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Family Income, School Attendance, and Academic Achievement in Elementary School

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Low family income is associated with poor academic achievement among children. Higher rates of school absence and tardiness may be one mechanism through which low family income impacts children's academic success. This study examines relations between family income, as measured by receipt of free or reduced-price lunch, school attendance, and academic achievement among a diverse sample of children from kindergarten to 4th grade (N = 35,419) using both random and within-child fixed-effects models. Generally, results suggest that the receipt of free or reduced-price lunch and duration of receipt have small but positive associations with school absences and tardies. Poor attendance patterns predict poorer grades, with absences more associated with grades than tardies. Given the small associations between receipt of free or reduced-price lunch and school attendance, and between the duration of receipt of free or reduced-price lunch and children's grades, results do not provide strong evidence that absences and tardies meaningfully attenuate relations between the duration of low family income and student achievement; poorer attendance and persistent low income independently predict poorer grades. Implications for policy and future research are discussed.

Keywords: academic achievement, school attendance, family income

Family income during childhood has substantial impacts on academic achievement (Duncan, Ziol-Guest, & Kalil, 2010). The achievement gap between children living in low-income families and those in more well-off families begins before kindergarten, and widens with age (Duncan & Magnuson, 2005; Heckman, 2006; Magnuson & Duncan, 2006). One possible mechanism underlying relations between family income and student achievement is school attendance. Children who miss class fail to benefit from teacher-led lessons, peer interactions, and other activities designed to foster learning, which is harmful for school success. Absences from school during the elementary school years are an important indicator of later academic success (Gottfried, 2011; Steward, Steward, Blair, Jo, & Hill, 2008). However, little is known about how living in a low-income household impacts children's school attendance, and, in turn, about how school attendance impacts academic achievement, particularly among diverse and inner-city populations of young children most at risk for poor achievement. Furthermore, less is known about how income stability (i.e., fluctuations in family income over time) relates to children's attendance and achievement. In this study, we address these gaps in the literature by examining relations between family income, school attendance, and academic achievement among an ethnically and racially diverse urban sample of children from kindergarten to fourth grade, using robust longitudinal methods to limit potential selection bias.

There is a vast literature on the impacts of income on family processes and children's development (Duncan & Brooks-Gunn, 1997; Duncan et al., 2010; Evans, 2004). Greater income enhances the material and social resources available to children (McLoyd, 1990); however, material resources, such as the number of books in the home, and children's access to learning opportunities explain only about one third of the poor–nonpoor achievement gap (Brooks-Gunn & Markman, 2005). Family income tends to be volatile (Ziliak, Hardy, & Bollinger, 2011), and the intensity and directionality of changes, even small income changes, experienced during childhood has been associated with long-term outcomes (Galambos & Silbereisen, 1987; Salkind & Haskins, 1982). Using data from the National Longitudinal Survey of Youth, Dahl and Lochner (2005) found that an increase in income of $1,000 was associated with a 2.1% and 3.6% of a standard deviation increase in children's math and reading test scores, respectively. Consistent with theory and research on the developmental importance of early childhood (Bronfenbrenner & Morris, 1998; Shonkoff & Phillips, 2000), experiencing low family income at younger ages versus later periods has a greater impact on achievement (Duncan & Brooks-Gunn, 1997; Duncan et al., 2010; National Institute of Child Health and Human Development Early Child Care Research

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Network [NICHD ECCRN], 2005). However, children whose families face persistent poverty fare the worst in terms of academic achievement (Dearing, McCartney, & Taylor, 2001; Duncan & Brooks-Gunn, 1997; NICHD ECCRN, 2005). Thus, the volatility, timing, and persistence of low family income appear important to child development.

When economic resources are scarce, children face challenges at multiple levels that may impact their likelihood of attending school on time or at all, which, in turn, may impact academic success. Children living in low-income families are more likely than their higher income peers to experience physical, behavioral, and mental health problems (Currie, 2005; Evans & Kim, 2007; Wentzel, 1991); poorer nutrition (Currie, 2005); and environmental hazards (Evans, 2004), which can lead to more missed days of school or tardiness. Children in low-income families tend to experience greater residential mobility, which is linked to poorer academic outcomes (Burkam, Lee, & Dwyer, 2009). Children in poverty are generally exposed to higher levels of family conflict than their higher income counterparts (Evans, 2004) and greater instability in family structure (Burkam et al., 2009). Residential and family instability may make establishing and maintaining routines difficult, which in turn may lead to more school absences and tardies. In addition, children living in low-income neighborhoods are more likely to experience child maltreatment (Coulton, Korbin, Su, & Chow, 1995), and exposure to this and other significant life events (e.g., parental divorce) is associated with increased problem behavior and school absence (Reynolds, Weissberg, & Kasprow, 1992). Parents struggling to make ends meet are more often employed during nonstandard hours (nights/weekends) or have variable work schedules (Han, 2004), which are linked with poorer child cognitive outcomes (Han, 2005). Children with parents who work rotating or nonstandard shifts may need to be more self-reliant in getting ready for and getting to school, which may result in increased school tardiness/absence.

Finally, family income may affect school attendance through neighborhood and societal characteristics. Low-income families are more likely to live in dangerous neighborhoods (Leventhal & Brooks-Gunn, 2004) and experience greater exposure to neighborhood violence (Krenichyn, Saegert, & Evans, 2001) than higher income families, and thus getting to and from school safely could be problematic. Indeed, neighborhood quality has been linked to academic achievement (Sanbonmatsu, Duncan, Kling, & Brooks-Gunn, 2006). Low-quality neighborhoods may negatively impact children's school attendance and achievement through increased stress from community violence, gangs, or drug activity; a lack of positive role models and the presence of negative peer influences, leading to problem behavior and truancy; or a lack of institutional resources including police protection (Sampson, Morenoff, & Ganon-Rowley, 2002).

Children who frequently miss or are late to school fail to benefit from teacher instruction and modeling, peer interactions, and other activities designed to scaffold learning. Indeed, there is a growing body of research linking attendance and academic achievement, such that as absenteeism increases, school performance declines (Gottfried, 2009, 2011; Reynolds et al., 1992; Steward et al., 2008). In one study, elementary students who missed school frequently (present less than 80% of school days) scored 20 points lower on a test of reading achievement compared with students who had close to perfect attendance (Family Housing Fund, 1998). After controlling for various demographic variables, Gottfried (2009) found that increased absenteeism predicted lower reading and math achievement among a sample of second- to fourth- grade ethnically diverse students. Other studies have exploited the exogenous variation in snow days to demonstrate that more instructional time, in terms of more school days, increases student performance on standardized tests (Marcotte & Hemelt, 2008).

Although the small body of research on absenteeism has focused on the number of days that children missed school (Gottfried, 2009, 2011), no prior studies could be found examining how tardiness, or missing part of the day, affects achievement. Tardiness is an issue with which the schools appear to be concerned, as indicated by the careful record keeping and disciplinary actions associated with being tardy. Research on tardiness has focused on demographic and individual differences linked with rates of tardiness rather than exploring links between being late for school and children's performance. For example, overweight children show more tardiness compared with nonoverweight peers (Shore et al., 2008). It is important to examine whether tardiness is associated with poor school performance among elementary students, particularly those from disadvantaged backgrounds. Absence and tardiness may be differentially linked to student achievement, with absence for the entire day likely having a more negative effect on children's school performance than missing only part of the day.

Because children from low-income families may be likely to miss school or be late more often than higher income children, the consistency of children's school attendance may account for part of the achievement gap between poor and nonpoor students. It may be particularly detrimental for children from low-income families to miss or be late to school because such families are less likely to have the time or resources necessary to help children "catch up" with missed school material, compared with peers from more advantaged backgrounds (Chang & Romero, 2008). Furthermore, compared with their higher income peers, low-income children are more likely to attend low-quality schools that often lack resources for educators to intervene with children who have poor attendance or who are often late to class (Hanushek, 1997; Leventhal & Brooks-Gunn, 2004; Sanbonmatsu et al., 2006). Using kindergarten and first-grade data from the Early Childhood Longitudinal Study – Kindergarten cohort, Ready (2010) found not only that school absences were negatively related to literacy development in kindergarten but also that school absences had more of a negative effect on achievement for children from low-socioeconomic (SES) backgrounds, compared with children of higher SES, and non-Asian minorities and English Language Learners (ELL) were more likely to be absent than other groups. Others have found that although chronic absence in kindergarten is related to lower first-grade performance for all children, missing school in kindergarten may be particularly detrimental for Latino children and children living in poverty (Chang & Romero, 2008).

Despite the many possible ways in which family income may be related to children's school attendance, very few studies have examined the links between family income, children's school absences and tardies, and their achievement, especially for children in elementary school. This is an important age at which to examine such links, as parents are more accountable for regular school attendance for their young children. Marcotte and Hemelt (2008) found that school closures had greater effects on younger elementary school children, compared with fifth and eighth grad-

ers. However, other studies suggest that school absences and tardies may have a greater negative effect on achievement as children grow older. Most previous research examining associations between children's absences and academic achievement among older school-age children, adolescents, or college students has found modest relationships between absenteeism and academic performance (e.g., Steward et al., 2008; Wentzel, 1991), whereas smaller but substantial associations between attendance and reading/math achievement are typically found with elementary school children, with standardized regression coefficients ranging between −0.05 and −0.14 (Gottfried, 2009, 2011).

The Present Study

Despite evidence that the achievement gap starts before kindergarten and widens throughout elementary school (Duncan & Magnuson, 2005), little is known about relations between school absences, tardies, and student achievement over time, particularly among ethnically diverse, low-income, young children who are most at risk for poor achievement. To date, no research has examined how instability in family income and the persistence of low family income relate to children's attendance in elementary school. In addition, with few exceptions (Gottfried, 2011; Marcotte & Hemelt, 2008), most previous research has relied on models that are susceptible to omitted variable bias resulting from the many differences between children with high and low rates of school attendance, or between high- and low-income families. For example, underlying family health problems (Currie, 2005), or the transportation problems or lengthy commute times common among low-income parents (Dunifon, Kalil, & Bajracharya, 2005), may affect both attendance and achievement. Most research uses ordinary least squares (OLS) regression, controlling for background characteristics; however, many of these differences are unobserved. Without being able to control for all of the potential ways in which children differ from each other, OLS regressions predicting school absences from family income, or student achievement from school attendance, may be biased.

The goal of this study was to estimate relations between family income, school attendance, and children's academic achievement over time among a diverse sample, using robust longitudinal methods including random-effects and within-child fixed-effects models. Data for this study come from the Miami School Readiness Project (MSRP; Winsler et al., 2012, 2008), a large-scale university–community partnership in which five countywide cohorts of children attending various types of community-based childcare and public school pre-kindergarten (pre-K) programs, most with the assistance of subsidies, were followed longitudinally through fourth grade. Consistent with prior work (Gottfried, 2009, 2011; Reynolds et al., 1992), we use in the present study children's receipt of free or reduced-price lunch in the National School Lunch Program (NSLP) as a proxy for family income status. Because most children are enrolled using direct certification by local education agencies, requiring little action from children's parents or guardians, participation in the NSLP is high among eligible children. To qualify for free or reduced-price lunch, a child's family must be at 130% or 185%, respectively, of the Federal Poverty Level (FPL). In 2010, 32 million children received free or reduced-price lunch at school (U.S. Department of Agriculture [USDA], 2010). Given that the FPL has been criticized as being too low to adequately represent economic hardship (Boushey et al., 2001), it is important to use both free and reduced-price lunch categories to represent different experiences of economic disadvantage. The 2012 FPL was $23,050 for a family of four (U.S. Department of Health and Human Services, 2012); thus, the annual income thresholds for a family of four were $42,643 for reduced-price lunch and $29,965 for free lunch, a difference in annual income of $12,500. Research suggests that small changes in income can lead to significant changes in children's development (Dahl & Lochner, 2005; Dearing et al., 2001); thus, it is possible that the increase in family income needed for a family to qualify for free lunch in 1 year and for reduced-price lunch the next year could correspond with meaningful increases in attendance or achievement.

Specifically, this study addresses five research questions: (1) Is family income status associated with the number of days children are absent from or late to school? We hypothesized that children receiving free or reduced-price lunch experience greater numbers of absences and tardies than their counterparts who pay full price. In addition, we expected receipt of free lunch to be associated with greater absences and tardies than receipt of reduced-price lunch. (2) Is family income status associated with children's academic achievement? We hypothesized that children receiving free or reduced-price lunch would have lower academic achievement than those paying full price and that receipt of free lunch would be more strongly linked to poorer achievement compared with receipt of reduced-price lunch. (3) Are school absences and tardies associated with children's academic achievement? We hypothesized that school absences and tardies would be associated with poor achievement and that absences would be more strongly associated with achievement than tardiness. (4) Assuming that the expected associations between family income and school attendance, and school attendance and student achievement are found, do the number of days absent or times tardy attenuate associations between family income and academic achievement? We expected the gap in achievement between low- and higher income children to be partially explained by their attendance patterns. (5) Does child age moderate associations between family income and school attendance, or between school attendance and student achievement? We hypothesized that poor attendance at the older grades (third and fourth) would be more strongly associated with poorer academic achievement compared with poor attendance at younger ages.

Method

Data

This study used data from the MSRP, a longitudinal cohort-sequential study of 42,287 children in a large, urban public school district in Florida who had participated in a large-scale project during their pre-kindergarten year (Winsler et al., 2012, 2008). The present study included a subsample of 35,419 children attending 259 public schools who remained in the study through kindergarten. All data were obtained from elementary school records. Because our study followed children who moved to other neighborhoods within the large county, only those children who moved counties or stopped attending public schools altogether were excluded from the sample. Kindergarten consisted of a full-day program in all schools. Children with special needs were excluded from the present study because we were interested in how family

income influences typically developing children's school attendance and achievement; special needs and poor health have been shown to negatively affect school attendance and achievement (Klebanov, Brooks-Gunn, & McCormick, 1994). Children who were retained at some point during early elementary school were also excluded. Because of the way the data set was compiled yearly from the district, it was not possible to track the children who repeated a grade and arrived late to the next grade late across 5 years (their data were in the "wrong" grade in time). Although it is not clear whether retained students were included in prior studies of attendance (Gottfried, 2009, 2011; Reynolds et al., 1992), it is unlikely that they were for the same structural reasons discussed above. Thus, we believe the exclusion of retained students in the present study increases comparability with prior research in this area.

Five cohorts of children entering kindergarten participated, with the oldest cohort (Cohort A) entering kindergarten in 2003 and the youngest (Cohort E) entering kindergarten in 2007. Due to the cohort-sequential longitudinal nature of the study, information in the later school years is only available for older cohorts. For example, although kindergarten information is available for all cohorts of children, fourth-grade data are only available for the oldest cohort (A), third-grade data only for the oldest two cohorts (A and B), and so on. Table 1 describes the cohort structure and the number of children in the sample each grade. The number of children lost each grade (due to the child leaving the school system, being retained, or skipping a grade) were from K to first grade $n = 928$; from first to second grade $n = 1{,}261$; from second to third grade $n = 981$; from third to fourth grade $n = 741$. Children with background and school absence/tardiness data for at least two grades (thus, excluding Cohort E) were included in the within-child fixed-effects models (explained below). To be included in the random-effects models, children had to have information on gender, race, ethnicity, ELL status, pre-K history, and absences/tardies for at least one grade. A total of 34,910 children were included in at least one model in the present study (83% of the total sample). Excluded children were more likely to be Black, receive free lunch (but not reduced-price lunch), and were less likely to be Hispanic, White, or ELL, than those remaining in the sample. Children with complete information and those with missing data did not differ on pre-K participation.

Measures

Income status. Children from low-income families are eligible for free or reduced-price lunch (130% of the FPL and 185% of the FPL, respectively) in the public school system. Eligibility is recertified at the beginning of each academic year (USDA, 2010). In Miami, families who receive the Supplemental Nutrition Assistance Program (formerly known as Food Stamps) or Temporary Assistance to Needy Families funds, and have a Social Security number on file at the school can qualify for direct certification and recertification each year. However, most families actively apply or reapply each year by completing and returning the eligibility form that all students receive through the mail at the beginning of each school year to qualify for the school lunch program. This measure served as a proxy of low-income status and was assessed at each grade in school, and was coded with two dummy variables of reduced-price lunch receipt (1 = *received reduced-price lunch*) and free lunch receipt (1 = *received free lunch*). In addition to status at each grade, two variables representing the duration of receipt of reduced-price lunch and duration of receipt of free lunch were generated by summing the years children were coded as receiving either reduced-price or free lunch, respectively (range = 0–5).

School absence and tardiness. Participants' attendance information was collected from school records each year. Teachers submitted active attendance reports daily, and administrative records listed both the total number of days tardy and the total number of days absent during each school year for each child. These totals represent the combination of both excused and unexcused absences and tardies. To examine potential nonlinear threshold effects, we generated categorical variables representing different ordinal levels of absences and tardies, with cutoffs based on prior research (Chang & Romero, 2008): fewer than 2 days absent or times tardy; 2–4 days absent/tardy; 5–9 days absent/tardy; 10–17 days absent/tardy; and 18 or more days absent/tardy.

Academic achievement in elementary school. At the end of each academic year, children received grades from their teachers for all subject areas. For example, in kindergarten subjects included language development, prereading, handwriting, math, science, Spanish, social studies, English as a second language, music, art, and physical education. Grades were based on a 3-point scale in kindergarten (3 = *Excellent*, 2 = *Satisfactory*, and 1 = *Unsatisfactory*). In first through fourth grade, grades were on a 5-point scale, ranging, with the familiar letter assignments of A to F (5 = *A*, 4 = *B*, 3 = *C*, 2 = *D*, and 1 = *F*). Composite scores were created by averaging all grades children received across all subjects in a given year, resulting in one overall grade for each year. Mean grades were standardized ($M = 0$, $SD = 1$) to allow for comparisons across grade levels. Preliminary analyses showed that grades for individual subjects were highly correlated, with no pattern in the correlations between particular subject grades and

Table 1
Cohort Structure and Number of Participants in Each Grade

Cohort	Year entered kindergarten	Kindergarten	1st grade	2nd grade	3rd grade	4th grade
A	2003	6,102	4,921	4,918	4,426	3,685
B	2004	6,992	6,481	5,817	5,328	
C	2005	7,879	7,094	6,500		
D	2006	4,863	6,382			
E	2007	5,916				
Total number of observations at each grade		31,722	24,878	17,235	9,754	3,685

attendance (i.e., it was not the case that math or PE grades were more influenced by missing school) and supported our decision to use composite grades for analyses.

The Florida Comprehensive Assessment Test (FCAT; Human Resources Research Organization & Harcourt Assessment, 2007), the standardized test used by the state to assess students' progress in math and reading, was administered in third and fourth grades. The assessment is closely aligned with the curriculum experienced by the students as both are required to cover state standards of content for each year. The FCAT was administered over several days in the spring of the academic year, with children spending 4–8 hr each day completing the test. Questions are in both multiple-choice and short-answer formats. For the present study, total scale scores were used from both the reading and math portions of the test (range = 100–500; Cronbach's α = .90 for math and .98 for reading; Human Resources Research Organization & Harcourt Assessment, 2007).

Child and family characteristics. Child gender and race/ethnicity (Black, Hispanic, Hispanic Black, or White) were obtained from school records. A child was considered an ELL if the parent reported a home language other than English upon entering kindergarten or the child received the English proficiency test required for children designated by the school as ELLs. Whether the child attended a free, half-day pre-K program at a public school (62%; the vast majority of being free Title I programs) or community-based childcare (38%; of these, 95% center-based, 5% family childcare) via state childcare subsidies for low-income families, was known from the original study (Winsler et al., 2008).

Analytic Plan

To address potential omitted variable bias resulting from the unobserved ways that children living in low-income families differ from those living in higher income families, we used both random-effects (RE) models and within-child fixed-effects (FE) regressions, pooling all available data from all five periods (K, first, second, third, and fourth grade) and relying on repeated observations of family income, school absences and tardies, and achievement measures for each child. Because of the cohort-sequential design, some children were observed for more data waves than others; because the regression models used predict cross-sectional associations between concurrent measures of attendance, achievement, and school lunch status (or the duration of school lunch status to that point), this is not a problem in the analyses.

RE models address potential omitted variable bias by including a child-specific intercept in order to capture any unobserved characteristics, assuming that all omitted variables are randomly distributed, and are independent of predictors and outcomes (Allison, 2005). All possible relevant fixed (time-invariant) and time-varying background characteristics measured are controlled in the model to limit potential omitted variable bias. In our RE models, covariates included child age, gender, race/ethnicity, ELL status, and whether the child attended a public school pre-K program (vs. childcare in the community). Because of the cohort-sequential nature of our data, standardized tests scores are available for Cohorts A and B only; therefore, our RE models predicting test scores include these cohorts only.

By contrast, FE models use within-child comparisons to predict changes in the outcome (attendance or achievement) from changes over time in the predictor (income or attendance) for the same child. As a result, all measured and unmeasured fixed effects of a given child or his or her family drop out of the FE model (e.g., child gender), and more conservative estimates are produced. As such, FE models examine how a child's attendance or achievement at a specific time point deviates from that same child's average level of attendance or achievement measured across all data waves (in this study, two to five data waves, depending on the availability of data). This is predicted by family income status or child's school attendance level at a single time point, from which is subtracted either the family's average income status or the child's average attendance level across all waves. Only time-varying covariates are included in FE models; our model controlled for child grade in school. Because of the cohort-sequential design, the FE models that predict math and reading scores include Cohort A only, as this is the only cohort with 2 years of test score data; this model is analogous to a change model.

FE models require variation in both the predictor and outcome. We had substantial variation in receipt of free or reduced-price lunch; 21% changed lunch status between K and first grade; 22% for first and second grades; 23% for second and third grades; and 24% for third and fourth grades. Of children with data through fourth grade, 43% had experienced at least one change in lunch status from K through fourth grade: 16% had changed lunch status once, 18% twice, and 9% three or four times. At each time point, between 52% and 54% of the changes were to free lunch from reduced-price lunch, or vice versa. The predictor variable representing the duration of time a child spent in a low-income household, by definition, is cumulative; these models include children who consistently lived in low-income homes and those who experienced changes in family income.

Both FE and RE analyses control for numerous factors to limit potential biases from observed and unobserved differences between children in family and school experiences, but have limitations. First, the assumption in the RE approach that all omitted variables are randomly distributed and are independent of predictors and outcomes is easily violated; for example, there are likely unobserved differences between children living at different income levels that also affect their attendance or achievement, such as parental education or involvement in their children's education. Because of this, the FE models, which control for all time-invariant characteristics and thus provide more conservative estimates, are our preferred specification. Second, neither the RE nor FE models remove the biasing effects of unmeasured variables that change with time. For example, changes in parental health or stress that co-occur with, or even cause or are caused by, changes in children's school attendance or achievement will still bias our estimates. Third, the FE model assumes that constant factors such as gender have a consistent or time-invariant effect on the dependent variable, and does not account for the fact that the influence of such measures may change with age. Finally, neither analytic approach addresses reverse causality, the possibility that family income is impacted by children's attendance at school, or that low-achieving students are more likely to miss school.

The measures of school absence and tardiness were skewed. Over all five grades, 51% of children had five or fewer absences

per year, 11% had no absences per year, and less than 1% had 34 or more absences (range = 0–142). In the pooled data, more than one quarter of children were not tardy during a year (27%), 51% were tardy 2 or fewer days, and only 2% were tardy 47 or more times per year (range = 0–169). To account for the nonnormal distributions, Poisson regressions were used to predict the continuous measures of school absences and tardies from free or reduced-price lunch receipt, and the categorical absence and tardiness variables were used as independent variables to predict children's achievement.

A series of regression models were run. First, Poisson RE and FE models predicted school absences and tardies from receipt of free and reduced-price lunch, and the duration of receipt of free or reduced-price lunch. Second, RE and FE models predicted student achievement from receipt of free and reduced-price lunch, and the duration of receipt of free or reduced-price lunch. Third, RE and FE models predicted student achievement from categorical measures of school absences and tardies. Fourth, the attenuation models, predicting student achievement from measures of school absences, tardies, and family income (both concurrent and duration), were conducted. Finally, we tested whether child age moderates (anticipated) associations between family income and school attendance, and between school attendance and achievement (Aiken & Clay, 1991). Results of Hausman chi-square tests, one method used to compare regression coefficients from RE and FE models, were significant for all models, indicating that there are systematic differences between the coefficients in the RE and FE models (Hausman, 1978). Thus, we prefer the FE estimates, although we present results from both types of models. Because of the large sample size, a conservative alpha of .01 was used to determine statistical significance. Effect sizes for continuous variables are calculated by dividing the standard deviation of the independent variable by the standard deviation of the dependent variable, and multiplying by the coefficient.

Results

Descriptive Results

Table 2 provides descriptive information for the sample across years. At each grade, between 61% and 67% of children received free lunch, and an additional 11%–15% received reduced-price lunch. By fourth grade, children had received free and reduced-price lunch for an average of .67 and 3.19 years, respectively. The

Table 2
Sample Descriptive Statistics

Variable	Child grade					
	K	1st grade	2nd grade	3rd grade	4th grade	Total sample
Receive reduced-price lunch	11.24%	12.04%	13.22%	14.01%	14.73%	12.31%
Receive free lunch	66.64%	66.60%	64.63%	63.02%	61.49%	65.62%
Number of years received reduced-price lunch	.11 (.32)	.23 (.53)	.36 (.72)	.50 (.91)	.67 (1.11)	.26 (.61)
Number of years received free lunch	.67 (.47)	1.32 (.87)	1.98 (1.24)	2.60 (1.61)	3.19 (1.98)	1.40 (1.25)
Child is male	52.22%	51.26%	50.46%	49.19%	47.95%	51.08%
Child is White	6.04%	5.63%	5.69%	5.89%	5.80%	5.83%
Child is Black	32.89%	32.63%	33.26%	33.08%	33.18%	32.88%
Child is Hispanic	55.91%	56.22%	55.26%	56.63%	56.26%	56.26%
Child is Hispanic Black	1.89%	2.09%	2.38%	0.82%	1.67%	1.89%
Child is an English Language Learner	56.93%	57.16%	56.68%	58.21%	59.10%	57.18%
Child attended public school pre-K program	68.50%	62.65%	61.65%	62.24%	60.54%	64.45%
Child attended childcare in the community	31.50%	37.35%	38.35%	37.76%	39.46%	35.55%
Attendance variables						
Number of days absent from school	8.71 (8.39)	7.18 (7.14)	6.32 (6.45)	5.45 (5.70)	5.16 (5.87)	7.29 (7.41)
Number of times tardy to school	7.53 (12.44)	7.66 (12.72)	7.25 (12.07)	6.57 (11.01)	6.07 (11.15)	7.34 (12.25)
Absent < 2 days	15.04%	19.44%	23.11%	26.71%	29.29%	19.78%
Absent 2–4 days	21.57%	24.43%	25.64%	27.94%	28.45%	24.18%
Absent 5–9 days	28.91%	28.83%	28.72%	27.08%	25.60%	28.51%
Absent 10–17 days	22.48%	19.59%	16.95%	14.46%	13.29%	19.29%
Absent 18 + days	12.00%	7.71%	5.57%	3.80%	3.63%	8.23%
Tardy < 2 days	41.49%	41.61%	42.68%	44.60%	47.22%	42.31%
Tardy 2–4 days	20.53%	20.01%	20.06%	20.84%	21.32%	20.35%
Tardy 5–9 days	13.96%	14.04%	13.76%	12.79%	12.86%	13.77%
Tardy 10–17 days	10.64%	10.51%	10.63%	10.08%	8.38%	10.44%
Tardy 18 + days	13.49%	13.83%	12.88%	11.68%	10.23%	13.13%
Achievement variables						
School grades (raw scores)	2.38 (0.46)	4.23 (0.63)	4.11 (0.62)	3.99 (0.61)	4.12 (0.52)	3.51 (0.64)
FCAT Math score				2.99 (1.11)	3.04 (0.97)	3.00 (1.07)
FCAT Reading score				3.18 (1.18)	3.19 (1.17)	3.19 (1.18)
Number of children with obs. at each grade[a]	31,113	24,914	17,315	9,568	3,662	86,518

Note. K = Kindergarten; FCAT = Florida Comprehensive Assessment Test. Values in parentheses represent standard deviations.
[a] Following several cohorts longitudinally, the number of observations (obs.) decreases with age. The figure in the final column represents the number of observations within children across all 5 years.

sample is racially, ethnically, and linguistically diverse, with more than half the children identified as Hispanic and as ELL. About two thirds (64%) had attended public school pre-K, and the rest attended center-based or family childcare at age 4. Across all grades, on average, children were absent from school 7.29 days per year, and tardy 7.34 days per year. Children received an average grade of "satisfactory" in kindergarten and an overall "B" average in first through fourth grade.

Predicting School Absences and Tardies From Receipt of Free and Reduced-Price Lunch

Results from the Poisson RE and within-child FE regression main-effects models that estimate relationships between the receipt, and duration of receipt, of free and reduced-price lunch and school absences and tardies are in Table 3. Child and family characteristics are controlled (not shown). Generally, results from both the RE and FE models reveal very small but significant associations between the receipt of free or reduced-price lunch and greater absences and tardies. Receipt of free lunch (under 130% FPL) is associated with more tardies and more absences (the latter in the RE models only) than receipt of reduced-price lunch (130%–185% FPL). Effect sizes were small for both days absent (.001%–.006%) and times tardy (.001%–.002%), and tended to be smaller in the FE models than the RE models. Associations between free lunch and days absent, and reduced-price lunch and times tardy, were not significant in the FE models. As expected, results from both RE and FE models indicate that longer periods of receipt of free school lunch are associated with more school absences and tardies. A longer duration of reduced-price lunch receipt is associated with more tardies in both types of models, and with more absences in the FE models only. Effect sizes are again small, with each additional grade spent receiving free or reduced-price lunch associated with a 0.1%–0.2% increase in absences or tardies.

Predicting Student Achievement From Receipt of Free and Reduced-Price Lunch

Table 4 displays the results from the RE and FE models predicting student achievement from receipt, and duration of receipt, of reduced-price and free lunch. Results from the RE models indicate children receiving free lunch or reduced-price lunch obtained considerably poorer grades than those paying full price (−18.3% and −6.2%, respectively). At third and fourth grades, receipt of free and reduced-price lunch were also associated with lower standardized test scores in the RE models. In contrast with expectations, however, results from the FE models suggest that changes in children's receipt of free or reduced-price lunch were not associated with changes in grades or test scores.

In models predicting student achievement from duration of receipt of free and reduced-price lunch, both RE and FE models indicate that longer duration of receipt predicted lower grades. That is, the length of time spent in a household that qualified as low income appears to have a cumulative, negative effect on student grades. Effect sizes are relatively small (decreases ranged from 0.04 and 0.18 of a standard deviation in grades). Children who experienced longer periods of free or reduced-price lunch averaged slightly lower test scores than those with fewer years of receipt, but the lack of significance in the FE models indicates that

Table 3
Predicting Child Absence and Tardiness From Free and Reduced-Price Lunch Receipt and Duration of Free/Reduced-Price Lunch Receipt: Regression Results

Variable	Predicting days absent				Predicting times tardy			
	Poisson RE *B* (*SE*)	Poisson FE *B* (*SE*)	Poisson RE *B* (*SE*)	Poisson FE *B* (*SE*)	Poisson RE *B* (*SE*)	Poisson FE *B* (*SE*)	Poisson RE *B* (*SE*)	Poisson FE *B* (*SE*)
Full lunch (ref)								
Reduced-price lunch	.052** (.008)	.032** (.009)			.034** (.008)	.018† (.008)		
Free lunch	.094** (.007)	.012 (.008)			.065** (.007)	.042** (.008)		
Number of years reduced-price lunch			.008 (.006)	.025** (.006)			.032** (.006)	.029** (.006)
Number of years free lunch			.061** (.003)	.036** (.004)			.037** (.004)	.031** (.004)
Child grade	−.137** (.001)	−.137** (.001)	−.183** (.003)	−.167** (.003)	−.023** (.001)	−.023** (.001)	−.051** (.003)	−.047** (.003)
Constant	2.084** (.019)		2.123** (.019)		2.196** (.030)		2.201** (.031)	
Wald χ^2	11,284.47**	10,437.26**	10,812.56**	9,982.33**	1,201.95**	374.25**	1,042.35**	331.54**
Log likelihood	−262,698.18	−132,560.01	−244,570.00	−125,046.03	−309,498.27	−183,605.48	−287,423.16	−172,597.09
N	34,910	23,467	31,764	21,973	34,910	21,892	31,764	20,945

Note. RE = random effects; FE = within-child fixed effects; ref = reference. Child gender, race, English Language Learner status, and pre-Kindergarten attendance are controlled for in RE models (not shown). In FE models, 11,395 children were dropped because they had only 1 year's data. For days absent analyses, 557 children were dropped because they were never absent; for tardy analyses, 2,132 children were dropped because they were never tardy.
† $p < .05$. ** $p < .001$.

Table 4
Predicting Student Achievement From Free and Reduced-Price Lunch Receipt and Duration of Free/Reduced-Price Lunch Receipt: Regression Results

Variable	Predicting mean standardized grades (K–4th grades)				Predicting math scores (3rd–4th grades only)				Predicting reading scores (3rd–4th grades only)			
	RE *B (SE)*	FE *B (SE)*	RE *B (SE)*	FE *B (SE)*	RE *B (SE)*	FE *B (SE)*	RE *B (SE)*	FE *B (SE)*	RE *B (SE)*	FE *B (SE)*	RE *B (SE)*	FE *B (SE)*
Full lunch (ref)												
Reduced-price lunch	−.120** (.011)	−.013 (.014)			−.131** (.030)	.042 (.05)			−.136** (.033)	−.020 (.060)		
Free lunch	−.246** (.010)	−.027† (.013)			−.380** (.025)	.037 (.053)			−.376** (.027)	−.015 (.059)		
Number of years reduced-price lunch			−.044** (.007)	−.039** (.009)			−.023 (.012)	−.004 (.054)			−.004 (.014)	.021 (.060)
Number of years free lunch			−.181** (.005)	−.141** (.006)			−.135** (.008)	0.005 (.039)			−.143** (.009)	−.040 (.044)
Child grade	−.004† (.002)	.007* (.002)	.125** (.004)	.106** (.005)	−.161** (.015)	−.321** (.016)	−.087** (.017)	−.334** (.033)	.045* (.016)	.079** (.017)	.133** (.018)	.094† (.037)
Constant	.53** (.02)	.011 (.010)	.445** (.020)	.095** (.006)	3.992** (.063)	4.025** (.066)	3.843** (.065)	4.131** (.064)	3.546** (.069)	2.939** (.072)	3.354** (.071)	2.999** (.070)
R^2 (overall)	.100	.038	.111	.066	.087	.002	.095	.0001	.089	.001	.099	.057
N	34,238	34,746	31,191	31,683	9,732	9,738	8,554	8,557	9,731	9,737	8,554	8,557

Note. RE = random effects; FE = within-child fixed effects; ref = reference. Child gender, race, English Language Learner status, and pre-Kindergarten (K) attendance are controlled for in RE models (not shown). Because the FE approach inherently controls for all stable, time-invariant variables including gender and race, these variables were not included in the FE regression models.
† $p < .05$. * $p < .01$. ** $p < .001$.

duration of receipt did not have a cumulative effect on scores; however, this may be due to a lack of within-child variation in standardized test scores, given they were administered at two grades only.

Predicting Student Achievement From School Absences and Tardies

Results from the RE and FE models predicting achievement from absences and tardies are in Table 5. As predicted, in both models, children with more absences and tardies received lower grades than peers with better attendance, and grades were lower during the years children demonstrated poorer attendance. Although children with poorer attendance received lower math and reading scores compared with peers in the RE models, the lack of significance in the FE models suggests that children do not have worse test scores during years in which they have poorer attendance. Again, this may be the result of the limited number of data waves that include test scores.

Because grades are available at all ages, we restrict our attenuation analyses to mean standardized grades, which are shown in Tables 6 and 7. RE models provide some evidence that school absences and tardies attenuate associations between family income status and children's grades, in that the coefficients for free and reduced-price lunch receipt were smaller than in Table 4. In both the RE and FE models, a longer period of receipt of free or reduced-price lunch, more days absent, and more times tardy independently predicted poorer grades, but the coefficients for the duration of receipt of free and reduced-price lunch were somewhat smaller than in the main models (see Table 4), suggesting that school attendance partially attenuates relations between duration of low income and children's achievement. The lack of attenuation is not surprising given the small associations between family income and children's attendance patterns, and between the duration of low family income and children's grades.

Sensitivity Analyses

We tested the moderating effects of child age (grade in school) in the FE models. Results (available upon request) provide evidence that the association between income and absence grew slightly with children's age. The associations between free lunch and days absent and times tardy increased by 0.03 and 0.02 days, respectively, with each grade. Similarly, associations between duration of free-lunch receipt and absences grew with age by 0.03. By contrast, the association between duration of free lunch and times tardy decreased by 0.02 with each grade. Child grade also moderated associations between income and grades. As expected, associations between free or reduced-price lunch and standardized grades increased in magnitude (became more negative) as children aged. Finally, child grade moderated associations between attendance and children's grades, with five or more absences appearing to serve as a threshold. That is, as children aged, associations between the categorical measures of school absence (five or more) and children's grades grew in magnitude (became more negative). The pattern was similar with tardiness, although there did not appear to be a threshold; with each grade, each categorical measure of times tardy increased its negative effect on children's grades. Finally, separate FE models by child gender and race (Black,

Table 5
Predicting Student Achievement From Child Absence and Tardiness: Regression Results

	Predicting mean standardized grades (K–4th grades)				Predicting math scores (3rd–4th grades)				Predicting reading Scores (3rd–4th grades)			
Variable	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)
Absent < 2 days (ref)												
Absent 2–4 days	−.110** (.008)	−.080** (.009)			−.100** (.022)	−.019 (.034)			−.157** (.024)	−.044 (.037)		
Absent 5–9 days	−.206** (.008)	−.144** (.010)			−.181** (.024)	−.052 (.041)			−.232** (.026)	−.023 (.045)		
Absent 10–17 days	−.341** (.010)	−.215** (.012)			−.287** (.029)	−.053 (.053)			−.410** (.032)	−.039 (.058)		
Absent 18 + days	−.560** (.013)	−.296** (.016)			−.506** (.050)	−.093 (.089)			−.673** (.054)	−.079 (.098)		
Tardy < 2 days (ref)												
Tardy 2–4 days			−.075** (.007)	−.047** (.008)			−.123** (.022)	−.016 (.032)			−.091** (.024)	.073† (.036)
Tardy 5–9 days			−.143** (.039)	−.088** (.010)			−.147** (.027)	−.035 (.043)			−.144** (.029)	.050 (.047)
Tardy 10–17 days			−.194** (.010)	−.129** (.012)			−.210** (.030)	−.097 (.050)			−.207** (.033)	.073 (.056)
Tardy 18 + days			−.238** (.010)	−.140** (.013)			−.222** (.030)	−.095 (.056)			−.259** (.033)	.001 (.062)
Child grade	−.022** (.002)	−.005† (.002)	−.002 (.002)	.006* (.002)	−.167** (.015)	−.323** (.060)	−.168** (.015)	−.324** (.016)	.038† (.016)	.078** (.017)	.041† (.016)	.080** (.017)
Constant	.638** (.020)	.131** (.008)	.516** (.020)	.046** (.006)	3.987** (.064)	4.090** (.060)	3.943** (.063)	4.093** (.056)	3.601** (.070)	2.957** (.066)	3.484** (.069)	2.895** (.062)
R^2 (overall)	.114	.034	.090	.017	.076	< .001	.069	< .001	.091	.004	.076	.001
N	34,238	34,746	34,238	34,746	9,732	9,738	9,732	9,738	9,731	9,737	9,731	9,737

Note. K = Kindergarten; RE = random effects; FE = within-child fixed effects; ref = reference.
† $p < .05$. * $p < .01$. ** $p < .001$.

Table 6
Testing the Attenuation Effects of Child Absence and Tardiness in the Relationship Between Free/Reduced Lunch Receipt and Student Achievement

	Predicting mean standardized grades			
Variable	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)
Full-price lunch (ref)				
Received reduced-price lunch	−.117** (.011)	−.012 (.014)	−.120** (.011)	−.013 (.014)
Received free lunch	−.233** (.010)	−.027† (.013)	−.245** (.010)	−.027† (.013)
Absent fewer than 2 days (ref)				
Absent 2–4 days	−.109** (.008)	−.079** (.009)		
Absent 5–9 days	−.204** (.008)	−.144** (.010)		
Absent 10–17 days	−.335** (.010)	−.215** (.012)		
Absent 18 or more days	−.548** (.013)	−.296** (.016)		
Tardy fewer than 2 days (ref)				
Tardy 2–4 days			−.075** (.007)	−.047** (.008)
Tardy 5–9 days			−.141** (.009)	−.088** (.010)
Tardy 10–17 days			−.192** (.010)	−.129** (.012)
Tardy 18 or more days			−.235** (.010)	−.140** (.013)
Child grade	−.025** (.002)	−.005† (.013)	−.006* (.002)	.006* (.002)
Constant	.747** (.021)	.151** (.013)	.632** (.020)	.066** (.011)
R^2 (overall)	.134	.045	.113	.030
N	34,238	34,746	34,238	34,746

Note. RE = random effects; FE = within-child fixed effects; ref = reference. Child gender, race, English Language Learner status, and pre-Kindergarten attendance are controlled for in RE models (not shown). Because the FE approach inherently controls for all stable, time-invariant variables including gender and race, these variables were not included in the FE regression models.
† $p < .05$. * $p < .01$. ** $p < .001$.

Hispanic, White) showed no differences in associations between school lunch status, school attendance, and achievement, suggesting that patterns in our sample are similar for girls and boys and across racial/ethnic categories.

Discussion

This study examined relations between family income, school attendance, and achievement among a large sample of children

Table 7
Testing the Attenuation Effects of Child Absence and Tardiness in the Relationship Between Duration of Free/Reduced Lunch Receipt and Student Achievement

	Predicting mean standardized grades			
Variable	RE *B* (*SE*)	FE *B* (*SE*)	RE *B* (*SE*)	FE *B* (*SE*)
Number of years child received reduced-price lunch	−.045** (.007)	−.036** (.009)	−.044** (.007)	−.038** (.009)
Number of years child received free lunch	−.174** (.005)	−.139** (.006)	−.179** (.005)	−.140** (.006)
Absent fewer than 2 days (ref)				
Absent 2–4 days	−.100** (.008)	−.074** (.009)		
Absent 5–9 days	−.188** (.009)	−.134** (.010)		
Absent 10–17 days	−.314** (.010)	−.206** (.012)		
Absent 18 or more days	−.531** (.014)	−.296** (.017)		
Tardy fewer than 2 days (ref)				
Tardy 2–4 days			−.069** (.007)	−.040** (.008)
Tardy 5–9 days			−.138** (.009)	−.083** (.010)
Tardy 10–17 days			−.183** (.010)	−.121** (.012)
Tardy 18 or more days			−.227** (.010)	−.135** (.013)
Child grade	.099** (.004)	.092** (.005)	.121** (.004)	.104** (.005)
Constant	.652** (.021)	.227** (.010)	−.541 (.021)	.145** (.007)
R^2 (overall)	.142	.094	.123	.080
N	31,191	31,683	31,191	31,683

Note. RE = random effects; FE = within-child fixed effects; ref = reference. Child gender, race, English Language Learner status, and pre-Kindergarten attendance are controlled for in RE models (not shown). Because the FE approach inherently controls for all stable, time-invariant variables including gender and race, these variables were not included in the FE regression models.
** $p < .001$.

from kindergarten to fourth grade, and represents a contribution to the literature in several important ways. First, we are among the first to examine children's tardiness to school, in addition to school absence. Second, we focus on an understudied group, specifically, ethnically and linguistically diverse, low-income, young children, allowing us to examine the extent to which variation in income and attendance matters for the early achievement of educationally at-risk elementary school children. Third, we examine questions new to the school absence literature (i.e., attendance attenuating income–achievement links, age moderating attendance effects on outcomes) using multiple, robust analysis techniques designed to minimize selection bias.

Results suggest that the receipt of free or reduced-price lunch and duration of receipt, used as proxies for low family income, had generally positive but quite small associations with the number of days children were absent from or late to school. However, building on previous research with older and more advantaged samples (Gottfried, 2009, 2011; Reynolds et al., 1992; Steward et al., 2008), we found that poorer school attendance was associated with nonnegligible decreases in children's grades. The relationship between school attendance and achievement was concurrent; that is, in the same year, more days absent or times tardy were associated with lower grades and test scores, and the strength of associations between absences and grades grew as children advanced through elementary school. In general, the relationship between school absence and achievement, although moderate in magnitude, was stronger than that between times tardy and achievement. In other words, missing an entire day of school appears to be worse for children's school performance than missing part of the day. When children arrive late, they have the opportunity to catch up on the day's lesson, whereas when children are absent the entire day, teachers may not be able to review material from a prior day for one child. Therefore, policies and practices that help children get to school, even if late, may help improve achievement.

It is interesting to note that the number of absences and tardies declined over time from kindergarten to fourth grade. This may be because, as children grow older, parents recognize the importance of school attendance, which is key given that this study also revealed that the number of days absent became more important for achievement as children grew older during elementary school. Understanding age-related differences in relations between attendance and child outcomes is important, but has, to date, been hampered by the fact that most previous research on children's school attendance has typically involved older students (Steward et al., 2008). Indeed, age differences in the influence of school attendance on behavior were shown in a recent study in which, among middle-school students, missing school was prospectively associated with increases over time in conduct problems and depression, but among high school students, directionality was reversed—the mental health and behavioral concerns predicted later absenteeism (Wood et al., 2012). One caveat worth noting, however, is that another potential explanation for the decreasing number of absences and tardies with age may be that children with particularly poor attendance could have been those retained in-grade and thus excluded from our sample.

One of the goals of this work was to discover the extent to which school attendance can explain associations between income and school achievement. The strong version of this hypothesis would see school attendance as the main mechanism through which family income affects children's early achievement, such that when attendance is included in the models, the effect of income on achievement would disappear altogether. A softer version of this hypothesis would expect only partial attenuation, with income–achievement associations reducing somewhat with the inclusion of attendance in the analyses. Given the relatively small associations identified between low family income and school attendance, and the very small or null findings between low family income and children's achievement, it was not surprising that we found that, technically, school absences and tardies only partially attenuated the effects of family income on academic achievement; however, given the large sample size, the small change in the coefficients, and the size of the standard errors, results do not provide evidence that school attendance attenuates links between family income and achievement in a meaningful way. Thus, there appear to be other mechanisms through which family income influences school achievement in the early years of school. It is important to recall that our at-risk sample represents a restricted range of income, and that fact, combined with our conservative analysis techniques, limits our likelihood of identifying larger effects.

As with all research, this study has several limitations. First, our RE models are susceptible to omitted variable bias from time-invariant characteristics, and both the RE and FE models are subject to omitted variable bias from time-varying characteristics, or from time-invariant factors that change their relationships with the outcomes over time. Furthermore, our FE models examined how changes in family income related to children's school attendance, and how changes in children's attendance patterns relate to achievement; such changes in income or school attendance may also co-occur with other potentially disruptive events in children's lives, such as changes in household structure. Unfortunately, many family characteristics such as household composition or parental employment were not measured, and thus we were unable to control for these, potentially biasing our results.

A second limitation pertains to the sample. As noted above, although ethnically, racially, and linguistically diverse, our sample had a restricted income range. Due to the original nature of the project (to evaluate the progress of children from economically disadvantaged families), many of those children who did not qualify for free or reduced-price lunch in a particular academic year were likely not living very far above the eligibility line. This restricted income range may explain our lack of large or significant findings regarding family income and school attendance or achievement. It is important to note that a number of studies using samples with greater income variation find that relatively small increases in income may be meaningful for children's academic performance (Dahl & Lochner, 2005), with implications for the levels of support provided by antipoverty programs. Additionally, because of the nature of the original study, our sample included only children who attended prekindergarten or licensed or informal childcare in the year prior to kindergarten, excluding those in exclusive parent care during that year. Furthermore, and similar to other work in this area, we restricted our sample to children who progressed on time through elementary school and who did not have special needs. Such children may have displayed better attendance patterns than their retained peers or those with special needs. Children from low-income families are more likely to be retained in-grade (Alexander, Entwisle, & Dauber, 2003) and to have health problems (Currie, 2005), and therefore, it is possible

that we missed a subsample of low-performing children with higher rates of absences and tardies. In addition, some children who moved away from the school district were lost from the sample. However, in our study, unlike others, children had to move out of the county and/or stop attending public school altogether in order to be lost—we included children who moved to other neighborhoods within the large county.

Finally, the study's measures were limited, particularly our lack of a specific assessment of family income. Although receipt of free- or reduced-lunch status is an often-used indicator of family income, it is possible that receipt of free or reduced-price lunch does not map on to family economic resources in this sample and that changes in receipt of free or reduced-price lunch do not accurately reflect changes in family income (Harwell & LeBeau, 2010), which may underlie our largely null findings regarding family income and children's achievement and of attenuating effects. Parents or educators may not consistently complete or return the appropriate forms each year, and thus a failure to reenroll children in the program could result from reasons other than an increase in family income, which would threaten the validity of our measure. Furthermore, our study did not take into account measures of school or neighborhood quality. Prior research indicates that higher quality schools may have more of an impact on the academic achievement of children from less advantaged backgrounds compared with those from more advantaged backgrounds (Raudenbush, 2009; Ready, 2010). It may be that children from low-income families who attend higher quality schools are more negatively impacted when they miss school (i.e., they have more to lose) than similarly poor children attending lower quality schools. Other studies emphasize the importance of neighborhood characteristics on children's educational achievement (Leventhal & Brooks-Gunn, 2004).

Conclusions

This study builds on the existing literature by demonstrating that children's school attendance patterns are linked with achievement in elementary school among a predominantly disadvantaged sample. Ensuring that children attend school, even if late, may be one way to enhance achievement among low-income children. Providing transportation or tracking and following up with students who are chronically absent or tardy may help encourage student attendance, and in turn, increase achievement. However, we identified very small associations between low-income status and school attendance within this generally disadvantaged sample, and largely null findings between low family income and children's achievement. More research is needed to shed light on other mechanisms through which family income affects children's achievement that may serve as policy levers to help close the achievement gap.

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