

**Do Family Structure Transitions Explain Race and Ethnic Differences in Academic
Achievement across the Early Life Course?**

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Draft: September 18, 2007

*Paper prepared for submission to the 2008 Annual Meetings of the Population Association of America. The authors gratefully acknowledge support from The Russell Sage Foundation and the Spencer Foundation.

Do Family Structure Transitions Explain Race and Ethnic Differences in Academic Achievement across the Early Life Course?

Abstract

Using the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K), we examine race and ethnic differences in the duration in a single-parent household and the timing and type of family structure transitions from kindergarten to fifth grade. In addition, we examine whether race and ethnic differences in family structure patterns and changes can explain race and ethnic differences in reading, math, and science test scores in fifth grade. We find that time spent in a single-parent household explains a substantial proportion of the association between race and test scores. Transitions are associated with lower test scores and earlier transitions seem to have a greater impact on achievement than later transitions. Finally, making a positive transition, compared to experiencing a parental divorce, is not associated with better test scores. Overall, our findings suggest that changes in household structure may be important in understanding the lower academic achievement of Black and Hispanic young children.

Important and widespread changes in family formation in the United States means that a growing number of children are living with single parents and experiencing multiple transitions and disruptions in their home life. Existing research suggests that single parenthood can be detrimental to children's academic achievement, and this disadvantage is generally attributed to the reduced economic and maternal resources that often come along with single parenthood. These findings lend support to a life course theory of human development, in which lives are lived interdependently; a mother's transitions into and out of romantic partnerships influences her children's outcomes. Life course theory also suggests that the timing and duration of single parenthood may be associated with children's outcomes. However, few researchers have used a life course perspective to examine the association between single parenthood and academic achievement in elementary school. This is a crucial period in a child's educational career, and it is the time when race and ethnic differences first emerge. Given that the likelihood of living in a single-parent household varies by race and ethnicity, we are interested in whether household structure can explain the differential educational outcomes in early childhood. Our study uses longitudinal data from the Early Childhood Longitudinal Survey-Kindergarten Cohort (ECLS-K), a nationally representative sample of kindergarteners in 1998-99. Utilizing a life course perspective, we contribute to this literature by focusing on how three different but interdependent aspects of household structure influences test scores in fifth grade: (1) duration of time spent in a single-parent family; (2) timing of family structure transition; and (3) type of family structure transition (union formation versus union dissolution),

Background

Changes in family formation

Family formation in the United States has undergone dramatic changes in the past five decades (Spain and Bianchi 1996; England and Farkas 1986). Individuals are increasingly likely to delay marriage or forego the institution completely, and the weakening cultural imperative to marriage means that growing numbers of children are born to single mothers. Thus, the percentage of children living in single-parent families has increased rapidly; currently, about one-quarter of children live with only one parent and many more will experience family disruption and single parenthood in their lives (Ellwood and Jencks 2004). Nearly 40 percent of children are born outside of a marital union (Wu, Bumpass, and Musick 2001); of those born in any kind of union (cohabiting or married), about 34 percent will experience a family disruption before age 16 (Bumpass and Lu 2000).

Children who live in single-parent families, however, are not evenly distributed among the population of children; minority children and children in families with lower socioeconomic standing have been most affected by these changes (Ellwood and Jencks 2004; Bumpass 1990). In 2001, about 27 percent of white children and 57 percent of black children were living in single-parent families (Ellwood and Jencks 2004). Blacks are more likely than whites to both delay and forego marriage (Cherlin 1992; Spain and Bianchi 1996; Mare and Winship 1991), and more likely to have a nonmarital birth (Wu et al. 2001; Cherlin 1992; Morgan and Rindfuss 1999; Smith, Morgan, and Koropeckyj-Cox 1996; Spain and Bianchi 1996). Class differences in single parenthood exist as well, with individuals of lower socioeconomic status being less likely to marry and more likely to have a nonmarital birth than their counterparts of higher socioeconomic status (Goldstein and Kenney 2001; Ellwood and Jencks 2004). Minority and low-SES children also suffer lower educational achievement early in the life course (Kao and Thompson 2003).

Consequences of changing family formation for children

The rapid increase in children who grow up with a single parent suggests that the meaning of the life course – from early childhood through adulthood – has been altered dramatically (Furstenberg 1990). The family is an agent of socialization for children (Brody 1998), and family experiences are associated with developmental outcomes (Bronfenbrenner 1979; Bronfenbrenner and Morris 1998; Vandell 1990). To begin with, living in a single-parent household is generally a transitional status – single parents often marry or remarry when their children are still young, and some children experience multiple relationship transitions – which means that these children must learn to negotiate complex kinship ties. Additionally, because these families usually have fewer economic and psychological resources than two-parent families, single parenthood is associated with negative educational outcomes for children and adolescents.

Although there are some exceptions, empirical work generally finds that single parenthood is negatively associated with outcomes in childhood and adolescence (for reviews of the literature, see Seltzer 1994; Amato 2000; Sigle-Rushton and McLanahan 2004; for an exception, see Biblarz and Raftery 1999). While the effects of single parenthood generally decline over time (Sigle-Rushton and McLanahan 2004), the negative consequences are lasting and can persist into adulthood (Amato 2000; McLanahan and Bumpass 1988).

Economic insecurity is the biggest explanation for why children in single-parent households have worse outcomes than those in two-parent households (Amato 2000; Sigle-Rushton and McLanahan 2004; McLanahan and Sandefur 1994; Thomson, Hanson, and McLanahan 1994; Biblarz and Raftery 1999). There is a high correlation between single parenthood and poverty (Teachman, Tedrow, and Crowder 2000). Single-parent families

generally only have income from one adult, and these families have fewer support networks on which to rely on for financial or instrumental assistance (Eggebeen 1992; Eggebeen 2005; Eggebeen and Hogan 1990; Seltzer 1994). Additionally, single mothers face unique challenges to finding and sustaining gainful employment including child care needs, low human capital, and employer discrimination. Fathers who do not live with their children are generally required by law to provide financial assistance to their child's mother. Many mothers, however, do not file formal child support claims and, even among those who do, few receive formal payments and these formal payments are rarely enough to make ends meet (Seltzer 1994; Huang, Mincy, and Garfinkel 2005). McLanahan and Sandefur (1994) find that income differences explain at least half of the gap in educational attainment, teenage childbearing, and labor force idleness differences between children in two-parent and one-parent families. Additionally, economic resources account for a large share of the differences in cognitive and behavioral outcomes of kindergarten children (Artis 2007), though others find that income has a bigger effect on cognitive outcomes than behavioral outcomes of children (Thomson et al. 1994).

In addition to the mediation of income on the association between single parenthood and child and adolescent outcomes, other family-level factors help to ameliorate some of the disadvantage associated with growing up in a disrupted or never-intact family. To begin with, adults experience non-economic vulnerability after divorce; those who divorce are more likely to have psychological problems and experience social isolation, and these problems are both associated with pre-divorce characteristics (perhaps even the impetus for the divorce) and of the separation itself. Empirical research shows that parental characteristics can play an important role in mediating the negative outcomes of divorce (Amato 2000; Entwisle, Alexander, and Olson 1997). For example, children of divorce receive less encouragement in their education,

which leads to lower outcomes (Seltzer 1994). These parental characteristics, however, are less important than income in mediating the relationship between single parenthood and child outcomes (Thomson et al. 1994; Sigle-Rushton and McLanahan 2004).

Life course perspective to explain outcomes associated with single parenthood

Life course theory is one theoretical framework used to explain the outcomes associated with single parenthood and family structure transitions. In the past four decades, this framework has emerged as the dominant perspective in understanding human development and functioning from early childhood through adulthood. This theory rests on the assumption that life trajectories are influenced by both structure and agency and that social pathways are age-graded; timing of events, beginning early in one's development, have lasting implications on subsequent development (Elder, Johnson, and Crosnoe 2003).

Life course theory is guided by five paradigmatic principles (Elder et al. 2003). First, human development is a lifelong process; development does not stop once an individual reaches adolescence or even adulthood (Elder et al. 2003; Cote 2000). Second, the life course is embedded in time and place, and both historical circumstances and ecological context shape developmental outcomes (Elder et al. 2003; Elder, Modell, and Parke 1993; Schneider and Stevenson 1999; Mintz 2004; Bronfenbrenner and Morris 1998). Third, although social pathways are shaped by social structure and institutions, individuals have agency throughout childhood, adolescence, and adulthood (Johnson 2001; Shanahan 2000; Elder et al. 2003). The fourth principle of life course theory is that of linked lives; individuals live their lives interdependently of one another. Finally, social pathways are age-graded, and the causes and consequences of developmental outcomes are contingent on their timing of occurrence (Elder et al. 2003). Hence, following the logic of the life course perspective, we anticipate that the effects of single

parenthood early in a child's life may have lasting effects on educational outcomes later in life. Moreover, the cumulative effect of multiple transitions over childhood may be more detrimental on educational outcomes than stable household structures.

Research suggests that a life course perspective can explain differences in academic achievement among adolescents who experience particularly family structure transitions. Heard (2007) finds that duration and timing of family structure transitions is associated with high school grade point average, and but that the strength of these associations vary by race. For example, the amount of time spent in a single-parent family is less detrimental to black adolescents than white adolescents, and is most detrimental to Hispanic adolescents. Although a life course perspective posits that experiences in childhood have lasting effects on individual lives, this framework has rarely been used to explain differences in outcomes in elementary school (Entwisle et al. 2003). This is an important gap in the literature as elementary school is an important part of the life course, as this time is a critical period for long-term educational outcomes (Alexander, Entwisle, and Dauber 2002; Entwisle 1995; Entwisle and Alexander 1989). Inequalities that exist in elementary school are associated with disadvantage throughout the life course (Entwisle et al. 2003; Entwisle and Alexander 1989).

Thus, guided by a life course perspective and current gaps in the literature, we seek to answer three questions. First, what are the characteristics of the families of children in elementary school, and how do these characteristics vary by racial and ethnic group? Second, how are family structure characteristics – including duration of time spent in a single-parent family, timing of family structure transitions, and type of family structure transitions – associated with academic achievement in elementary school? Finally, how much of the racial gap in achievement can be explained by different family types?

Data and Methods

Data source

This research uses data from multiple waves of the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K), a study conducted by the National Center of Education Statistics (NCES).¹ These data were collected in a three-stage sampling frame. Researchers first selected a national sample of schools that contain kindergarten classrooms. Researchers then sampled kindergarten classes and teachers within each school and, finally, a sample of students within each classroom. The original sample includes 17,487 students in approximately 3,500 classrooms in 1,280 schools. Data were collected from parents and each child’s school, and children were given a battery of standardized tests in math, reading, and science during each wave.

These data are well-suited to answer our research questions for several reasons. To begin with, the data include information on the child’s living arrangements during each wave of data collection. Additionally, the longitudinal nature of the design allows us to examine how children’s academic trajectories change as their family situations change. Although we cannot make statements about causality, these data allow us to better understand potential causal processes than we would be able to with a cross-sectional design. Finally, researchers oversampled for both minority groups and children of immigrants – two populations generally neglected in the literature about family structure – and we can make comparisons between native-born white children and minority immigrant children. These data will allow us to better understand the often complex family situations of these young children. When weighted, these data are nationally representative of all U.S. children who began kindergarten in 1998-99.

¹ Comprehensive documentation is available from the NCES website.

Key variables

Test scores: We predict math, reading, and science test scores at the end of fifth grade. All evaluations followed a two-stage format to reduce ceiling and floor effects. Students first took a short routing test, and responses to this test determined the difficulty level of a second, longer test. Additionally, all three evaluations are based on Item Response Theory (IRT), which places each student on a continuous scale according to the difficulty, discriminating ability, and guess-ability of each question. This method also uses the pattern of right, wrong, and omitted responses to all questions administered to estimate the score a child would have received if they answered all questions (National Center for Education Statistics 2001).

Family structure transitions: We construct several measures of family structure. First, our multivariate analyses include a dummy variable for if the child is living with married parents. Given data limitations, it is impossible to distinguish between children who are living with two biological parents and children who are living with one biological parent and a step-parent. Another important limitation is that parents who are cohabiting are considered unmarried in our analyses, as researchers only asked about cohabitation during the first wave of data collection.

Additionally, we estimate the duration of time spent in a single-parent family from birth through the end of fifth grade. This is calculated by using data about 1.) whether the child's mother was married when he or she was born and 2.) family structure characteristics at each wave (kindergarten, first, third, and fifth grades). This variable is measured in months and ranges from 0 to 122. Although this measure is not perfect, we believe it captures an important dimension of childhood experiences.

We also include dummy variables for the timing of any family structure transition: no transition (omitted category), transition before the end of kindergarten, and transition after

kindergarten. Finally, for those children who experienced some kind of family structure transition, we include a dummy variable for type of transition. A positive transition – meaning the child went from living with an unmarried mother to living with a married mother – is coded as 1, and a negative transition is coded as 0.

Race: In all of our multivariate analyses, we include child’s race as key independent variables. Race is represented by the following dummy variables: white (reference group), black, Hispanic, Asian, and other race. Because some race groups are too small to analyze separately, we combine the following children into an other race category: Hawaiian/Pacific Islander, American Indian/Alaska Native, and non-Hispanic multiracial. We use child’s race instead of mother’s race because of our ultimate focus on test scores; however, mother’s race and child’s race are highly correlated, and this decision does not substantively influence our results.

Economic instability: We include family socioeconomic status (SES) as a potential mechanism through which family structure is associated with academic outcomes. The ECLS-K data set provides a five-category composite family SES measure that includes parents’ education, parents’ occupational prestige, and household income. NCES researchers standardized each of these categories to have a mean of 0 and a standard deviation of 1. They produced the composite measure used here by computing the average of the available categories (for example, some children had fewer than five available categories because of an absent parent), and composite measures range from -4.75 to 2.75 (National Center for Education Statistics 2001). In analyses not presented, we substitute our composite measure of SES for additional measures of SES, including poverty status, a hardship index, and if the family receives public assistance. Our results are robust no matter how we measure economic hardship.

Maternal resources: Additionally, we include three variables that represent resources the mother has available to her child: depressive symptoms, perceptions of social support, and involvement at the child's school. Parents were to report how often (never, some of the time, a moderate amount of the time, or most of the time) they felt the following: bothered by things that don't usually bother them; did not feel like eating or had a poor appetite; could not shake off the blues even with help from their family or friends; had trouble keeping their mind on what they were doing; felt depressed; felt that everything they did was an effort; felt fearful; felt their sleep was restless; felt they talked less than usual; felt lonely; felt sad; or felt they could not get going. We sum mothers' responses to these questions to create an index of depressive symptoms that ranges from 12 to 48. Higher values correspond to higher levels of depressive symptoms.

Additionally, mothers were asked to report the extent to which they could rely on friends and family members for the following social support: child care if she needs to run an errand; a ride to get child to the doctor; checking on child if he or she is sick; talking about child's school problems with someone; emergency financial assistance; someone to talk to. Parents were given the following options, which represent the extent that parents have available support: never true, sometimes true, and always true. We sum mothers' responses to these questions to create an index of perceptions of social support that ranges from 6 to 18. Higher values correspond to higher levels of support.

Finally, we construct an index of parental involvement in their child's school. Parents were asked if they or another adult in their household have participated in the following activities since the beginning of the school year: attended an open house or a back-to-school night; attended a meeting of a PTA, PTO, or Parent-Teacher Student Organization; gone to a parental advisory group or policy council; attended a regularly-scheduled parent-teacher conference;

attended a school or class event, such as a play, sports event, or science fair; volunteered at the school or served on a committee; and participated in fundraising for the school. The parental involvement index is a sum of these items that ranges from 0 to 6. Higher values indicate more involvement.

Control variables: Our multivariate analyses also control for child and household characteristics that past researchers have demonstrated important to academic achievement. Children's immigrant status is represented by a dummy variable (1 = child of immigrants, 0 = child of native-born parents). We use parents' immigrant status instead of child's immigrant status since the children in our sample are quite young and generally parents' immigrant status is more important for predicting outcomes (Kao 2004; Suarez-Orozco and Suarez-Orozco 2001). Child gender is represented by a dummy variable (1 = male, 0 = female). Number of siblings in the household is a continuous variable that ranges from 0 to 12. Finally, we control for mother's employment status to approximate the amount of time mothers have available. We include dummy variables indicating whether mothers are employed part-time (working fewer than 35 hours per week) or unemployed, with mothers employed full-time serving as our reference category.

Analytic sample and plan

The analytic sample for this paper includes the 11,274 students whose parents completed the questionnaire at the end of fifth grade and who took the achievement tests in reading, math, and science. We begin by looking at descriptive statistics of family structure, focusing on the differences between racial and ethnic groups. We next present multivariate models that look at how duration of time spent in a single-parent family is associated with academic achievement at the end of fifth grade. We then look at how timing of family structure transitions matter and,

finally, how type of family structure transition (positive versus negative) influences test scores. In all of our multivariate tables, our first models estimate the direct influence of race. Model 2 adds the family structure variables. Model 3 adds basic demographic characteristics, including family SES, and Model 4 includes maternal resources (depressive symptoms, social support, and involvement in school). This sequence of modeling allows us to examine how much of race differences in achievement can be explained away by family structure and family transitions across the early life course.

Descriptive statistics of all variables used in the analysis are included in Table 1. White children comprise about 57 percent of the sample. About 14 percent of the children are black, 17 percent are Hispanic, and 6 percent are Asian. In terms of family structure, about 74 percent of children are living with two married parents (either two biological parents or a biological parent and a stepparent) in fifth grade. Despite the relatively high number of children living with married parents, many have experienced substantial family structure transitions. About 27 percent have made some sort of family structure transition, and some have made more than one transition (results not shown). On average, children have spent 27 months in a single parent family, although substantial variation exists.

[Table 1 about here.]

Preliminary Results

Race differences in family structure transitions

Although these descriptives are important, they mask the dramatic differences in family structure characteristics and transitions among racial and ethnic groups. Table 2 presents these differences. To begin with, white and Asian children are most likely to be born to married parents (85 percent and 86 percent, respectively, and these differences are not significant), while

only 32 percent of black children were born to married parents. Hispanic and other race children fall in the middle of the spectrum; about 64 percent of Hispanic children and 55 percent of other race children were born to married parents. Note that these patterns mirror race and ethnic differences in test scores throughout childhood. By fifth grade, fewer white children are living with two married parents and minority children are more likely to be living with two married parents. Only 81 percent of white children are living with married parents and 39 percent of Black children are living in this arrangement at the end of elementary school. Asians are the exception, as they are about as equally likely to be living with married parents at birth and in fifth grade. Looking at the duration of time spent in a single-parent family corroborates these results. Asian children, on average, spend the least amount of time in a single-parent family (about 14 months). Black children spend 77 months in a single-parent family by the end of fifth grade. There is substantial variation within race group as well, but the between race group differences are substantial.

[Table 2 about here.]

These descriptives suggest that by the end of fifth grade, sizeable numbers of children experience family structure transitions. Interestingly, this pattern is most common among Hispanic children; 34 percent of Hispanic children experience a family structure transition. About 32 percent of black and other race children experience a transition, along with about 25 percent of white children. Even among Asian children, most of whom live with two parents, a substantial percentage (16 percent) experience some family structure transition. About 11 percent of Asian children experience a negative transition and about 10 percent experience a positive transition.

Timing of family structure transition – before the end of kindergarten or after kindergarten – is another important variable in our multivariate analyses. These descriptives show that experiencing a family structure transition before the end of kindergarten is more common than later in elementary school, and this finding does not vary across racial or ethnic group. Taken together, these descriptive tabulations suggest that although important race differences exist in family structure arrangements – minority children are much more likely than white children to live in single-parent families – children of all race groups experience family transitions in elementary school.

Duration, timing, and type of transition

Because our multivariate analyses are preliminary and do not utilize the longitudinal data to its fullest potential, we only briefly discuss our findings here. We plan to significantly revise these analyses before the PAA Meetings in Spring 2008. To begin with, Table 3 looks at how duration of time spent in a single-parent family is associated with test scores. Because results are consistent across reading, math, and science test scores, our discussion focuses on reading scores. The first model shows that, not controlling for other characteristics, minority children perform worse than white children. Black children are most disadvantaged, scoring nearly 20 points below white children.

[Table 3 about here.]

Model 2 includes two family structure variables: a dummy variable indicating if the child is currently living with two married parents, and a continuous variable that indicates the amount of time spent in a single-parent family since birth. As expected, duration of time in a single-parent family is negative associated with reading scores. Interestingly, once race and duration of time is controlled for, currently living with married parents is not associated with academic

outcomes. The inclusion of these two family structure variables attenuates the association between race and reading test scores; notably, the coefficient for Asian children falls from significance.

These prior models are limited as they do not control for other child- and family-level characteristics that might be associated with test scores. Models 3 and 4 add demographic, socioeconomic, and maternal resources variables. Consistent with our hypotheses, duration of time spent in a single-parent family is still negatively associated with test scores. The inclusion of these variables also attenuates the race coefficients; however, the differences between Model 2 and Model 4 are smaller than the differences between Model 1 and Model 2. The predictions of math and science test scores are similar.

Tables 4 and 5, respectively, consider the influence of timing of family structure transitions and the type of family structure transitions. Turning first to Table 4, we find that the timing of transition is only associated with children's readings scores and not math or science test scores. After including all control in the analysis, children who make a transition after kindergarten have lower test scores than those who do not. Because this finding does not persist when looking at math and science scores, we plan to further explore these results in our subsequent analyses.

[Table 4 about here.]

Finally, we look at whether the type of transition matters in predicting elementary school test scores. This analysis is limited to students who experienced at least one family structure transition by the end of fifth grade. Because a positive family structure transition is often associated with increased income and maternal resources, there is reason to believe that this type of transition may be less harmful to children's test scores than a negative family structure

transition, which is generally accompanied by a decline in income and maternal resources. On the other hand, it is possible that any type of family structure transition is detrimental to children and that what matters is stability in household structure. The gain in resources may be buffered by the negative consequences of stability, which may introduce conflict within the household. Our results support the former hypothesis, as a positive family structure transition – compared to a negative family structure transition – is not associated with better test scores. Thus, children who make positive transitions are not necessarily better off than their counterparts who experience a parental divorce.

[Table 5 about here.]

Future Analyses

Although our findings describe important patterns of family structure transitions and academic achievement in elementary school, these results are preliminary and we plan to substantially modify them before PAA. Perhaps most importantly, subsequent analyses will use complex modeling techniques to estimate how family structure transitions matter for children. For example, these very preliminary analyses only include a measure of family socioeconomic status at one point in time – fifth grade – which does not capture how family SES might change as a result of a transition. It is likely that mothers gain economic resources when marrying and lose economic resources when their relationships dissolves, and these fluctuations in income likely have important consequences of children’s elementary school achievement. Similarly, our preliminary models only include measures of maternal resources (depressive symptoms, social support, and involvement in school) at one point in time and our analyses will be substantially improved when we look how a change in resources is associated with a change in test scores.

Thus, future analyses will use more sophisticated methods of modeling longitudinal data (most likely hierarchical models) to better capture child and family characteristics that vary over time.

Aside from this substantial change to our analyses, we plan to make additional changes. First, because past research shows important within-race variation exists, we plan to look at nativity differences in family structure transitions. We have applied for access to restricted-use data from NCES, which will allow us to examine national-origin and ethnic groups separately. Additionally, our current analyses do not adequately address the fact that some children have made multiple family transitions by the end of fifth grade (for example, some children have experienced both a divorce and a remarriage). We need to account for these changes in our modeling, as well as more thoroughly examine the consequences of multiple transitions on elementary school achievement. Finally, our analytic sample is substantially smaller than the full ECLS-K sample at baseline because of attrition. It is likely that children who experienced family structure transitions are under-represented in our sample, as those who did were probably more likely to move and, thus, less likely to be tracked over time. Future analyses will explore how attrition might influence our results, and will examine possible ways to correct for attrition (for example, with multiple imputation). We also plan to use regression techniques to impute missing data, as well as weight our analyses so that they are representative of the kindergarten cohort of 1998-99.

Overall, we believe that we have introduced important distinctions in how family structures may matter; moreover, our link between transitions and duration of family structure in early childhood to race and ethnic differences in educational achievement innovates upon previous research.

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Table 1. Means and Standard Deviations of Variables Used in Analyses

	Mean	S.D.	Min	Max
<i>Academic achievement</i>				
Reading	139.40	23.19	58.23	181.22
Math	113.92	21.34	46.97	150.94
Science	57.62	14.39	16.76	87.58
<i>Race</i>				
White	0.57	1.00	n/a	n/a
Black	1.14	1.00	n/a	n/a
Hispanic	0.17	1.00	n/a	n/a
Asian	0.06	1.00	n/a	n/a
Other race	0.05	1.00	n/a	n/a
<i>Family structure</i>				
Parents married	0.74	1.00	n/a	n/a
Months spent in single-parent family	26.84	43.38	0.00	128.00
Any family structure transition	0.27	1.00	n/a	n/a
Transition before end of kindergarten	0.18	1.00	n/a	n/a
Transition after kindergarten	0.15	1.00	n/a	n/a
Any negative family structure transition	0.17	1.00	n/a	n/a
Any positive family structure transition	0.17	1.00	n/a	n/a
<i>Demographic and socioeconomic characteristics</i>				
Children of immigrants	0.21	1.00	n/a	n/a
Male	0.51	1.00	n/a	n/a
Number of siblings in household	1.57	1.17	0.00	12.00
Mom employed full-time	0.51	1.00	n/a	n/a
Mom employed part-time	0.23	1.00	n/a	n/a
Mom unemployed	0.26	1.00	n/a	n/a
Family SES	0.01	0.81	-2.48	2.54
<i>Maternal resources</i>				
Mother's depressive symptoms	16.78	6.07	12.00	48.00
Mother's social support	16.53	2.12	6.00	18.00
Mother's involvement in school	4.12	1.48	0.00	6.00
N	11,274			

Table 2. Academic Achievement in Fifth Grade and Family Structure Transitions, By Race

	All	White	Black	Hispanic	Asian	Other ^a
<i>Academic achievement in fifth grade</i>						
Reading	139.40	145.62	125.95 ***	130.55 ***	140.78 ***	132.51 ***
Math	113.92	118.99	98.80 ***	107.52 ***	119.60	108.29 ***
Science	57.62	62.56	46.71 ***	51.31 ***	57.21 ***	53.54 ***
<i>Family Structure</i>						
Parents married at birth	0.73	0.85	0.32 ***	0.64 ***	0.86	0.55 ***
Married (end of kindergarten)	0.72	0.81	0.34 ***	0.68 ***	0.88 ***	0.58 ***
Married (end of first grade)	0.72	0.81	0.37 ***	0.70 ***	0.87 ***	0.59 ***
Married (end of third grade)	0.75	0.82	0.41 ***	0.71 ***	0.85 *	0.65 ***
Married (end of fifth grade)	0.74	0.81	0.39 ***	0.70 ***	0.85 *	0.62 ***
Months spent in single-parent family	26.84	17.94	76.98 ***	34.72 ***	14.18 *	41.81 ***
Any family structure transition	0.27	0.25	0.32 ***	0.34 ***	0.16 ***	0.32 ***
Transition before end of kindergarten	0.18	0.16	0.21 ***	0.23 ***	0.10 ***	0.23 ***
Transition after kindergarten	0.15	0.13	0.17 ***	0.19 ***	0.10 **	0.19 ***
Any negative family structure transition	0.17	0.17	0.16	0.19 *	0.11 ***	0.17
Any positive family structure transition	0.17	0.14	0.22 ***	0.24 ***	0.10 **	0.24 ***
N	11,274	6,405	1,249	2,055	771	611

^a Other race category combines Pacific Islander, American Indian, and multiracial children.

^ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 3. Duration of Time in a Single-Parent Family and Academic Achievement in Fifth Grade

	Reading				Math				Science			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<i>Race</i>												
White (omitted)	---	---	---	---	---	---	---	---	---	---	---	---
Black	-19.70 *** (0.68)	-13.40 *** (0.90)	-9.17 *** (0.85)	-8.79 *** (0.87)	-20.19 *** (0.62)	-14.32 *** (0.83)	-11.12 *** (0.79)	-10.68 *** (0.81)	-15.85 *** (0.40)	-11.77 *** (0.54)	-9.22 *** (0.51)	-9.15 *** (0.52)
Hispanic	-15.07 *** (0.55)	-12.69 *** (0.63)	-5.09 *** (0.71)	-5.00 *** (0.71)	-11.47 *** (0.51)	-9.27 *** (0.58)	-4.10 *** (0.65)	-3.99 *** (0.66)	-11.25 *** (0.33)	-9.50 *** (0.38)	-4.52 *** (0.42)	-4.49 *** (0.43)
Asian	-4.84 *** (0.83)	-1.91 ^ (1.04)	0.76 (1.11)	1.23 (1.15)	0.61 (0.76)	2.36 * (0.95)	3.16 ** (1.03)	3.45 ** (1.06)	-5.35 *** (0.50)	-3.35 *** (0.62)	-0.42 (0.66)	0.06 (0.69)
Other race	-13.11 *** (0.92)	-7.74 *** (1.06)	-4.77 *** (1.01)	-4.74 *** (1.02)	-10.70 *** (0.85)	-6.59 *** (0.97)	-4.73 *** (0.93)	-4.79 *** (0.05)	-9.02 *** (0.55)	-6.30 *** (0.64)	-4.20 *** (0.60)	-4.14 *** (0.61)
<i>Family structure</i>												
Months spent in single-parent family		-0.10 *** (0.01)	-0.96 *** (0.01)	-0.05 *** (0.01)		-0.09 *** (0.09)	-0.05 *** (0.08)	-0.05 *** (0.09)		-0.06 *** (0.01)	-0.03 *** (0.01)	-0.03 *** (0.01)
Parents married		-0.68 (0.85)	-1.65 * (0.82)	-1.85 * (0.83)		-0.78 (0.78)	-1.85 * (0.75)	-1.90 * (0.77)		-0.42 (0.51)	-0.96 ^ (0.49)	-0.93 ^ (0.50)
<i>Demographic and socioeconomic characteristics</i>												
Child of immigrants			-1.94 ** (0.68)	-1.36 ^ (0.69)			0.46 (0.63)	1.02 (0.64)			-2.41 *** (0.41)	-1.99 *** (0.42)
Male			-3.17 *** (0.43)	-3.02 *** (0.43)			3.94 *** (0.39)	4.09 *** (0.40)			3.25 *** (0.25)	3.33 *** (0.26)
Number of siblings in household			-2.30 *** (0.20)	-2.20 *** (0.20)			-1.06 *** (0.18)	-1.02 *** (0.19)			-1.37 *** (0.12)	-1.35 *** (0.12)
Mom employed full-time (omitted)			---	---			---	---			---	---
Mom employed part-time			2.20 *** (0.53)	2.01 *** (0.53)			1.93 *** (0.49)	1.71 ** (0.49)			1.12 *** (0.31)	0.99 *** (0.32)
Mom unemployed			1.17 * (0.54)	1.23 * (0.55)			0.40 (0.50)	0.40 (0.51)			0.40 (0.32)	0.38 (0.33)
Family SES			10.01 *** (0.30)	9.15 *** (0.32)			8.73 *** (0.28)	7.92 *** (0.30)			5.63 *** (0.18)	5.13 *** (0.19)

Table 3 continued

Maternal resources

Mother's depressive symptoms				-0.13 ** (0.04)				-0.09 * (0.04)				-0.05 * (0.02)
Mother's social support				-0.06 (0.10)				-0.09 (0.10)				-0.01 (0.07)
Mother's involvement in school				1.48 *** (0.17)				1.22 *** (0.16)				0.84 *** (0.10)
R-squared	0.11	0.13	0.26	0.27	0.11	0.13	0.24	0.24	0.17	0.18	0.30	0.31
N	11,091	8,252	8,077	7,750	11,100	8,255	8,080	7,753	11,096	8,256	8,081	7,754

^ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 4. Timing of Family Structure Transition and Academic Achievement in Fifth Grade

	Reading				Math				Science			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<i>Race</i>												
White (omitted)	---	---	---	---	---	---	---	---	---	---	---	---
Black	-19.67 *** (0.81)	-16.98 *** (0.81)	-11.14 *** (0.79)	-10.18 *** (0.85)	-20.19 *** (0.62)	-17.31 *** (0.74)	-12.78 *** (0.74)	-11.88 *** (0.79)	-15.85 *** (0.40)	-13.72 *** (0.49)	-10.27 *** (0.47)	-9.91 *** (0.51)
Hispanic	-15.07 *** (0.60)	-14.49 *** (0.60)	-5.87 *** (0.68)	-5.28 *** (0.72)	-11.47 *** (0.51)	-10.91 *** (0.55)	-4.79 *** (0.63)	-4.27 *** (0.66)	-11.25 *** (0.33)	-10.53 *** (0.36)	-4.97 *** (0.41)	-4.67 *** (0.43)
Asian	-4.84 ** (0.96)	-3.13 ** (0.96)	0.26 (1.08)	1.09 (1.15)	0.61 (0.76)	1.47 ^ (0.88)	2.92 ** (1.00)	3.37 ** (1.06)	-5.35 *** (0.50)	-4.00 *** (0.57)	-0.71 (0.65)	0.03 (0.69)
Other race	-13.11 *** (1.03)	-9.47 *** (1.03)	-5.82 *** (0.99)	-5.26 *** (1.02)	-10.70 *** (0.85)	-8.02 *** (0.94)	-5.61 *** (0.92)	-5.28 *** (0.94)	-9.02 *** (0.55)	-7.29 *** (0.62)	-4.72 *** (0.59)	-4.47 *** (0.61)
<i>Family structure</i>												
Transition before kindergarten		-2.75 *** (0.62)	-0.64 (0.60)	-0.52 (0.63)		-2.68 *** (0.57)	-0.73 (0.55)	-0.77 (0.58)		-1.66 *** (0.37)	-0.33 (0.36)	-0.45 (0.38)
Transition after kindergarten		-2.04 ** (0.66)	-1.05 ^ (0.63)	-1.47 * (0.65)		-1.04 ^ (0.60)	-0.31 (0.58)	-0.61 (0.61)		-0.61 (0.39)	-0.08 (0.38)	-0.26 (0.39)
Parents married		6.04 *** (0.58)	1.83 *** (0.58)	1.14 ^ (0.69)		5.70 *** (0.53)	1.64 ** (0.54)	0.98 ^ (0.58)		3.85 *** (0.35)	1.53 *** (0.35)	1.06 ** (0.37)
R-squared	0.11	0.13	0.26	0.26	0.11	0.13	0.24	0.24	0.17	0.18	0.31	0.31
N	11,091	9,113	8,535	7,754	11,100	9,118	8,539	7,757	11,096	9,117	8,538	7,758

^ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.

Note: Model 3 includes the following control variables: child of immigrant parents, child is male, number of siblings, mother's employment, and family SES. Model 4 includes these variables, as well as mother's depressive symptoms, mother's social support, and mother's involvement in school.

Table 5. Type of Family Structure Transition and Academic Achievement in Fifth Grade Among Children Who Experienced a Transition

	Reading				Math				Science			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<i>Race</i>												
White (omitted)	---	---	---	---	---	---	---	---	---	---	---	---
Black	-15.68 *** (0.93)	-15.88 *** (1.06)	-11.01 *** (1.09)	-10.17 *** (1.23)	-16.42 *** (0.85)	-16.45 *** (0.97)	-12.62 *** (1.01)	-12.26 *** (1.13)	-13.62 *** (0.54)	-13.34 *** (0.61)	-10.41 *** (0.63)	-10.01 *** (0.70)
Hispanic	-12.30 *** (0.82)	-13.07 *** (0.91)	-5.48 *** (1.09)	-4.02 ** (1.23)	-8.90 *** (0.76)	-9.72 *** (0.84)	-4.15 *** (1.00)	-2.94 ** (1.13)	-10.17 *** (0.48)	-10.38 *** (0.53)	-5.71 *** (0.62)	-5.05 *** (0.70)
Asian	-4.81 *** (1.22)	-4.03 ** (1.52)	1.69 (1.89)	1.18 (2.28)	1.06 (1.12)	-0.66 (1.40)	3.31 ^ (1.74)	2.25 (2.09)	-6.00 *** (0.71)	-5.35 *** (0.88)	-1.08 (1.08)	-0.93 (1.29)
Other race	-14.28 *** (1.33)	-15.24 *** (1.46)	-10.46 *** (1.52)	-10.37 *** (1.65)	-11.06 *** (1.23)	-11.92 *** (1.35)	-8.17 *** (1.40)	-8.29 *** (1.51)	-9.16 *** (0.78)	-9.62 *** (0.85)	-6.38 *** (0.87)	-6.53 *** (0.93)
<i>Family structure</i>												
Positive transition		-0.99 (0.81)	0.49 (0.85)	-0.48 (1.01)		-1.34 ^ (0.75)	0.43 (0.78)	-0.07 (0.92)		-0.69 (0.47)	0.06 (0.48)	-0.39 (0.57)
Parents married		1.99 * (0.80)	-0.92 (0.86)	-0.29 (1.02)		1.98 ** (0.74)	-1.13 (0.80)	-0.90 (0.93)		1.26 ** (0.46)	-0.35 (0.49)	-0.23 (0.58)
R-squared	0.08	0.09	0.21	0.21	0.09	0.09	0.20	0.20	0.15	0.15	0.27	0.27
N	5,031	4,047	3,286	2,682	5,039	4,055	3,291	2,631	5,034	4,053	3,289	2,632

^ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.

Note: Model 3 includes the following control variables: child of immigrant parents, child is male, number of siblings, mother's employment, and family SES. Model 4 includes these variables, as well as mother's depressive symptoms, mother's social support, and mother's involvement in school.