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Family poverty and neighborhood poverty: Links with children's school readiness before and after the Great Recession

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Abstract

This paper examines how neighborhood and family poverty predict children's academic skills and classroom behavior at school entry, and whether associations have changed over a period of twelve years spanning the Great Recession. Utilizing the Early Childhood Longitudinal Study–Kindergarten 1998 and 2010 cohorts and combined with data from the U.S. Census and American Community Survey, we find that the proportion of kindergarten children living in moderate and high poverty neighborhoods increased from 1998 to 2010, and that these increases were most pronounced for non-poor and white children. Using OLS and fixed effects regression analyses and holding family poverty constant, we find that children in neighborhoods with higher levels of poverty start school less ready to learn than their peers. Specifically, children from the highest poverty neighborhoods start school almost a year behind children from the lowest poverty neighborhoods in terms of their academic skills. In addition, we find that the academic skills gap between poor- and non-poor children within neighborhood poverty categories grew from 1998 to 2010, particularly in high poverty neighborhoods. These findings appear to be explained both by changes in the composition of families within neighborhood poverty categories and income increases among non-poor families. The findings indicate that neighborhood poverty may be a useful proxy to identify children and families in need of additional support.

Keywords

Neighborhood poverty; The Great Recession; School readiness; Early childhood development; Family poverty

1. Introduction

Low-income families reside in many types of communities, but some neighborhoods have much higher concentrations of poor families than others. After declines in the proportion of Americans living in neighborhoods with concentrated poverty in the 1990s—from 20.0% in

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1990 to 18.1% in 2000—this trend reversed during the ensuing decade, climbing during the Great Recession. From 2000 to 2010, the proportion of people living in high-poverty neighborhoods rose to 25.7% (Bishaw, 2014), and this trend was most pronounced among families with children (Owens, 2016). This occurred against the backdrop of increasing economic segregation fueled at least in part by increasing income inequality among families with children (Owens, 2016).

Increasing numbers of children residing in neighborhoods with concentrated poverty is a concerning trend. For children and youth, experiencing higher rates of neighborhood poverty has been associated with less favorable outcomes, including low levels of school readiness (Brooks-Gunn & Duncan, 1997; Caughy & O'Campo, 2006; Ensminger, Lamkin, & Jacobson, 1996; Kohen, Leventhal, Dahinten, & McIntosh, 2008; Leventhal & Brooks-Gunn, 2000; Wodtke, Harding, & Elwert, 2011). School readiness, children's early academic and behavioral skills, in turn is a robust predictor of long-term achievement and wellbeing (e.g., Duncan et al., 2007; Jones, Greenberg, & Crowley, 2015).

Income-based achievement gaps in children's school readiness skills widened in the 1990s (Reardon, 2011). While recent work suggests this gap narrowed slightly in subsequent years, it is still large—around 0.5 standard deviations for behavioral measures and over one standard deviation for early math and reading skills (Reardon & Portilla, 2016). Research on income-based achievement gaps has focused solely on family income without attention to other dimensions of economic disadvantage. The spatial concentration of economic disadvantage in residential neighborhoods is increasingly recognized as a potentially important context that creates burdens on families beyond their own individual economic circumstances (Chetty, Hendren, & Katz, 2016), but has not yet been explored as an aspect of disadvantage that may play a unique role in predicting early achievement gaps.

This paper considers the accumulation of neighborhood economic disadvantage during the first decade of the 21st century and its consequences for children's school readiness over a period of 12 years spanning the Great Recession. Using the Early Childhood Longitudinal Study-Kindergarten Cohorts (ECLS-K) from 1998 and 2010, we analyze how the distribution of poor and nonpoor families with kindergarten children across neighborhoods has changed, and how family and neighborhood poverty predict children's academic skills and classroom behavior at school entry. Although the analyses are correlational in nature, understanding the strength of neighborhood poverty's predictive power is important from a standpoint of assessing whether children in high poverty neighborhoods might face potential challenges when they enter school and thus need additional supports.

1.1. Background and theoretical motivation

A large body of research has focused on understanding poverty as a key determinant of children's wellbeing (Duncan, Magnuson & Votruba-Drzal, 2015; Yoshikawa, Aber, & Beardslee, 2012). Compared with their more affluent peers, poor children have lower levels of school achievement and attainment, worse health, and are rated by teachers and parents as having worse classroom behaviors (Duncan et al., 2015). In studies of poverty, family-level economic resources, rather than community or neighborhood resources, are often privileged as the key determinants. This is based on the assumption that families have a choice in

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where they reside, even if their selection of residential neighborhoods is constrained by their incomes (Yinger, 2002).

Yet, increasingly theory and empirical evidence point to the importance of "place" in understanding economic fortunes (Chetty et al., 2016). Indeed, neighborhood contexts may play a significant role in shaping the experiences of children, such as the safety and quality of residential neighborhoods, as well as the quality of institutions and institutional resources available (Leventhal, Dupere, & Shuey, 2015). For young children specifically, parents living in disadvantaged neighborhoods have few options for high-quality child care and education that are both enriching and accessible (Burchinal, Nelson, Carlson, Brooks-Gunn, & J., 2008; Dupere, Leventhal, Crosnoe, & Dion, 2010; Leventhal et al., 2015; McCoy, Connors, Morris, Yoshikawa, & Friedman-Krauss, 2015; Reardon & Bischoff, 2011). High-poverty neighborhoods can also affect young children directly through exposure to more toxins, noise pollution, and other aspects of stressful environments (Evans, 2004, 2006; Evans & Kim, 2007). Finally, neighborhood poverty may also indirectly affect children because of its negative influence on parental wellbeing (Kohen et al., 2008; Ross, 2000), which in turn, can affect interactions with children (Paschall & Hubbard, 1998; Pinderhughes, Nix, Foster, & Jones, 2001).

In considering how family and neighborhood poverty shape families' lives and children's development, it is important to understand how race and ethnicity affects residential experiences. Economic and racial segregation "are distinct but overlapping phenomena" (Lichter, Parsai & Taquino, 2012, p. 383). Sharkey (2014) demonstrates that neighborhood contexts are especially salient in the lives of African-American children residing in poor urban areas, because of the way in which multiple generations' experience of concentrated neighborhood poverty has affected their family lives. African-American children are not only more likely to be poor, but their poverty is compounded by their parents having been raised in the context of poor and racially segregated communities, which through disinvestments have remained in decline. In addition, even middle-class African-Americans tend to live in neighborhoods which are significantly poorer and have higher concentrations of minority residents relative to their middle-class white counterparts (Adelman, 2004; Pattillo, 2005).

When considering change in exposure to concentrated poverty over time, however, racial and ethnic trends are more complicated. Although after the Recession more Americans live in neighborhoods of concentrated poverty, the increase in exposure to neighborhood poverty was not equally shared. Whites saw the highest percentage gains in exposure to neighborhood poverty, as poverty shifted to the suburbs and to the Midwest and South (Bishaw, 2014). In fact, between 1980 and 2010, the black-white gap in neighborhood poverty declined, not because blacks made gains but because more poor whites were living in poor neighborhoods (Firebaugh & Acciai, 2016). Thus the growth in living in concentrated poverty was larger among whites, despite the fact that urban residents and African-Americans are still much more likely to live in concentrated poverty (Kneebone, Nadeau, & Berube, 2011). Though not a central focus of this study, these recent changes in the residential circumstances from the perspective of young children, and their potential link to school readiness, deserve further exploration.

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1.2. Children's school readiness and early neighborhood contexts

School readiness refers to foundational skills and behaviors that prepare children to meet learning expectations in the first year of formal schooling. Children's skills at school entry are robust predictors of later performance on reading and math skill tests, with the strongest predictors of later achievement including both early academic skills and attention-related behaviors (Duncan et al., 2007). Differences in early skills by family income or education, often referred to as "achievement gaps," are consequential for children's educational trajectories because these differences persist and accumulate over the course of schooling (Alexander, Entwisle, & Olson, 2007; Heckman, 2006; Jordan, Kaplan, Ramineni, & Locuniak, 2009), with implications for later economic outcomes and social inequalities.

Though the role of family income in predicting early achievement gaps is well documented (Reardon, 2011; Reardon & Portilla, 2016), research focusing on the role of neighborhoods contexts is both more limited and less conclusive. Research on the consequences of the economic characteristics of neighborhoods tends to overlook young children in favor of studying older youth, despite the fact that preschoolage children and their parents spend considerable time in their residential neighborhood (Sampson, Sharkey, & Raudenbush, 2008; Shonkoff & Phillips, 2000). After reviewing studies of children and adolescents, Leventhal et al. (2015) concluded that high-neighborhood SES predicts better school readiness, academic achievement, and educational attainment among children, whereas lower neighborhood SES predicts worse behavior and mental health outcomes among children. However, they found that neighborhood SES (high or low) generally explains only 5% to 10% of the variance in developmental outcomes—a small effect—after accounting for child and family background characteristics.

Studies addressing the effects of the neighborhood economic conditions specifically on developmental outcomes in early childhood are limited to a few, and only one dataset used in these studies had a nationally representative sample of U.S. infants or preschoolers (Leventhal & Brooks-Gunn, 2000). A community study of Head Start attendees found that neighborhood disadvantage predicted pre-schoolers' math and letter–word skills but not their receptive vocabulary or social outcomes (Hanson et al., 2011). Vaden-Kiernan et al.'s (2010) examination of a nationally representative sample of Head Start attendees found a slightly different pattern of associations: low neighborhood SES predicted lower receptive vocabulary and math skills and higher levels of parent-reported problem behavior, but not letter–word identification skills or teacher-reported behavior problems. Finally, a Canadian study found that having ever lived in a poor neighborhood during early childhood predicted lower vocabulary scores at age five (Jones & Shen, 2014). These studies show that neighborhood disadvantage predicts some dimensions of children's school readiness, but suggest that the strength of these associations may differ across the specific measures and populations studied. Quantifying the average strength and robustness of the associations is complicated by the studies' differing samples, measures of neighborhood SES, and selection of covariates.

Given the large empirical and methodological challenges to identifying the causal effects of neighborhood poverty on children's outcomes (Subramanian, 2004), most studies in this area, including those reviewed above, are correlational. As a result, although associations

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may be identified, the extent to which they are causal is not clear. Recent analyses from experimental data provide new insights into the long-term causal effects of neighborhoods, showing long-term impacts on adult employment and earnings for younger children whose families moved from high- to low-poverty neighborhoods. The gains from moving to lower poverty areas declined steadily with the age of the child at the time of the move (Chetty et al., 2016).

Results that provide causal estimates may be useful for understanding the benefits of policies that change neighborhood economic characteristics (or change a family's neighborhood of residence). However, from a standpoint of wanting to identify children who might be in need of additional support and intervention, the predictive power of neighborhood poverty may be as important as its causal effects. Even if neighborhood disadvantage is not causally associated with children's wellbeing, it may be a strong predictor of concurrent and subsequent child wellbeing specifically because of sorting and selection mechanisms that result in the most disadvantaged families residing in the most economically and socially disadvantaged neighborhoods (Sampson & Sharkey, 2008). Indeed, if neighborhood poverty predicts children's achievement and behavior after accounting for family income and other family background characteristics, then targeting neighborhoods may be a useful tool for policy makers and administrators in designing family support and child intervention programs and for setting program eligibility guidelines.

1.3. The present study

The present study describes national trends in the association between neighborhood and family poverty and children's academic skills and classroom behavior at school entry. Using two nationally representative samples of kindergarteners—the ECLS-K cohorts of 1998 and 2010, as well as U.S. census data on neighborhood poverty—we consider if and how these relationships have changed over a period of 12 years spanning the Great Recession by testing three research questions: (1) How has the distribution across neighborhoods of families by race and poverty status changed from 1998 to 2010? Given that more Americans, in particular whites and those living in suburban and smaller metropolitan areas, are living in high-poverty neighborhoods after the Recession (Bishaw, 2014), we hypothesize that more young children will be living in high poverty neighborhoods after the Recession; (2) How has the family income gap in children's school readiness skills within neighborhoods changed? Increased heterogeneity in high-poverty neighborhoods should mean an increase in the school readiness gap for children living in these neighborhoods, because the income gap itself may have increased if increasingly higher-income children are living next to lower-income children. Therefore, we expect that the family income gap in children's school readiness will grow within neighborhood poverty categories; and (3) Controlling for family background characteristics, do levels of neighborhood poverty predict children's school readiness schools in two nationally representative samples of kindergarten children from two periods of time? We expect that neighborhood poverty will explain a small yet significant amount of variation in children's school readiness after holding constant family background.

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This study contributes to the literature on neighborhoods, early childhood development, and school readiness in two important ways. First, this is one of only a few studies to examine the role of neighborhood poverty on outcomes in early childhood with nationally representative samples of U.S. children. The findings provide new information on the strength of associations between family and neighborhood poverty status and young children's development. Second, this is the first study to combine two nationally representative samples of kindergarteners and two sets of Census data on children's home neighborhood contexts, providing a landscape for understanding how neighborhood contexts and respective school readiness outcomes have changed during and after the recession. This advance enables us to examine whether the associations between family and neighborhood poverty and children's school readiness have changed between 1998 and 2010.

2. Methods

2.1. Data and sample

Data come from the ECLS-K 1998 and 2010 cohorts, two nationally representative samples of U.S. kindergartners. The 1998 cohort comprises approximately 21,250 kindergarteners who attended 1277 schools in the 1998–1999 academic year (West, Denton, & Germino-Hausken, 2000). The 2010 cohort comprises about 18,200 U.S. kindergarteners who attended 970 schools in the 2010–2011 academic year (Mulligan, Hastedt, & McCarroll, 2012). We exclude children if they were missing data on the dependent variables, resulting in a total sample size of 19,200 and 15,700 respectively. We combine data from the ECLS-K samples with data on children's home neighborhood poverty levels from the 2000 U.S. Decennial Census (for the 1998 cohort) and the 2008–2012 American Community Survey (for the 2010 cohort). Tables 1a and 1b summarize the demographic characteristics of kindergarten children in the United States by neighborhood and family poverty categories.

2.2. Measures

2.2.1. Reading and math skills—In the fall of kindergarten, children's math and reading skills were assessed during one-on-one testing sessions administered by field staff in adaptive tests designed to match a child's skills level to the difficulty of items they are given. The assessment items used were developed specifically for the ECLS-K, and adapted from existing instruments. Each study cohort was given a unique set of items. A detailed psychometric report has been published for the 1998 (Rock & Pollack, 2002) and 2010 (Mulligan et al., 2012) panels. There were some differences in how the language screener was administered in the two panels, which are described in Appendix A.

The reading test assessed knowledge of basic skills such as letters and word recognition, beginning and ending sounds, vocabulary, and passage comprehension ($\alpha = 0.93$ and 0.95 in 1998 and 2010, respectively). The math test evaluated understanding of numbers, geometry, and spatial relations ($\alpha = 0.92$ in both 1998 and 2010). The math and reading outcomes are transformations of latent ability scores (i.e., theta scores) into standardized t-scores that have a mean of 0 and standard deviation of 1 (based on the full sample distribution for that year). By using standardized scores, any population mean differences across the two cohorts were

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eliminated. As a result, our analysis focuses on how the relative skill and behavior levels within cohorts are distributed across neighborhood poverty categories.

2.2.2. Behaviors—Children's behavior was measured using teacher self-administered survey measures that were completed during the fall of kindergarten. To ease interpretation of these measures, all were standardized based on the full samples to have a mean of 0 and a standard deviation of 1. All the measures demonstrated good indications of internal consistency as evident by their split-half reliabilities for the 1998 cohort.

Externalizing behavior was measured by the Social Skills Rating Scale (SSRS), in which teachers reported how often the child demonstrated externalized problem behaviors. The five-item scale included questions about how frequently the child fights, argues, gets angry, acts impulsively, or disturbs ongoing activities. A higher score represented worse behavior (split-half reliability of 0.90 and 0.88 for 1998 and 2010 cohorts).

Self-control was comprised four teacher-reported items from the SSRS that measure how well children are able to maintain self-control around their peers. Items include how frequently the child respects the property of others, controls their temper, accepts peer ideas for group activities, and appropriately responds to peer pressure. A higher score represented better behavior (split-half reliability of 0.79 and 0.81 for 1998 and 2010 cohorts).

Finally, the approaches-to-learning measure comprised six items reported by the teacher describing how often the child exhibits positive approaches to classroom learning behaviors related to task persistence, independence, and flexibility. The specific items asked how frequently the child demonstrates the following learning behaviors: keeps belongings organized; shows eagerness to learn new things; works independently; easily adapts to changes in routine; persists in completing tasks; and pays attention well. A higher score represents more positive approaches to learning (split-half reliability of 0.89 and 0.70 for 1998 and 2010 cohorts).

2.2.3. Family poverty status—Family poverty was measured by family's reported household income compared with federal poverty thresholds, which are based on family size and structure. Caregivers reported a one-year measure of family income for the prior year in a telephone survey during the fall of the child's kindergarten year. Families whose incomes were below the federal poverty threshold (which is based on family size) are designated as poor, and those with incomes above the threshold are categorized as nonpoor. About 20% of children in the 1998 sample were poor. Reflecting an increase in the federal poverty rates during the Recession, 28% in the 2010 sample lived in poor families.

2.2.4. Neighborhood poverty levels—Neighborhood poverty was measured as the percent of persons living below the federal poverty threshold in the 2000 U.S. Census tract of the child's neighborhood (for the 1998 cohort). Because the 2010 U.S. Census did not gather income data, the percentage of persons living below the federal poverty threshold was averaged over 2008 to 2012 in the American Community Survey. As a result, neighborhood characteristics were measured for the child's residential neighborhood during kindergarten, but the characteristics of the neighborhood were measured two years after their kindergarten

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year for the 1998 cohort, and over an average of five years spanning 2008–2012 for the 2010 cohort.

Most studies of associations between neighborhood characteristics and children's wellbeing use data from the U.S. Census. These data provide detailed information about the economic characteristics of residents of Census-defined areas. Census data have several limitations but are generally accepted as the only comprehensive source of detailed information about all residents of defined geographic areas (Sampson, Morenoff, & Gannon-Rowley, 2002). In describing neighborhood poverty, a common approach is to characterize neighborhoods by the percent of families or residents with income below the federal poverty threshold.

For our analysis, neighborhoods are categorized into four categories based on prior research by the U.S. Census Bureau (Bishaw, 2011): low-poverty neighborhoods, census tracts with < 14% of residents living below the federal poverty threshold (representing a neighborhood with a poverty rate lower than the national average poverty rate of about 14%); moderate-low-poverty neighborhoods (14%–19% of residents living in poverty); moderate-high-poverty neighborhoods (20%–39% of residents living in poverty); and high-poverty neighborhoods (40% or more of residents living in poverty) (Bishaw, 2011). We use these categories to build on the work by the Census Bureau and ensure that findings are policy relevant.

2.2.5. Covariates—Multivariate analyses included a set of covariates that were selected to measure family characteristics related to poverty and children's outcomes. These characteristics are selected because they are largely considered "fixed" characteristics in that they are unlikely to change (rapidly) as a function either family income or neighborhood poverty. Sampson and Sharkey (2008) find that in predicting neighborhood selection, race and income explains residential patterns of mobility how neighborhood inequalities are maintained over time. By including these observed background measures, we estimate partial correlations in the association between neighborhood poverty and school readiness that takes into account a large portion of social selection into a specific neighborhood. These characteristics include parental education (the highest level of education achieved by either of the parents or guardians in a two-parent household or by the only parent or guardian in a single-parent household, categorized as: less than high school, high school degree, some college/vocational or technical degree, and at least a college degree); family structure (two biological parents, single mother, other); maternal age; an indicator for whether English was the primary language spoken at home; urbanicity of the school neighborhood (urban, suburban, small town, and rural); number of children living in the household; and child gender, race (white non-Hispanic, black non- Hispanic, Hispanic, Asian, other), and age at assessment.

A complicated question in this area of research is whether studies should control for concurrent family income when estimating the associations between neighborhood poverty and children's outcomes. A key argument in favor of this approach is that families reside in poor neighborhoods because they lack the resources to find housing in more affluent areas. Yet, recent work has found that neighborhoods may affect children by directly limiting their parents' income and employment – thus adding a concurrent control for family income may

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indeed lead to an underestimate of the role of neighborhood in shaping children's life chances (Wodtke et al., 2011). This suggests that the best analytic approach would be one that could estimate an unbiased effect of neighborhood poverty, without controlling for concurrent family income. Yet, to do so requires an identification strategy based on observing children before and after changes in neighborhood residence and poverty levels – data that is especially hard to come by in studies of young children. For this reason, we provide partial correlations that focus on background characteristics as well as concurrent family poverty status, a conservative approach to estimating the association between neighborhood poverty and children's outcomes. In sensitivity checks, we also use a continuous measure of family income as a covariate.

2.3. Analytic plan

To investigate how the two cohorts of children's experiences of neighborhood poverty may have differed (research question #1), we first conducted a descriptive analysis of the composition of children living in neighborhoods with different poverty rates in 1998 and in 2010 by family poverty status and by race/ethnicity. Next, to understand how any changes in these residential experiences are associated with school readiness gaps, we assessed the mean raw standardized scores for academic and behavioral skills for children on each of the outcomes by family and neighborhood poverty status across time (research question #2). Finally, to consider how neighborhood poverty might be predictive of school readiness, we estimated associations between neighborhood poverty and each of the child academic skills and behaviors measures using ordinary least squares (OLS) regression analysis with a Huber-White correction to adjust the standard errors for clustering of children within schools (research question #3).

In answering this last question, we first pooled the panels to assess if there were any statistically significant interactions between cohort, neighborhood, and family poverty. A significant interaction would indicate that the relationship between family and neighborhood poverty differed across cohorts. There were no statistically significant three-way interaction effects for any outcome, indicating that the relationships between family poverty, neighborhood poverty and school readiness skills did not change across the two time periods. Thus, for all multivariate regression analyses, we pooled both cohorts and included an indicator for panel membership.

One concern in predicting children's school readiness by categories of neighborhood poverty is that the children have already spent time in their classrooms when they are assessed, so some differences may be attributable to the quality of schools or classrooms or, in the case of the behavior measures, teachers' reporting biases. In order to address this concern, we estimated teacher fixed effect regressions, which compare children within the same classrooms who reside in neighborhoods with differing poverty levels. This approach identifies the predictive power of neighborhood poverty within a classroom, holding constant family poverty status, and thus to be successful, there must be sufficient number of classrooms with children from neighborhoods of varying poverty. In our data, 28% of classrooms have children from varying neighborhood poverty categories in 1998 and 45% met this criterion in 2010.

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About 18% (N = 3700) of the children in the ECLS-K 1998 did not have complete geocoded addresses, either because their parents did not participate in an initial survey or the address they provided was invalid. About 4% (N = 650) of the children in the ECLS-K 2010 did not have complete geocoded addresses for similar reasons. Multiple imputation was used to impute missing covariates and missing neighborhood and family poverty data. Using Stata's "ice" command, 20 imputed datasets were created. In the 1998 sample, the rate of missing data on covariates used ranged from 0% to 6.3%, and in 2010, ranged from 0% to 25.4%. Finally, all analyses used sampling weights created by the National Center for Education Statistics, which make the resulting estimates nationally representative and address potential biases due to non-response.

3. Results

3.1. Changes in the distribution of young children across neighborhoods from 1998 to 2010

The two cohorts in our analysis span a period of time that included a major economic shock, with large effects on family and community resources, for this reason we first describe changes in residential neighborhoods with higher (or lower) concentrations of poverty. Compared with 1998, in 2010 kindergarten children were less likely to live in low-poverty neighborhoods (56.1% in 2010 versus 64.0% in 1998; $t = -9.45$, $p < 0.001$) and more likely to live in moderate-low-(16.0% versus 14.1%; $t = 3.76$, $p < 0.001$), moderate-high- (23.6% versus 19.2%; $t = 6.88$, $p < 0.001$), and high-poverty neighborhoods (4.3% versus 2.8%; $t = 6.83$, $p < 0.001$) (Fig. 1). Notably, the increase in residing in poor neighborhoods was concentrated among nonpoor children. Specifically, nonpoor children were nearly eight percentage points less likely to reside in a low-poverty neighborhood in 2010 compared with 1998 (67.2% versus 74.9%; $t = -9.37$, $p < 0.001$), whereas similar proportions of poor children resided in such neighborhoods at both times (34.4% versus 32.1%; $t = -0.16$, $p = 0.873$). In addition, nonpoor children were over three percentage points more likely to live in a moderate-high-poverty neighborhood in 2010 (14.7% versus 11.5% in 1998; $t = 6.53$, $p < 0.001$), whereas poor children chances of doing so did not change over time (38.3% versus 39.9% in 1998; $t = -0.71$, $p = 0.480$).

Appendix B describes changes in neighborhood poverty by child race in detail. Compared with 1998, in 2010, white children were less like to live in low-poverty neighborhoods and more likely to live in moderate-low-, moderate-high-, and high-poverty neighborhoods. Black children were only more likely to live in a moderate-high-poverty neighborhoods. These data suggest that from 1998 to 2010, although there was an overall decrease in the number of children living in low-poverty neighborhoods, the more advantaged (i.e., non-poor, and white children experienced most of the declines in neighborhood affluence). Next, we turn to considering whether neighborhood poverty predicts school readiness.

3.2. Children's academic skills and classroom behaviors by neighborhood and family poverty: descriptive analyses

Next, we assess the extent to which neighborhood poverty concentration predicts children's school readiness. With two cohorts that differ in terms of their distribution across

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neighborhood poverty categories and in their experiences of poverty, we estimated the associations between both neighborhood and family poverty and children's academic skills and classroom behaviors at school entry. Table 2 represents the weighted, raw mean standardized scores for each outcome for the full sample, and by family poverty status in 1998 and 2010.

With respect to academic skills, we find differences related to both family poverty and neighborhood poverty. Figs. 2 and 3 show that in 1998 and 2010, poor children in high-poverty neighborhoods scored lower on tests of academic skills compared with their more affluent peers. In 1998, nonpoor children in low-poverty neighborhoods were the only children who scored above the sample mean for both reading and math scores. In 2010, nonpoor children in low- and moderate-low-poverty neighborhoods scored above the mean.

Figs. 2 and 3 show a positive increase in standardized math and reading scores across all neighborhoods in 2010. This might give the false impression that children's skills uniformly improved since 1998. However, given that we standardized scores within cohorts, this cannot explain the apparent patterns. Indeed, this shift was the result of the differential composition of poor and nonpoor children across each of the neighborhood groups. Specifically, as shown in Fig. 1, more non-poor families were living in higher poverty neighborhoods in 2010, thereby presumably increasing the skill level of the neighborhood category averages.

Table 3 shows that the gaps in academic skills between poor and nonpoor children within neighborhoods also increased, with the largest growth in gaps occurring in higher poverty neighborhoods. For example, the first row in Table 3 shows that the raw gap between poor and nonpoor children's reading scores in high-poverty neighborhoods was 0.23 standard deviations in 1998 and 0.34 standard deviations in 2010. This is equivalent to about a little over one month of learning (Hill et al., 2008). Similarly, the gap between poor and nonpoor children's externalizing behaviors in the highest poverty neighborhoods is larger in 2010 (−0.02 versus −0.22 SD). The increased gap of 0.2 SD is equivalent to about half of the gap reported between boys and girls at this age (Duncan & Magnuson, 2011). These changes appear to be the result of the fact that from 1998 to 2010, (1) poor families' average income remained stagnant, (2) more nonpoor families were living in higher poverty neighborhoods, and (3) nonpoor families' average income had increased (see Tables 1a and 1b). It is possible that this resulted in larger income gaps within the higher poverty neighborhoods, which in turn leads to larger achievement gaps between poor and nonpoor children.

We next examined three dimensions of children's classroom behaviors: externalizing problem behavior, self-control, and approaches to learning. Figs. 4–6 and Table 2 display the relationship between family and neighborhood poverty and standardized teacher-reported measures of children's classroom behaviors in 1998 and 2010. The figures show that overall, nonpoor children in low-poverty neighborhoods were rated by teachers as having better classroom behaviors than their peers. As with academic outcomes, the raw mean standardized scores for behavioral outcomes within neighborhoods improved in 2010 compared with 1998, in particular for nonpoor children in moderate-lowand moderate-high-poverty neighborhoods (see the third and fourth sets of columns in Table 2). As was the case for achievement, this finding does not reflect uniformly better behavior but rather a shifting

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composition with more nonpoor children residing in higher poverty neighborhoods. Finally, the overall magnitude of the differences within and across neighborhoods was somewhat smaller for these measures of teacher-reported behavior compared with reading and math skills.

Unlike the family and neighborhood poverty gradients found w ithin and between neighborhoods for academic outcomes, behavioral outcomes showed gradients that were not as steep or as consistent. For all three behavioral outcomes, there was more similarity in scores by family poverty grouping than by neighborhood poverty grouping, and this differentiation was more pronounced in 2010 than in 1998 (see Figs. 4–6). These findings suggest that in 1998, neighborhood poverty differentiated children in terms of their behavioral outcomes more than family income, while in 2010 family income became a stronger differentiator than neighborhood.

3.3. Children's academic skills and classroom behaviors by neighborhood and family poverty: multivariate analyses

Children residing in neighborhoods with differing levels of poverty may come from families that differ in many observable and unobservable ways. Thus, describing patterns of achievement and behavior by family and neighborhood poverty does not directly test the strength of the associations between neighborhood poverty categories and children's school readiness. Tables 4 and 5 display the regression results for both OLS and teacher fixed effects models in which academic and behavioral outcomes were modeled as a function of neighborhood poverty categories controlling demographic and family covariates, which reduce the likelihood that observed confounders explain the associations between poverty and school readiness.

Holding constant family poverty status, children living in low-poverty neighborhoods had higher reading scores than children in moderate-low-, moderate-high-, and high-poverty neighborhoods. Children also had lower math scores in moderate-low-, moderate-high-, and high-poverty neighborhoods. The differences in math and reading scores between low-poverty and both the low-moderate- and high-moderate-poverty neighborhoods were roughly comparable (effect sizes of about 0.10), but were larger among the high-poverty neighborhoods (effect sizes of roughly 0.20). The teacher fixed effects regressions hold constant not only observed characteristics but also any shared background or experiences that children placed in the same classroom might have. In particular, this approach also should hold constant parents' demonstrated preferences for particular school characteristics to the extent that children are sorted across schools due to these factors. The teacher fixed effect yielded coefficients that were very close to those that resulted from the OLS models, suggesting that estimates of neighborhood poverty in the OLS models were not biased by unobserved characteristics shared by children in the same classroom or school.

The pattern of associations between neighborhood poverty and classroom behavioral outcomes were more complicated (Table 5). For externalizing problem behaviors, the OLS models showed children in moderate-low- and high-poverty neighborhoods had scores similar to their peers in low-poverty neighborhoods, although children in moderate-high-poverty neighborhoods were rated as having significantly higher externalizing problem

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behaviors ($b = 0.072$, $SE = 0.027$, $p < 0.01$). The results from the teacher fixed effects models, in contrast, showed that all three categories of higher neighborhood poverty were associated with higher levels of externalizing problem behavior, and that the size of the association was larger in moderate-high- and high-poverty neighborhoods. For the approaches to learning outcome, the OLS model results suggested no significant differences across categories of neighborhood poverty, and yet results from the teacher fixed effect models suggested a gradient across neighborhood poverty categories. This pattern is partially replicated for self-control.

The fact that this differential pattern of OLS and fixed effect regression results arose for teachers' reports of behavior but not for reading and math test scores points to the potential role of teacher perceptions or differing standards for behavior across classrooms. That is, when teachers' standards and reporting biases were held constant by comparing children in the same classroom, differences were apparent, but when ratings were compared across classrooms, such differences appear to be obscured.

3.4. Sensitivity analyses

We conducted three sets of analyses to assess the sensitivity of the results to different definitions of family poverty and neighborhood poverty. We based the definitions for these categories on prior theory and research, but recognize that the specific cutoffs are somewhat arbitrary. The results are summarized in Appendix C, and Appendix Tables 1–6. First, we added an additional family income category to the analyses, by separating families with income levels between 100 and 200% of the poverty line, and income levels 200% or more of the poverty line. The relationships observed were comparable across the two groups, with children in low-income families scoring between children in poor families and higher income families (≥200% of poverty line). Second, we tested the sensitivity of the results to the definition of neighborhood poverty categories by defining neighborhood poverty in five categories (0%–9.9%, 10%–19.9%, 20%–29.9%, 30%–39.9%, and 40% or more). The trends observed were very similar in both the pattern of relationships and the magnitude in that they showed an increase of children residing in higher poverty neighborhoods in the later cohort. Finally, we considered a continuous measure of family income rather than dichotomous indicators of poverty status. While the results change slightly, the pattern of results is similar and our overall conclusions remained the same.

4. Discussion

As economic inequality became more pronounced in the United States over the past decade, differences in the social and economic resources afforded to advantaged and disadvantaged children have grown, resulting in dramatically diverging destinies based on family origins (McLanahan, 2004). Against the backdrop of growing economic inequality, the Great Recession created a large economic shock for many families, affecting not just their own incomes, but the incomes of their communities, and as a result the number of Americans living in neighborhoods with high concentrations of poverty increased (Bishaw, 2014; Lichter et al., 2012). Our findings demonstrate that young children were no exception. Compared with 1998, in 2010 not only were a greater proportion of kindergartners living in

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poor families, they were also living in higher poverty neighborhoods. This is a concerning change because family and neighborhood poverty predict children's school readiness, and children's early school skills subsequently predict their later academic success and educational attainment (Duncan et al., 2007; Magnuson, Duncan, Lee, & Metzger, 2016). With greater family and neighborhood poverty, schools and communities are faced with greater challenges in supporting children's learning.

Increases in the likelihood of residing in higher poverty neighborhoods were most pronounced for nonpoor and for white children, a finding which parallels that for adults (Bishaw, 2014) and has largely been explained by an increase in the number of communities with concentrated poverty in the Midwest and South (Kneebone et al., 2011). What remains unclear, however, is whether such changes were the result of residential mobility, with higher incomes families relocating to poorer neighborhoods, or poverty rates within stable neighborhoods increasing despite a residentially stable population. Whatever the exact mix of explanations, the recession may have slightly diversified America's lower income neighborhoods, a change in trends from prior entrenchment of economic segregation. However, it is important to note that the overall proportions of nonpoor and white children living in moderate-high- and high-poverty neighborhoods remain small. Moderate-high and high-poverty neighborhoods were and remain largely populated by poor and nonwhite children.

The extent that neighborhood conditions and residential segregation, more generally, have an effect on families' socioeconomic status and on family dynamics is difficult to disentangle. Theoretically, neighborhood poverty is one of the many pathways through which family poverty affects young children, as families' income constrains their purchasing power in the housing markets. Poor families are less able than affluent families to invest in their children by choosing a safe neighborhood with high quality schools, parks, and other activities and organizations that may support their children's healthy development. Residing in a neighborhood of concentrated poverty may also compound the difficulty that poor families face in escaping poverty because in these neighborhoods, housing values remain low, chances of criminal victimization remain higher, high-paying jobs are less available, exposure to disease and substance abuse is greater, and individuals are more socially isolated (Pebley & Sastry, 2003). Thus, residential economic segregation and residence in concentrated poverty neighborhoods may be important determinants of family income or socioeconomic status as well as a major explanation for how family income affects children's outcomes.

Although our estimates are descriptive, the magnitude of differences across rates of neighborhood poverty are worth considering. Differences across neighborhoods of differing poverty levels are staggering large. Our findings suggest that further attention should be given to how advantages and disadvantages accrue for children not just in the family context but also through the neighborhood context. For these children, both family poverty and neighborhood poverty were consistently associated with lower levels of school readiness across both cohorts. Even modest neighborhood effects may be of considerable interest to policy makers, as these differences are compounded for populations of children who may already be facing significant challenges in schools.

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Although our estimates are only descriptive, the magnitude of differences across rates of neighborhood poverty are worth considering. Differences across neighborhoods of differing poverty levels are staggering large. The difference in academic skills between highest and lowest neighborhood poverty categories was 0.62 standard deviations units for reading and 0.80 standard deviation units for math scores in both 1998 and 2010. Given that children learn about one standard deviation of academic skills during the kindergarten year (Hill et al., 2008), children in the highest poverty neighborhoods start school close to a year behind their peers from low-poverty neighborhoods. This total neighborhood gradient is larger than black–white gaps found in these data during the 1998 kindergarten year (Duncan & Magnuson, 2011), and about the same size as the gaps between children with mothers who have a high school degree and those with mothers who have completed a college degree (authors' calculation of ECLS-K data, not shown). In summary, significant variation in school readiness in the United States is found across students in differing neighborhoods.

Differences in children's behavior across neighborhood poverty groups were smaller than for children's achievement, and more apparent in 1998 than 2010. In 2010, family poverty better predicted behavior than neighborhood poverty, though some differences by neighborhood poverty were still observed. This change may be explained by the changing composition of families within neighborhood types, with more nonpoor children living in higher poverty neighborhoods in 2010. The differences between children in the lowest and highest poverty neighborhoods amount to approximately 0.4 standard deviations in 1998, and 0.2 standard deviations in 2010. This difference in behaviors in 1998 is about the same magnitude as the average differences in these measures between girls and boys in these data (Duncan & Magnuson, 2011). The multivariate regression and fixed effects analyses showed that for moderate-low, moderate-high, and high-poverty neighborhoods, children are reported to have more behavior problems that those in low-poverty neighborhoods. However, unlike with academic outcomes, these associations were roughly similar in size across all three types of neighborhoods, with negative relations for children in moderate-low poverty neighborhoods showing the most consistent results across models for all behavioral outcomes.

The poverty-related raw gaps within neighborhood categories are somewhat smaller than the differences across neighborhoods (approximately 0.5 standard deviations) but are still substantial, amounting to approximately half a year of kindergarten. Notably, the multivariate regression and fixed effects analyses revealed that the coefficients for moderate-low and moderate-high poverty neighborhoods similar in size, and coefficients for high-poverty neighborhoods approximately twice the magnitude for academic outcomes (approximately 0.1 versus 0.2 standard deviations). This study also documented an increased achievement gap after the recession between poor and nonpoor children within neighborhoods, such that differences in children's academic skills by family poverty status within neighborhoods grew between 1998 and 2010. This appears to be explained by changes in the composition of families within different types of neighborhoods and increased income inequality within neighborhoods. Put another way, the increase in economic diversity in neighborhoods also led to more income inequality within neighborhoods. Nonpoor families' incomes increased over the period, while poor families' incomes remained stagnant. Thus, while inequality in achievement within neighborhood

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poverty categories increased between 1998 and 2010, this was not due to changes in the relationship between neighborhoods and child outcomes. Rather, more nonpoor children lived in higher poverty neighborhoods in 2010, and their families' incomes grew disproportionately relative to those of poor children.

Our findings suggest that further attention should be given to howadvantages and disadvantages accrue for children not just in the family context but also through the neighborhood context. For these children, both family poverty and neighborhood poverty were consistently associated with lower levels of school readiness across both cohorts. Even modest neighborhood effects may be of considerable interest to policy makers, as these differences are compounded for populations of children who may already be facing significant challenges in schools.

How should communities and schools respond to increased numbers of children experiencing both family poverty and higher concentrations of community poverty? A clear challenge is that as communities face higher levels of economic hardship, they often have lower levels of tax revenues to support services and programs that might serve these children. For example, state and local prekindergarten programs did not expand during the recession, despite the potential for more children to need publicly funded early education programs. Moreover, for communities that are increasingly poor, including suburban and rural areas, the network of non-profit social service agencies that serve poor populations may be far less robust and accessible to needy families (Allard, 2017). This suggests that increases in family and neighborhood poverty may be hard for local communities to adequately respond to in the short-term, and this might put greater strain on schools and other youth serving organizations until greater capacity to support and address the needs of low-income families is developed. For this reason, more research attention is needed to understand how families and children experienced the increases in poverty and the extent to which it might have long-run links to wellbeing.

4.1. Limitations

These analyses are limited in several ways. First, several issues related to measurement error in both the poverty measures and outcomes should be noted. Due to data limitations, the measure of neighborhood poverty reflected data from two years after children's residence is measured in 1998 and from a five-year period spanning the year of residence in 2010. When families with children move, they tend to move between neighborhoods with similar characteristics (Jackson & Mare, 2007). Nevertheless, we cannot be sure that our measures of neighborhood poverty align exactly with the year of children's entry into kindergarten. Future research would benefit not only from better-alignment of data but from a full history of early neighborhood context, so that children's developmental history of neighborhood contexts can be better characterized. Unfortunately, with few exceptions longitudinal studies are not designed to capture spatial aspects of poverty as a shared characteristic among children, as children are often sampled from schools rather than home neighborhoods (for an exception see Project on Human Development in Chicago Neighborhoods, Earls & Buka, 1997). To more deeply investigate neighborhood effects on child development as well as other outcomes, a different approach to sampling frames and data collection will be

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necessary (Allard & Paisner, 2016). Second, family income was assessed as a single item, asking the primary caregiver about the family's prior-year income. Although this type of assessment is common, it may result in measurement error, especially around the poverty threshold, which would lead to a misclassification of a child's poverty status. In addition, this study includes only one dimension of the neighborhood context. Indeed, research shows that features of the neighborhood such as violence, racial segregation, social disorganization and social control, predict early childhood behavioral outcomes (Ingoldsby & Shaw, 2002). Considering other such dimensions of the neighborhood context may help to explain why high poverty neighborhoods are associated with poorer child outcomes.

Issues of nonresponse are also important to consider. Using two large, nationally representative datasets is a strength of this study given that prior studies of young children were less representative, but a potential weakness of these data are missing data, and specifically the proportion of children missing valid addresses was much larger in the 1998 panel compared to the 2010 panel. To handle missing data, we used multiple imputation, an effective means provided the data are missing at random, and also employed analytic weights. Of course, it is impossible to ascertain whether such assumptions for multiple imputation and weights are fully met. If nonresponse was driven by unobservable characteristics of children and families our estimates may be biased.

Prior work suggests that the selection of families into neighborhoods is explained by observed characteristics, many of which are included as controls. We estimate partial correlations and do not provide a causal estimate of associations between neighborhood poverty and children's school readiness. It is important to recall that descriptive differences do not indicate causal associations. Indeed, these data indicate that families are not randomly sorted among neighborhoods with respect to parental education, family structure, or race and ethnicity. In addition, the family income gap between poor and nonpoor children is much larger in low-poverty neighborhoods when compared with high-poverty neighborhoods. These and other differences are likely to contribute to children's early academic skills and behaviors.

4.2. Conclusions

The findings suggest that interventions and policies aimed at improving children's school readiness should take into account children's neighborhood context. Although these analyses do not isolate how much of the observed developmental differences can be causally attributed to differing dimensions of children's poverty experiences, the findings offer some insights for targeting intervention and remediation efforts. The data clearly suggest that both family and neighborhood poverty are useful indicators for identifying children who may need extra supports in terms of school readiness skills, and that the characteristics of children who may be in need of these services has changed to include a larger portion of children. Although only a small percentage of all children resided in high-poverty neighborhoods in 2010 (about 4.3% of children reside in neighborhoods with poverty rates of 40% or higher), nearly a quarter of children (23.2%) lived in moderate-high-poverty neighborhoods (with poverty rates between 20% and 39%). Regardless of family poverty

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status, on average these children compared poorly with their peers in more affluent neighborhoods.

One approach to help close the school-readiness gap observed across neighborhoods might be targeting Head Start centers to be located specifically in high-poverty neighborhoods, and expanding eligibility to any family living in that neighborhood. Importantly, a recent study showed that Head Start center quality was significantly lower in high-poverty neighborhoods (McCoy et al., 2015), suggesting some explanation for why these programs may not currently be effectively closing these neighborhood gaps. Thus, if such programs were to serve as "equalizers" across neighborhoods, efforts would need to be made to ensure high-quality programming in the highest poverty neighborhoods. While in recent years there have been increased policy efforts to expand place-based initiatives as an approach to combating poverty, such as the Promise Zones initiative, these programs have not specifically targeted early childhood development. Given the ways neighborhoods affect parent mental health (e.g., Kohen et al., 2008), and the critical mediating role of parents' emotional distress and parenting practices in the relation between income and children's development (e.g., Linver, Brooks-Gunn, & Kohen, 2002), our findings suggest that place-based initiatives that also provide support to poor parents *living in high poverty neighborhoods* specifically, or to all families living in high poverty neighborhoods regardless of family income may be effective. Combining efforts to promote early childhood development, through direct services to children and parents, with such place-based programs may be the most effective way to reach children most in need.

Appendix A.: Language screening procedures in the ECLS-K 1998 and 2010 panels

In 1998, a brief language screener was given to children who were identified by teachers or school records as having a non-English language background (8% of children) to determine whether the children understood English well enough to receive the direct assessment in English. About 40% of children who completed the screener scored below the cutoff and received a reduced version of the assessment (3% of the total sample) (West et al., 2000). These children were not given the reading assessment as it was only available in English, but a Spanish version of the math test was given to children who failed the English-language screener and had Spanish language background. In 2010, all children were administered the language screener as the first component of the direct cognitive assessment. For children whose home language was English, the screener primarily served as a warm-up or practice for the rest of the assessment since the items were of low difficulty (Tourangeau et al., 2013). All children received the first set of items on the reading assessment in English, regardless of their performance on the language screener. Spanish-speaking children who did not achieve pass the screener were then administered a short reading assessment in Spanish that measured Spanish early reading skills (SERS), as well as the mathematics assessment that had been translated into Spanish (2% of the sample).

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Appendix B.: Changes in the distribution of young children across neighborhoods from 1998 to 2010 by race

Experiences of child poverty differ across racial and ethnic groups, with much higher rates of poverty and chronic poverty among communities of color. As a result, it is important to understand how experiences of neighborhood poverty might also differ for racial and ethnic groups (white, black, and Hispanic children). Results suggest that increases in the proportion of children residing in poor neighborhoods were not experienced equally across all groups (data not shown). Compared with black and Hispanic children, white children were much more likely to live in low-poverty neighborhoods in both 1998 and 2010. Although all groups were less likely to live in a low-poverty neighborhood in 2010 compared with 1998, the largest changes occurred for white children (70.5% in 2010 versus 83.7% in 1998; $t = -10.49$, $p < 0.001$), with much smaller changes for Hispanic children (39.6% versus 42.9%; $t = -2.13$, $p < 0.05$), and no significant changes for black children (31.2% versus 34.9%; $t = -1.54$, $p = 0.126$). Compared with 1998, in 2010, white children were more likely to live in moderate-low-, moderate-high-, and high-poverty neighborhoods. In contrast, in 2010 black children were only more likely to live in a moderate-high-poverty neighborhood than in 1998 (42.9% in 2010 versus 38.8% in 1998%; $t = 2.44$, $p < 0.05$). Finally, in 2010 Hispanic children were more likely to live in a high-poverty neighborhood than in 1998 (8.7% versus 3.7%; $t = 8.20$, $p < 0.001$).

Appendix C.: Sensitivity analyses

We conducted three sets of analyses to assess the sensitivity of the results to different definitions of family poverty and neighborhood poverty. First, we considered children's family poverty status for two separate groups above the federal poverty line: income levels between 100% and 200% of the poverty line, and income levels 200% or more of the poverty line. These analyses allowed us to assess if the changes observed were concentrated in children whose families lived on the margins of poverty. We analyzed the compositional analyses as well as the trends in mean school readiness over time for these two groups. Results showed that the compositional changes were not limited to one group. Rather, children in families with incomes between 100% and 200% of the federal poverty line and children in families with incomes 200% or more of the federal poverty line were both less likely to live in low-poverty neighborhoods and more likely to live in moderate- and high-poverty neighborhoods (see Appendix Table 1). These shifts were similar in magnitude across neighborhood categories. The relationship between neighborhood poverty, family poverty, and school readiness outcomes also were comparable across the two groups, with children in low-income families (incomes between 100% and 200% of the federal poverty line) scoring between children in families below the poverty line and higher income children (see Appendix Table 2).

Second, we tested the sensitivity of the results to the definition of neighborhood poverty categories by defining neighborhood poverty in five categories (0%–9.9%, 10%–19.9%, 20%–29.9%, 30%–39.9%, and 40% or more). The trends observed were very similar in both

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the pattern of relationships and the magnitude in that they showed an increase of children residing in higher poverty neighborhoods in the later cohort (see Appendix Tables 3–6).

Finally, we considered whether our results would differ if we included a continuous measure of family income rather than a dichotomous indicators of poverty status (results not shown). For academic outcomes, the pattern of findings is very similar for the OLS analyses with coefficients slightly smaller in magnitude. For the fixed effects analyses, however, the coefficients for moderate-low and moderate-high poverty neighborhoods are no longer statistically significant, and the coefficient for high-poverty neighborhoods is larger in magnitude (−0.22 for reading, −0.18 for math) and statistically significant. The results for behavioral outcomes are largely unchanged. (Results available for first author upon request.)

Appendix Table 1

Percent of kindergarten children by neighborhood poverty and alternative specification of family poverty, in 1998 and 2010.

	Low poverty neighborhood (0–13.9%)		Moderate-low poverty neighborhood (14–19.9%)		Moderate-high poverty neighborhood (20–39.9%)		High poverty neighborhood (40% +)	
	1998	2010	1998	2010	1998	2010	1998	2010
All children	64.0	56.1	14.1	16.0	19.2	23.6	2.8	4.3
< 100% FPL	34.4	32.1	18.5	17.6	38.3	39.9	8.8	10.3
100–200% FPL	53.8	49.0	18.4	19.1	24.7	38.1	3.0	3.9
200% plus FPL	80.9	73.5	10.3	13.3	8.3	11.9	0.5	1.2

Notes. FPL stands for family poverty line, a threshold calculated by the family's income relative to the federal poverty threshold in the state in which the child resides.

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Appendix Table 2

Standardized school readiness outcomes by neighborhood poverty and alternative specification of family poverty, in 1998 and 2010.

	All neighborhoods		Low poverty neighborhood (0–13.9%)		Moderate-low poverty neighborhood (14–19.9%)		Moderate-high poverty neighborhood (20–39.9%)		High poverty neighborhood (40% +)	
	1998	**2010**	**1998**	**2010**	**1998**	**2010**	**1998**	**2010**	**1998**	**2010**
Reading										
≤100% FPL	−0.490	−0.382	−0.374	−0.299	−0.529	−0.337	−0.558	−0.425	−0.597	−0.537
100–200% FPL	−0.262	−0.098	−0.188	−0.018	−0.372	−0.138	−0.351	−0.194	−0.371	−0.235
200% plus	0.206	0.318	0.263	0.375	−0.030	0.206	−0.088	0.146	−0.170	−0.133
Math										
≤100% FPL	−0.481	−0.441	−0.326	−0.332	−0.510	−0.349	−0.577	−0.514	−0.649	−0.640
100–200% FPL	−0.214	−0.131	−0.117	−0.022	−0.313	−0.133	−0.354	−0.288	−0.479	−0.379
200% plus	0.279	0.346	0.345	0.424	0.015	0.203	−0.053	0.089	−0.370	−0.192
Externalizing										
≤100% FPL	0.177	0.180	0.079	0.094	0.204	0.259	0.204	0.217	0.414	0.162
100–200% FPL	0.094	0.075	0.006	0.030	0.191	0.045	0.209	0.208	0.378	−0.146
200% plus	−0.049	−0.081	−0.075	−0.099	0.057	−0.088	0.080	0.023	0.051	0.081
Self-control										
≤100% FPL	−0.218	−0.199	−0.105	−0.119	−0.196	−0.248	−0.287	−0.227	−0.442	−0.246
100–200% FPL	−0.066	−0.048	0.034	−0.011	−0.109	−0.023	−0.252	−0.152	−0.381	0.089
200% plus	0.119	0.123	0.145	0.139	0.032	0.082	−0.034	0.087	−0.172	−0.016
Approaches to learning										
≤100% FPL	−0.089	−0.037	−0.031	−0.019	−0.124	−0.011	−0.186	−0.113	−0.325	0.127
100–200% FPL	0.159	0.172	0.185	0.175	0.048	0.149	0.039	0.205	0.011	−0.062
200% plus	−0.490	−0.382	−0.374	−0.299	−0.529	−0.337	−0.558	−0.425	−0.597	−0.537

Notes. FPL stands for family poverty line, a threshold calculated by the family's income relative to the federal poverty threshold in the state in which the child resides.

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Appendix Table 3

Percent of kindergarten children by family poverty and alternative specification for neighborhood poverty, in 1998 and 2010.

	Neighborhood poverty rate									
	0–9.9%		10–19.9%		20–29.9%		30–39.9%		40% or more	
	1998	2010	1998	2010	1998	2010	1998	2010	1998	2010
All children	49.9	41.9	28.0	30.1	13.7	15.9	5.5	7.7	2.8	4.3
Nonpoor children	57.9	51.1	27.1	29.7	10.3	12.4	3.2	4.7	1.6	2.1
Poor children	18.8	18.3	31.7	31.2	26.5	25.1	14.9	15.2	8.1	10.1
White children	66.8	54.9	25.1	30.8	6.8	10.2	1.3	3.1	0.1	1.0
Black children	19.0	21.6	31.9	26.5	22.9	24.8	14.5	16.3	11.8	10.8
Hispanic children	29.1	25.0	33.0	30.8	24.4	22.2	10.1	13.3	3.5	8.7

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Appendix Table 4

Standardized school readiness outcomes by family poverty and alternative specification of neighborhood poverty, in 1998 and 2010.

	0–9.9%		10–19.9%		20–29.9%		30–39.9%		40% or more	
	1998	2010	1998	2010	1998	2010	1998	2010	1998	2010
Reading										
≤100% FPL	−0.303	−0.256	−0.249	−0.283	0.078	0.115	−0.073	−0.107	−0.172	−0.213
> 100% FPL	0.215	0.321	0.301	0.376	−0.081	−0.095	0.134	0.126	0.150	0.144
Math										
≤100% FPL	−0.491	−0.347	−0.469	−0.371	0.208	0.178	−0.192	−0.202	−0.283	−0.244
> 100% FPL	−0.119	0.111	−0.065	0.097	0.062	−0.007	0.021	0.035	0.021	0.083
Externalizing										
≤100% FPL	−0.545	−0.398	−0.537	−0.486	0.152	0.190	−0.228	−0.204	−0.267	−0.249
> 100% FPL	−0.243	−0.009	−0.203	−0.086	0.138	0.164	−0.135	−0.067	−0.092	0.016
Self-control										
≤100% FPL	−0.571	−0.469	−0.634	−0.559	0.229	0.261	−0.357	−0.265	−0.337	−0.246
> 100% FPL	−0.258	−0.076	−0.342	−0.149	0.271	−0.006	−0.271	0.051	−0.153	0.114
Approaches to learning										
≤100% FPL	−0.593	−0.537	−0.630	−0.640	0.375	0.162	−0.426	−0.246	−0.386	−0.203
> 100% FPL	−0.363	−0.196	−0.505	−0.308	0.357	−0.060	−0.362	0.049	−0.265	0.055

Notes. FPL stands for family poverty line, a threshold calculated by the family's income relative to the federal poverty threshold in the state in which the child resides.

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Appendix Table 5

Regression coefficients for OLS and Teacher fixed effects models for children's academic outcomes with alternative specification of neighborhood poverty.

	Reading		Math	
	OLS	Teacher FE	OLS	Teacher FE
Family poor	−0.119*** (0.016)	−0.156*** (0.026)	−0.145*** (0.015)	−0.153*** (0.026)
Neighborhood poverty level[a]				
10–19.9%	−0.125*** (0.015)	−0.077** (0.030)	−0.153*** (0.014)	−0.100*** (0.029)
20–29.9%	−0.162*** (0.021)	−0.073+ (0.039)	−0.191*** (0.019)	−0.111** (0.038)
30–39.9%	−0.135*** (0.029)	−0.091+ (0.051)	−0.201*** (0.027)	−0.098* (0.050)
High poverty (40%+)	−0.247*** (0.038)	−0.197*** (0.062)	−0.253*** (0.034)	−0.176** (0.061)

Notes. Covariates include parent education (less than HS; HS/voc/tech degree; Some college; College plus), child gender, child race, child age, English home language (y/n), Urbanicity, two bio parents, single mother, maternal age, # children in household.

OLS models use clustered standard errors for children nested in schools.

[a]Reference group is low poverty neighborhood (0–9.9%).

*p < .05.

**p < .01.

***p < .001.

+p < .10.

Appendix Table 6

Regression coefficients for OLS and teacher fixed effects models for children's behavioral outcomes with alternative specification of neighborhood poverty.

	Externalizing		Self-control		Approaches to learning	
	OLS	Teacher FE	OLS	Teacher FE	OLS	Teacher FE
	b (SE)					
Family poor	0.049** (0.017)	0.119*** (0.030)	−0.085*** (0.017)	−0.153 (0.030)	−0.123*** (0.016)	−0.182*** (0.028)
Neighborhood poverty level[a]						
10–19.9%	0.048** (0.016)	0.073* (0.033)	−0.033* (0.017)	−0.081* (0.032)	−0.024 (0.016)	−0.088** (0.030)
20–29.9%	0.074*** (0.022)	0.165*** (0.042)	−0.061** (0.023)	−0.143*** (0.042)	−0.026 (0.022)	−0.141*** (0.040)
30–39.9%	0.067* (0.030)	0.100+ (0.058)	−0.080* (0.033)	−0.057 (0.057)	0.002 (0.030)	−0.076 (0.054)
High poverty (40%+)	0.051 (0.040)	0.140* (0.070)	−0.064 (0.040)	−0.026 (0.069)	−0.024 (0.038)	0.145* (0.064)

Notes. Covariates include parent education (less than HS; HS/voc/tech degree; some college; college plus), child gender, child race, child age, English home language (y/n), Urbanicity, two bio parents, single mother, maternal age, # children in household.

OLS models use clustered standard errors for children nested in schools.

[a]Reference group is low poverty neighborhood (0–9.9%).

*p < .05.

**p < .01.

***p < .001.

+p < .10.

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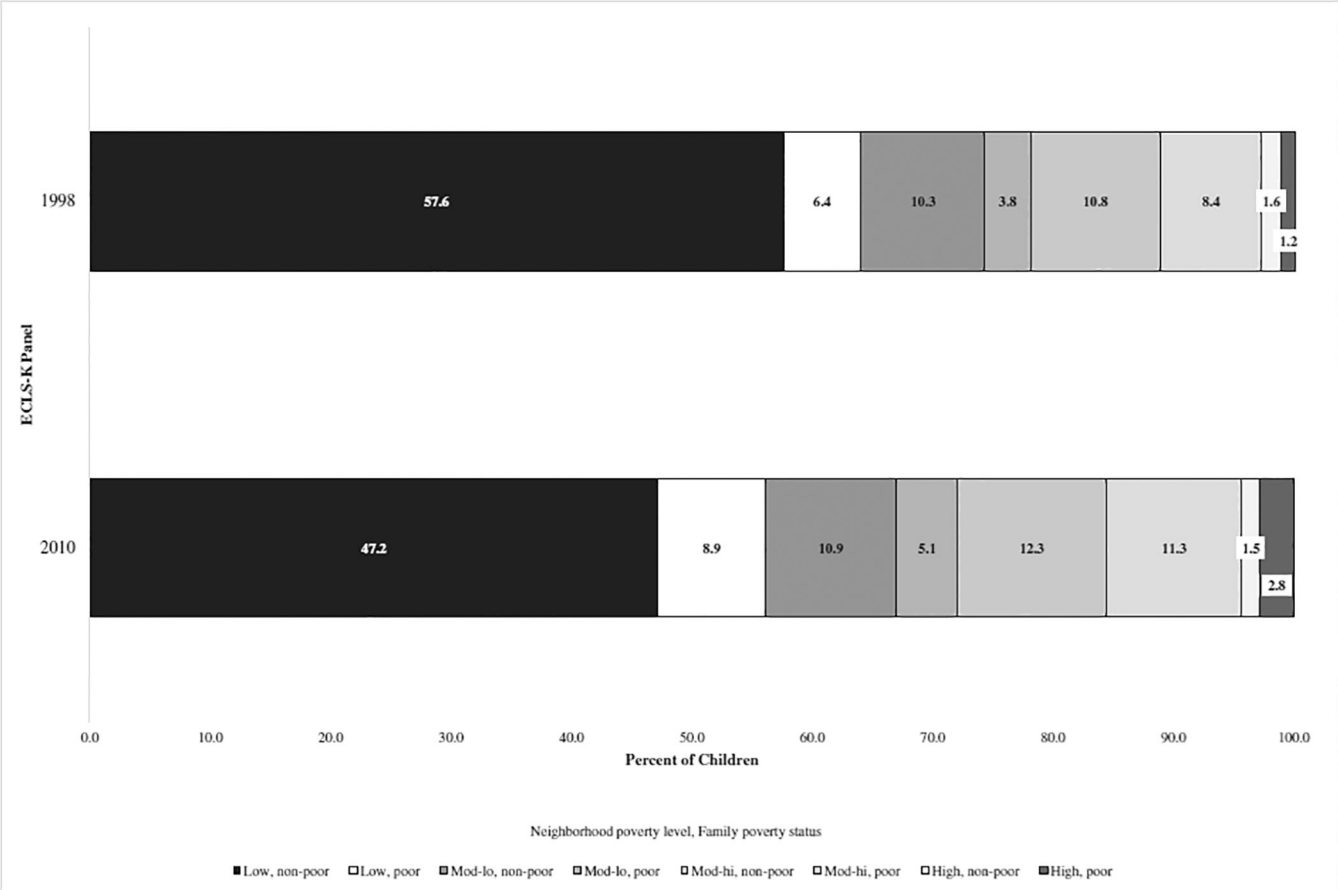

Fig. 1.

Percent of poor and nonpoor kindergarteners living in neighborhoods with concentrated poverty in 1998 and 2010.

Note. Each bar represents the children in an ECLS-K panel (1998, N = 19,200; 2010, N = 15,700) by neighborhood and family and neighborhood poverty level. Estimates derived from 20 multiply imputed datasets and are weighted.

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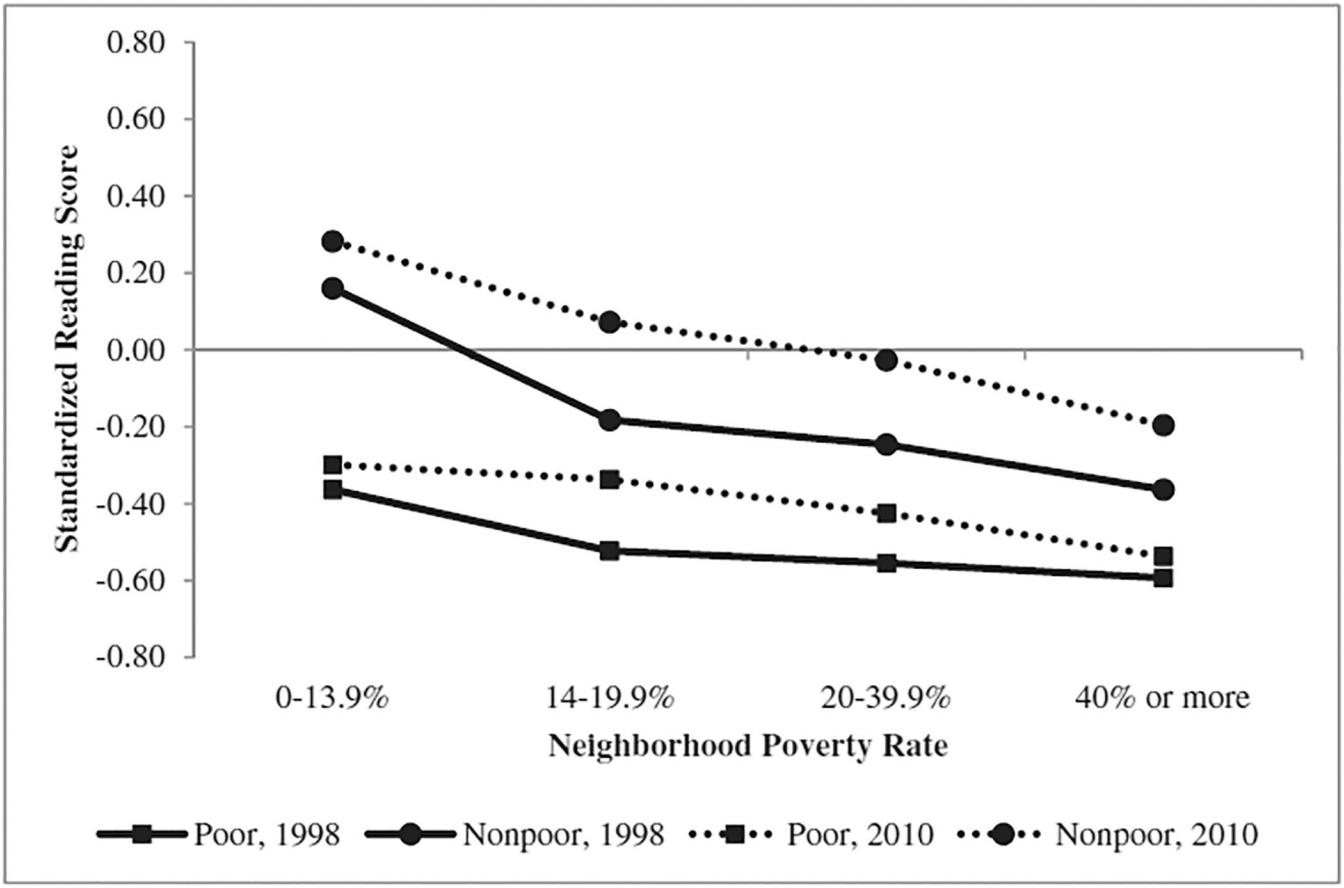

Fig. 2.

Standardized reading scores for poor and nonpoor children in the fall of Kindergarten, in 1998 and 2010.

Note. Each point represents the children in an ECLS-K panel by neighborhood and family and neighborhood poverty level. Estimates are weighted and derived from 20 multiply imputed datasets.

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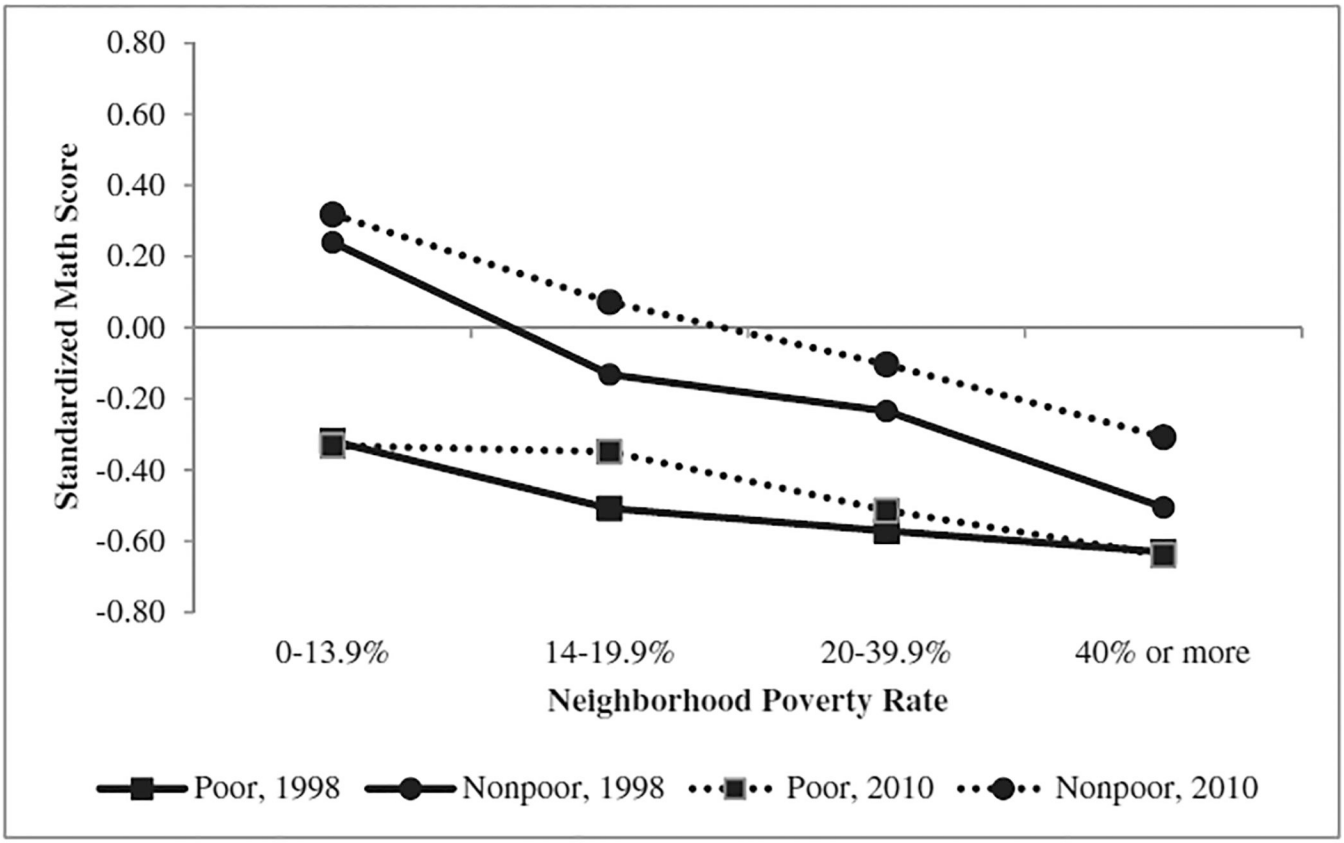

Fig. 3.

Standardized math scores for poor and nonpoor children in the fall of Kindergarten, in 1998 and 2010.

Note. Each point represents the children in an ECLS-K panel by neighborhood and family and neighborhood poverty level. Estimates are weighted and derived from 20 multiply imputed datasets.

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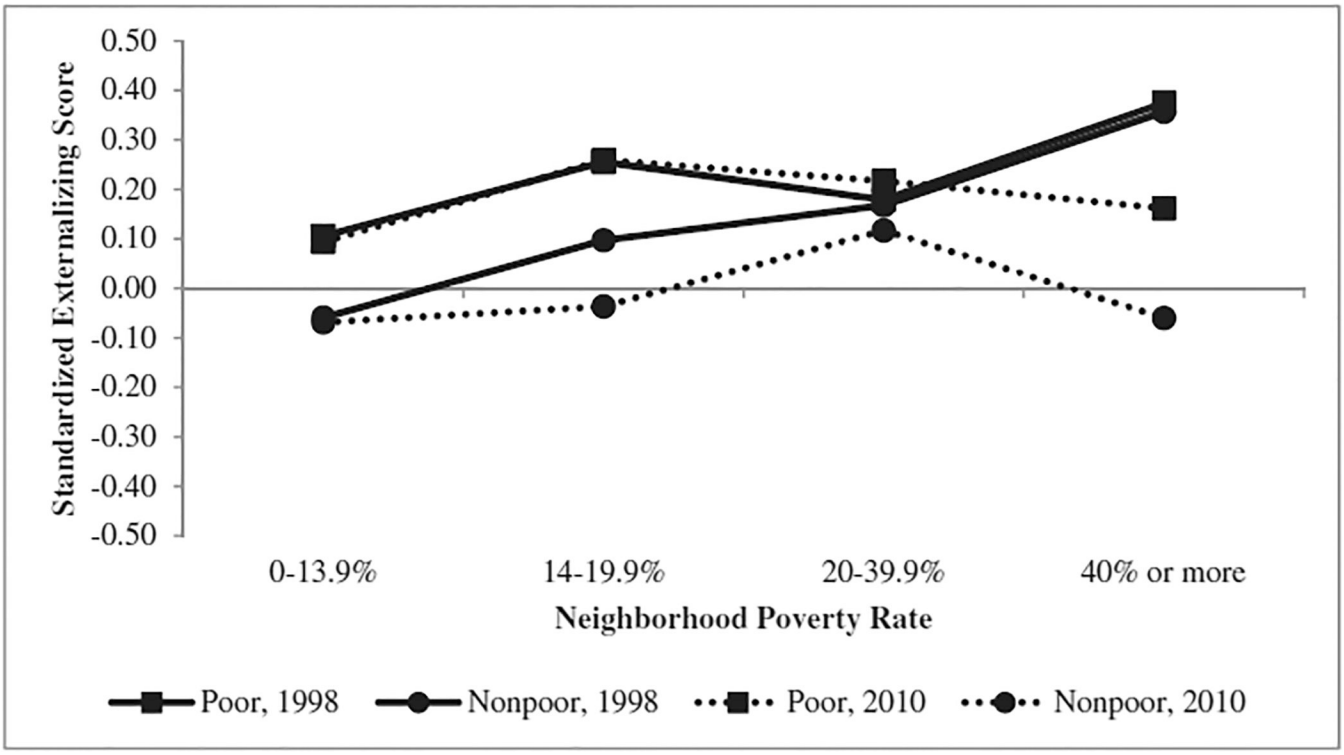

Fig. 4.

Standardized teacher-reported externalizing scores for poor and nonpoor children in the fall of Kindergarten, in 1998 and 2010.

Note. Each point represents the children in an ECLS-K panel by neighborhood and family and neighborhood poverty level. Estimates are weighted and derived from 20 multiply imputed datasets.

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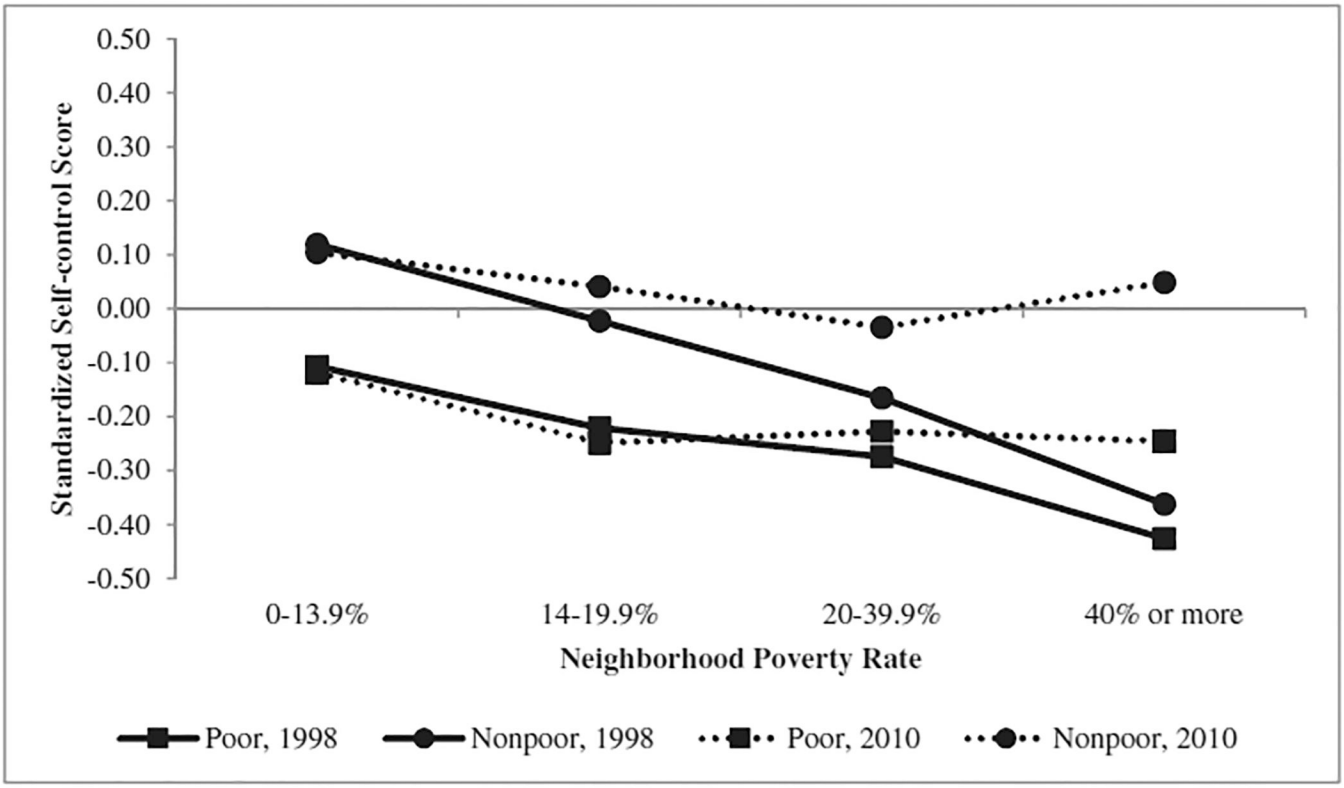

Fig. 5.

Standardized teacher-reported self-control scores for poor and nonpoor children in the fall of Kindergarten, in 1998 and 2010.

Note. Each point represents the children in an ECLS-K panel by neighborhood and family and neighborhood poverty level. Estimates are weighted and derived from 20 multiply imputed datasets.

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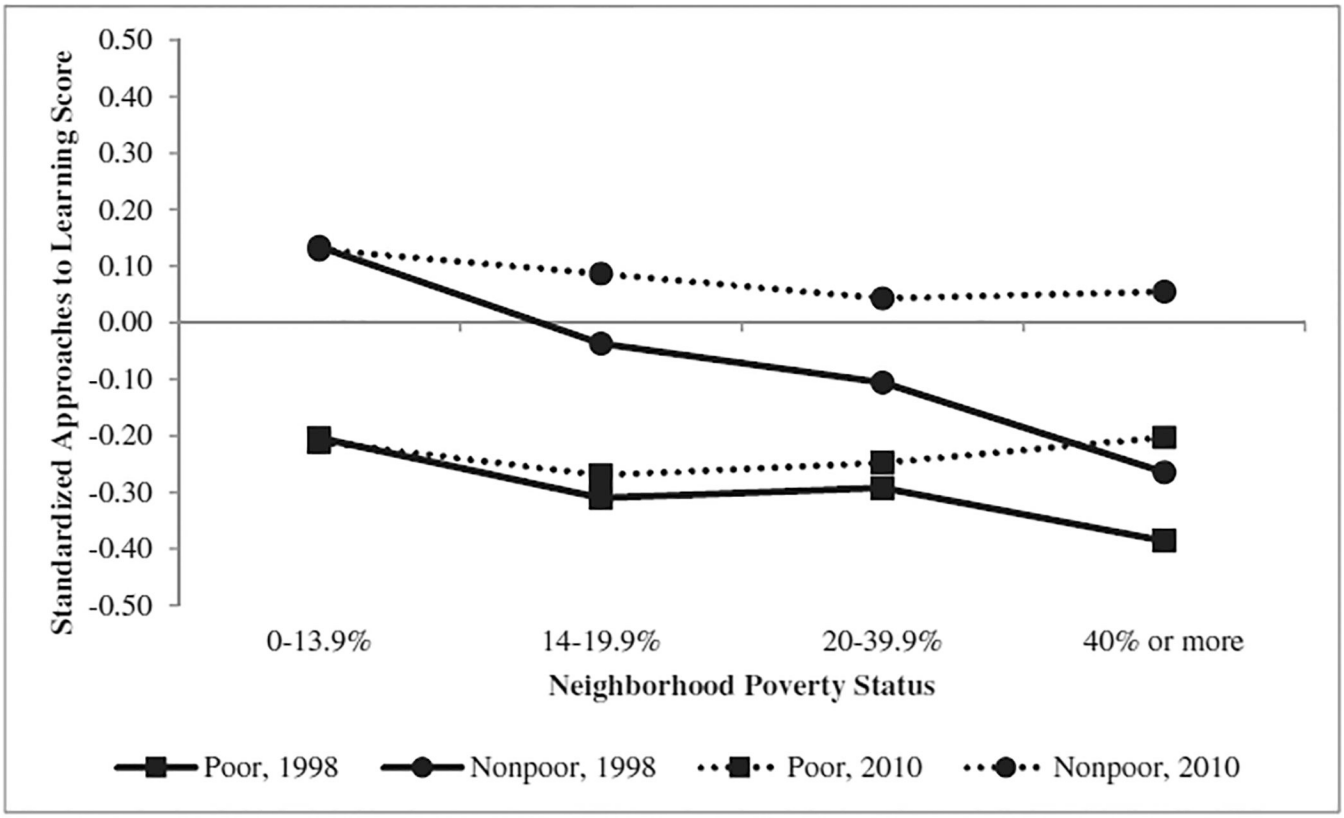

Fig. 6.

Standardized teacher-reported approaches to learning scores for poor and nonpoor children in the fall of Kindergarten, in 1998 and 2010.

Note. Each point represents the children in an ECLS-K panel by neighborhood and family and neighborhood poverty level. Estimates are weighted and derived from 20 multiply imputed datasets.

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Table 1a

Weighted sample distribution and descriptives by family and neighborhood poverty status at kindergarten entry, ECLS-K 1998.

	All children	Low poverty neighborhood (0–13.9%)			Moderate-low poverty neighborhood (14–19.9%)			Moderate-high poverty neighborhood (20–39.9%)			High poverty neighborhood (40% +)		
		All	≤ 100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL
Race/ethnicity													
White	57.0	72.2	48.9	74.9	43.7	30.3	48.1	24.0	14.6	31.3	2.3	2.1	2.5
Black	16.0	8.4	18.4	7.3	19.7	25.2	17.7	31.2	34.9	28.2	67.8	67.8	67.8
Hispanic	19.3	12.5	23.3	11.3	28.2	35.4	25.5	34.7	39.7	30.7	24.2	24.0	24.6
Asian	3.1	3.0	3.3	2.9	3.5	3.3	3.5	3.1	2.8	3.4	2.4	3.0	1.5
Other	4.6	3.8	6.1	3.6	5.3	5.8	5.1	7.0	8.0	6.2	3.3	3.2	3.6
Annual income category[a]	10.7	12.4	3.6	13.3	8.8	3.6	10.8	6.9	3.5	9.6	5.1	3.2	7.8
Percent below poverty	20.3	10.1			27.2			43.8			58.7		
Mother's education													
< High school	10.8	4.6	19.7	2.9	16.6	31.8	10.9	24.5	36.5	15.2	31.2	35.2	25.4
High school/vocational degree	33.4	28.2	50.0	25.9	40.9	46.5	38.8	43.2	45.0	41.9	44.2	49.3	36.9
Some college	27.0	67.1	30.7	71.2	42.5	21.7	50.3	32.3	18.5	43.0	24.6	15.5	37.7
Bachelor's degree or higher	28.8	38.7	9.0	42.0	15.3	3.5	19.7	9.1	2.3	14.4	6.6	3.3	11.2
Family structure													
Two biological parents	60.2	69.5	34.1	73.2	50.2	29.3	57.8	39.8	27.5	48.9	20.5	17.2	25.1
Single mother	34.2	25.4	59.0	21.9	42.7	62.7	35.4	53.9	66.8	44.3	74.8	76.9	72.0
Other family type	5.6	5.1	6.9	4.9	7.1	8.0	6.8	6.3	5.7	6.8	4.7	5.9	2.9
Location type													
Urban	37.7	28.9	30.7	28.8	41.9	41.9	42	58.6	60.9	56.4	72.5	70.1	75.5
Suburban	39.5	49.4	44.2	50	26.9	26.7	26.9	19.7	17	22.1	11.2	9.4	13.8
Town	10.9	10.8	12.7	10.6	14.2	13.1	14.5	10.2	9.3	11	0.3	0.6	0.3
Rural	11.9	12.5	10.6	8.4	18.3	16.6	11.8	11.4	12.9	10.5	16.0	20.0	10.5
Percent of sample	*100.0*	*64.0*	*6.4*	*57.6*	*14.1*	*3.8*	*10.3*	*19.2*	*8.4*	*10.8*	*2.8*	*1.6*	*1.2*

Note. All income categories are calculated after adjusting family income for inflation to 2010 USD. N = 19,200; estimates derived from 20 multiply imputed datasets.

[a]Annual family income reported in $5000 increments on a scale from 1 to 18 as calculated by NCES in the 2010 panel. 1: > $5001; 2: $5001–$10,000; 3: $10,001–$15,000; 4: $15,001–$20,000; 5: $20,001–$25,000; 6: $25,001–$30,000; 7: $30,001–$35,000; 8: $35,001–$40,000; 9: $40,001–$45,000; 10: $45,001–$50,000; 11: $50,001–$55,000; 12: $55,001–$60,000; 13: $60,001–$65,000; 14: $65,001–$70,000; 15: $70,001–$75,000; 16: $75,001–$100,000; 17: $100,001–$200,000; 18: > $200,000.

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Table 1b

Weighted sample distribution and descriptives by family and neighborhood poverty status at kindergarten entry, ECLS-K 2010.

	All children	Low poverty neighborhood (0–13.9%)			Moderate-low poverty neighborhood (14–19.9%)			Moderate-high poverty neighborhood (20–39.9%)			High poverty neighborhood (40% +)		
		All	≤100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL	All	≤100% FPL	> 100% FPL
Race/ethnicity													
White	51.3	64.5	40.6	69.0	48.7	33.6	55.7	28.9	17.7	39.2	11.8	9.0	17.3
Black	13.5	7.6	13.4	6.4	14.2	20.0	11.7	23.6	28.3	19.3	33.6	33.4	33.8
Hispanic	24.8	17.2	36.2	21.8	26.3	36.0	21.8	37.3	44.8	30.3	49.3	51.7	44.8
Asian	4.6	5.6	4.4	5.8	3.9	2.6	4.4	3.3	2.7	3.9	1.9	2.1	1.5
Other	5.8	5.2	5.4	5.0	6.9	8.0	6.4	6.9	6.5	7.3	3.4	3.8	2.6
Annual income category[a]	10.3	12.2	3.7	13.7	9.3	3.6	11.8	7.1	3.3	10.4	5.5	3.2	9.7
Percent below poverty	28.1	15.8			31.7			47.9			65.5		
Mother's education													
< High school	13.7	6.8	25.0	3.4	15.2	8.6	29.6	25.2	13.6	37.6	34.2	20.7	41.3
High school/vocational degree	28.8	23.8	20.7	40.2	32.9	28.7	42.0	36.0	34.0	38.3	37.7	34.2	39.5
Some college	26.8	26.9	26.5	27.0	29.8	23.8	32.7	25.5	20.6	30.0	20.4	15.9	29.0
Bachelor's degree or higher	30.8	42.5	8.3	48.9	22.0	4.6	30.0	13.3	3.5	22.4	7.7	3.3	16.0
Family structure													
Two biological parents	66.1	74.7	47.8	79.3	60.5	41.0	69.1	52.6	40.0	63.7	44.9	40.7	52.8
Single mother	20.8	14.1	35.6	10.5	23.8	39.9	16.8	32.1	45.9	20.0	38.2	42.8	29.8
Other family type	13.1	11.2	16.6	10.2	15.7	19.1	14.1	15.3	14.1	16.3	16.9	16.5	17.4
Location type													
Urban	32.0	22.5	28.6	21.4	30.4	35.8	27.8	47.1	51.1	43.4	72.1	74.9	67.0
Suburban	33.1	42.7	36.1	43.9	24.3	24.4	24.4	20.1	19.5	20.7	16.6	16.8	16.4
Town	11.5	11.0	13.5	10.6	13.9	11.1	15.2	12.6	12.4	12.7	2.9	1.7	5.1
Rural	23.4	23.8	21.8	24.1	31.4	28.7	32.6	20.2	17.0	23.2	8.4	6.7	11.5
Percent of sample	*100.0*	*56.1*	*8.9*	*47.2*	*16.0*	*5.1*	*10.9*	*23.6*	*11.3*	*12.3*	*4.3*	*2.8*	*1.5*

N = 15,700; estimates derived from 20 multiply imputed datasets.

[a]Annual family income reported in $5000 increments on a scale from 1 to 18 as calculated by NCES. 1: > $5001; 2: $5001–$10,000; 3: $10,001–$15,000; 4: $15,001–$20,000; 5: $20,001–$25,000; 6: $25,001–$30,000; 7: $30,001–$35,000; 8: $35,001–$40,000; 9: $40,001–$45,000; 10: $45,001–$50,000; 11: $50,001–$55,000; 12: $55,001–$60,000; 13: $60,001–$65,000; 14: $65,001–$70,000; 15: $70,001–$75,000; 16: $75,001–$100,000; 17: $100,001–$200,000; 18: > $200,000.

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Table 2

Standardized school readiness outcomes by family and neighborhood poverty at kindergarten entry, in 1998 and 2010.

	All neighborhoods			Low poverty neighborhood (0–14%)			Moderate-low poverty neighborhood (14–19%)			Moderate-high poverty neighborhood (20–39%)			High poverty neighborhood (40% +)		
	1998	**2010**	***t*-Stat**	**1998**	**2010**	***t*-Stat**	**1998**	**2010**	***t*-Stat**	**1998**	**2010**	***t*-Stat**	**1998**	**2010**	***t*-Stat**
Reading															
All	−0.03	0.04	4.44***	0.11	0.20	4.33***	−0.27	−0.05	6.50***	−0.37	−0.21	5.06***	−0.50	−0.42	1.16
≤100% FPL	−0.48	−0.38	3.53***	−0.36	−0.30	1.10	−0.52	−0.34	2.67**	−0.55	−0.42	2.96**	−0.59	−0.54	0.39
> 100% FPL	0.06	0.19	7.64***	0.16	0.28	6.72***	−0.18	0.07	6.87***	−0.25	−0.03	5.64***	−0.36	−0.20	1.98*
Math															
All	0.02	0.03	3.60***	0.19	0.22	2.54	−0.22	−0.05	7.28***	−0.37	−0.29	5.55***	−0.58	−0.53	1.24
≤100% FPL	−0.47	−0.44	3.79***	−0.32	−0.33	0.46	−0.51	−0.35	3.51***	−0.57	−0.51	3.64***	−0.63	−0.64	−0.38
> 100% FPL	0.13	0.20	6.11***	0.24	0.32	5.06***	−0.13	0.07	6.78***	−0.23	−0.10	5.06***	−0.51	−0.31	2.85**
Externalizing															
All	0.03	0.02	0.05	−0.04	−0.04	−0.38	0.14	0.05	−1.79	0.17	0.16	0.98	0.37	0.09	−2.78**
≤100% FPL	0.18	0.18	0.83	0.11	0.09	−0.13	0.26	0.26	0.54	0.18	0.22	1.68	0.37	0.16	−1.61
> 100% FPL	−0.01	−0.03	−1.61	−0.06	−0.07	−0.92	0.10	−0.04	−2.83**	0.17	0.12	−0.35	0.36	−0.06	−2.59**
Self-control															
All	0.01	0.00	−1.11	0.10	0.07	−1.83	−0.07	−0.04	0.32	−0.21	−0.12	2.04*	−0.40	−0.15	3.07**
≤100% FPL	−0.22	−0.20	−0.33	−0.11	−0.12	−0.67	−0.22	−0.25	−1.03	−0.27	−0.23	0.27	−0.43	−0.25	1.35
> 100% FPL	0.06	0.07	0.46	0.12	0.10	−0.99	−0.02	0.04	1.26	−0.17	−0.03	2.63**	−0.36	0.05	3.54***
Approaches to learning															
All	0.02	0.02	0.04	0.10	0.08	−1.73	−0.10	−0.02	2.14*	−0.18	−0.09	2.52*	−0.34	−0.12	3.18***
≤100% FPL	−0.27	−0.23	1.05	−0.20	−0.21	−0.10	−0.31	−0.27	−0.01	−0.29	−0.25	0.68	−0.39	−0.20	2.13*
> 100% FPL	0.08	0.11	1.61	0.13	0.13	−0.64	−0.04	0.09	2.87**	−0.11	0.04	3.05**	−0.26	0.05	2.51*

Note. Weighted means. The t-stat tests the difference in means across cohorts.

N = 19,200 (1998 panel), N = 15,700 (2010 panel); estimates derived from 20 multiply imputed datasets. t-Statistic derived from an OLS regression analysis with a panel indicator predicting outcome scores for (1) the full sample, (2) poor children, and (3) nonpoor children. As a reference, children learn about one standard deviation in academic skills over the course of kindergarten (Hill, Bloom, Black, & Lipsey, 2008). Thus, 0.1 SD is equivalent to about 1 month of learning. As further reference, the difference in behavioral skills between girls and boys in kindergarten is about 0.4 SD (Duncan & Magnuson, 2011).

* $p < 0.05$.

** $p < 0.001$.

*** $p < 0.001$.

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Table 3

Family poverty-related gaps in school readiness at kindergarten entry, in 1998 and 2010.

	All neighborhoods		Low-poverty (0–13.9%)		Moderate-low poverty (14–19.9%)		Moderate-high poverty (20–39.9%)		High poverty (40%+)	
	1998	2010	1998	2010	1998	2010	1998	2010	1998	2010
	Gap in score by standard deviation									
Reading	0.55	0.57	0.52	0.58 +	0.34	0.41	0.31	0.40	0.23	0.34
Math	0.60	0.64	0.56	0.65	0.38	0.42	0.34	0.41	0.13	0.33 *
Externalizing	−0.19	−0.21	−0.16	−0.16	−0.16	−0.30 +	−0.01	−0.10 *	−0.02	−0.22
Self-control	0.35	0.34	0.34	0.34	0.27	0.36	0.19	0.29	0.12	0.26
Approaches to learning	−0.27	−0.23	−0.20	−0.21	−0.31	−0.27	−0.29	−0.25	−0.39	−0.20

Note. Differences presented represented weighted raw mean standardized differences. Standard deviation units are derived within each panel. N = 19,200 (1998 panel), N = 15,700 (2010 panel). Estimates derived from 20 multiply imputed datasets.

+ p < 0.10.

* p < 0.05.

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Table 4

Regression coefficients for OLS and teacher fixed effects models for children's academic skills.

	Reading		Math	
	OLS	Teacher FE	OLS	Teacher FE
	b (SE)			
Family poor	−0.121*** (0.016)	−0.157*** (0.026)	−0.148*** (0.015)	−0.154*** (0.026)
Neighborhood poverty level[a]				
Moderate-low poverty (14–19.9%)	−0.105*** (0.018)	−0.094** (0.033)	−0.119*** (0.017)	−0.092** (0.033)
Moderate-high poverty (20–39.9%)	−0.120*** (0.018)	−0.066* (0.022)	−0.148*** (0.017)	−0.081* (0.032)
High poverty (40%+)	−0.215*** (0.037)	−0.188** (0.062)	−0.207*** (0.033)	−0.153* (0.060)
2010 panel indicator	0.043** (0.016)		0.035* (0.014)	

Notes. OLS models use clustered standard errors for children nested in schools. Rounded to the nearest 50 according to NCES guidelines, sample size is 25,000 (reading) and 26,000 (math). Coefficients derived from 20 multiply imputed datasets, and represent unweighted estimates. All models include the following family and child demographic covariates: parental education (less than high school, high school degree, some college/vocational or technical degree, and at least a college degree); family structure (two biological parents, single mother, other); maternal age; an indicator for whether English was the primary language spoken at home; urbanicity of the school neighborhood (urban, suburban, small town, and rural); number of children living in the household; and child gender, race (white non-Hispanic, black non-Hispanic, Hispanic, Asian, other), and child age at assessment. Coefficients for covariates not shown.

[a]Reference group is low poverty neighborhood (0–13.9%).

*p < 0.05.

**p < 0.01.

***p < 0.001.

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Table 5

Regression coefficients for OLS and teacher fixed effects models for children's behavioral outcomes.

	Externalizing		Self-control		Approaches to learning	
	OLS	Teacher FE	OLS	Teacher FE	OLS	Teacher FE
	b (SE)					
Family poverty (1 = yes)	0.050 ** (0.017)	0.119 *** (0.030)	−0.085 *** (0.017)	−0.153 *** (0.030)	−0.123 *** (0.016)	−0.183 *** (0.029)
Neighborhood poverty level[a]						
Moderate-low poverty (14–19.9%)	0.049 ** (0.019)	0.081 * (0.037)	−0.047 * (0.020)	−0.100 ** (0.037)	−0.026 (0.019)	−0.081 * (0.035)
Moderate-high poverty (20–39.9%)	0.062 *** (0.019)	0.133 *** (0.037)	−0.063 ** (0.020)	−0.108 ** (0.037)	−0.014 (0.019)	−0.100 ** (0.035)
High poverty (40%+)	0.040 (0.038)	0.137 (0.070) *	−0.060 (0.040)	−0.023 (0.067)	−0.022 (0.038)	−0.134 * (0.060)
2010 panel indicator	−0.001 (0.015)		−0.007 (0.018)		−0.009 (0.017)	

Notes. OLS models use clustered standard errors for children nested in schools. Rounded to the nearest 50 according to NCES guidelines, sample size is 25,000 (externalizing), 24,000 (self-control), and 25,400 (approaches to learning). Coefficients derived from 20 multiply imputed datasets, and represent unweighted estimates. All models include the following family and child demographic covariates: parental education (less than high school, high school degree, some college/vocational or technical degree, and at least a college degree); family structure (two biological parents, single mother, other); maternal age; an indicator for whether English was the primary language spoken at home; urbanicity of the school neighborhood (urban, suburban, small town, and rural); number of children living in the household; and child gender, race (white non-Hispanic, black non-Hispanic, Hispanic, Asian, other), and child age at assessment. Coefficients for covariates not shown.

[a]Reference group is low poverty neighborhood (0–13.9%).

*p < 0.05.

**p < 0.01.

***p < 0.001.