,796 members of the 1998-99 kindergarten cohort, and are representative of the 3.8 million students in school in spring 2004 who were in kindergarten in fall 1998.[3] Findings are based on all students who participated in the ECLS-K, not just those at grade level; in the spring of 2004 most students (86 percent) were in fifth grade, some (14 percent) were in a lower grade, and few (1 percent) were in a higher grade (table 1).

The ECLS program includes two longitudinal studies, the ECLS-K and a separate study of a birth cohort (ECLS-B) that follows a national sample of children born in the U.S. in the year 2001 from birth through kindergarten entry.

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[1]Several other federal agencies provide support for this study, including the Head Start Bureau of the Administration on Children, Youth, and Families, U.S. Department of Health and Human Services; the Economic Research Service of the U.S. Department of Agriculture; the National Institute for Child Health and Human Development; and the U.S. Department of Education's Office of Special Education Programs, Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students; and the Policy and Program Studies Service.

[2]This E.D. Tab is a purely descriptive analysis. All differences discussed are statistically significant at the .05 level as measured by two-tailed Student's *t* tests; this means a difference is discussed only if the probability that it is due to chance (i.e., sampling variability) is less than 1 in 20. In an effort to focus on substantive differences, percentage point differences are only discussed if they are 5 points or greater, unless percentages fall below 5 or above 95 percent, and mean score differences are only discussed if the associated Cohen's *d* is .2 or greater. For more information, please see Appendix A. Survey Methodology and Glossary.

[3]Since the sample of children fielded in 2004 was not freshened with fifth-graders who did not have a chance to be sampled in kindergarten (for example, because they were out of the country during their kindergarten year), this sample of children does not represent all fifth-graders in 2004. The sample includes only those children who participated in any part of the assessment, such as height or weight measurements, in each of the following data collections: fall and spring of kindergarten, spring of first grade, and spring of fifth grade.

The Current Study

The ECLS-K selected a nationally representative sample of kindergartners in the fall of 1998 and, to date, has followed these children through the spring of fifth grade. The focus of the current report is findings from the sixth wave of the ECLS-K data, when most of the ECLS-K children were in the spring of their fifth-grade year.

The full ECLS-K base-year sample is composed of 22,782 children who attended 944 schools with kindergarten programs during the 1998–99 school year. The base-year ECLS-K sample is nationally representative of the 3.8 million children enrolled in kindergartens in the United States during the 1998–99 school year.

The base-year (i.e., the kindergarten year) data were collected in the fall and spring of the 1998–99 school year. Two more waves of data were collected in the fall and spring of the 1999–2000 school year when most, but not all, of the base-year children were in first grade.[4] A fifth wave of data was collected in the spring of the 2001–02 school year when most, but not all, of the sampled children were in third grade. A sixth wave of data was collected in the spring of the 2003–04 school year when most, but not all, of the sampled children were in fifth grade.

The weighted school response rate[5] for the kindergarten year was 74 percent. In that year, the child and parent completion rates were 92 percent and 89 percent, respectively. In the spring of 2000 (first grade), 88 percent of children and 85 percent of the parents who were eligible for first-grade data collection participated in the study. In the spring of 2002 (third grade), 80 percent of the children and 77 percent of the parents who were eligible for the third-grade data collection participated in the study. Finally, in the spring of 2004 (fifth grade), about 85 percent of children and 89 percent of parents who were eligible for the fifth-grade data collection participated (U.S. Department of Education 2006).

For more technical information on issues such as sampling design, eligibility, and participation, please see Appendix A. Survey Methodology and Glossary.

Contents and Organization of the E.D. TAB

The information presented in this report was selected to describe the academic achievement of the cohort of students. The results are organized as follows: (1) Reading Achievement in Fifth Grade, (2) Mathematics Achievement in Fifth Grade, and (3) Science Achievement in Fifth Grade. Children's spring fifth-grade achievement are described by similar sets of child, family, and school characteristics. The child, family, and school characteristics used in this report include the following:[6]

[4]Though the majority of base-year children were in first grade during the 1999–2000 school year, about 5 percent of the sampled children were retained in kindergarten and less than 1 percent of others were in second grade during the 1999–2000 school year. The fall first-grade data collection was limited to a 30-percent subsample of schools. Approximately 27 percent of the base-year students who were eligible to participate in year 2 attended the 30-percent subsample of schools.
[5]Weighted by the base weight (the inverse of the probability of selection).
[6]For more information please see Appendix A. Survey Methodology and Glossary.

- child's sex;
- child's race/ethnicity;
- poverty status, spring 2004;
- poverty status, fall 1998 through spring 2004;
- mother's highest level of education, spring 2004;
- family type, spring 2004;
- family type, fall 1998 through spring 2004;
- primary home language at kindergarten entry;
- school type, spring 2004;
- school type, fall 1998 through spring 2004;
- grade level of child, spring 2004;
- fall kindergarten reading achievement;
- fall kindergarten mathematics achievement;
- fall kindergarten general knowledge achievement;
- number of places child has lived, fall 1998 through spring 2004; and
- number of schools child has attended, fall 1998 through spring 2004.

The percentage distribution of students according to these characteristics is presented in table 1.

Selected Findings

Reading Achievement in Fifth Grade

The ECLS-K reading achievement scale score provides an overall measure of reading achievement by which students from different subpopulations can be compared. In spring 2004, the reading scale scores had a potential range of 0 to 186 (M=138; *se*=.56). In addition to an overall reading achievement score, the ECLS-K provides information on student performance with respect to nine reading proficiency levels.[7] This report focuses on the five highest proficiency levels, which reflect a progression of knowledge and skills at the fifth-grade (from easiest to most difficult): (1) understanding words in context, (2) making inferences using cues that were directly stated with key words in the text (literal inference), (3) identifying clues used to make inferences (deriving meaning), (4) demonstrating understanding of author's craft and making connections between a problem in the narrative and similar life problems (interpreting beyond text), and (5) comprehending biographical and expository text (evaluating nonfiction).[8]

Overall Reading Achievement

- **Child's race/ethnicity.** White and Asian students scored higher, on average, than Black or Hispanic students (table 2). There were variations, however, within racial and ethnic groups. For example, although 43 percent of White students scored in the highest third of the distribution of reading achievement scores, 23 percent scored in the lowest third. Among Black students, 17 percent scored in the highest third, while 55 percent scored in the lowest third.

- **Poverty status, spring 2004.** Students living in households below the poverty level threshold scored lower, on average, than students living in households at or above the poverty threshold. Sixty-one percent of students in poverty scored in the lowest third of the distribution of reading achievement scores, compared with 25 percent of students in households at or above the poverty threshold.

- **Poverty status, fall 1998 through spring 2004.** Students living in poverty for all rounds of data collection from fall 1998 through spring 2004 scored lower, on average, than students who moved into and out of poverty during the same time period.

- **Mother's highest level of education, spring 2004.** On average, students whose mothers' highest level of education was less than high school scored lower than other students, while students whose mothers had a bachelor's degree or higher scored higher than other. Among students whose mothers had less than a high school diploma or equivalent, 7 percent scored in the top third of reading achievement scores. In comparison, 58 percent of students whose mothers had a bachelor's degree or higher scored in the top third.

[7]For more information on how reading achievement was measured, please see Appendix A. Survey Methodology and Glossary.
[8]The four reading proficiency levels excluded from this report include letter recognition (level 1), identifying beginning sounds (level 2), identifying ending sounds (level 3), and recognizing sight words (level 4).

- **Family type, spring 2004.** On average, students living in two-parent or single-parent families outperformed those living in other types of families (i.e., living with related or unrelated guardians). Also, students in single-parent families were less likely than students in two-parent families to score in the top third of the distribution of reading scores (22 percent of students in single-parent families, compared with 39 percent of students in two-parent families).

- **Family type, fall 1998 through spring 2004.** Students living in single-parent families for all rounds of data collection were less likely to score in the top third than were students whose family type changed from two-parent to single-parent sometime between fall 1998 and spring 2004 (20 percent, compared with 31 percent).

- **Primary home language at kindergarten entry.** On average, students whose primary home language was English when they entered kindergarten[9] outperformed those whose primary home language was not English when they entered kindergarten. Among students whose primary home language was English, 30 percent scored in the bottom third and 36 percent scored in the top third of the fifth-grade reading achievement distribution. Among students whose primary home language was not English, 53 percent scored in the bottom third and 16 percent scored in the top third.

- **School type, spring 2004.** Students attending private schools scored higher, on average, than students in public schools. While public school students were fairly evenly arrayed across the distribution of reading scores, private school students were concentrated toward the upper end of the distribution with 52 percent of private school students scoring in the top third of the distribution.

- **School type, fall 1998 through spring 2004.** Students who attended private school and then transferred to public school by spring 2004 were more likely to score in the highest third than students who attended public school during all rounds of data collection.[10]

- **Grade level of child, spring 2004.** Students enrolled in a grade below fifth grade, their modal grade level in 2004, scored lower, on average, than students enrolled in fifth grade. Three-quarters of below-grade-level students (75 percent) scored in the bottom third of the reading achievement score distribution, compared with 27 percent of students at grade level.

- **Fall kindergarten reading knowledge and skills.** Students' kindergarten year (fall 1998) reading achievement scores were positively associated with their spring 2004 reading achievement scores. Sixty-five percent scored in the highest third in the fall of 1998 also scored in the highest third in 2004. Fifty-three percent of students who scored in the lowest third in the fall of 1998 scored in the lowest third in 2004. In general,

[9]The ECLS-K collected information about children's home language during the kindergarten year of the study.
[10]Differences in fifth-graders' achievement relative to the types of schools they attended should be interpreted with caution, as children also demonstrated differences in achievement by the type of school they attended in the fall of kindergarten (West, Denton, and Reaney 2001).

students who scored in the lowest third in fall 1998 scored lower than others in 2004, while students who scored in the highest third in fall 1998 scored higher than others in 2004.

- **Number of places child has lived, fall 1998 through spring 2004.** High student mobility, as measured by living in four or more places from kindergarten through fifth grade or by changing schools three or more times, was, to a certain extent, associated with where students fell in the reading achievement score distribution. Students who had lived in four or more places from kindergarten through fifth grade were less likely to score in the highest third (21 percent) than were students who had lived in two places (37 percent) or in one place (39 percent).

- **Number of schools child has attended, fall 1998 through spring 2004.** Students who changed schools three or more times from fall 1998 through spring 2004 were more likely than students who changed schools fewer times (or never changed schools) to score in the lowest third (55 percent of students who changed schools three or more times, compared with 37 percent who changed twice, 31 percent who changed once, and 31 percent who never changed).

Specific Reading Knowledge and Skills

- Overall, 97 percent of students were proficient in understanding words in context, 87 percent in making literal inferences, 70 percent in deriving meaning, 44 percent in making interpretations beyond the text, and 7 percent in evaluating nonfiction (table 3).

- The following statements describe differences between subpopulations of students in each of the five reading proficiency areas.

    - White and Asian students were more likely to demonstrate proficiency than Black or Hispanic students.

    - Students living in poverty were less likely to demonstrate proficiency than students living at or above the poverty threshold.

    - Students who were persistently in poverty were less likely to demonstrate proficiency than students whose households were never in poverty (i.e., who were consistently at or above poverty).

    - Students whose mothers' highest level of education was less than high school were less likely to demonstrate proficiency than students whose mothers had higher levels of education.

    - Students from two-parent families were more likely to demonstrate proficiency than students from single-parent and other family types (i.e., related and/or unrelated guardians). Students from single-parent families were more likely to

demonstrate proficiency than students from other family types in the four most advanced reading proficiency areas shown in table 3.

- Students who lived in two-parent families for all rounds outperformed students whose families changed from single-parent to two-parent from kindergarten through fifth grade.

- Students whose primary home language was English were more likely to demonstrate proficiency than students whose primary home language was not English.

- Students enrolled in private schools were more likely to demonstrate proficiency than students enrolled in public schools.

- Students enrolled below modal grade level were less likely to demonstrate proficiency than students enrolled in fifth grade.

- Students who scored in the lowest third of reading achievement scores in fall kindergarten were less likely than others to demonstrate proficiency, while students who scored in the highest third were more likely to do so.

- Although students in certain subpopulations were more or less likely, in the aggregate, to demonstrate proficiency in the reading skills shown in table 3, for each of the reading skills there were students in higher achieving subpopulations who did not demonstrate proficiency and students in the lower achieving subpopulations who demonstrated proficiency. For example, of students whose primary home language was not English when they entered kindergarten, 95 percent were proficient in understanding words in context, 79 percent in making literal inferences, 55 percent in deriving meaning, 32 percent in interpreting beyond the text, and 3 percent in evaluating nonfiction.

Mathematics Achievement in Fifth Grade

In spring 2004, the ECLS-K overall mathematics scale scores had a potential range from 0 to 153 (M=112; *se*=.61). In addition to an overall mathematics achievement score, the ECLS-K provides more specific information on mathematics proficiency in nine areas of mathematics knowledge and skills.[11] This report focuses on the five highest proficiency levels, which reflect a progression of knowledge and skills at the fifth-grade level. These five levels are as follows (from easiest to most difficult): (1) solving simple multiplication and division problems and recognizing more complex number patterns, (2) demonstrating understanding of place value in integers to the hundreds place, (3) using knowledge of measurement and rate to solve word problems, (4) solving problems using fractions, and (5) solving word problems using area and volume.[12]

Overall Mathematics Achievement

- **Child's sex.** There were differences by sex with respect to the distribution of mathematics achievement scores (table 4). A higher percentage of male students (37 percent) scored in the highest third of the distribution than did female students (30 percent). Female students were more likely than male students to score in the lowest third (37 percent, compared with 30 percent).

- **Children's race/ethnicity.** The average mathematics scale scores for Black students were lower than those of White or Asian students. In addition, while the reading scores of Black and Hispanics were not substantively different from one another, Black students' average mathematics scale scores were lower than those of Hispanic students. Eleven percent of Black students scored in the highest third of the distribution of mathematics scores, while about 62 percent scored in the lowest third of the distribution. Twenty-three percent of Hispanic students scored in the highest third, while 41 percent scored in the lowest.

- **Poverty status, spring 2004.** Students living in households below the poverty threshold scored lower, on average, than students living in households at or above the poverty threshold. Fifty-seven percent of students in poverty scored in the lowest third of the distribution of mathematics achievement scores, compared with 26 percent of students living in households at or above the poverty threshold.

- **Poverty status, fall 1998 through spring 2004.** Students living in poverty for all rounds of data collection from fall 1998 through spring 2004 scored lower, on average, than students who moved into and out of poverty during the same time period. Both of these groups scored lower than students living at or above the poverty threshold for all rounds.

[11]For more information on how mathematics achievement was measured, please see Appendix A. Survey Methodology and Glossary.

[12]The four mathematics proficiency levels excluded from this report include counting, numbers, and shapes (level 1), relative size (level 2), ordinality and sequence (level 3), and addition/subtraction (level 4).

- **Mother's highest level of education, spring 2004.** On average, students whose mothers' highest level of education was less than high school scored lower than other students, while students whose mothers had a bachelor's degree or higher scored higher than other students. Among students whose mothers had less than a high school diploma or equivalent, 10 percent scored in the top third of mathematics achievement scores. In comparison, 58 percent of students whose mothers had a bachelor's degree or higher scored in the top third.

- **Family type, spring 2004.** On average, students living in two-parent families outperformed those living with related or unrelated guardian(s) (i.e., "other" family type).

- **Family type, fall 1998 through spring 2004.** Students living in two-parent families for all rounds of data collection were more likely to score in the top third than were students whose families changed from single-parent to two-parent sometime between fall 1998 and spring 2004 (45 percent, compared with 18 percent). However, 21 percent of children who were in two-parent families for all rounds scored in the bottom third of the mathematics achievement score distribution.

- **Primary home language at kindergarten entry.** Among those students whose primary home language was English, 32 percent scored in the bottom third and 35 percent scored in the top third. Among students whose primary home language was not English, 43 percent scored in the bottom third and 23 percent scored in the top third. Compared with students whose primary language was English, students whose primary language was not English were more likely to score in the bottom third and less likely to score in the top third.

- **School type, spring 2004.** While public school students were spread fairly evenly across the mathematics score distribution, private school students were less likely than public school students to score in the lowest third and more likely than public school students to score in the highest third.

- **School type, fall 1998 through spring 2004.** Compared with students who attended public school for all rounds, students who attended private school for all rounds were less likely to score in the lowest third and more likely to score in the upper third, as were students who moved from private to public school between kindergarten and fifth grade.

- **Grade level of child, spring 2004.** Students enrolled below the modal grade level scored lower, on average, than students enrolled in fifth grade. Sixty-nine percent of students below the modal grade scored in the bottom third of the distribution of mathematics achievement scores, compared with about 28 percent of students at grade level.

- **Fall kindergarten mathematics knowledge and skills.** Students' mathematics achievement scores from the fall of 1998 (their kindergarten year) were associated with their fifth-grade mathematics achievement scores. Of students who scored in the highest third in 1998, 67 percent scored in the highest third in 2004. In general, in terms of average overall achievement, students who scored in the lowest third in 1998 scored

lower than others in 2004, while students who scored in the highest third in 1998 scored higher than others in 2004.

- **Number of places child has lived, fall 1998 through spring 2004.** High student mobility, as measured by living in four or more places from fall 1998 through spring 2004 was, to a certain extent, associated with where students fell in the mathematics achievement score distribution. Compared with students who had resided in one place from kindergarten through fifth grade, students who had lived in four or more places were less likely to score in the highest third and more likely to score in the lowest third.

- **Number of schools child has attended, fall 1998 through spring 2004.** Students who changed schools three or more times from fall 1998 through spring 2004 were more likely than students who changed schools one time or not at all to score in the lowest third (52 percent of students who changed schools three or more times, compared with 32 percent who changed once and 30 percent who never changed).

Specific Mathematics Knowledge and Skills

- Overall, 92 percent of students demonstrated proficiency in multiplication and division, 74 percent in place value, 43 percent in rate and measurement, 13 percent in fractions, and 2 percent in area and volume (table 5).

- The following statements describe differences between subpopulations of students in each of the five reading proficiency areas.

    - Male students were more likely to demonstrate proficiency than female students in the four highest mathematics proficiencies (i.e., place value, rate and measurement, fractions, and area and volume) shown in table 5.

    - White and Asian students were more likely to demonstrate proficiency in each of the specific mathematics proficiencies than were Black or Hispanic students, and Black students were less likely to demonstrate proficiency than were Hispanic students. Asian students outperformed White students on fractions and on area and volume.

    - Compared with students living at or above the poverty threshold, students living in poverty were less likely to demonstrate proficiency in each of the mathematics levels.

    - From fall 1998 through spring 2004, students who lived continuously in households below the poverty threshold were less likely to demonstrate proficiency than those students who lived persistently in households at or above the poverty threshold.

- In every proficiency level, students whose mothers' highest level of education was a bachelor's degree or higher were more likely to demonstrate proficiency, compared with students in each of the other maternal education categories.

- For each of the five mathematics proficiencies, students in two-parent families were more likely to demonstrate proficiency than students living with related and/or un-related guardian(s) (i.e., "other" family type). Compared with students in single-parent families, students in two-parent families were more likely to demonstrate proficiency in place value, rate and measurement, fractions, and area and volume.

- For each mathematics proficiency, students who lived in two-parent families for all rounds outperformed those who lived in single-parent families for all rounds, those who lived in other family types for all rounds, and those whose family type changed two or more times.

- Compared with students whose primary home language in kindergarten was not English, students whose primary home language was English in kindergarten were more likely, in the spring of 2004, to demonstrate proficiency in place value, rate and measurement, fractions, and area and volume.

- In all but the highest mathematics proficiency level (i.e., area and volume), private school students were more likely to demonstrate proficiency than public school students.

- Students who moved from public to private school over the course of their elementary education were less likely to demonstrate proficiency than students who attended private schools across all rounds of the study in the multiplication and division and place value proficiency levels.

- In each mathematics proficiency level, students enrolled below grade level were less likely to demonstrate proficiency than students enrolled in fifth grade.

- For each proficiency level, students who scored in the lowest third of mathematics achievement scores in kindergarten were less likely than others to demonstrate proficiency, while students who scored in the highest third were more likely to do so.

- Students who lived in four or more places from fall 1998 through spring 2004 were less likely to demonstrate proficiency in place value, rate and measurement, fractions, and area and volume, than students who lived in one place.

- Students who changed schools three or more times were less likely to demonstrate proficiency in the place value, rate and measurement, and proficiency levels than both students who changed schools only once and students who remained in the same school across all rounds of data collection.

- Although students in certain subpopulations were more or less likely, in the aggregate, to demonstrate proficiency in the mathematics skills presented in table 5, for each of the mathematics skills, there were individuals in higher achieving subpopulations who do not demonstrated proficiency, and there were individuals in lower achieving subpopulations who demonstrated proficiency. While female students were less likely than male students to demonstrate proficiency in four of the five mathematics proficiencies, 91 percent of females demonstrated proficiency in multiplication and division, 70 percent in place values, 39 percent in rate and measurement, 10 percent in fractions, and 1 percent in area and volume.

Science Achievement in Fifth Grade

The fifth-grade science assessment measured understanding of the physical and natural world and their ability to draw inferences, comprehend relationships, interpret scientific data, formulate hypotheses, and identify the best plan to investigate a given question.[13] In spring 2004, the ECLS-K science assessment scale scores had a potential range from 0 to 92 (M=57; *se*=.36). The content of the science assessment did not lend itself to the formation of proficiency levels. Therefore, this E.D. TAB presents information on children's overall science knowledge and skills.

Overall Science Achievement

- **Child's sex.** A higher percentage of male students (37 percent) scored in the highest third of the science score distribution than did female students (29 percent) (table 6). Female students were more likely than male students to score in the lowest third (38 percent, compared with 29 percent).

- **Child's race/ethnicity.** Black students' average science scale scores were lower than those of White or Asian students. As in mathematics achievement, Black students' average science scale scores were lower than those of Hispanic students. Asian students were more likely than White students to score in the lowest third in science. Thirty-three percent of Asian students scored in the lowest third in science, compared with 20 percent of White students.

- **Poverty status, spring 2004.** Students living in poverty households scored lower, on average, than students living in households at or above the poverty threshold. Sixty-two percent of students in poverty scored in the lowest third of the science achievement score distribution, compared with 24 percent of students at or above the poverty thresholds.

- **Poverty status, fall 1998 through spring 2004.** Students living in poverty for all rounds of data collection from fall 1998 through spring 2004 scored lower, on average, than students who moved into and out of poverty during the same time period. Both of these groups scored lower than students living at or above poverty for all rounds.

- **Mother's highest level of education, spring 2004.** On average, students whose mothers' highest level of education was less than high school scored lower than other students, while students whose mothers had a bachelor's degree or higher scored higher than other students. Among students whose mothers had less than a high school diploma or equivalent, 8 percent scored in the top third of science achievement scores. In comparison, 60 percent of students whose mothers had a bachelor's degree or higher scored in the top third.

[13]For more information on how science achievement was measured, please see Appendix A. Survey Methodology and Glossary.

- **Family type, spring 2004.** On average, students living in two-parent families outperformed those living in single-parent or other family types (i.e., related and/or unrelated guardians).

- **Family type, fall 1998 through spring 2004.** Students living in two-parent families for all rounds of data collection were more likely to score in the top third than were students whose family type changed from single-parent to two-parent sometime between fall 1998 through spring 2004 (45 percent compared with 27 percent). However, 21 percent of children who were in two-parent families for all rounds scored in the bottom third of the science achievement score distribution.

- **Primary home language at kindergarten entry.** Students' average fifth-grade scale scores in science were greater, on average, among students whose primary home language was English, compared with those whose primary home language was not English, when they entered kindergarten. Among students whose primary home language was English, 29 percent scored in the bottom third and 36 percent scored in the top third. Among students whose primary home language was not English, 57 percent scored in the bottom third and 15 percent scored in the top third.

- **School type, spring 2004.** The average private school student science score did not differ substantively from the average public school student science score. However, while public school students were fairly evenly distributed across the science score distribution, private school students were concentrated toward the upper end of the distribution, and more likely to score in the upper third of the distribution of scores; 51 percent of private school students scored in the top third of the distribution of science achievement scores, compared with 31 percent of public school students.

- **School type, fall 1998 through spring 2004.** Students who moved from public school to private school were more likely than students who attended private school across all rounds of the study to score in the lowest third of the science score distribution (36 percent, compared with 16 percent). Students who moved from public school to private school were more likely to score in the highest third than were students who attended public school throughout the elementary grades (50 percent compared with 30 percent).

- **Grade level, spring 2004.** Students enrolled below the modal grade scored lower, on average, than students enrolled in fifth grade. Sixty-seven percent of below-grade-level students scored in the bottom third of the science achievement score distribution, compared with 28 percent of students at grade level.

- **Fall kindergarten general knowledge achievement.** In the fall of 1998 (at the start of their kindergarten year), students were administered a general knowledge assessment that measured their knowledge of natural sciences and social studies on a single scale. Students' general knowledge achievement scores from fall 1998 were positively associated with their spring 2004 science achievement scores. In general, students who scored in the highest third of the general knowledge assessment in 1998 scored higher than others on the science assessment in 2004. Similarly, students who scored in the

lowest third of the general knowledge assessment in 1998 scored lower than others on the science assessment in 2004. Among students who scored in the lowest third in the fall of 1998, 63 percent scored in the lowest third of scores on the 2004 science assessment, 29 percent scored in the middle third, and 8 percent scored in the highest third. Among students who scored in the highest third in 1998, 4 percent scored in the lowest third of scores on the 2004 science assessment, 29 percent scored in the middle third, and 67 percent scored in the highest third.

- **Number of places student has lived, fall 1998 through spring 2004.** Students who had lived in four or more places from fall 1998 through spring 2004 were more likely to score in the lowest third (42 percent) than were students who had lived in one place (27 percent).

- **Number of schools student has attended, fall 1998 through spring 2004.** Students who changed schools three or more times from fall 1998 through spring 2004 were less likely than students who changed schools fewer times (or never changed schools) to score in the highest third (17 percent of students who changed schools three or more times, compared with 31 percent who changed twice, 34 percent who changed once, and 35 percent who never changed).

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Tables

Table 1. Percentage distribution of child, family, and school characteristics: 1998, 1999, 2000, 2002, and 2004

Characteristic	Percent of children
Total	100.0
Child's sex	
Male	51.5
Female	48.5
Child's race/ethnicity[1]	
White, non-Hispanic	57.7
Black, non-Hispanic	16.0
Hispanic	18.9
Asian, non-Hispanic	2.8
Other, non-Hispanic	4.6
Poverty status, spring 2004	
Below poverty threshold	20.5
At or above poverty threshold	79.5
Poverty status, fall 1998 through spring 2004	
Below, all rounds	7.4
At or above, all rounds	69.8
In and out of poverty	22.8
Mother's highest level of education, spring 2004	
Less than high school	11.3
High school diploma or equivalent	25.4
Some college or vocational technical degree	36.3
Bachelor's degree or higher	27.0
Family type, spring 2004	
Two parents	73.6
Single parent	24.4
Other[2]	2.1
Family type, fall 1998 through spring 2004	
Two parents, all rounds	67.7
Single parent, all rounds	10.7
Other, all rounds[2]	0.8
Two parents to single parent	7.8
Single parent to two parents	5.3
Multiple changes	7.7
Primary home language at kindergarten entry	
English	88.2
Not English	11.8

See notes at end of table.

Table 1. Percentage distribution of child, family, and school characteristics: 1998, 1999, 2000, 2002, and 2004—Continued

Characteristic	Percent of children
School type, spring 2004	
Public	90.1
Private	9.9
School type, fall 1998 through spring 2004	
Public school, all rounds	80.6
Private school, all rounds	7.0
Public school to private school	2.7
Private school to public school	7.6
Multiple changes	2.1
Grade level of child, spring 2004	
Below grade level	14.1
Fifth grade	85.6
Above grade level	0.3 !
Number of places child has lived, fall 1998 through spring 2004	
One place	59.5
Two places	28.6
Three places	8.2
Four or more places	3.8
Number of schools child has attended, fall 1998 through spring 2004	
Same school, every round	33.9
One change, across rounds	41.9
Two changes, across rounds	20.1
Three or more changes, across rounds	4.0

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: Detail may not sum to totals because of rounding. Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table 2. Mean reading scale scores, and percentage distribution of spring fifth-grade reading scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	137.6	33.3	33.3	33.4
Child's sex				
Male	136.0	35.0	33.6	31.4
Female	139.2	31.5	33.0	35.4
Child's race/ethnicity[1]				
White, non-Hispanic	143.4	23.1	34.2	42.7
Black, non-Hispanic	125.7	55.5	28.0	16.6
Hispanic	130.0	45.7	34.4	19.9
Asian, non-Hispanic	141.8	26.4	34.8	38.8
Other, non-Hispanic	133.1	38.1	35.9	26.0
Poverty status, spring 2004				
Below poverty threshold	121.5	60.9	25.9	13.2
At or above poverty threshold	142.6	24.5	35.5	40.0
Poverty status, fall 1998 through spring 2004				
Below, all rounds	117.8	67.3	24.9	7.8
At or above, all rounds	145.6	19.2	35.3	45.5
In and out of poverty	129.7	46.8	33.8	19.5
Mother's highest level of education, spring 2004				
Less than high school	118.0	66.2	26.4	7.4
High school diploma or equivalent	132.7	41.6	33.3	25.2
Some college or vocational technical degree	138.3	31.4	36.3	32.3
Bachelor's degree or higher	151.9	9.7	32.0	58.3
Family type, spring 2004				
Two parents	141.0	27.5	33.4	39.1
Single parent	131.6	43.4	34.2	22.4
Other[2]	122.8	55.0	30.2	14.7
Family type, fall 1998 through spring 2004				
Two parents, all rounds	144.3	21.9	33.4	44.7
Single parent, all rounds	132.0	43.1	36.5	20.4
Other, all rounds[2]	125.7	45.5	31.2	23.3 !
Two parents to single parent	138.5	26.4	42.9	30.7
Single parent to two parents	133.2	41.7	33.3	25.1
Multiple changes	132.5	43.2	32.1	24.6
Primary home language at kindergarten entry				
English	139.3	30.2	33.6	36.3
Not English	127.1	52.6	31.8	15.6

See notes at end of table.

Table 2. Mean reading scale scores, and percentage distribution of spring fifth-grade reading scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	136.4	35.1	33.6	31.3
Private	147.8	16.4	31.8	51.8
School type, fall 1998 through spring 2004				
Public school, all rounds	135.5	36.8	33.4	29.8
Private school, all rounds	149.8	12.8	33.3	54.0
Public school to private school	141.1	27.7	29.2	43.2
Private school to public school	145.4	18.8	36.1	45.2
Multiple changes	138.6	27.1 !	38.6	34.3
Grade level of child, spring 2004				
Below grade level	113.3	75.2	18.3	6.5
Fifth grade	141.4	26.6	35.9	37.5
Above grade level	165.0	3.2 !	4.4 !	92.4
Fall kindergarten reading achievement, overall scale score				
Lowest third	124.6	53.3	34.5	12.2
Middle third	137.5	32.6	38.8	28.6
Highest third	154.4	7.1	28.1	64.8
Number of places child has lived, fall 1998 through spring 2004				
One place	141.2	27.0	33.6	39.4
Two places	139.3	30.1	33.4	36.5
Three places	136.9	35.0	34.8	30.2
Four or more places	132.7	40.2	39.0	20.8
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	138.9	30.6	34.2	35.2
One change, across rounds	138.3	31.5	34.4	34.1
Two changes, across rounds	135.5	37.5	31.8	30.7
Three or more changes, across rounds	129.0	54.8	21.8	23.4

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: The ECLS-K fifth grade overall reading scale score had a potential range of 0 to 186. Detail may not sum to totals because of rounding. Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table 3. Percentage of children who demonstrate certain specific reading knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Understanding words in context	Making literal inference	Deriving meaning from text	Interpreting beyond text	Evaluating nonfiction
Total	97.1	86.5	70.5	44.4	7.3
Child's sex					
Male	96.6	85.1	68.3	42.9	7.1
Female	97.6	88.1	72.8	46.0	7.5
Child's race/ethnicity[1]					
White, non-Hispanic	98.0	90.6	78.8	51.0	9.9
Black, non-Hispanic	95.0	78.1	53.5	31.1	2.2
Hispanic	96.1	81.7	59.8	35.5	3.6
Asian, non-Hispanic	97.7	89.7	77.1	49.1	8.2
Other, non-Hispanic	95.8	82.0	64.4	40.2	6.4
Poverty status, spring 2004					
Below poverty threshold	93.4	73.6	47.6	27.7	1.8
At or above poverty threshold	98.2	90.5	77.7	49.7	9.0
Poverty status, fall 1998 through spring 2004					
Below, all rounds	93.1	70.9	40.8	23.3	0.7
At or above, all rounds	98.6	92.4	81.8	53.3	10.6
In and out of poverty	95.9	81.4	59.8	35.1	3.4
Mother's highest level of education, spring 2004					
Less than high school	92.7	70.7	42.5	24.0	0.7
High school diploma or equivalent	96.4	83.3	63.8	38.7	4.8
Some college or vocational technical degree	97.6	88.3	72.6	44.4	5.6
Bachelor's degree or higher	99.2	95.4	89.1	61.4	15.9
Family type, spring 2004					
Two parents	97.6	88.7	75.1	48.3	8.9
Single parent	96.4	83.0	62.4	37.0	4.0
Other[2]	92.9	74.9	50.5	29.3	1.1
Family type, fall 1998 through spring 2004					
Two parents, all rounds	98.1	90.9	79.5	52.2	10.6
Single parent, all rounds	96.8	84.5	63.4	36.6	4.4
Other, all rounds[2]	92.9	75.4	56.5	33.6	1.2 !
Two parents to single parent	97.7	88.1	73.4	44.6	5.6
Single parent to two parents	96.9	85.1	65.6	38.3	3.0
Multiple changes	96.6	83.3	62.4	38.4	4.6
Primary home language at kindergarten entry					
English	97.3	87.7	73.0	46.4	8.0
Not English	95.4	79.4	55.1	32.3	3.2

See notes at end of table.

Table 3. Percentage of children who demonstrate certain specific reading knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Understanding words in context	Making literal inference	Deriving meaning from text	Interpreting beyond text	Evaluating nonfiction
School type, spring 2004					
Public	96.9	85.8	69.0	43.0	6.6
Private	98.5	93.0	83.8	56.5	13.5
School type, fall 1998 through spring 2004					
Public school, all rounds	96.7	85.1	67.6	42.1	6.4
Private school, all rounds	99.1	95.1	87.6	58.3	11.8
Public school to private school	96.9	87.1	72.5	49.6	14.9
Private school to public school	98.5	92.4	82.2	53.0	10.0
Multiple changes	97.7	90.1	76.4	43.7	3.6 !
Grade level of child, spring 2004					
Below grade level	91.1	65.3	34.5	20.2	0.9 !
Fifth grade	98.0	89.9	76.2	48.2	8.2
Above grade level	99.8	98.7	96.9	79.8	38.5 !
Fall kindergarten reading achievement, overall scale score					
Lowest third	94.5	77.2	53.1	29.9	1.8
Middle third	97.9	88.6	72.1	42.7	4.6
Highest third	99.4	96.6	91.9	64.6	16.7
Number of places child has lived, fall 1998 through spring 2004					
One place	97.8	89.0	75.1	48.4	9.0
Two places	97.3	87.8	72.9	46.4	8.2
Three places	97.3	86.8	70.4	43.0	5.4
Four or more places	96.7	84.0	65.7	38.0	4.3
Number of schools child has attended, fall 1998 through spring 2004					
Same school, every round	97.3	87.6	72.6	45.8	7.2
One change, across rounds	97.1	87.0	71.6	45.2	7.9
Two changes, across rounds	96.7	84.9	67.1	42.2	6.9
Three or more changes, across rounds	96.0	80.4	57.7	34.6	3.8 !

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table 4. Mean mathematics scale scores, and percentage distribution of spring fifth-grade mathematics scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	111.9	33.3	33.4	33.3
Child's sex				
Male	114.1	29.8	33.3	37.0
Female	109.6	37.0	33.5	29.5
Child's race/ethnicity[1]				
White, non-Hispanic	117.3	22.9	34.4	42.7
Black, non-Hispanic	97.9	61.8	27.2	11.0
Hispanic	107.4	40.6	36.4	22.9
Asian, non-Hispanic	119.7	20.4	31.5	48.1
Other, non-Hispanic	106.4	42.2	31.6	26.2
Poverty status, spring 2004				
Below poverty threshold	98.7	56.9	30.7	12.4
At or above poverty threshold	116.1	25.8	34.3	39.9
Poverty status, fall 1998 through spring 2004				
Below, all rounds	94.7	66.0	25.8	8.2
At or above, all rounds	119.0	21.0	33.5	45.6
In and out of poverty	105.7	42.7	37.2	20.1
Mother's highest level of education, spring 2004				
Less than high school	95.4	62.4	27.3	10.3
High school diploma or equivalent	107.1	40.0	37.2	22.8
Some college or vocational technical degree	112.8	31.6	36.1	32.3
Bachelor's degree or higher	124.6	13.1	28.5	58.4
Family type, spring 2004				
Two parents	115.3	26.4	34.3	39.3
Single parent	105.3	47.7	31.1	21.2
Other[2]	99.0	53.7	36.7	9.6
Family type, fall 1998 through spring 2004				
Two parents, all rounds	118.3	21.4	33.1	45.5
Single parent, all rounds	105.6	49.5	32.3	18.2
Other, all rounds[2]	97.6	54.3	34.8	10.9 !
Two parents to single parent	112.7	33.0	32.4	34.7
Single parent to two parents	108.3	40.1	41.7	18.2
Multiple changes	106.5	37.6	41.6	20.7
Primary home language at kindergarten entry				
English	112.9	31.6	33.2	35.2
Not English	106.1	43.2	33.4	23.4

See notes at end of table.

Table 4. Mean mathematics scale scores, and percentage distribution of spring fifth-grade mathematics scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	111.2	34.5	33.4	32.1
Private	118.5	22.1	32.7	45.2
School type, fall 1998 through spring 2004				
Public school, all rounds	110.5	35.9	33.0	31.1
Private school, all rounds	120.2	16.5	36.8	46.7
Public school to private school	113.4	38.1	20.2	41.8
Private school to public school	119.4	19.9	33.7	46.4
Multiple changes	108.6	38.9	44.5	16.6 !
Grade level of child, spring 2004				
Below grade level	92.5	68.8	23.3	7.9
Fifth grade	115.0	27.6	35.1	37.3
Above grade level	133.6	2.7 !	25.4 !	71.9
Fall kindergarten mathematics achievement, overall scale score				
Lowest third	95.2	64.0	28.9	7.2
Middle third	112.3	30.1	43.7	26.2
Highest third	128.3	5.8	27.4	66.8
Number of places child has lived, fall 1998 through spring 2004				
One place	115.8	26.9	32.8	40.3
Two places	112.7	31.9	33.4	34.6
Three places	111.3	30.7	41.2	28.1
Four or more places	105.7	42.3	32.8	24.9
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	113.4	29.7	34.7	35.5
One change, across rounds	112.5	32.1	34.1	33.8
Two changes, across rounds	110.2	38.0	29.5	32.5
Three or more changes, across rounds	102.0	51.6	33.9	14.5

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: The ECLS-K fifth grade overall mathematics scale score had a potential range of 0 to 153. Detail may not sum to totals because of rounding. Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table 5. Percentage of children who demonstrate certain specific mathematics knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Multi-plication and division	Place value	Rate and measure-ment	Fractions	Area and volume
Total	92.4	73.5	42.9	13.2	1.8
Child's sex					
Male	93.3	76.6	46.7	16.1	2.4
Female	91.5	70.3	39.0	10.2	1.2
Child's race/ethnicity[1]					
White, non-Hispanic	95.3	81.6	52.4	17.7	2.5
Black, non-Hispanic	84.2	52.1	19.3	2.7	0.3 !
Hispanic	91.1	67.6	33.7	7.3	0.8
Asian, non-Hispanic	95.2	83.4	57.5	23.8	3.7
Other, non-Hispanic	87.6	64.0	35.4	11.9	1.3
Poverty status, spring 2004					
Below poverty threshold	84.2	53.1	21.6	3.5	0.3
At or above poverty threshold	95.0	80.1	49.8	16.3	2.2
Poverty status, fall 1998 through spring 2004					
Below, all rounds	81.1	44.8	16.1	3.0 !	0.2
At or above, all rounds	96.2	84.0	55.1	19.2	2.7
In and out of poverty	89.6	65.6	31.3	6.2	0.6
Mother's highest level of education, spring 2004					
Less than high school	80.2	47.0	18.5	3.5	0.5
High school diploma or equivalent	90.3	67.5	33.9	7.2	0.8
Some college or vocational technical degree	94.4	76.2	42.9	10.8	1.3
Bachelor's degree or higher	98.3	90.4	65.8	28.4	4.0
Family type, spring 2004					
Two parents	94.1	78.7	48.9	16.3	2.2
Single parent	89.6	63.4	30.9	6.7	0.8
Other[2]	81.2	58.6	23.5	2.0 !	0.1
Family type, fall 1998 through spring 2004					
Two parents, all rounds	95.5	82.8	54.4	19.3	2.6
Single parent, all rounds	90.5	64.8	30.1	6.0	1.0 !
Other, all rounds[2]	76.7	56.9	24.5	2.7 !	0.2 !
Two parents to single parent	93.6	74.4	43.7	13.3	1.6
Single parent to two parents	93.0	69.7	32.3	9.6	1.6 !
Multiple changes	89.3	66.7	34.2	6.4	0.7
Primary home language at kindergarten entry					
English	92.9	75.0	44.7	14.1	1.9
Not English	89.2	64.8	33.0	8.6	1.2

See notes at end of table.

Table 5. Percentage of children who demonstrate certain specific mathematics knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Multi-plication and division	Place value	Rate and measure-ment	Fractions	Area and volume
School type, spring 2004					
Public	92.0	72.5	41.7	12.6	1.7
Private	96.1	83.3	54.3	18.2	2.4
School type, fall 1998 through spring 2004					
Public school, all rounds	91.5	71.3	40.7	11.9	1.6
Private school, all rounds	97.9	87.4	57.0	15.4	2.0
Public school to private school	91.1	71.6	46.9	22.9	3.0
Private school to public school	96.3	83.8	56.0	22.1	2.7
Multiple changes	95.4	76.2	26.0	4.8 !	1.6 !
Grade level of child, spring 2004					
Below grade level	78.1	41.4	14.0	3.4 !	0.3 !
Fifth grade	94.7	78.6	47.5	14.7	2.0
Above grade level	99.7	96.5	79.9	60.0 !	10.2 !
Fall kindergarten mathematics achievement, overall scale score					
Lowest third	82.1	47.2	15.4	1.7	0.1
Middle third	95.6	77.6	39.3	7.5	0.6
Highest third	99.5	95.7	74.0	30.5	4.7
Number of places child has lived, fall 1998 through spring 2004					
One place	94.5	79.0	49.7	17.0	2.5
Two places	92.7	74.7	44.7	13.5	1.5
Three places	93.1	75.0	40.1	9.7	0.8
Four or more places	88.5	65.2	32.3	7.2	0.8 !
Number of schools child has attended, fall 1998 through spring 2004					
Same school, every round	93.2	76.1	45.9	13.2	1.7
One change, across rounds	92.7	74.3	43.9	14.3	1.9
Two changes, across rounds	91.7	70.3	39.8	12.1	1.7
Three or more changes, across rounds	86.6	59.7	23.9	6.8 !	1.6 !

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table 6. Mean science scale scores, and percentage distribution of spring fifth-grade science scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	56.7	33.3	33.3	33.3
Child's sex				
Male	58.5	29.2	33.3	37.5
Female	54.7	37.7	33.4	29.0
Child's race/ethnicity[1]				
White, non-Hispanic	61.6	19.6	35.2	45.2
Black, non-Hispanic	45.9	63.0	26.6	10.4
Hispanic	51.4	47.8	34.7	17.5
Asian, non-Hispanic	57.9	32.5	27.1	40.4
Other, non-Hispanic	53.2	43.1	31.4	25.6
Poverty status, spring 2004				
Below poverty threshold	46.4	62.3	26.8	10.9
At or above poverty threshold	59.8	24.4	35.0	40.6
Poverty status, fall 1998 through spring 2004				
Below, all rounds	43.4	70.7	22.7	6.6
At or above, all rounds	61.9	18.8	34.4	46.8
In and out of poverty	52.0	45.3	36.7	18.0
Mother's highest level of education, spring 2004				
Less than high school	44.7	67.0	25.4	7.6
High school diploma or equivalent	53.6	42.1	32.6	25.3
Some college or vocational technical degree	57.2	29.7	39.6	30.8
Bachelor's degree or higher	65.3	11.5	28.5	60.1
Family type, spring 2004				
Two parents	58.9	27.4	33.4	39.3
Single parent	52.2	45.1	33.0	21.9
Other[2]	47.5	51.5	34.8	13.7
Family type, fall 1998 through spring 2004				
Two parents, all rounds	61.0	21.3	33.9	44.8
Single parent, all rounds	52.5	41.8	36.5	21.7
Other, all rounds[2]	49.0	52.2	23.8	24.1 !
Two parents to single parent	57.5	32.7	30.8	36.5
Single parent to two parents	54.4	41.6	31.3	27.1
Multiple changes	54.6	41.6	32.9	25.6
Primary home language at kindergarten entry				
English	57.9	29.4	34.4	36.2
Not English	49.1	57.1	27.6	15.3

See notes at end of table.

Table 6. Mean science scale scores, and percentage distribution of spring fifth-grade science scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	56.1	34.8	33.8	31.5
Private	62.1	21.2	28.1	50.7
School type, fall 1998 through spring 2004				
Public school, all rounds	55.6	36.2	33.5	30.3
Private school, all rounds	62.7	16.4	34.0	49.6
Public school to private school	59.1	35.6	14.0	50.4
Private school to public school	60.6	25.4	29.9	44.7
Multiple changes	58.6	15.2 !	63.1	21.7 !
Grade level of child, spring 2004				
Below grade level	45.3	67.0	23.3	9.7
Fifth grade	58.5	28.0	35.0	37.0
Above grade level	72.6	3.2 !	10.5 !	86.4
Fall kindergarten general knowledge achievement, overall scale score				
Lowest third	46.6	62.7	28.9	8.4
Middle third	58.3	25.3	44.8	30.0
Highest third	67.9	4.0	28.9	67.1
Number of places child has lived, fall 1998 through spring 2004				
One place	59.0	26.9	33.6	39.5
Two places	58.1	29.6	32.3	38.1
Three places	56.7	33.3	36.1	30.6
Four or more places	54.0	42.2	40.0	17.8
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	57.6	30.4	34.2	35.4
One change, across rounds	56.8	33.5	32.2	34.3
Two changes, across rounds	55.6	36.9	32.1	31.0
Three or more changes, across rounds	52.7	38.8	43.7	17.4

! Interpret with caution. Standard error is more than one third as large as estimate.

[1]The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race).

[2]Other refers to related and unrelated guardian(s).

NOTE: The ECLS-K fifth grade overall science scale score had a potential range of 0 to 92. Detail may not sum to totals because of rounding. Estimates were weighted by C1_6FC0.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Appendix A
Survey Methodology and Glossary

Survey Methodology

The National Center for Education Statistics in the Institute of Education Sciences, U.S. Department of Education, has sponsored the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) to provide detailed information on children's school achievement and experiences. Estimates in this report are based on information collected by Westat. The children participating in the ECLS-K are followed longitudinally from kindergarten and into the later grades. Estimates in this report are based on data collected from and about children when they entered kindergarten for the first time in the fall of 1998, in the spring of 2000 (when most of the children were in first grade), in the spring of 2002 (when most were third-graders), and in the spring of 2004 (when most children were in fifth grade).

Sample Design

A nationally representative sample of 22,782 children enrolled in 944 kindergarten programs during the 1998–99 school year participated in the ECLS-K. The children attended both public and private kindergartens that offered full-day and part-day programs. The sample includes children from different racial/ethnic and socioeconomic backgrounds and includes oversamples of Asian/Pacific Islander children, private kindergartens, and private kindergartners.

Sampling for the ECLS-K involved a dual-frame, multistage sampling design. The first stage of sampling involved the selection of 100 primary sampling units (PSU) from a national sample of PSUs. The PSUs were counties and county groups. Public and private schools were then selected within the PSUs, and children were sampled from the selected schools. Public schools were selected from the NCES 1995–96 Common Core of Data (CCD) Universe File, which is a public school frame, and private schools were selected from a private school frame developed from the 1995–96 Private School Survey (PSS), another NCES survey.[14] Approximately 23 kindergartners were selected in each of the sampled schools. In the spring of first grade, the sample was freshened to obtain a nationally representative sample of first-graders by bringing into the study first-graders who were not enrolled in kindergarten during the 1998–99 school year and therefore did not have an opportunity for selection in the base year.

In the first grade data collection, while all students still enrolled in their base-year schools were recontacted, a 50-percent subsample of base-year students who had transferred from their kindergarten school was followed. For information on freshening procedures and subsampling of transfer children (i.e., movers), refer to the *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, First-Grade Public-Use Data Files and Electronic Codebook* (U.S. Department of Education 2002). The third-grade data collection targeted base-year respondents

[14]During the spring of 1998, Westat identified new schools that were not found on either frame. A sample of these schools was included in the ECLS-K school sample.

and children sampled in first grade through the freshening operation. Sample freshening was not implemented in third or fifth grade; hence no new students entered the sample. As in the first-grade data collection, for the third-grade collection, a subsample of students who had transferred from their school was followed, and all others were followed at 50 percent. In third grade, however, the subsampling rate applied to transferred children was slightly higher: children whose home language was not English (also known as children belonging to the language minority group) and who moved for the first time in third grade were followed at 100 percent. For a detailed description of the third-grade sample, see the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) Third Grade Public-Use Data Files and Electronic Code Book* (U.S. Department of Education 2003).

In fifth grade, the sample that was fielded was reduced by excluding certain special groups of children from data collection, and by setting differential sampling rates for movers in different categories. Specifically, children in four groups were not fielded for the fifth-grade survey, irrespective of other subsampling procedures that were implemented. The groups were (1) children who became ineligible in an earlier round because they died or moved out of the country, (2) children who were subsampled out in previous rounds because they were movers, (3) children whose parents emphatically refused to cooperate (hard refusals), and (4) children eligible for the third-grade sample for whom there were neither first-grade nor third-grade data. Of the remaining children, those who moved from their original schools during fifth grade or earlier were subsampled for follow-up. Children whose home language was not English (language minority) continued to be a special domain of analytic interest, and were subsampled at higher rates.

Of the remaining children, those who moved from their original schools during fifth grade or earlier were subsampled for follow-up. In order to contain the cost of data collection, the rate of subsampling was lower in fifth grade than it had been in previous years. The subsampling rates maximize the amount of longitudinal data available for key analytic groups. Children whose home language is not English (language minority) continued to be a special domain of analytic interest, and were subsampled at higher rates. Children were subsampled at different rates depending on the longitudinal data available for those children.

For base-year respondents, the sampling rates for following movers are as follows:

- 0.33 for non-language minority (LM) movers with full longitudinal data;
- 0.25 for non-LM movers with third-grade but not first-grade data;
- 0.15 for non-LM movers with first-grade but not third-grade data;
- 0.75 for LM movers with full longitudinal data;
- 0.50 for LM movers with third-grade but not first-grade data; and
- 0.25 for LM movers with first-grade but not third-grade data.

The subsampling rate for children added to the sample in spring 2000 when it was freshened who were movers in spring 2004 (or earlier) are as follows:

- 0.33 for non-LM movers with full longitudinal data;
- 0.15 for non-LM movers with third-grade but not first-grade data;

- 0.15 for non-LM movers with first-grade but not third-grade data;
- 0.75 for LM movers with full longitudinal data;
- 0.25 for LM movers with third-grade but not first-grade data; and
- 0.25 for LM movers with first-grade but not third-grade data.

These rates are different than those used in third grade where movers were subsampled uniformly at a rate of 0.5, and language minority children were followed at 100 percent (unless they were already subsampled out in first grade). The mover follow-up activities that originally targeted a 50 percent subsample of children in base year schools resulted in a 54 percent subsample with the addition of language minority children in third grade. For fifth grade, these mover follow-up activities targeted a 42 percent subsample of movers who were eligible to be fielded in fifth grade and resulted in a 41 percent subsample. See the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 Fifth-Grade Data Files and Electronic Code Book* (U.S. Department of Education 2006) for a more detailed description of the fifth-grade sample.

Fall kindergarten data were obtained from September to December 1998, with 80 percent of the assessments conducted between early October and mid-November. The spring kindergarten data were obtained from March to June 1999, with 80 percent of the assessments conducted between mid-April and late May. Spring first-grade data were obtained from March to July 2000, and spring third-grade data were obtained from March to July 2002, with 80 percent of the assessments at each round conducted between early April and late May. Spring fifth-grade data were collected from February through June 2004, with over 75 percent of the child assessments completed by the end of April.

Response Rates

A total of 944 of the 1,277 originally sampled schools participated during the base year of the study. This translates into a weighted response rate (weighted by the base weight) of 74 percent for the base year of the study. The school response rate during the spring of the base year (74.2 percent) was higher than during the fall (69.4 percent); this was because some of the schools that originally declined to participate decided to participate in the spring. Nearly all (99.4 percent) of the schools that participated in the fall of the base year also participated in the spring.

The weighted child base-year survey completion rate was 92 percent (i.e., 92 percent of the children were assessed at least once during kindergarten). The weighted parent base-year completion rate was 89 percent (i.e., a parent interview was completed at least once during kindergarten). Thus, the weighted overall base-year response rate for children was 68.1 percent (74 percent x 92 percent) and the weighted base-year response rate for the parent interview was 65.9 percent (74 percent x 89 percent). About 95 percent of the children and 94 percent of the parents who participated in the fall of kindergarten also participated in the spring. About 88 percent of the children and 85 percent of the parents who were eligible for the spring first-grade data collection participated. In the spring of 2002 (third grade), about 80 percent of the children and 77 percent of the parents who were eligible for the spring third-grade data collection participated. Finally, about 85 percent of children and 89 percent of parents eligible for the

spring fifth-grade data collection (spring 2004) participated (U.S. Department of Education 2006).

A nonresponse bias analysis was conducted to determine if substantial bias was introduced as a result of the base-year school nonresponse. For information on the nonresponse bias analysis, refer to the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 Base Year Public-Use Data Files and Electronic Codebook* (U.S. Department of Education 2001) and the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 First-Grade Public-Use Data Files and Electronic Codebook* (U.S. Department of Education 2002). Findings from these analyses suggest that there is not a substantial bias due to nonresponse.

The item nonresponse rates for the variables used in this report are low, ranging from 0 to about 1.5 percent for the analysis sample. A few of the variables were fully imputed and have no missing data (e.g., mother's education). More information on item missing data can be found in the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 Fifth-Grade Restricted-Use Child File* (U.S. Department of Education 2006).

Data Reliability

Estimates produced using data from the ECLS–K are subject to two types of error, sampling and nonsampling errors. Nonsampling errors are errors made in the collection and processing of data. Sampling errors occur because the data are collected from a sample rather than a census of the population. A detailed discussion of these types of errors can be found in *America's Kindergartners* (West, Denton, and Germino Hausken 2000).

Standard Errors and Weights

As in previous years, the ECLS-K data are weighted to compensate for unequal probabilities of selection at each sampling stage and to adjust for the effects of school, child, teacher, and parent nonresponse. However, unlike the kindergarten and first-grade years, the sample was not freshened after the first grade year with third- or fifth-graders who did not have a chance to be sampled in kindergarten or first grade. Therefore, estimates from the ECLS-K third- and fifth-grade data are representative of the population cohort rather than all third-graders in 2001–02 or all fifth-graders in 2003–04. In addition, the teachers and schools are not representative of third-grade teachers and schools in 2001–02, or of fifth-grade teachers and schools in 2003–04. A brief description of the weighting process follows. The first stage of the weighting process assigns weights to the sampled primary sampling units (PSUs) that are equal to the inverse of the PSU probability of selection.[15] The second stage of the weighting process assigns weights to the schools sampled within PSUs. The base weight for each sampled school is the PSU weight multiplied by the inverse of the probability of selecting the school. The base weights for eligible schools are adjusted for nonresponse. These adjustments are made separately for public and private schools.

[15]The approach used to develop weights for the ECLS-K is described in the *ECLS-K Data Files and Electronic Codebooks* (U.S. Department of Education 2001, U.S. Department of Education 2002, U.S. Department of Education 2003, and U.S. Department of Education 2006).

The base weight for each child in the sample is the school nonresponse adjusted weight for the school the child attends, multiplied by a post-stratified within-school student weight (total number of students in the school, divided by the number of students sampled in the school). The child panel weight (C1_6FC0), which is the weight used to produce the estimates found in this report, is the base-year child weight adjusted for nonresponse to the child assessments at each round of data collection. Only those cases with child assessment data in both fall and spring of kindergarten, spring of first grade, spring of third grade, and spring of fifth grade are included in this weighting procedure.[16] Again, these adjustments are made separately for public and private schools. This weight sums to the population of all children who attended kindergarten in the fall of 1998.

In addition to properly weighting the responses, special procedures for estimating the statistical significance of the estimates were employed, because the data were collected using a complex sample design. Complex sample designs, like that used in the ECLS-K, result in data that violate the assumptions that are normally required to assess the statistical significance of results. Frequently, standard errors of estimates based on complex samples are larger than those based on simple random samples. Replication methods of variance estimation were used to reflect the multistage sample design used in the ECLS-K. Using SAS-callable SUDAAN statistical software,[17] the jackknife replication method (JK2) was used with 90 ECLS-K replicate weights to compute approximately unbiased estimates of the standard errors of the estimates in the report. The jackknife method was used to estimate the precision of the estimates of the reported national percentages and means.

Statistical Procedures

Comparisons made in the text were tested for statistical significance at the $p<.05$ level to ensure that the differences are larger than might be expected due to sampling variation. When comparing estimates between categorical groups (e.g., sex, race/ethnicity), *t* statistics were calculated. The formula used to compute the *t* statistic was

$$t = \frac{Est_1 - Est_2}{\sqrt{SE_1^{\,2} + SE_2^{\,2}}}$$

where Est_1 and Est_2 are the estimates being compared and SE_1 and SE_2 are their corresponding standard errors. Due to the large sample size, many differences (no matter how substantively minor) are statistically significant. In this report, we define "substantive differences" as percentage differences of 5 points or greater, unless percentages fall below 5 or above 95

[16]Children received a valid child assessment weight if they participated in any part of the child assessment, such as the height and weight measurements, at each time period. Thus, children who were unable to take the cognitive assessments because of their disability or language status could still have a valid child assessment weight.
[17]SUDAAN statistical software is designed to calculate estimates and appropriate standard errors for multistage, stratified, and unequal probability sample designs.

percent, or mean score differences with a Cohen's *d* of .2 or greater. The formula used to compute the *d* statistic was

$$d = \frac{Est_1 - Est_2}{\sqrt{\frac{(n_1 - 1)(SE_1\sqrt{n_1})^2 + (n_2 - 1)(SE_2\sqrt{n_2})^2}{n_1 + n_2}}}$$

where Est_1 and Est_2 are the mean scores being compared, SE_1 and SE_2 are their corresponding standard errors, and n_1 and n_2 are their corresponding unweighted sample sizes. Differences were only discussed if they were both statistically significant and substantive.

Glossary: Constructs and Variables Used in Analysis

Direct Cognitive Assessment: Reading, Mathematics, and Science

The direct cognitive assessments were individually administered at all six time points. A two-stage cognitive assessment approach was used to maximize the accuracy of measurement and reduce administration time by using the children's responses from a brief first-stage routing test to select a second-stage form of the appropriate level of difficulty.

The kindergarten-first grade (K-1) cognitive assessment focused on three general content areas: (1) reading; (2) mathematics; and (3) knowledge of the social and physical world, referred to as "general knowledge." The K-1 assessment did not ask the children to write anything or to explain their reasoning; rather, children pointed to their answers or responded orally to complete the tasks. The assessment battery was administered using small easels with the items printed on one side and administration instructions for the assessor on the other side. Assessors entered children's responses on a laptop computer.

The third- and fifth-grade direct cognitive assessments, as in previous years, included reading and mathematics domains. By third grade, however, children's knowledge of the world is more categorized into science and social studies domains. With limited time available for direct assessment, the assessments after first grade included only the science domain. Easels were used to administer items in reading, mathematics, and science. The students also completed workbooks with open-ended mathematics questions. The reading passages were in a booklet format to allow the student to refer back to the story when answering the questions. The assessor read all questions. While the child read the response options in the reading assessment, all the response options were read to the child in the mathematics and science assessments.

The ECLS-K fifth-grade direct cognitive assessment battery was designed to assess children's academic achievement in spring of fifth grade, and to provide a means of measuring growth

since kindergarten entry.[18] Therefore, the cognitive assessments (the K-1 assessment and the third- and fifth-grade assessments) were designed to have overlapping items, i.e., items that were included in at least two rounds of data collection.

Reading. The K-1 reading assessment included questions designed to measure basic skills (print familiarity, letter recognition, beginning and ending sounds, creating rhyming words, "sight" word recognition), vocabulary (receptive vocabulary), and comprehension (listening comprehension, words in context). Comprehension items measured skills in initial understanding, developing interpretation, personal reflection, and demonstrating critical stance.

The third-grade reading assessment included items designed to measure phonemic awareness, single word decoding, vocabulary (reading), and passage comprehension. Comprehension measured skills in initial understanding, developing interpretation, personal reflection, and demonstrating a critical stance. The passage reading section examined sentence, paragraph, and story comprehension and was composed of a variety of literary genres including poetry, letters, informational text, and narrative text.

In the fifth grade, items were added to the reading assessment. These items were more difficult and contributed to the formation of a proficiency level where children demonstrated their ability to comprehend biographical and expository text (evaluating nonfiction). Children were required to identify the tone of a remark, the author's purpose for a selection, and evidence for and against theories discussed in the text.

In addition to serving as an overall indicator of children's reading knowledge and skills (i.e., an overall scale score), the third- and fifth-grade reading battery links with the kindergarten and first-grade reading battery, creating the information on the following specific reading skills (i.e., proficiency scores): (1) identifying upper- and lower-case letters of the alphabet by name (letter knowledge); (2) associating letters with sounds at the beginning of words (beginning sounds); (3) associating letters with sounds at the end of words (ending sounds); (4) recognizing common "sight" words (sight words); (5) reading words in context (words in context); (6) making inferences using cues that were directly stated with key words in text (literal inference); (7) identifying clues used to make inferences (extrapolation); (8) demonstrating understanding of author's craft and making connections between a problem in the narrative and similar life problems (evaluation); and (9) comprehension of biographical and expository text (evaluating nonfiction).

This E.D. TAB presents information on children's overall reading knowledge and skills. Additionally, this E.D. TAB presents information on the children's specific reading skills associated with fifth grade (proficiency levels 5 through 9—words in context; literal inference; deriving meaning, interpreting beyond text; and evaluating nonfiction). Skill levels 1 through 4 (letter knowledge, beginning sounds, ending sounds, and sight words) are achieved by nearly all normally-developing children by the time they enter fifth grade and thus are not addressed in this report.

[18]For more information on the ECLS-K direct cognitive assessment please see the User's Manuals on the *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 Fifth-Grade Restricted-Use Child File* (U.S. Department of Education 2006).

Mathematics. The K-1 mathematics assessment was designed to measure skills in conceptual knowledge, procedural knowledge, and problem solving. The third- and fifth-grade mathematics assessments addressed the following content strands: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and patterns, algebra, and functions. The cognitive processes (conceptual, procedural, and problem solving) were assessed in each of the strands. Some of the items drew upon knowledge from more than one strand. For example, an item might require that a child apply knowledge about geometry, measurement, and number operations to answer the question correctly.

In addition to serving as an overall indicator of children's mathematics knowledge and skills (i.e., an overall scale score), the third- and fifth-grade mathematics battery links with the kindergarten and first-grade mathematics battery, creating the information on the following specific mathematics skills (i.e., proficiency scores): (1) identifying some one-digit numerals, recognizing geometric shapes, and one-to-one counting up to 10 objects (number and shape); (2) reading all one-digit numerals, counting beyond 10, recognizing a sequence of patterns, and using nonstandard units of length to compare the size of objects (relative size); (3) reading two-digit numerals, recognizing the next number in a sequence, identifying the ordinal position of an object, and solving a simple word problem (ordinality and sequence); (4) solving simple addition and subtraction problems (addition and subtraction); (5) solving simple multiplication and division problems and recognizing more complex number patterns (multiplication and division); (6) demonstrating understanding of place value in integers to the hundreds place (place value); (7) using knowledge of measurement and rate to solve word problems (rate and measurement); (8) solving problems using fractions (fractions); and (9) solving word problems involving area and volume (area and volume).

This E.D. TAB presents information on children's overall mathematics knowledge and skills. Additionally, this E.D. TAB presents information on specific mathematics skills that are expected to develop between the spring of third grade and the spring of fifth grade (proficiency levels 5 through 9—multiplication and division; place value; rate and measurement; fractions; and area and volume).

Science. The third- and fifth-grade batteries differed from the K-1 battery. The K-1 battery included a measure of general knowledge whereas the third- and fifth-grade batteries included a measure of science. The K-1 general knowledge assessment battery consisted of items that measured knowledge in the natural sciences and social studies in a single scale. The third- and fifth-grade science assessment placed equal emphasis on life science, earth and space science, and physical science. Similar to the K-1 assessment of general knowledge, children needed to demonstrate understanding of the physical and natural world, draw inferences, and comprehend relationships. The content of the science assessment did not lend itself to the formation of proficiency levels. Therefore, this E.D. TAB presents information on children's overall science knowledge and skills.

Child and Family Characteristics

A number of variables used in this report were derived by combining information from one or more questions in the ECLS-K study instruments. The name of the source variable as presented

on the ECLS–K Public-Use Data File is shown after the description in all capital letters within brackets. More information on the derivation of key variables is described in Chapter 7 of the *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Fifth-Grade Data File and Electronic Codebook* (U.S. Department of Education 2006).

- **Child's sex [R6GENDER].** This composite is mainly taken from information confirmed in the fall kindergarten parent interview. If the parent interview indicated a sex different from the field management system, then the parent interview information took priority.

- **Child's race/ethnicity [W5RACETH].** In spring of fifth grade, the race of the focal child was no longer collected in the parent interview; thus, race information is based on race collected in previous parent interviews and the FMS. The race/ethnicity composite on the ECLS-K fifth-grade restricted-use data file was constructed from two parent-reported variables: ethnicity and race. Following the 1997 Office of Management and Budget guidelines, respondents were allowed to indicate that their child belonged to more than one of the following race categories: White, Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander. In addition, each respondent was asked to identify whether the child was Hispanic. The following are the five composite race/ethnicity categories presented in this report: White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and Other, non-Hispanic (which includes Native Hawaiian, Pacific Islanders, American Indians, Alaska Natives, and non-Hispanic children of more than one race). When race/ethnicity differences are presented in this report, White refers to White, non-Hispanic, and Black refers to Black, non-Hispanic.

- **Poverty status, spring 2004 [W5POVRTY].** The federal poverty level status composite variable is derived from household income and the total number of household members. Federal poverty thresholds are used to define households below the poverty level. Households whose income fell below the appropriate threshold based on Census information from 2003 were classified as living in poverty. For example, if a household contained two members, and the household income was lower than $12,015, then the household was considered to be below the poverty threshold.

- **Poverty status, fall 1998 through spring 2004 [derived from WKPOV_R, W1POVRTY, W3POVRTY, and W5POVRTY].** This composite variable classified children into three categories: (1) below the poverty threshold, all rounds; (2) at or above the poverty threshold, all rounds; and (3) in and out of poverty across rounds. The composite was derived from poverty status variables for kindergarten, first grade, third grade, and fifth grade. The poverty status variables were created using federal poverty thresholds and derived from household income and the number of household members.

- **Mother's highest level of education, spring 2004 [W5MOMED].** This composite is derived from parent interview information on the mother's educational attainment, and is imputed using hot-deck procedures if missing. For this report, the composite was collapsed into a four-category variable: less than high school, high school diploma or equivalent, some college or vocational technical degree, and bachelor's degree or higher.

The 260 children without mothers in the household in the fifth-grade year do not have values for this variable.

- **Family type, spring 2004 [P6HFAMIL].** This composite is derived from parent interview information on the number of parents and siblings in the home. For this report, the composite was collapsed into a three-category variable: two-parent household, single-parent household, and other household. Other households include related and/or unrelated guardians.

- **Family type, fall 1998 through spring 2004 [derived from P1HFAMIL, P2HFAMIL, P4HFAMIL, P5HFAMIL, and P6HFAMIL].** This composite variable classified children into six categories: (1) two parents, all rounds; (2) single parent, all rounds; (3) other parent type, all rounds (related or unrelated guardians(s); (4) two parents to single parent; (5) single parent to two parents; and (6) multiple changes. The composite was derived from family type variables for fall kindergarten, spring kindergarten, spring first grade, spring third grade, and spring fifth grade, which indicated whether a child lived in a home with two parents, a single parent, or some other type of parent at the time of data collection.

- **Primary home language at kindergarten entry [WKLANGST].** This composite is derived from the fall kindergarten parent interview on information on the different languages spoken in the home. Children are classified into two categories for this variable: English language and non-English language.

- **School type, spring 2004 [S6PUPRI].** This variable indicates whether a child attended a public or private school in the spring of fifth grade. Public schools included Bureau of Indian Affairs and tribal schools, public schools of choice (e.g., charter schools), and public schools with magnet programs. Private schools included Catholic schools, other religious private schools, and nonreligious private schools.

- **School type, fall 1998 through spring 2004 [derived from S2KPUPRI, S4PUPRI, S5PUPRI, S6PUPRI].** This composite variable classified children into five categories: (1) public school all years, (2) private school all years, (3) public school to private school, (4) private school to public school, and (5) multiple changes in school type across rounds. The composite was derived from school type variables from the kindergarten, first grade, third grade, and fifth-grade data collections, which indicated whether a child attended a public or private school. Public schools included Bureau of Indian Affairs and tribal schools, public schools of choice (e.g., charter schools), and public schools with magnet programs. Private schools included Catholic schools, other religious private schools, and nonreligious private schools.

- **Grade level of child, spring 2004 [T6GLVL]. Grade level of child, spring 2004 [T6GLVL].** To create the grade-level composite (T6GLVL), five possible sources of information were used: (1) reading teacher questionnaire (Q1 G6GRENRL for grade level); (2) special education teacher part B (Q2 E6ENRGR for grade level); (3) child assessment introductory section (AIQ.030 C6INGRAD; completed by interviewer); (4)

child assessment closing section (ACQ.005 C6FIFTH and ACQ.010 C6GRADE, completed by interviewer); and (5) FMS information about grade level. If conflicts existed among these five sources, the grade level indicated by the majority of the nonmissing sources was used for T6GLVL.

- **Number of places child has lived, fall 1998 through spring 2004 [derived from P4NUMPLA, P5NUMPLA, and P6NUMPLA].** This composite variable classified children into four categories according to the number of places they had lived from kindergarten through fifth grade: (1) one place, (2) two places, (3) three places, and (4) four or more places (the "four or more places" category also included children who never lived in one place for at least 4 months from kindergarten through fifth grade). In first grade, parents were asked how many places the child had lived for 4 months or more since kindergarten. In third and fifth grade, parents were asked how many places the child had lived for 4 months or more since the prior round of information was collected.

- **Number of schools child has attended, fall 1998 through spring 2004 [derived from S1_ID, S2_ID, S4_ID, S5_ID, and S6_ID].** This composite variable classified children into four categories according to how many times they changed schools from kindergarten through fifth grade: (1) same school, every round; (2) one change; (3) two changes; and (4) three or more changes. In the ECLS-K, each school is assigned a unique school identification number. S1_ID (fall kindergarten), S2_ID (spring kindergarten), S4_ID (first grade), S5_ID (third grade), and S6_ID (fifth grade) are the school identification numbers associated with the child for each round of data collection. If a child changed schools, the school identification number changed. Because information was collected in fall kindergarten, spring kindergarten, fall first grade, spring first grade, spring third grade, and spring fifth grade, this variable might slightly underestimate the number of changes in a child's school. That is, we did not collect information in second or fourth grade, and information was not collected on the "total number" of school changes from either the parent or the school records. Therefore, calculating school mobility in this way is a close approximation.

Appendix B
Standard Error Tables

Table B-1. Standard errors for the percentage distribution of child, family, and school characteristics: 1998, 1999, 2000, 2002, and 2004

Characteristic	Percent of children
Total	†
Child's sex	
Male	0.35
Female	0.35
Child's race/ethnicity	
White, non-Hispanic	1.44
Black, non-Hispanic	0.84
Hispanic	1.06
Asian, non-Hispanic	0.20
Other, non-Hispanic	0.93
Poverty status, spring 2004	
Below poverty threshold	1.09
At or above poverty threshold	1.09
Poverty status, fall 1998 through spring 2004	
Below, all rounds	0.70
At or above, all rounds	1.30
In and out of poverty	1.04
Mother's highest level of education, spring 2004	
Less than high school	0.79
High school diploma or equivalent	0.82
Some college or vocational technical degree	1.02
Bachelor's degree or higher	0.94
Family type, spring 2004	
Two parents	1.07
Single parent	1.05
Other	0.33
Family type, fall 1998 through spring 2004	
Two parents, all rounds	1.33
Single parent, all rounds	0.81
Other, all rounds	0.15
Two parents to single parent	0.62
Single parent to two parents	0.52
Multiple changes	0.66
Primary home language at kindergarten entry	
English	0.73
Not English	0.73

See notes at end of table.

Table B-1. Standard errors for the percentage distribution of child, family, and school characteristics: 1998, 1999, 2000, 2002, and 2004—Continued

Characteristic	Percent of children
School type, spring 2004	
Public	0.77
Private	0.77
School type, fall 1998 through spring 2004	
Public school, all rounds	0.88
Private school, all rounds	0.59
Public school to private school	0.37
Private school to public school	0.57
Multiple changes	0.42
Grade level of child, spring 2004	
Below grade level	1.10
Fifth grade	1.09
Above grade level	0.12
Number of places child has lived, fall 1998 through spring 2004	
One place	1.01
Two places	0.96
Three places	0.74
Four or more places	0.45
Number of schools child has attended, fall 1998 through spring 2004	
Same school, every round	1.31
One change, across rounds	1.29
Two changes, across rounds	1.21
Three or more changes, across rounds	0.65

† Not Applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten –Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table B-2. Standard errors for mean reading scale scores, and percentage distribution of spring fifth-grade reading scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	0.56	1.05	0.87	0.98
Child's sex				
Male	0.76	1.42	1.21	1.31
Female	0.80	1.47	1.20	1.59
Child's race/ethnicity				
White, non-Hispanic	0.70	1.28	1.23	1.37
Black, non-Hispanic	1.17	2.55	2.07	2.37
Hispanic	0.81	1.56	1.74	1.59
Asian, non-Hispanic	1.60	3.06	2.81	3.34
Other, non-Hispanic	4.48	8.04	5.07	5.14
Poverty status, spring 2004				
Below poverty threshold	1.30	2.21	1.69	1.69
At or above poverty threshold	0.47	1.01	1.04	1.09
Poverty status, fall 1998 through spring 2004				
Below, all rounds	1.46	3.11	2.99	1.78
At or above, all rounds	0.55	1.04	1.24	1.28
In and out of poverty	1.26	2.39	2.15	2.06
Mother's highest level of education, spring 2004				
Less than high school	1.28	2.12	1.97	1.72
High school diploma or equivalent	1.03	1.98	1.84	1.71
Some college or vocational technical degree	0.77	1.68	1.86	1.83
Bachelor's degree or higher	0.70	1.04	1.95	1.99
Family type, spring 2004				
Two parents	0.63	1.15	1.05	1.20
Single parent	0.96	2.12	2.20	1.78
Other	3.36	6.98	7.17	4.20
Family type, fall 1998 through spring 2004				
Two parents, all rounds	0.63	1.06	1.22	1.42
Single parent, all rounds	1.65	3.60	3.51	3.11
Other, all rounds	6.77	10.67	7.75	11.24
Two parents to single parent	1.74	3.34	4.30	3.71
Single parent to two parents	2.17	5.17	5.30	4.34
Multiple changes	2.45	4.46	4.15	4.84
Primary home language at kindergarten entry				
English	0.59	1.05	1.00	1.09
Not English	1.12	2.36	1.69	1.58

Table B-2. Standard errors for mean reading scale scores, and percentage distribution of spring fifth-grade reading scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	0.63	1.21	0.94	1.11
Private	1.42	2.29	2.23	2.79
School type, fall 1998 through spring 2004				
Public school, all rounds	0.66	1.25	0.94	1.17
Private school, all rounds	0.84	1.40	2.18	2.44
Public school to private school	3.87	6.78	5.39	6.38
Private school to public school	2.02	3.11	4.68	4.94
Multiple changes	4.52	9.38	9.05	10.75
Grade level of child, spring 2004				
Below grade level	1.62	3.71	3.32	1.69
Fifth grade	0.57	1.15	0.88	1.06
Above grade level	3.71	3.25	3.23	4.98
Fall kindergarten reading achievement, overall scale score				
Lowest third	1.00	2.19	1.99	1.29
Middle third	0.74	1.71	1.58	1.52
Highest third	0.54	0.84	1.53	1.60
Number of places child has lived, fall 1998 through spring 2004				
One place	0.71	1.34	1.26	1.43
Two places	0.97	2.02	2.31	2.09
Three places	2.30	5.23	4.27	4.56
Four or more places	3.47	7.10	6.68	6.37
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	0.86	1.42	0.77	1.21
One change, across rounds	0.77	1.70	1.42	1.64
Two changes, across rounds	1.37	2.54	2.71	3.09
Three or more changes, across rounds	3.88	8.17	7.21	6.71

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table B-3. Standard errors for the percentage of children who demonstrate certain specific reading knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Understanding words in context	Making literal inference	Deriving meaning from text	Interpreting beyond text	Evaluating nonfiction
Total	0.16	0.47	0.82	0.61	0.36
Child's sex					
Male	0.24	0.67	1.06	0.81	0.51
Female	0.20	0.60	1.15	0.92	0.53
Child's race/ethnicity					
White, non-Hispanic	0.18	0.51	0.93	0.82	0.59
Black, non-Hispanic	0.38	1.14	1.77	1.25	0.55
Hispanic	0.26	0.76	1.28	0.84	0.55
Asian, non-Hispanic	0.51	1.25	2.09	1.85	1.16
Other, non-Hispanic	1.22	4.10	6.84	4.39	1.61
Poverty status, spring 2004					
Below poverty threshold	0.52	1.35	1.87	1.19	0.52
At or above poverty threshold	0.10	0.34	0.66	0.58	0.43
Poverty status, fall 1998 through spring 2004					
Below, all rounds	0.61	1.84	2.38	1.22	0.23
At or above, all rounds	0.10	0.35	0.71	0.70	0.54
In and out of poverty	0.43	1.19	1.85	1.33	0.83
Mother's highest level of education, spring 2004					
Less than high school	0.64	1.48	1.90	1.11	0.18
High school diploma or equivalent	0.33	0.96	1.55	1.10	0.78
Some college or vocational technical degree	0.20	0.63	1.18	0.89	0.41
Bachelor's degree or higher	0.11	0.33	0.75	0.97	1.01
Family type, spring 2004					
Two parents	0.16	0.50	0.88	0.72	0.49
Single parent	0.29	0.95	1.49	1.02	0.53
Other	1.92	3.83	5.09	2.76	0.35
Family type, fall 1998 through spring 2004					
Two parents, all rounds	0.15	0.40	0.78	0.78	0.63
Single parent, all rounds	0.42	1.37	2.50	1.90	1.17
Other, all rounds	2.71	7.07	9.24	6.39	0.47
Two parents to single parent	0.36	1.57	2.70	2.00	0.91
Single parent to two parents	0.56	1.85	3.29	2.39	0.64
Multiple changes	0.54	2.08	3.43	2.79	1.50
Primary home language at kindergarten entry					
English	0.17	0.49	0.84	0.66	0.42
Not English	0.41	1.02	1.79	1.16	0.44

Table B-3. Standard errors for the percentage of children who demonstrate certain specific reading knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Understanding words in context	Making literal inference	Deriving meaning from text	Interpreting beyond text	Evaluating nonfiction
School type, spring 2004					
Public	0.17	0.52	0.92	0.69	0.38
Private	0.30	0.90	1.76	1.72	1.51
School type, fall 1998 through spring 2004					
Public school, all rounds	0.18	0.54	0.97	0.73	0.39
Private school, all rounds	0.11	0.36	0.86	1.18	1.06
Public school to private school	1.01	2.78	5.25	4.45	4.10
Private school to public school	0.35	1.12	2.31	2.65	2.21
Multiple changes	1.28	3.32	6.08	5.35	1.63
Grade level of child, spring 2004					
Below grade level	0.62	1.87	2.60	1.41	0.37
Fifth grade	0.12	0.41	0.84	0.66	0.41
Above grade level	0.12	0.74	2.34	5.19	13.55
Fall kindergarten reading achievement, overall scale score					
Lowest third	0.43	1.09	1.65	0.88	0.38
Middle third	0.16	0.59	1.15	0.88	0.56
Highest third	0.05	0.23	0.57	0.74	0.85
Number of places child has lived, fall 1998 through spring 2004					
One place	0.16	0.51	0.99	0.84	0.62
Two places	0.28	0.81	1.37	1.11	0.96
Three places	0.52	1.95	3.46	2.62	1.21
Four or more places	0.88	3.43	5.15	3.56	1.43
Number of schools child has attended, fall 1998 through spring 2004					
Same school, every round	0.25	0.75	1.21	0.88	0.38
One change, across rounds	0.21	0.61	1.20	0.89	0.57
Two changes, across rounds	0.36	1.04	1.85	1.63	1.09
Three or more changes, across rounds	0.98	3.72	5.89	4.08	1.57

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table B-4. Standard errors for mean mathematics scale scores, and percentage distribution of spring fifth-grade mathematics scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	0.61	1.24	0.84	1.21
Child's sex				
Male	0.74	1.45	1.20	1.53
Female	0.81	1.74	1.23	1.55
Child's race/ethnicity				
White, non-Hispanic	0.81	1.61	1.20	1.77
Black, non-Hispanic	1.13	2.32	2.04	1.62
Hispanic	0.77	1.64	1.48	1.67
Asian, non-Hispanic	1.32	2.63	3.01	2.80
Other, non-Hispanic	3.51	6.95	4.39	4.35
Poverty status, spring 2004				
Below poverty threshold	1.05	2.63	2.08	1.35
At or above poverty threshold	0.55	1.15	1.03	1.27
Poverty status, fall 1998 through spring 2004				
Below, all rounds	1.27	2.95	2.51	1.46
At or above, all rounds	0.70	1.40	1.01	1.56
In and out of poverty	1.07	2.48	2.24	2.07
Mother's highest level of education, spring 2004				
Less than high school	1.31	3.04	2.72	1.30
High school diploma or equivalent	0.88	1.98	1.70	1.67
Some college or vocational technical degree	0.83	1.98	1.61	1.66
Bachelor's degree or higher	0.77	1.54	1.80	2.19
Family type, spring 2004				
Two parents	0.65	1.37	1.01	1.46
Single parent	0.89	1.96	1.74	1.53
Other	3.00	6.87	6.96	2.84
Family type, fall 1998 through spring 2004				
Two parents, all rounds	0.70	1.41	1.16	1.66
Single parent, all rounds	1.55	3.30	3.06	2.61
Other, all rounds	5.58	10.14	10.23	4.37
Two parents to single parent	1.48	3.53	3.68	3.77
Single parent to two parents	2.06	4.62	4.32	3.29
Multiple changes	2.05	4.24	4.46	3.65
Primary home language at kindergarten entry				
English	0.68	1.37	0.91	1.35
Not English	1.05	2.11	2.02	1.93

Table B-4. Standard errors for mean mathematics scale scores, and percentage distribution of spring fifth-grade mathematics scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	0.66	1.39	0.88	1.30
Private	1.46	2.76	1.61	2.80
School type, fall 1998 through spring 2004				
Public school, all rounds	0.70	1.48	0.85	1.41
Private school, all rounds	0.88	2.19	1.72	2.28
Public school to private school	4.47	7.52	4.24	7.85
Private school to public school	1.63	3.45	4.21	4.45
Multiple changes	2.73	8.41	8.32	7.13
Grade level of child, spring 2004				
Below grade level	1.70	3.60	2.27	2.24
Fifth grade	0.68	1.41	0.93	1.40
Above grade level	5.74	2.42	22.07	21.86
Fall kindergarten mathematics achievement, overall scale score				
Lowest third	0.74	1.62	1.40	0.76
Middle third	0.67	1.73	1.57	1.73
Highest third	0.44	0.78	1.61	1.60
Number of places child has lived, fall 1998 through spring 2004				
One place	0.68	1.31	1.21	1.55
Two places	1.04	2.20	1.79	2.15
Three places	2.03	5.05	4.49	4.37
Four or more places	2.82	5.64	5.96	4.81
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	0.86	1.44	0.86	1.27
One change, across rounds	0.76	1.69	1.41	1.71
Two changes, across rounds	1.24	2.78	2.31	2.45
Three or more changes, across rounds	3.29	7.84	6.34	4.41

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table B-5. Standard errors for the percentage of children who demonstrate certain specific mathematics knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Multi-plication and division	Place value	Rate and measure-ment	Fractions	Area and volume
Total	0.47	0.96	1.04	0.63	0.14
Child's sex					
Male	0.58	1.12	1.29	0.92	0.22
Female	0.66	1.32	1.40	0.80	0.14
Child's race/ethnicity					
White, non-Hispanic	0.49	1.18	1.48	1.09	0.24
Black, non-Hispanic	1.54	1.92	1.50	0.69	0.16
Hispanic	0.63	1.22	1.53	0.79	0.10
Asian, non-Hispanic	1.06	1.97	2.52	1.98	0.56
Other, non-Hispanic	3.22	5.78	4.76	2.68	0.32
Poverty status, spring 2004					
Below poverty threshold	1.13	1.98	1.43	0.58	0.06
At or above poverty threshold	0.39	0.79	1.06	0.79	0.18
Poverty status, fall 1998 through spring 2004					
Below, all rounds	1.82	2.35	1.70	1.06	0.08
At or above, all rounds	0.43	0.97	1.33	1.00	0.24
In and out of poverty	1.06	1.91	1.77	0.71	0.08
Mother's highest level of education, spring 2004					
Less than high school	1.78	2.52	1.56	0.57	0.15
High school diploma or equivalent	0.85	1.41	1.50	0.78	0.15
Some college or vocational technical degree	0.59	1.37	1.51	0.90	0.18
Bachelor's degree or higher	0.28	0.91	1.69	1.92	0.45
Family type, spring 2004					
Two parents	0.42	0.96	1.26	0.80	0.18
Single parent	0.91	1.58	1.34	0.78	0.15
Other	4.58	4.97	3.33	0.66	0.04
Family type, fall 1998 through spring 2004					
Two parents, all rounds	0.43	0.99	1.39	0.98	0.23
Single parent, all rounds	1.56	2.64	2.47	1.43	0.37
Other, all rounds	8.13	9.08	5.36	1.35	0.06
Two parents to single parent	1.23	2.49	2.99	2.11	0.27
Single parent to two parents	1.57	3.36	3.73	2.48	0.89
Multiple changes	2.14	3.74	3.13	1.52	0.22
Primary home language at kindergarten entry					
English	0.52	1.07	1.17	0.75	0.16
Not English	1.01	1.66	1.74	1.02	0.18

Table B-5. Standard errors for the percentage of children who demonstrate certain specific mathematics knowledge and skills, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Multi-plication and division	Place value	Rate and measure-ment	Fractions	Area and volume
School type, spring 2004					
Public	0.51	1.06	1.12	0.66	0.15
Private	0.97	2.12	2.64	1.99	0.36
School type, fall 1998 through spring 2004					
Public school, all rounds	0.53	1.10	1.23	0.70	0.14
Private school, all rounds	0.27	1.35	1.99	1.57	0.34
Public school to private school	3.32	6.35	7.42	5.73	0.88
Private school to public school	0.80	2.43	3.29	3.69	0.48
Multiple changes	2.33	4.23	5.97	2.81	1.32
Grade level of child, spring 2004					
Below grade level	1.78	3.05	2.34	1.34	0.13
Fifth grade	0.44	1.05	1.23	0.74	0.16
Above grade level	0.20	2.11	12.97	20.60	4.84
Fall kindergarten mathematics achievement, overall scale score					
Lowest third	0.99	1.37	0.86	0.31	0.03
Middle third	0.46	1.13	1.38	0.78	0.07
Highest third	0.07	0.40	1.02	1.38	0.39
Number of places child has lived, fall 1998 through spring 2004					
One place	0.47	0.97	1.28	1.05	0.25
Two places	0.79	1.63	1.86	1.35	0.21
Three places	1.52	3.54	3.71	1.88	0.15
Four or more places	3.47	5.01	3.94	1.81	0.30
Number of schools child has attended, fall 1998 through spring 2004					
Same school, every round	0.74	1.32	1.27	0.76	0.14
One change, across rounds	0.55	1.27	1.41	0.89	0.23
Two changes, across rounds	1.07	2.22	2.12	1.50	0.38
Three or more changes, across rounds	3.42	5.91	4.70	2.81	1.24

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.

Table B-6. Standard errors for mean science scale scores, and percentage distribution of spring fifth-grade science scale scores, by child, family, and school characteristics: Spring fifth grade, 2004

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
Total	0.36	1.22	0.91	0.93
Child's sex				
Male	0.51	1.55	1.12	1.34
Female	0.52	1.72	1.42	1.36
Child's race/ethnicity				
White, non-Hispanic	0.41	1.32	1.23	1.25
Black, non-Hispanic	0.76	2.52	2.39	1.57
Hispanic	0.49	1.63	1.86	1.60
Asian, non-Hispanic	1.01	3.10	2.49	2.95
Other, non-Hispanic	2.25	8.41	4.64	5.61
Poverty status, spring 2004				
Below poverty threshold	0.70	2.35	1.80	1.35
At or above poverty threshold	0.29	1.03	1.01	1.09
Poverty status, fall 1998 through spring 2004				
Below, all rounds	0.88	3.09	2.83	1.24
At or above, all rounds	0.34	1.05	1.26	1.39
In and out of poverty	0.76	2.54	2.66	2.21
Mother's highest level of education, spring 2004				
Less than high school	0.81	2.66	2.33	1.24
High school diploma or equivalent	0.63	2.12	1.78	1.86
Some college or vocational technical degree	0.49	1.81	1.68	1.55
Bachelor's degree or higher	0.49	1.30	1.68	1.93
Family type, spring 2004				
Two parents	0.37	1.22	1.09	1.25
Single parent	0.66	2.29	2.08	1.65
Other	1.93	6.57	7.36	4.42
Family type, fall 1998 through spring 2004				
Two parents, all rounds	0.37	1.08	1.27	1.43
Single parent, all rounds	1.24	4.29	3.83	3.14
Other, all rounds	4.57	10.24	6.75	11.25
Two parents to single parent	1.16	3.82	3.52	3.75
Single parent to two parents	1.31	5.02	5.34	4.48
Multiple changes	1.43	4.77	3.63	4.19
Primary home language at kindergarten entry				
English	0.40	1.33	1.02	1.06
Not English	0.66	1.98	1.42	1.50

Table B-6. Standard errors for mean science scale scores, and percentage distribution of spring fifth-grade science scale scores, by child, family, and school characteristics: Spring fifth grade, 2004—Continued

Characteristic	Mean fifth-grade scale score	Percentage distribution of fifth-grade scale scores		
		Lowest third	Middle third	Highest third
School type, spring 2004				
Public	0.41	1.37	1.00	1.00
Private	0.84	2.50	2.20	2.98
School type, fall 1998 through spring 2004				
Public school, all rounds	0.45	1.44	1.04	1.10
Private school, all rounds	0.65	2.02	2.43	2.81
Public school to private school	2.22	7.01	4.18	6.85
Private school to public school	1.36	4.25	3.52	4.90
Multiple changes	1.76	5.43	10.15	8.13
Grade level of child, spring 2004				
Below grade level	0.93	2.94	2.56	2.37
Fifth grade	0.38	1.28	0.99	1.08
Above grade level	2.92	3.25	7.89	9.01
Fall kindergarten general knowledge achievement, overall scale score				
Lowest third	0.56	2.13	1.84	1.04
Middle third	0.37	1.47	1.40	1.38
Highest third	0.30	0.51	1.54	1.60
Number of places child has lived, fall 1998 through spring 2004				
One place	0.43	1.37	1.18	1.31
Two places	0.61	1.85	1.86	2.03
Three places	1.38	4.96	3.92	4.40
Four or more places	1.45	7.44	6.82	4.07
Number of schools child has attended, fall 1998 through spring 2004				
Same school, every round	0.54	1.56	0.96	1.34
One change, across rounds	0.47	1.61	1.50	1.53
Two changes, across rounds	0.89	2.83	2.73	2.56
Three or more changes, across rounds	2.18	7.20	7.18	5.68

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten–Third-Grade Public-Use Data File, and Fifth-Grade Restricted-Use Data File.