Risk Factors and Academic Outcomes in Kindergarten Through Third Grade

During the 2010–11 school year, 6 percent of first-time kindergartners had both the risk factor of living in poverty and the risk factor of not having a parent who completed high school, 2 percent had the single risk factor of not having a parent who completed high school, and 18 percent had the single risk factor of living in poverty. Students who were living in poverty and who did not have a parent who completed high school tended to score lower in reading, mathematics, and science in each of their first four years of school compared to their peers who had neither risk factor at kindergarten entry.
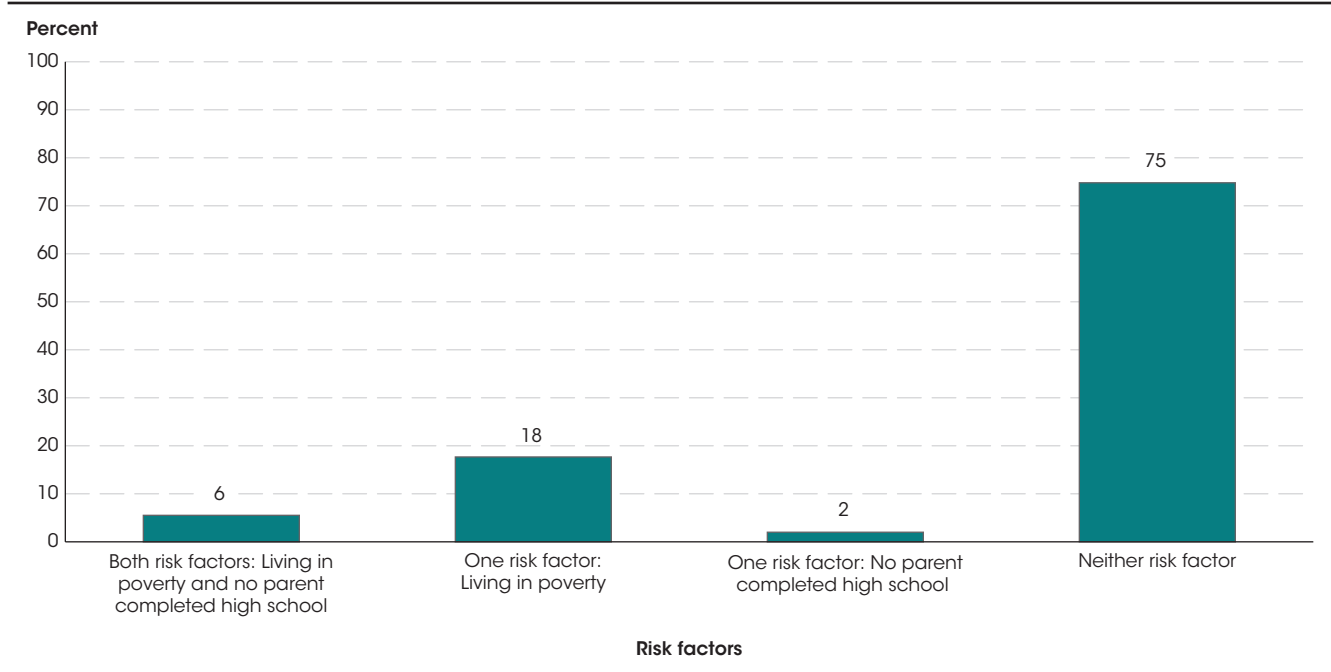
Prior research has found associations among family risk factors and poor educational outcomes, including low achievement scores, having to repeat a grade, and dropping out of high school.[1] Family risk factors include coming from a low-income family or single-parent household, not having a parent who completed high school, and living in a household where the primary language is not English. Young children vary in their academic skills at kindergarten entry, with those who have one or more family risk factors tending to score lower in reading and mathematics in kindergarten and over the first few years of elementary school compared to their peers with fewer or no risk factors. This Spotlight focuses on the characteristics of students who had two of these types of risk factors at kindergarten entry: living in households with income below the federal poverty threshold and not having a parent who completed high school. It then describes associations between the presence or absence of these two family risk factors and students' academic achievement from kindergarten through third grade.[2]

In the Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), information on family risk factors was collected through parent interviews. Household poverty status in kindergarten was based on whether the household's income fell below poverty thresholds defined by the U.S. Census Bureau. These thresholds reflect the amount of income that is considered sufficient to meet household needs, given family size and composition.[3] Parents' highest level of education was measured in the fall of students' kindergarten year and reflects the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents.[4] For this spotlight, children living in households whose income fell below the federal poverty threshold are identified as "living in poverty," and children living in households in which no parent or guardian had completed high school are identified as "not having a parent who completed high school."

In addition, the ECLS-K:2011 assessed children's skills in reading, mathematics, and science in kindergarten through grade 3. Trained assessors conducted individually administered, two-stage adaptive assessments (with the exception of the spring kindergarten science assessment, which was a nonadaptive one-stage assessment) in which assessors asked children questions related to images presented on a small easel and entered the children's responses into a study computer. Reading and mathematics assessments were administered in the fall and spring of kindergarten through grade 2 and in the spring of grade 3. Science assessments were administered in the spring of kindergarten, in the fall and spring of grades 1 and 2, and in the spring of grade 3.[5] Possible scores on the assessments range from 0 to 141 in reading, 0 to 135 in mathematics, and 0 to 87 in science.

Figure 1. **Percentage distribution of fall 2010 first-time kindergartners, by risk factors related to parent education and poverty: School year 2010–11**

Percent

Bars: Both risk factors: Living in poverty and no parent completed high school = 6; One risk factor: Living in poverty = 18; One risk factor: No parent completed high school = 2; Neither risk factor = 75.
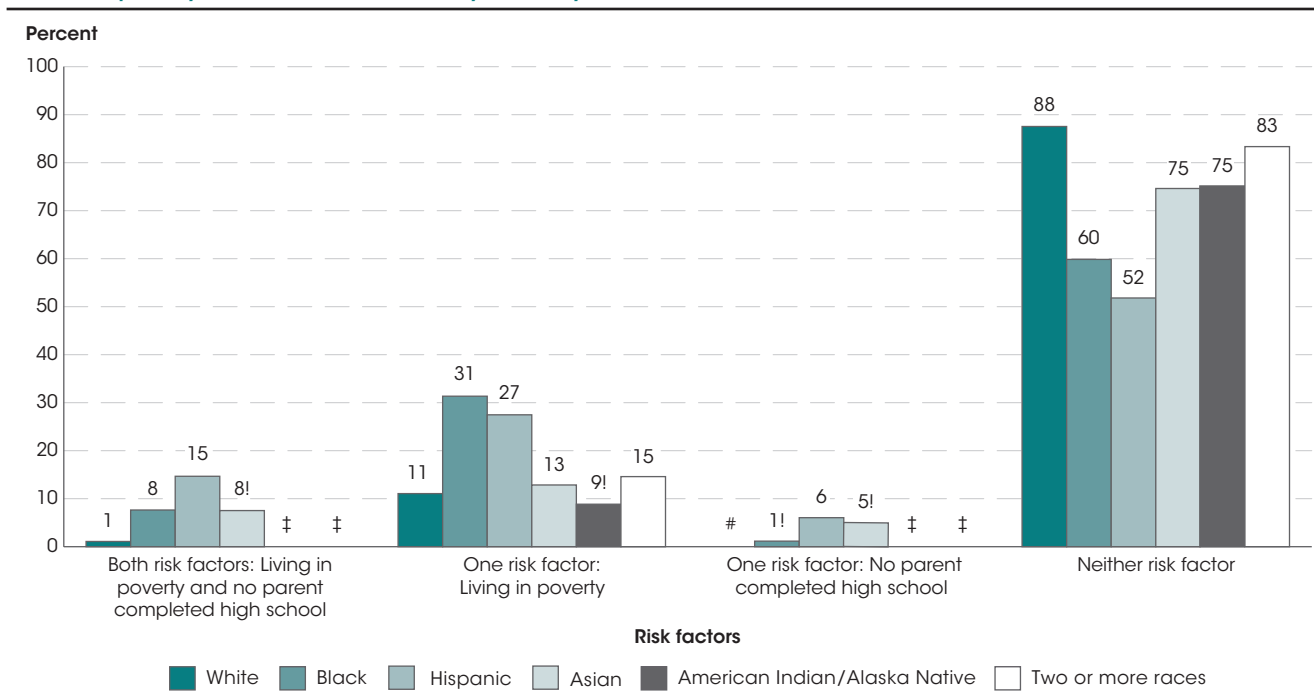
Risk factors

NOTE: Estimates weighted by W7C17P_7T170. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Estimates represent characteristics as of 2010–11, when the first wave of data collection occurred, and include the entire sample of 2010–11 first-time kindergartners. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010. Detail may not sum to totals because of rounding and survey item nonresponse.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016,* table 220.39.

During the 2010–11 school year, 6 percent of first-time kindergartners had both the risk factor of living in poverty and the risk factor of not having a parent who completed high school, 18 percent had the single risk factor of living in poverty, and 2 percent had the single risk factor of not having a parent who completed high school. About 75 percent of first-time kindergartners had neither of these two risk factors present during their kindergarten year.

Figure 2. Percentage distribution of fall 2010 first-time kindergartners, by risk factors related to parent education and poverty and child's race/ethnicity: School year 2010–11

Rounds to zero.
! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.
‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.
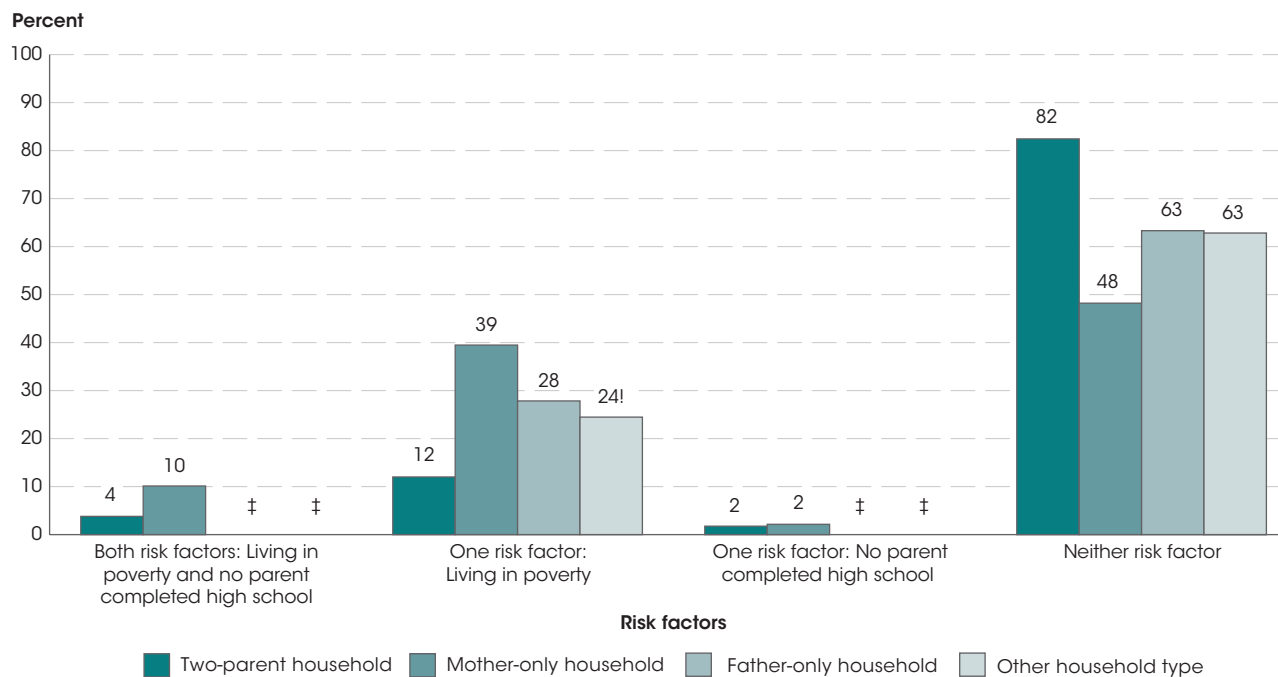NOTE: Estimates weighted by W7C17P_7T170. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Estimates represent characteristics as of 2010–11, when the first wave of data collection occurred, and include the entire sample of 2010–11 first-time kindergartners. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010. Detail may not sum to totals because of rounding and survey item nonresponse. Race categories exclude persons of Hispanic ethnicity. Pacific Islander estimates are excluded from the figure due to insufficient sample sizes. Although rounded numbers are displayed, the figures are based on unrounded estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.39.

The percentage of first-time kindergartners who had family risk factors analyzed in this report differed with respect to their race/ethnicity, household type, and primary home language. The percentage of first-time kindergartners who had both risk factors of living in poverty and not having a parent who completed high school was higher for Hispanic students (15 percent) than for Black and Asian students (8 percent each), and the percentages for these three racial/ethnic groups were all higher than the percentage for White students (1 percent). Having the single risk factor of living in poverty was more common for Black (31 percent) and Hispanic kindergartners (27 percent) than it was for kindergartners of Two or more races (15 percent), Asian kindergartners (13 percent), White kindergartners (11 percent), and American Indian/Alaska Native

kindergartners (9 percent). The percentages of Hispanic and Asian kindergartners with the single risk factor of not having a parent who completed high school (6 and 5 percent, respectively) were higher than the percentages for Black (1 percent) and White kindergartners (less than 1 percent). In contrast, the percentage of first-time kindergartners who had neither risk factor were higher for White kindergartners (88 percent), kindergartners of Two or more races (83 percent), and Asian and American Indian/Alaska Native kindergartners (75 percent each) than for Black (60 percent) and Hispanic kindergartners (52 percent). In addition, the percentage who had neither risk factor was higher for Black kindergartners than for Hispanic kindergartners, and was higher for White kindergartners than for Asian and American Indian/Alaska Native kindergartners.

Figure 3. Percentage distribution of fall 2010 first-time kindergartners, by risk factors related to parent education and poverty and household type: School year 2010–11

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.
‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.
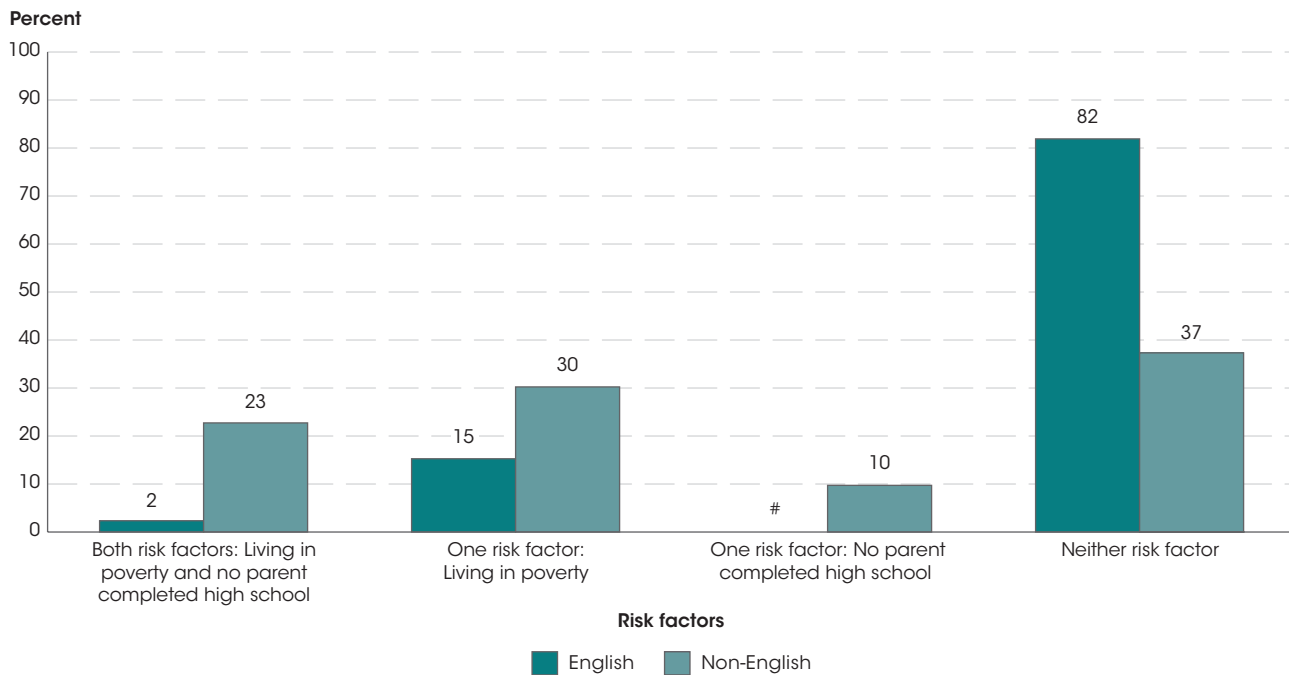NOTE: Estimates weighted by W7C17P_7T170. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Estimates represent characteristics as of 2010–11, when the first wave of data collection occurred, and include the entire sample of 2010–11 first-time kindergartners. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010. A two-parent household may have two biological parents, two adoptive parents, or one biological/adoptive parent and one other parent/partner. A mother-only or father-only household has one biological or adoptive parent only, without another parent/partner. In other household types, which do not include biological or adoptive parents, the guardian or guardians may be related or unrelated to the child. Detail may not sum to totals because of rounding and survey item nonresponse. Although rounded numbers are displayed, the figures are based on unrounded estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.39.

With respect to household type,[6] the percentage of first-time kindergartners who had both the risk factor of living in poverty and the risk factor of not having a parent who completed high school was higher for students living in mother-only households (10 percent) than for students living in two-parent households (4 percent). Having the single risk factor of living in poverty was more common for students in mother-only (39 percent) and father-only households (28 percent) than it was for students in two-parent households (12 percent). No measurable differences by household type were found with respect to the percentage of students with the single risk factor of not having a parent who completed high school. The percentage of first-time kindergartners who had neither risk factor was highest for students from two-parent households (82 percent) and lowest for students from mother-only households (48 percent); about 63 percent each of first-time kindergartners from father-only households and from other household types had neither risk factor.

Figure 4. Percentage distribution of fall 2010 first-time kindergartners, by risk factors related to parent education and poverty and primary home language: School year 2010–11
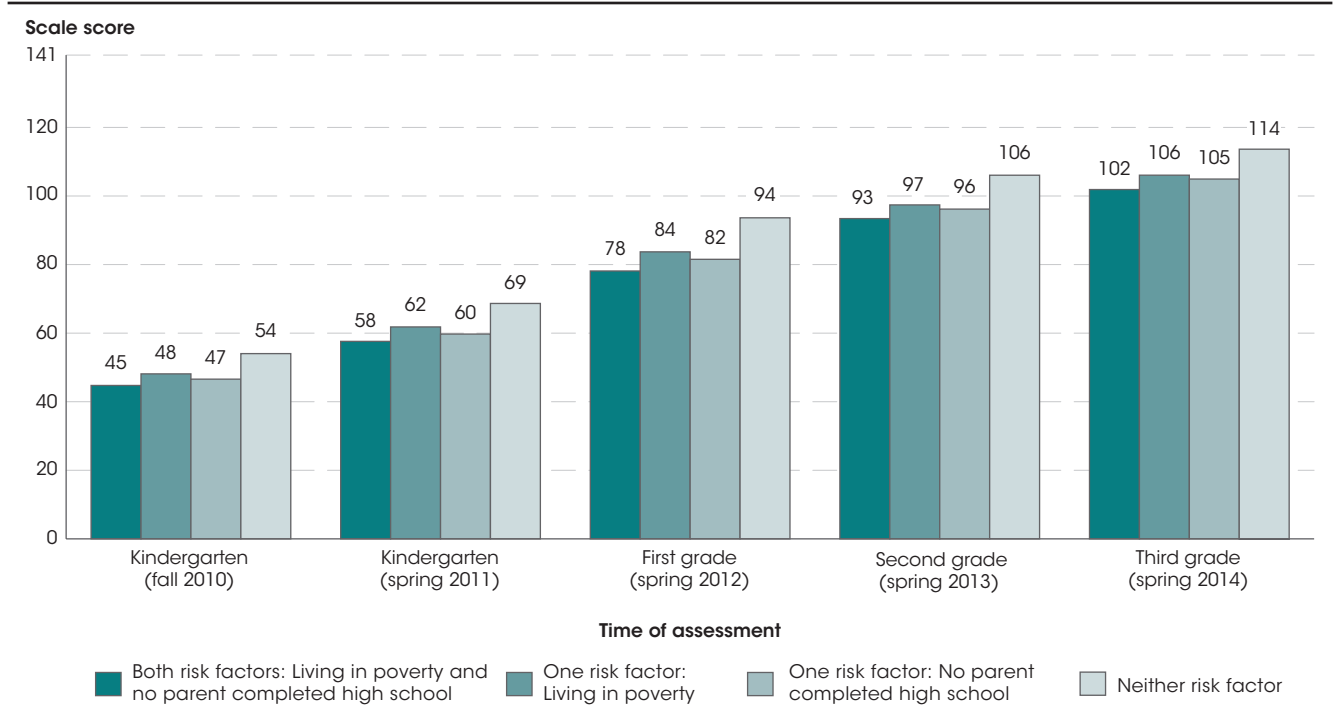

Rounds to zero.
NOTE: Estimates weighted by W7C17P_7T170. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Estimates represent characteristics as of 2010–11, when the first wave of data collection occurred, and include the entire sample of 2010–11 first-time kindergartners. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010. Detail may not sum to totals because of rounding and survey item nonresponse.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.39.

About 23 percent of first-time kindergartners whose primary home language was not English had both the risk factor of living in poverty and the risk factor of not having a parent who completed high school, compared with 2 percent of kindergartners whose primary home language was English. Similarly, the percentage of students who had the single risk factor of living in poverty was higher for those whose primary home language was not English than for those whose primary home language was English (30 vs. 15 percent), and the percentage with the single risk

factor of not having a parent who completed high school was also higher for those whose primary home language was not English than for those whose primary home language was English (10 percent vs. less than 1 percent). In contrast, the percentage of first-time kindergartners who had neither risk factor was higher for kindergartners whose primary home language was English (82 percent) than for kindergartners whose primary home language was not English (37 percent).

Figure 5. Average reading scale scores of fall 2010 first-time kindergartners, by time of assessment and risk factors related to parent education and poverty: Fall 2010 through spring 2014
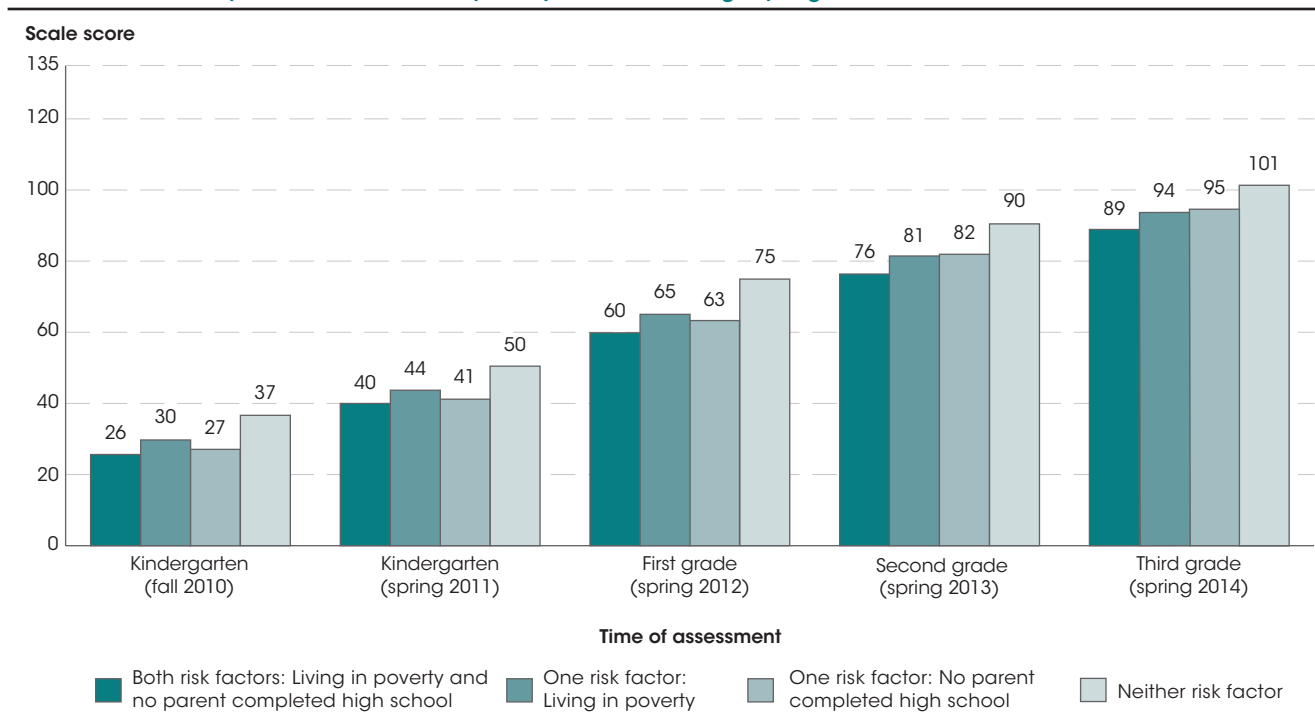
Scale score

NOTE: Estimates weighted by W7C17P_7T170. Scores on the reading assessments reflect performance on questions measuring basic skills (print familiarity, letter recognition, beginning and ending sounds, rhyming words, and word recognition); vocabulary knowledge; and reading comprehension, including identifying information specifically stated in text (e.g., definitions, facts, and supporting details), making complex inferences from texts, and considering the text objectively and judging its appropriateness and quality. Possible scores for the reading assessment range from 0 to 141. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Most of the children were in first grade in 2011–12, second grade in 2012–13, and third grade in 2013–14, but some of the children were in other grades. In 2013–14, for example, 6 percent of the children were not in third grade (e.g., were in second grade, fourth grade, or ungraded classrooms). Information on risk factors and student and family characteristics are based on data collected during the kindergarten year. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.40.

Students who were living in poverty and who did not have a parent who completed high school tended to score lower in reading, mathematics, and science over each of their first four years of school compared to their peers who had neither risk factor at kindergarten entry. In reading, for instance, fall kindergarten scores were higher, on average, for students who had neither risk factor (54 points) than for students who had the single risk factor of living in poverty (48 points), the single risk factor of not having a parent who completed high school (47 points), and both the risk factor of living in poverty and the risk factor of not having a parent who completed high school (45 points).[7] This pattern persisted in the spring data collections in kindergarten, first grade, second grade, and third grade. For example, spring third-grade reading scores were higher, on average, for students who had neither risk factor (114 points) than for those with the single risk factor of living in poverty (106 points), those with the single risk factor of not having a parent who completed high school (105 points), and those with both risk factors (102 points). In addition, students with the single risk factor of living in poverty at kindergarten entry scored higher in reading across all data collections than students with both risk factors.

Figure 6. Average mathematics scale scores of fall 2010 first-time kindergartners, by time of assessment and risk factors related to parent education and poverty: Fall 2010 through spring 2014

Scale score

Legend:
- Both risk factors: Living in poverty and no parent completed high school
- One risk factor: Living in poverty
- One risk factor: No parent completed high school
- Neither risk factor

NOTE: Estimates weighted by W7C17P_7T170. Scores on the mathematics assessments reflect performance on questions on number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability (measured with a set of simple questions assessing children's ability to read a graph); and prealgebra skills such as identification of patterns. Possible scores for the mathematics assessment range from 0 to 135. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Most of the children were in first grade in 2011–12, second grade in 2012–13, and third grade in 2013–14, but some of the children were in other grades. In 2013–14, for example, 6 percent of the children were not in third grade (e.g., were in second grade, fourth grade, or ungraded classrooms). Information on risk factors and student and family characteristics are based on data collected during the kindergarten year. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.41.

In mathematics, while students who had neither risk factor scored highest at each data collection, differences in scores among the other risk factor groups varied by grade level. In the fall of kindergarten, the average score was highest for first-time kindergartners who had neither risk factor (37 points), and the average score for those who had the single risk factor of living in poverty (30 points) was higher than the average scores for those with the single risk factor of not having a parent who completed high school (27 points) and for those who had both the risk factor of living in poverty and the risk factor of not having a parent who completed high school (26 points).[8] In the spring data collections for kindergarten and first grade, students with neither risk factor had the highest average

scores, and students with the single risk factor of living in poverty had higher average scores than students with both risk factors. In the spring data collections for second and third grade, average mathematics scores were highest for students with neither risk factor and lowest for students with both risk factors; no measurable differences were observed between the average scores for students having either of the single risk factors. For instance, students with neither risk factor had the highest average spring third-grade score (101 points), and students who had either the single risk factor of living in poverty or the single risk factor of not having a parent who completed high school had higher average scores (94 and 95 points, respectively) than students who had both risk factors (89 points).

Figure 7. Average science scale scores of fall 2010 first-time kindergartners, by time of assessment and risk factors related to parent education and poverty: Spring 2011 through spring 2014
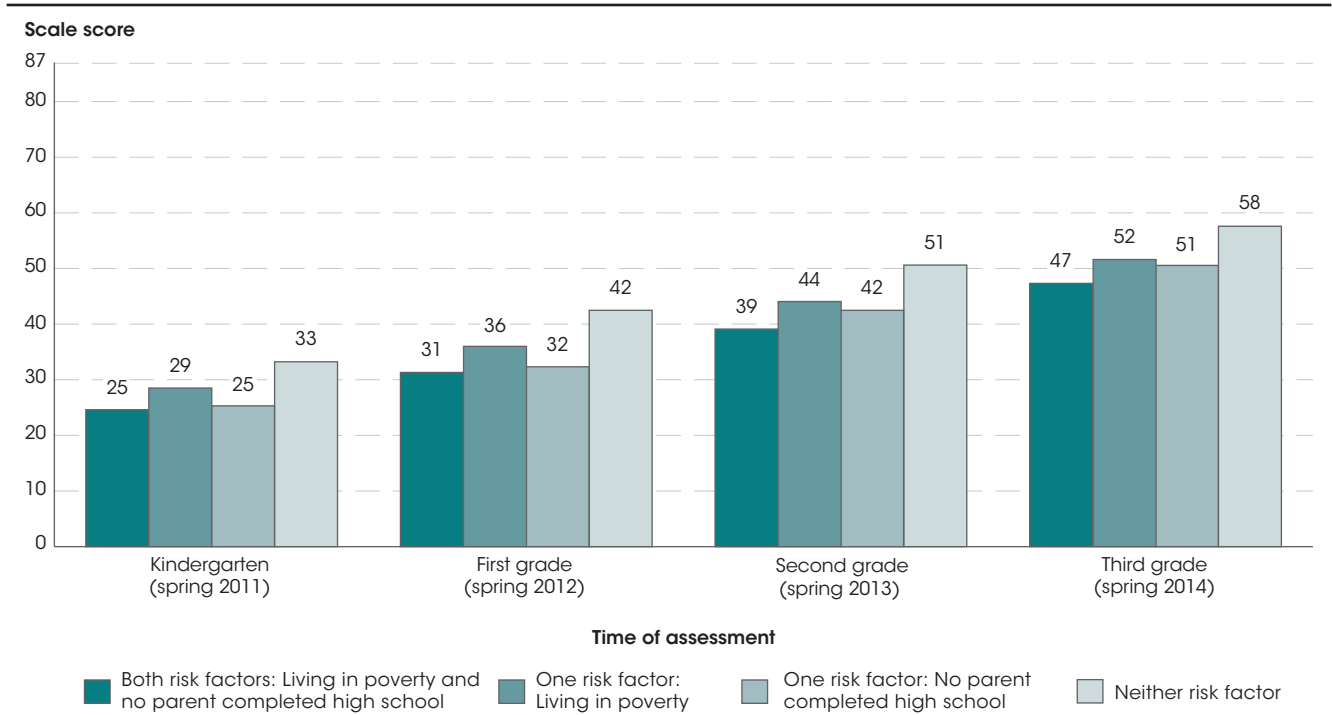
NOTE: Estimates weighted by W7C17P_7T170. Science was not assessed in the fall of kindergarten. Scores on the science assessment reflect performance on questions on physical sciences, life sciences, environmental sciences, and scientific inquiry. Possible scores for the science assessment range from 0 to 87. Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Most of the children were in first grade in 2011–12, second grade in 2012–13, and third grade in 2013–14, but some of the children were in other grades. In 2013–14, for example, 6 percent of the children were not in third grade (e.g., were in second grade, fourth grade, or ungraded classrooms). Information on risk factors and student and family characteristics are based on data collected during the kindergarten year. Parents' highest level of education is the highest level of education achieved by either of the parents or guardians in a two-parent household, by the only parent in a single-parent household, or by any guardian in a household with no parents. Poverty status is based on preliminary U.S. Census income thresholds for 2010, which identify incomes determined to meet household needs, given family size and composition. For example, a family of three with one child was below the poverty threshold if its income was less than $17,552 in 2010. Although rounded numbers are displayed, the figures are based on unrounded estimates.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 2010–11 (ECLS-K:2011), Kindergarten–Third Grade Restricted-Use Data File. See *Digest of Education Statistics 2016*, table 220.42.

Differences in science scores among the risk factor groups also varied by grade level. In the spring data collections for kindergarten and first grade, students with neither risk factor had the highest average science scores. In addition, students with the single risk factor of living in poverty had higher average scores than students with the single risk factor of not having a parent who completed high school as well as higher average scores than students with both the risk factor of living in poverty and the risk factor of not having a parent who completed high school. For example, the average spring kindergarten science score was highest for first-time kindergartners who had neither risk factor (33 points), and the average score for those who had the single risk factor of living in poverty (29 points) was higher than the average score for those with the single risk factor of not having a parent who completed high

school and higher than the average score for those with both risk factors (25 points each).[9] Similar to the pattern observed in mathematics, average science scores in the spring data collections for second and third grade were highest for students who had neither risk factor and lowest for students who had both risk factors; no measurable differences were observed between the average scores for students who had either of the single risk factors. For instance, students with neither risk factor had the highest average spring third-grade score (58 points), and students who had either the single risk factor of living in poverty or the single risk factor of not having a parent who completed high school had higher average scores (52 and 51 points, respectively) than students who had both risk factors (47 points).

Endnotes:

[1] Croninger, R.G., and Lee, V.E. (2001). Social Capital and Dropping Out of High School: Benefits to At-Risk Students of Teacher's Support and Guidance. *Teachers College Record, 103*(4): 548–581. Retrieved March 2, 2017, from http://www.tcrecord.org/library/abstract.asp?contentid=10776.

Natriello, G., McDill, E.L., and Pallas, A.M. (1990). *Schooling Disadvantaged Children: Racing Against Catastrophe*. New York: Teachers College Press.

Rathbun, A., and West, J. (2004). *From Kindergarten Through Third Grade: Children's Beginning School Experiences* (NCES 2004–007). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved March 2, 2017, from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004007.

Zill, N., and West, J. (2001). *Entering Kindergarten: A Portrait of American Children When They Begin School: Findings From The Condition of Education 2000* (NCES 2001-035). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved March 2, 2017, from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2001035.

[2] Estimates pertain to a sample of children who were enrolled in kindergarten for the first time in the 2010–11 school year. Most of the children were in first grade in 2011–12, second grade in 2012–13, and third grade in 2013–14, but some of the children were in other grades. In 2013–14, for example, 6 percent of the children were not in third grade (e.g., were in second grade, fourth grade, or ungraded classrooms). Due to the study's large sample size, many differences (no matter how substantively minor) are statistically significant. In this indicator, mean score differences are considered substantively meaningful if they are at least one-fifth of a standard deviation in size. Therefore, mean score differences are reported only if they are statistically significant at the $p < .05$ level and are at least one-fifth of a standard deviation in size.

[3] For example, based on preliminary U.S. Census income thresholds for 2010, a family of three that includes one child was below the poverty threshold if its income was less than $17,552 in 2010.

[4] Parents are identified as having completed high school if they reported receiving a high school diploma or acquiring a GED (high school equivalency based on passing the GED exam).

[5] Although assessment data were also collected in the fall of grades 1 and 2, results are not included in this spotlight because the assessments were only administered to a subsample of ECLS-K:2011 students.

[6] A two-parent household may have two biological parents, two adoptive parents, or one biological/adoptive parent and one other parent/partner. A mother-only or father-only household has one biological or adoptive parent only, without another parent/partner. In other household types, which do not include biological or adoptive parents, the guardian or guardians may be related or unrelated to the child.

[7] The fall kindergarten reading score for the full ECLS-K:2011 sample has a mean of 51 and a standard deviation (SD) of 11.1. Scale score gaps that are greater than or equal to 2.2 points (0.2 of an SD) are considered substantively meaningful for the purposes of this analysis. For example, the scale score gap between students who had neither risk factor (54 points) and those who had both risk factors (45 points) was 0.8 SD.

[8] The fall kindergarten mathematics score for the full ECLS-K:2011 sample has a mean of 33 and a standard deviation (SD) of 11.4. Scale score gaps that are greater than or equal to 2.3 points (0.2 of an SD) are considered substantively meaningful for the purposes of this analysis. For example, the scale score gap between students who had neither risk factor (37 points) and those who had both risk factors (26 points) was 1.0 SD.

[9] The spring kindergarten science score for the full ECLS-K:2011 sample has a mean of 31 and a standard deviation (SD) of 6.9. Scale score gaps that are greater than or equal to 1.4 points (0.2 of an SD) are considered substantively meaningful for the purposes of this analysis. For example, the scale score gap between students who had neither risk factor (33 points) and those who had both risk factors (25 points) was 1.2 SD.

Reference tables: *Digest of Education Statistics 2016*, tables 220.39, 220.40, 220.41, and 220.42

Related indicators and resources: Characteristics of Children's Families; Preschool and Kindergarten Enrollment; Kindergarten Entry Status: On-Time, Delayed-Entry, and Repeating Kindergartners [*The Condition of Education 2013 Spotlight*]; Kindergartners' Approaches to Learning Behaviors and Academic Outcomes [*The Condition of Education 2015 Spotlight*]; Kindergartners' Approaches to Learning, Family Socioeconomic Status, and Early Academic Gains [*The Condition of Education 2016 Spotlight*]

Glossary: Educational attainment, Household, Poverty (official measure), Racial/ethnic group