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Examining the Black–White Achievement Gap Among Low-Income Children Using the NICHD Study of Early Child Care and Youth Development

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The Black–White achievement gap in children's reading and mathematics school performance from 4½ years of age through fifth grade was examined in a sample of 314 lower income American youth followed from birth. Differences in family, child care, and schooling experiences largely explained Black–White differences in achievement, and instructional quality was a stronger predictor for Black than White children. In addition, the achievement gap was detected as young as 3 years of age. Taken together, the findings suggest that reducing the Black–White achievement gap may require early intervention to reduce race gaps in home and school experiences during the infant and toddler years as well as during the preschool and school years.

The substantial gap in educational achievement between Black and White children is one of the most pernicious problems facing American society. Black children in the U.S. start school about one half of a standard deviation behind their White peers on standardized reading and mathematics tests (Fryer & Levitt, 2004; Hanushek & Rivkin, 2006; Rouse, Brooks-Gunn, & McLanahan, 2005), and racial disparities in school achievement increase by about one tenth of a standard deviation during each year of school (Fryer & Levitt, 2004). Although the existence of this Black–White achievement gap is indisputable, its origins remain the focus of substantial debate among scientists, educators, and policy makers.

This question of origins can be more thoroughly addressed by drawing on some of the major traditions of developmental research. First, the achievement gap is a developmental process that unfolds in the years prior to school entry and then is acted on by school experiences (Condron, 2009; Fryer & Levitt, 2004). Thus, it needs to be examined by studying the major settings of early and middle childhood, the family, and child care and schools. Second, given the large disparities in family socioeconomic circumstances among most Black and White families (Reardon, 2003), such disparities

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need to be studied within, rather than across, socioeconomic groups, with special attention to how Black and White children differ even in the most disadvantaged segments of the American population (McLoyd, 1990). Third, as a complement to the economic and demographic perspectives that have traditionally dominated the work on the Black–White achievement gap (e.g., Jencks & Phillips, 1998), theoretical perspectives from developmental science can provide new insights into how the gap emerges. In this study, therefore, we draw on one of the major theoretical paradigms in developmental science for understanding racial differences in child outcomes (Garcia Coll et al., 1996) to examine the Black–White achievement gap among young children from low-income families only, paying special attention to the configuration of proximate developmental settings that differentially characterize the lives of Black and White children prior to and after their transitions into formal schooling.

As background, four main explanations for racial differences in achievement have been offered: genetic differences, differences in school quality, differences in family and neighborhood environments, even among children from comparably economically disadvantaged families, and student oppositional identity (Wiggan, 2007). Although cognitive skills and intelligence do have large heritable components, careful examination of the evidence suggests that genetic differences cannot explain most of the disparities in such attributes because they emerge after infancy. Moreover, achievement and achievement disparities are clearly influenced by environmental factors such as schooling and changes in parenting practices (Dickens, 2005). Similarly, some have contended that the gap is due to greater alienation from school among Black than White students. This explanation, however, has also largely been discounted because Black and White students seem to value education equally, although low-income and Black families may have less knowledge about or access to school expectations and resources than do White middle-class families (Tyson, Darity, & Castellino, 2005; Wiggan, 2007).

Over the years, therefore, most of the attention in studies of the Black–White achievement gap has been focused on group differences in the structures, qualities, and processes of the contexts in which Black and White children live their lives. In particular, the family, neighborhood, and school have been investigated extensively. This contextual approach lines up with the emphasis of the integrative model of development in context (Garcia Coll et al., 1996), a core theoretical model that developmentalists draw upon to understand ethnic or racial group differences in child development. The integrative model emphasizes the separate and combined effects of experiences in these settings over time (Garcia Coll et al., 1996). The integrative model (Garcia Coll et al., 1996; Wiggan, 2007) was designed to help researchers better study the developmental competencies of racial minority children. An extension of the ecological model, it emphasizes the role of critical aspects of social position, racism, and segregation in the environment of the minority child that are thought to influence the child's experiences in the more immediate family, neighborhood, and school contexts. The model argues that social position and racism impact the distal family and school characteristics, resulting in greater social disadvantage for Black families. These distal family and school characteristics, in turn, influence the proximal adult–child interactions that impact children's academic trajectories, such that Black children are likely to begin school with lower levels of achievement and may show slower rates of acquisition of skills. Social position is thought to shape parental values and practices in ways that influence how parents affect children's self-esteem and expectations of academic success. Social position is also thought to impact experiences in the classroom because cultural differences between middle-class teachers and lower income families are believed to result in lower expectations and failure to successfully communicate expectations, provide effective instruction, and evaluations between parents and teachers. Support for this model has been reported. Families with very low social positions face severe economic stress and often display parenting beliefs and practices that promote academic success, such as cultivating specific verbal skills, less frequently as families with more advantaged social positions (Bradley et al., 2000). In addition, overt and covert racism may limit opportunities for families in terms of employment, income, and housing and for children in terms of the quality of the schools they attend. For example, racism in the marketplace and labor force can result in lower incomes among Black families that select them into housing in more dangerous, disorganized neighborhoods with schools of lower quality (Leventhal & Brooks-Gunn, 2000). Racism can also result in teacher expectations that Black children will be less successful in school (Downey & Pribesh, 2004) and Black parents will be less successful in communications with teachers (Lareau, 2003). In sum, the integrative model suggests that the relative disadvantages in aspects of neighborhood (social disorganization), family (less income, more

authoritarian attitudes, and less verbal stimulation), and schooling (teachers with lower expectations) of Black children compared to White children may account for differential attainment and achievement between the two (Garcia Coll et al., 1996).

Despite the need for such a comprehensive model, most of the past research on the roles of families, neighborhoods, and schools in the achievement gap has examined the gap at specific points in time as a function of the family and neighborhood contexts separately from the school contexts, rather than examining all three contexts jointly and dynamically as suggested by the integrative model. Methodological factors in prior studies have interfered with attempts to follow this theoretically grounded approach. For example, one of the major national studies used to study the Black–White achievement gap—the Kindergarten Cohort of the Early Childhood Longitudinal Study (ECLS–K)—did not begin data collection until after the sample had started elementary school and contains no observational data on family, neighborhood, or even school contexts. Another, the Birth Cohort of the Early Childhood Longitudinal Study (ECLS–B) collected child-care data only in a subsample of children and does not follow children after kindergarten. Overcoming such methodological barriers to taking the more comprehensive approach suggested by developmental theory, however, is crucial, given the different implications for policy and practice of family, neighborhood, and school factors at different stages of development.

In contrast, we were able to use this integrative contextual approach with a study that began at birth and assessed children's home and school experience. In our inquiry, we focused exclusively on low-income Black and White children in attempt to isolate social forces (racism, social stratification) tied to race that affect child development, not just the socioeconomic marginalization that is so intricately intertwined with race in the U.S. (Garcia Coll et al., 1996; McLoyd, 1990). Careful design of studies, in terms of socioeconomic factors, is needed because White children are typically much more socioeconomically advantaged than Black children, giving them a kind of double advantage (i.e., more socioeconomic resources as well as higher status in the historical racial hierarchy in the United States). Any analysis that does not attempt to equate children in terms of socioeconomic position, then, is likely to be biased unless the family, neighborhood, and school factors are assumed to have the same impact on academic achievement across economic and racial groups. We focus in this report on low-income children because most policy initiatives focus on children from poor or near poor families, the children who are the least likely to enter school with the skills needed to be successful (Barnett, Epstein, Friedman, Boyd, & Hustedt, 2008). Moreover, by documenting and unpacking racial disparities within even the most socioeconomically disadvantaged segment of the child population in the United States, our findings can potentially speak to larger policy debates (e.g., affirmative action, school desegregation) about whether government efforts to equalize opportunities for social mobility should be class focused and race blind (Crosnoe, 2009; Rothstein, 2004).

Among the three major contexts studied, much is already known about the role of family and school factors in the Black–White gap, including evidence from a number of large, often nationally representative, longitudinal projects (Wiggan, 2007). Considerable evidence suggests that race differences in school readiness during early childhood are accounted for, at least to some extent, by differences in family and neighborhood characteristics, such as socioeconomic status (Duncan & Magnuson, 2005; Fryer & Levitt, 2004), parenting practices (Brooks-Gunn & Markman, 2005), and the quality, amount, and type of parental and nonparental care that parents arrange for their children (Magnuson & Waldfogel, 2005). These factors appear to account for race differences at the time of entry into school, but they do not explain increases in the achievement gap evident during the school years (Fryer & Levitt, 2005). In contrast, differences in schooling experiences appear to account for at least a portion of the widening achievement gap during elementary school (Downer & Pianta, 2006; Entwisle, Alexander, & Olson, 2005; Hanushek & Rivkin, 2006; Murnane, Willett, Bub, & McCartney, 2006). Among the school factors hypothesized to play a role in this process are the quality of teaching (Hanushek & Rivkin, 2006) and the proportion of poor and minority students in the school, which investigators believe affects a schools' ability to recruit and retain highly skilled teachers as well as the kinds of peer influences to which children are exposed (Lee & Loeb, 2000; Plank, 2000). Although these studies implicate family and schooling characteristics as influences on the achievement gap, none of this prior work has examined both family and nonfamily experiences in detail beginning in early life. An examination that includes both process and structural measures of early family and schooling experiences, in addition to later school and nonschool factors, could better account for the gap during the school years.

The purpose of this report, therefore, is to complement and extend the findings from analyses of large-scale data sets such as the National Longitudinal Survey of Youth (NLSY), the ECLS–K, and the ECLS–B. Thus, we simultaneously examine the home, school, and neighborhood contributors to race differences in achievement among low-income children in analyses that take into account the child's experience from birth through fifth grade and that draw on observational assessments of the quality of home and school contexts. Using longitudinal data collected from low-income Black and White children enrolled in the NICHD Study of Early Child Care and Youth Development (SECCYD), a 10-site longitudinal study of a diverse sample of American youth who have been followed from birth, we examined the relative contribution of three settings to racial differences in reading and mathematics performance to address three linked questions: (a) To what extent do reading and math trajectories in primary school differ for Black and White low-income children? (b) To what extent are differences in trajectories accounted for statistically by differences in family and nonfamily experiences before entry into school or during the primary school years? and (c) To what extent do family and school characteristics after entry into school predict academic trajectories differently for Black and White children?

In these analyses, we seek to extend the current literature in several ways. First, we focus on low-income children because they lag behind their more affluent peers academically and because disparities within this segment of the population are most indicative of differential treatment and experiences by race. Second, we estimate academic trajectories beginning at 54 months (before children start formal schooling) through fifth grade, using both the child's family, neighborhood, and child-care experiences prior to entry to school as well as their experiences in the family, neighborhood, and school during subsequent years. Third, we include both distal (structural) and proximal (functional) measures of families and schools so we can look both at organization of those contexts but also the *quality* of the child's experiences in them.

Method

Participants

The 1,364 families participating in the SECCYD were recruited during the first 11 months of 1991, from hospitals located in 10 sites around the United States. The sites were not randomly selected and the recruitment rates within site were not uniformly high (Duncan & Gibson, 2000). The sample, therefore, is not representative. Still, it is moderately large and racially and economically diverse. Assessments were conducted when the child was 6, 15, 24, 36, and 54 months old and in Grades 1, 3, and 5 with individual standardized tests, observations of families and school settings, and parent and teacher reports of behavior. Complete information on the SECCYD is available at https://secc.rti.org.

We restricted the sample to Black and White samples with similar low income in an attempt to isolate social forces tied to race that affect child development, not just the socioeconomic marginalization that is so intricately intertwined with race in the United States.

Methodologically, a focus on low-income children should also reduce potential bias because Black families often are considerably less advantaged than White families, including in this sample. The median income/poverty threshold for each family was computed from the early childhood assessments at 6, 15, 24, 36, and 54 months. Families were included if their median family income was 2.25 times the income that defined the poverty threshold for U.S. families. Using 225% of the poverty threshold included families viewed as poor or near poor by demographic classification, which, tellingly, was at the 75th percentile in the Black sample.

Measures

Academic achievement. Children were administered four subtests from the Woodcock–Johnson Psycho-Educational Battery–Revised: Letter–Word Identification (54 month and first grade), which assesses basic reading skills such as identifying isolated letters and words; Broad Reading (third and fifth grades), which adds assessment of passage comprehension to the assessment of identification of words; Applied Problems (54 month and fifth grade), which measures skill in analyzing and solving practical problems in mathematics; and Broad Math (third and fifth grades), which adds assessment of calculations (Woodcock & Johnson, 1990). Items are presented in order of increasing difficulty and are scored 0 = *incorrect/no response* or 1 = *correct response*, with basal and ceiling levels established. Typically, raw scores are converted to standard scores with a mean of 100 and a standard deviation of 15, but for this study, we relied upon *W* ability

scores so that change over time could be more easily documented. The scales were developed using item response theory which simultaneously estimates an ability or skill level for the child and difficulty indices for each items. The skill level raw scores were transformed using the Woodcock–Johnson software into a form of an age-equivalency score, a *W* score. The *W* score describes the child's skill level on a scale where a score of 500 represents the skill level expected of a fifth grader, with higher scores representing skill levels expected of older children and lower scores representing skill levels expected of younger children. The overall Woodcock–Johnson–Revised battery of tests has been standardized on a nationally representative sample from 24 months to 95 years of age. Internal-consistency reliability for the full battery of subscales ranged from .94 to .98, with test–retest reliability ranging from .80 to .87. Moreover, the subtests used here correlated substantially with other cognitive assessments (McGrew, Werder, & Woodcock, 1991) and have been found in previous work with the current sample to relate strongly to aspects of experience presumed to influence academic achievement, most notably quality of parenting (NICHD Early Child Care Research Network., 2005b).

Demographic characteristics. Parents were asked in each interview about whether there were one or two parents in the household and to describe their total household income, household size, and parental educational levels. The income-to-needs ratio was computed as the ratio of the total household income divided by the federal index for poverty, the household income used to define the poverty threshold for a household of that size.

Childrearing attitudes. The child's birth order, gender, and race were recorded at the first visit. Mothers completed the Modernity Scale (Schaefer & Edgerton, 1985) at the 1-month visit. This questionnaire discriminates between ''modern'' and ''traditional'' childrearing beliefs (Schaefer & Edgerton, 1985). This 16-item Likert-type questionnaire discriminates between ''traditional'' or relatively authoritarian approaches to childrearing and more ''modern or progressive'' child-centered approaches. Scores are derived by taking the mean of all items, with nontraditional beliefs reversed scored. Mothers holding a more traditional view agreed with statements such as ''Children must be carefully trained early in life or their natural impulses make them unmanageable'' and ''Children should always obey the teacher.'' Mothers with more progressive beliefs agreed with statements such as ''Children should be allowed to disagree with their parents if they feel their own ideas are better.'' Cronbach's alpha for this scale is .89.

Depressive symptoms. The mothers' *depressive symptoms* were measured at each age using the Center for Epidemiological Studies Depression (CES–D) Scale (Radloff, 1977). This 20-item questionnaire identifies depressive symptomatology in the general population. Scores are created by taking the mean of all items, with positive items reversed scored so that higher scores on this scale reflect more emotional distress. Coefficient alpha for this scale is .82.

Parenting. A parenting composite was created from ratings of maternal sensitivity and responsiveness during a videotaped interaction between mother and child under semistructured, free play (NICHD Early Child Care Research Network, 2000, 2002a), and ratings of the stimulation and responsiveness of family environment in a semi-structured interview, the Home Observation for the Measurement of the Environment (HOME) (Caldwell & Bradley, 1984). Maternal sensitivity was rated using videotaped mother–child interactions involving 15-min semistructured tasks (NICHD Early Child Care Research Network., 2003). These activities provided a context for observing the mother's support for the child in activities that could be frustrating but also an opportunity for fun together. Maternal sensitivity scores at each assessment age were the sum of the 7-point ratings of positive affect, supportive presence, respect for autonomy, intrusiveness (reversed), and hostility (reversed). Cronbach's alphas for the sensitivity composite scores ranged from .80 to .85 and interrater reliabilities determined from intraclass correlations (Winer, 1971) based on a second coding of 19.5% (196/1004) to 27% (271/987) of the videotapes at the different ages ranged from .84 to .91. The Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984) was administered during home visits at 6, 15, 36, and 54 months and in third and fifth grades. The focus is on the type of experiences the child experienced in the family and in family outings that are thought to promote social or cognitive development. The total score has proven to be a moderate to strong predictor of children's cognitive and social development for children of diverse social and economic backgrounds (Bradley et al., 2000). Information is obtained during the course of a home visit by means of observation and semi-structured

interview. All observers were required to maintain a criterion of agreement with the master coder on 90% of the items. Cronbach's alphas for the total score at each age exceeded .82.

The HOME and maternal sensitivity ratings were standardized and averaged at each age to create a composite score, using an average of the 54-month and third-grade HOME to impute the missing first-grade HOME scores. The mean was then standardized to have a mean of 0 and standard deviation of 1 at all ages. Together, these combined scores reflect parenting in two contexts: in the home and during semistructured play, and they proved to be the strongest predictor of child outcomes at 54 months in this sample (NICHD Early Child Care Research Network., 2003).

Neighborhood disadvantage. Information about neighborhood disadvantage was computed based on Census block indices of household income, employment status, and marital status. The block level census data was obtained for each family based on their address. These four indices were selected based on their use in prior studies to index neighborhood disadvantage (Burchinal, Nelson, Carlson, & Brooks-Gunn, 2008). The internal consistency of the four measures was $\alpha = .87$.

Child care. Child-care information was collected through phone calls with the mother and observations of the child's primary child-care setting. Mothers were called every 3 months between the time the baby was 1 month and 36 months, and approximately every 4 months between 36 and 54 months. During the phone calls, mothers were asked to list the various places the child received care. The total hours per week of regular nonmaternal care and whether the child attended a center was tallied for each phone call. The child's primary child-care setting was observed at all primary data collection ages.

Type, quality, and child–adult ratio were measured. *Type* was computed as the proportion of times that the mother reported that the child experienced center care during the phone calls between 1 month and 54 months of age based on growing evidence that center-based care promotes academic skills (Magnuson, Ruhm, & Waldfogel, 2007). Observational assessments of *quality* were obtained for primary nonmaternal arrangements that were used for 10 or more hours per week at 6, 15, 24, 36, and 54 months. Observations were conducted during two half-day visits scheduled within a 2-week interval at 6–36 months and one half-day visit at 54 months. At each half-day visit, observers completed two 44-min cycles of the Observational Record of the Caregiving Environment (ORCE; NICHD Early Child Care Research Network, 1996, 2002a). Positive caregiving composites were calculated from 4-point ratings of sensitivity to child's nondistress signals, stimulation of cognitive development, positive regard for child, emotional detachment (reversed), flatness of affect (reversed), intrusiveness (reversed), and detachment (reversed). Again, cumulative measures were computed using all quality assessments collected between the first measures at 6 months through the 54 month visit. In addition, the number of children and adults in each setting was counted and a child–teacher ratio was computed.

School characteristics. The NCES data base on American schools allowed the measurement of two demographic aspects of schools attended by SECCYD children: proportion of the student body receiving free or reduced price lunch (a proxy for school poverty) and non-White proportion of student body. Because they were highly correlated ($r = .75$), these two school characteristics were combined to form a measure of school demographic risk. In addition, the NCES reported on the child–teacher ratio at each age.

Children's classroom experiences were measured using the Classroom Observation System for First Grade (NICHD Early Child Care Research Network, 2002b), the Classroom Observation System for Third Grade (NICHD Early Child Care Research Network, 2005a), and the Classroom Observation System for Fifth Grade (Pianta et al., 2007). These observations described the teacher's behavior in the classroom with two 44-min cycle morning observations in first grade and eight 44-min cycles across the day in third and fifth grades. Three 7-point global ratings of the classroom environment were made at the end of each observation cycle: overcontrol by teacher, teacher's emotional detachment, teacher's sensitivity to student needs. The mean of these ratings was computed after reversing the two negative scales and comprised our classroom quality composite. All observers passed a videotaped reliability test involving six cases, obtaining an average intraclass correlation of .69.

Early cognitive skills. Cognitive competence at 36 months was estimated using an average of standardized scores ($\alpha = .77$) from individual assessments of the school readiness subscale of the Bracken School Readiness Composite (Bracken, 1984) and the Expressive and Receptive Language scale scores of the Reynell Developmental Language Scale (RDLS; Reynell, 1991). The school

readiness scale consists of 51 items grouped into five categories: knowledge of color, letter identification, number/counting, comparisons, and shape recognition. The RDLS is composed of 67-item scales. Alphas were .93 for verbal comprehension and .86 for expressive language.

Data Analysis

The first set of analyses examined the extent and correlates of Black–White differences in level and rate of change between 54 months and grade 5 in reading and mathematics achievement. Child, family, and neighborhood characteristics included measures collected in early childhood (site, gender, whether the child was firstborn, maternal education, maternal attitudes about childrearing, single parent, family income-to-needs ratio, parenting quality, and neighborhood disadvantage based on Census block indices of household income) and measures collected at the 54 month and Grade 1, 3, and 5 assessments (single parent, family income-to-needs ratio, and parenting quality). School characteristics included classroom quality rated by trained observers, student–teacher ratio, time in center care, and school compositional risk defined as a student body with a majority of students being non-White or receiving free/reduced-price lunch.

The second set of analyses examined the child's school readiness skills at 36 months to determine whether the achievement gap was detected as young as 36 months of age.

Results

Descriptive Analyses

Table 1 describes the child, family, and child care characteristics of the Black and White samples during early childhood, and Table 2 describes the longitudinal assessments for the Black and White families of academic skills and family and school characteristics. The Black and White samples were compared on all selected family, neighborhood and school characteristics using *t* tests and chi-square tests. For all *t* tests, effect sizes (*d*) were computed as the difference between the means of the Black and White children, divided by the sample standard deviation. Even in this low-income sample, the Black children lived in poorer households ($d = 0.79$, $p < .001$), were more likely to live with only one parent in early and middle childhood, had parents with more authoritarian parenting attitudes ($d = 0.87$, $p < .001$), received less sensitive care at home ($d = 1.14$, $p < .001$) and in child care ($d = 0.48$, $p < .001$) in early childhood, lived in more disadvantaged neighborhoods ($d = 1.32$, $p < .001$), and attended schools with a higher proportion of poor or minority students ($d = 1.41$, $p < .001$).

Table 1
Descriptive Statistics for Family, and Child-Care Characteristics During Early Childhood

	White				Black				
	N	Proportion	*M*	*SD*	*N*	Proportion	*M*	*SD*	Effect size
Child, family, neighborhood characteristics									
Male	244	0.61			100	0.53			
Firstborn	244	0.40			100	0.42			
Maternal education	244		12.94	2.24	100		12.54	1.44	0.20
Two-parent household	244	0.89			100	0.62			
Income/poverty	242		1.50	0.53	99		1.07	0.59	0.79***
Parenting	244		−0.27	0.72	100		−1.11	0.79	1.14***
Mat childrearing attitude	243		78.70	15.35	99		92.03	15.58	0.87***
Maternal depressive	244		11.57	6.99	100		13.50	6.63	0.28*
Neighborhood disadvantage	225		−0.27	0.65	90		0.68	0.87	1.32***
School characteristics									
Classroom quality	226		2.88	0.42	95		2.67	0.48	0.48***
Proportion center care	244		0.14	0.21	100		0.18	0.17	0.20

Note. Asterisks indicate significance of *t* test associated with *d*.
*$p < .05$. ***$p < .001$.

Table 2
Descriptive Statistics for Longitudinal Child Outcomes, Family, and School Characteristics

		54 months				Grade 1				Grade 3				Grade 5			
		N	*M*	*SD*	*d*	*N*	*M*	*SD*	*d*	*N*	*M*	*SD*	*d*	*N*	*M*	*SD*	*d*
Academic outcomes																	
WJ–R reading W score	White	221	363.6	19.50	0.42***	214	448.1	24.39	0.49***	206	491.1	16.51	0.70***	204	504.7	15.70	0.72***
	Black	93	355.0	22.19		85	436.6	20.84		87	478.6	20.77		88	492.9	18.40	
WJ–R math W score	White	221	420.0	19.16	0.72***	214	467.3	15.69	0.66***	206	490.1	15.10	0.48***	204	507.1	15.25	0.63***
	Black	91	405.8	21.37		85	457.1	14.83		89	482.7	16.23		88	497.3	16.44	
Family characteristics																	
Two-parent household	White	217	0.79			213	0.78			206	0.76			204	0.79		
	Black	93	0.39			85	0.45			89	0.45			87	0.46		
Income/poverty threshold	White	217	1.65	0.84	0.74***	213	1.96	1.10	0.59***	205	2.25	1.25	0.64***	204	2.25	1.30	0.46***
	Black	92	1.04	0.70		84	1.34	0.96		89	1.48	1.08		88	1.66	1.25	
Parenting	White	219	−0.31	1.05	0.87***	213	−0.30	1.00	1.12***	206	−0.43	1.05	0.74***	204	−0.41	1.10	0.58***
	Black	92	−1.25	1.16		84	−1.42	1.02		89	−1.18	0.94		88	−1.05	1.10	
Maternal depressive	White	219	3.07	1.46	0.42**	214	3.23	1.06	0.38*	206	3.29	1.03	0.27*	204	3.29	1.02	0.24*
	Black	93	3.66	1.34		85	3.62	0.99		89	3.56	1.00		88	3.53	0.98	
School characteristics																	
Classroom quality	White	211	2.97	0.59	0.12	207	3.38	0.50	0.30*	200	3.14	0.48	0.32*	198	3.15	0.39	0.10
	Black	91	2.90	0.58		85	3.23	0.52		89	2.98	0.54		88	3.11	0.39	
School risk	White	215	0.21	0.19	1.41***	214	0.22	0.19	1.26***	206	0.22	0.18	1.47***	204	0.24	0.20	1.28***
	Black	90	0.52	0.28		85	0.50	0.29		89	0.54	0.29		88	0.54	0.30	
Child–teacher ratio	White	194	16.71	4.33	0.10	194	15.54	3.49	0.09	194	16.71	4.33	0.10	194	15.54	3.49	0.09
	Black	89	17.13	4.31		89	15.23	3.26		89	17.13	4.31		89	15.23	3.26	

Note. Asterisks indicate significance of *t* test associated with *d*: *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3
Correlations Between Longitudinal Math and Reading Scores and Selected Family, Neighborhood, and School Characteristics for White and Black Children

	White children (n = 198–221)				Black children (n = 88–93)			
WJ-R math scores	Applied problems 54 months	Applied problems G1	Broad math G3	Broad math G5	Applied problems 54 months	Applied problems G1	Broad math G3	Broad math G5
Demographics								
Male	−.16*	.12	.09	.03	−.13	.07	−.08	.04
Mat education	.23***	.22***	.19***	.24***	.19	.13	.15	.19
Firstborn	.02	−.01	.07	.06	−.18	−.11	−.16	−.17
Partner 6–54 months	.08	.05	.06	.04	.16	.03	.10	.12
Current partner	.06	.15*	.22**	.13	.10	.04	.00	.08
Income 6–54	.23***	.23***	.19***	.13	.32**	.19	.17	.21*
Current income	.17*	.31***	.26***	.24***	.22*	.19	.12	.38***
Parenting								
Parenting 6–54	.38***	.37***	.29***	.36***	.42***	.43***	.24*	.30**
Current parenting	.32***	.29***	.30***	.27***	.34***	.52***	.32**	.45***
Parenting attitudes	−.18**	−.20**	−.09	−.15*	−.34**	−.45***	−.25*	−.38***
Maternal depressive symptoms 6–54	−.14*	−.12	−.09	−.11	−.19	−.32**	−.26*	−.09
Maternal depressive symptoms	−.05	−.17*	−.14*	−.11	−.17	−.09	−.12	.04
Neighborhood								
Neighborhood	−.10	−.07	−.00	−.05	−.00	−.06	.06	.03
Child care/school								
School risk	−.23***	−.22***	−.08	−.04	−.20	−.23*	−.14	−.28**
Child–teacher ratio	.11	.08	.24**	.18*	.08	−.01	−.14	−.19
Child-care quality 6–54 months	.16*	.15*	.11	.14	−.11	−.08	.03	.06
Current class quality	.06	.13	−.10	−.11	−.14	−.08	.02	.20
Center 1–54 months	.06	.01	−.05	−.14	−.07	−.02	−.02	.08
Child's early skills								
36 months cognitive composite	.64***	.50***	.49***	.51***	.52***	.60***	.41***	.40***

	White children (n = 198–221)				Black children (n = 88–93)			
WJ–R reading scores	Letter word 54 months	Letter word G1	Broad reading G3	Broad reading G5	Letter word 54 months	Letter word G1	Broad reading G3	Broad reading G5
Demographics								
Male	.10	.05	−.16	−.05	.06	.06	.05	.05
Mat education	.23*	.10	.02	.10	.25***	.25***	.23***	.31***
Firstborn	.13	.04	−.02	.00	.17*	.11	.10	.12
Partner 6–54 months	−.00	.02	.11	.24*	−.01	−.01	.02	.03
Current partner	.13	.01	−.05	.04	.04	.07	.20**	.16*
Income 6–54	.14	.18	.11	.21	.28***	.20***	.16**	.15*
Current income	.18	.14	.09	.33**	.20**	.29***	.33***	.32***
Parents & Parenting								
Parenting 6–54	.44***	.29**	.28**	.47***	.33***	.35***	.30***	.37***
Current Parenting	.40***	.23*	.30**	.37***	.29***	.35***	.25***	.34***
Parenting attitudes	−.23*	−.19	−.17	−.34**	−.24**	−.27***	−.22**	−.26**
Maternal depressive symptoms 6–54	−.16	−.30**	−.21*	−.22*	−.19*	−.16*	−.11	−.13

Table 3
Continued.

WJ–R reading scores	White children (n = 198–221) Letter word 54 months	Letter word G1	Broad reading G3	Broad reading G5	Black children (n = 88–93) Letter word 54 months	Letter word G1	Broad reading G3	Broad reading G5
Maternal depressive symptoms	.03	−16	−.09	−.01	−.13	−.14*	−.13	−.16*
Neighborhood								
Neighborhood disadv	−.08	−.09	.04	.04	−.07	−.06	−.00	−.06
Child care/school								
School risk	−.23*	−.10	−.17	−.21*	−.35***	−.24***	−.20***	−.13
Child–teacher ratio	−.03	−.03	−.17	−06	.06	.12	.18*	.17*
Child-care quality 6–54 months	.18	.01	.03	.07	.13	.14*	.03	.12
Current class quality	.05	−.04	−.02	.15	.03	.11	.01	−.10
Center 1–54 months	.03	−.13	−.10	−.04	−.02	−.01	−.08	−.11
Child's early skills								
36 months cognitive composite	.36***	.47***	.45***	.47***	.60***	.45***	.47***	.54***

*p < .05. **p < .01. ***p < .001.

The correlations among the predictors and between the predictors and the academic outcome scores were computed. The correlations among the predictors are available upon request from the authors, and Table 3 shows the correlations between these predictors and the longitudinal assessments of academic skills. Not surprisingly, many of the predictors are moderately to highly correlated because the predictors were selected to include as many contributory factors as possible, not necessarily to identify the best mediators. The early childhood and first grade assessments of income, partner status, and parenting show relatively high stability (r > .30), and both maternal education and income are correlated with each other and parenting attitudes and practices (r > .20). In contrast, the neighborhood and school factors were not highly correlated. Table 3 indicates that children's academic outcomes are all moderately to highly correlated with early cognitive skills, maternal education, family income, parenting attitudes and practices and school risk.

Longitudinal Analyses

Hierarchical linear model (HLM) analyses estimated the achievement gap and examined the extent to which it is accounted for by family and school characteristics. A series of HLMs described patterns of change over time in reading and mathematics skills and examined the extent to which the selected family, neighborhood, and school characteristics accounted for anticipated differences between the Black and White low-income children. Individual intercepts and slopes were estimated for each child to describe their reading and mathematics trajectories. Quadratic group growth curves were estimated after preliminary analyses indicated significant fixed, but not random, effects in the quadratic term. Age and all covariates were centered at the sample mean. Missing data on predictor variables were accounted for through the use of dummy variables that estimated the association between the predictor and outcome from the observed data (see NICHD Early Child Care Research Network and Duncan, 2003 for detail). This approach is conceptually equivalent to full-information maximum likelihood approaches used in structural equation modeling.

Five HLM analyses were conducted separately to describe the trajectories in reading and mathematics from entry to school through fifth grade. The first was an unconditional model, providing an estimate of the achievement gap in terms of estimated achievement levels in second grade, linear change in achievement skills, and the curvature in changes over time in achievement skills. The second model added the selected family and neighborhood characteristics: site, gender, maternal education, maternal attitudes about childrearing, whether mother

was partnered during early childhood and concurrently, mean income–needs ratio from early childhood and concurrently, mean parenting composite during early childhood and concurrently, and the neighborhood disadvantage composite. The third model added child-care and school characteristics to the unconditional model: proportion time in center care during early childhood, child-care quality during early childhood, current classroom quality, and the concurrent child–teacher ratios for the child's school. The fourth model included all family, neighborhood, and school characteristics. The final model added the child's 36 month cognitive score to the unconditional model to determine the extent to which the achievement gap existed before the low-income children were eligible for programs like Head Start or public prekindergartens.

Tests of mediation (Sobel, 1988) identified the family, neighborhood, or school covariates that predicted the achievement gap by testing the indirect path from the predictor through the hypothesized mediator of observed quality of the home and school environments to the outcome. The Sobel test computes the indirect path as the product of the coefficient for the predictor from an analysis of the mediator and the coefficient for the mediator in an analysis of the outcome divided by the estimated standard error of that indirect path coefficient (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Table 4 shows the results for coefficients and their effect sizes describing the achievement gap and appendices that list the coefficients for all of the reading and mathematics models are available upon request from the authors. The main effect in the row labeled race indicates the adjusted mean difference between Black and White children at the mean age, second grade. The coefficient for age describes the average gain per grade in the Rasch scores. The Race × Age coefficient indicates whether Black children showed larger (positive coefficient) or smaller (negative coefficient) linear gains between entry to school and Grade 5 relative to White children. The quadratic age coefficient reflects the extent to which change over time accelerates or decelerates. The Race × Age^2 coefficient indicates whether Black–White differences tend to accelerate over time (positive coefficient) or level off (negative coefficient). Effect sizes show the size of the gap at each assessment point.

Table 4
Growth Curve Analysis of Reading and Math Scores: Black–White Differences in Skill Levels and Rates of Change Over Time

		Model 1 No covariates	Model 2 Family and neighborhood characteristics	Model 3 School characteristics	Model 4 School, family, and neighborhood
Reading					
Race	*B* (*SE*)	−12.53*** (2.31)	−5.67* (2.67)	−8.10** (2.57)	−3.80 (2.75)
Race × Age	*B* (*SE*)	−0.40 (0.36)	−0.47 (0.49)	−0.88* (0.44)	−0.66 (0.53)
Race × Age^2	*B* (*SE*)	0.22 (0.17)	0.19 (0.17)	0.20 (0.17)	0.17 (0.17)
Effect sizes					
54 months	*d*	0.43	0.11	0.15	0.00
Grade 1	*d*	0.50	0.21	0.30	0.13
Grade 3	*d*	0.68	0.32	0.47	0.24
Grade 5	*d*	0.67	0.30	0.51	0.24
Math					
Race	*B* (*SE*)	−9.69*** (1.91)	−2.49 (2.21)	−5.94** (2.08)	1.08 (2.30)
Race × Age	*B* (*SE*)	0.97** (0.36)	0.31 (0.48)	0.71 (0.44)	0.16 (0.51)
Race × Age^2	*B* (*SE*)	−0.24 (0.12)	−0.25* (0.12)	−0.45*** (0.13)	−0.46*** (0.13)
Effect sizes					
54 months	*d*	0.73	0.29	0.62	0.31
Grade 1	*d*	0.66	0.19	0.43	0.09
Grade 3	*d*	0.56	0.15	0.37	0.09
Grade 5	*d*	0.56	0.27	0.51	0.32

Note. Covariates in Model 2 included as time invariant covariates: site, gender, whether the child was firstborn, maternal education, maternal childrearing attitudes, and as time-varying covariates, whether the mother was a single parent, family income-to-needs ratio, parenting quality, and neighborhood disadvantage. Covariates in Model 3 school demographic risk and classroom quality as time-varying predictors. Model 4 included all covariates in Models 2 and 3. Each predictor was also crossed with age in all models.
*$p < .05$. **$p < .01$. ***$p < .001$.

Unadjusted differences. The first column of Table 4 lists the coefficients for the unconditional model. The coefficients from this model (labeled no covariates) indicated that there were large and statistically significant differences in overall scores as indicated by race differences in the reading ($B = -12.53$, $p < .01$) and mathematics ($B = -9.69$, $p < .001$) intercepts and differences in linear rates of change over time in mathematics ($B = 0.97$, $p < .01$). The White children scored higher on average than Black children at all ages in reading ($0.43 < d < 0.68$, $p < .001$) and mathematics ($0.56 < d < 0.73$, $p < .001$). Black children showed bigger gains in mathematics over time than did White children.

Family and neighborhood characteristics. The second model examined the role of family and neighborhood demographic characteristics (see the second column of Table 4). The overall achievement gap as indexed by the intercept was statistically significant for reading ($B = -5.67$, $p < .05$) but not for mathematics ($B = -2.49$, $p > .05$). The rate of linear change in mathematics did not significantly differ for Black and White children ($B = 0.31$, $p > .05$), but the rate of quadratic change became statistically different ($B = -0.25$, $p < .05$). This difference in quadratic curvature suggested that the gains among Black children, compared with White children, were larger in early elementary school and smaller in later elementary school. That is, compared to White children, the Black children showed bigger gains in their mathematics skills during Grades 1–3 but slower rates of gains during Grades 3–5.

Including these family characteristics largely accounted for the achievement gap. The main effect of race was reduced by about 55% for reading and about 75% for mathematics and the linear change in mathematics by 61%, compared to Model 1.

Significant individual predictors included quality of parenting in early childhood as a predictor of reading level ($B = 4.98$, $SE = 1.72$, $p < .001$) and mathematics level ($B = 5.70$, $SE = 1.45$, $p < .001$). In addition, reading levels were higher when children were firstborn ($B = 4.96$, $SE = 1.81$, $p < .05$) or mothers had less traditional childrearing attitudes ($B = -0.14$, $SE = 0.07$, $p < .05$) and neighborhood disadvantage ($B = 2.67$, $SE = 1.35$, $p < .05$). Children showed larger gains in reading skills over time when they had two parents in early childhood ($B = 1.22$, $SE = 0.56$, $p < .05$) or less income in early childhood ($B = -0.79$, $SE = 0.40$, $p < .05$) and in mathematics skills if they were boys ($B = 1.04$, $SE = 0.33$, $p < .01$). Tests of mediation indicated that race differences in parenting during early childhood mediated some of the achievement gap in mathematics ($z = 3.24$, $p < .01$) and reading ($z = 2.54$, $p < .05$).

School characteristics. The third model included early and middle childhood school characteristics. Adjusting for school characteristics (see Model 3 in Table 4) reduced, but did not eliminate, the race difference by about 35% in reading and 39% in mathematics. There were significant differences between Black and White children in their overall levels of reading ($B = -8.10$, $p < .01$) and mathematics ($B = -5.94$, $p < .01$) and in the quadratic curvature in change in mathematics scores over time ($B = -0.45$, $p < .001$).

Individual school characteristics predicted the overall level and rates of change in reading and mathematics. Children showed higher levels of reading ($B = -7.63$, $SE = 3.17$, $p < .05$) and mathematics ($B = -5.88$, $SE = 2.70$, $p < .05$) overall when their schools were rated as being lower than higher risk. In addition, children had higher overall reading skills when they experienced higher child-care quality ($B = 5.82$, $SE = 2.38$, $p < .001$). When children experienced less center care, they showed larger gains over time in reading ($B = -1.66$, $SE = 0.82$, $p < .05$) and mathematics ($B = -1.61$, $SE = 0.80$, $p < .05$). In addition, when the child–teacher ratio was smaller, children showed larger gains in mathematics over time ($B = -0.19$, $SE = 0.08$, $p < .05$).

Race differences in classroom quality and adult–child ratios accounted for some of the differences in mathematics trajectories. Black children, but not White children, had higher mathematics skills when they had smaller child–teacher ratios ($B = -0.81$, $SE = 0.31$, $p < .01$). Black children also showed significantly bigger gains in mathematics over time if they experienced a lower student–teacher ratio ($B = -0.21$, $SE = 0.10$, $p < .05$; increment to linear change associated with a 1-point increase in child–teacher ratio is $B = -0.19$ for Black children and $B = 0.02$ for White children). In addition, Black children, but not White children, showed larger gains in mathematics skills over time when they experienced higher quality instruction ($B = 2.04$, $SE = 0.69$, $p < .01$; increment to linear change associated with a 1-point increase in the instruction quality is $B = 1.39$ for Black children and $B = -0.65$ for White children). That is, Black children, but not White children, demonstrated more gains over time in their mathematics skills when they experienced either smaller child–teacher ratios or higher quality instruction.

Family and school characteristics. Race differences in the intercepts were no longer significant statistically for either reading or mathematics when all

covariates were included in the model, reducing the main effect of race relative to the unconditional model by 70% for reading and 89% for mathematics. The gap in reading was statistically eliminated when family/neighborhood and school characteristics were jointly considered (see Model 4 in Table 4) as evidenced by nonsignificant race differences in the intercept, linear change in age, and quadratic change in age. The achievement gap in mathematics was statistically eliminated in the early elementary school years, but the Race × Age^2 interaction indicated that differences between Black and White children decreased in early elementary school and increased in later elementary school.

In these analyses, family and school characteristics predicted overall levels and rates of change in academic skills. Parenting during early childhood continued to predict both reading ($B = 4.32$, $SE = 1.74$, $p < .001$) and mathematics ($B = 4.97$, $SE = 1.48$, $p < .001$) skills. Reading levels were also higher when children were firstborn ($B = 4.45$, $SE = 1.82$, $p < .001$), and larger gains in reading over time occurred when mothers had a partner during early childhood ($B = 1.21$, $SE = 0.56$, $p < .05$). Overall mathematics levels were also related to neighborhood disadvantage ($B = 2.35$, $SE = 1.18$, $p < .05$) and smaller child–teacher ratios for Black but not White children ($B = -0.83$, $SE = 0.30$, $p < .01$). Rates of linear change over time were larger for boys ($B = 0.96$, $SE = 0.33$, $p < .01$) and when children experienced smaller child–teacher ratios ($B = -0.16$, $SE = 0.08$, $p < .05$) or higher quality instruction among Black, but not White, children ($B = 2.01$, $SE = 0.68$, $p < .01$). Figure 1 displays this Race × Quality × Time interaction, showing the predicted trajectory over time for Black and White children who experienced quality of instruction that was 1 *SD* above and below the mean.

Follow-up mediation analyses indicate that race differences in parenting in early childhood contributed to Black–White differences in achievement across time in mathematics and reading and that race differences in classroom instruction accounted for some of the race differences in rates of change over time in mathematics.

School readiness skills at 36 months. Next, we asked whether the achievement gap was present at 3 years of age. Black children scored 10.51 points ($SE = 1.29$, $p < .001$) lower than the White children on the 36-month composite readiness score ($d = 0.87$). Inclusion of the 36-month cognitive skill measure in the unconditional model statistically eliminated the difference between Black and White children at entry to school for reading ($B = -3.14$, $SE = 2.23$, $p > .05$; $d = 0.03$) and mathematics ($B = -0.85$, $SE = 1.77$, $p > .05$; $d = -0.21$), suggesting that the achievement gap existed at 36 months.

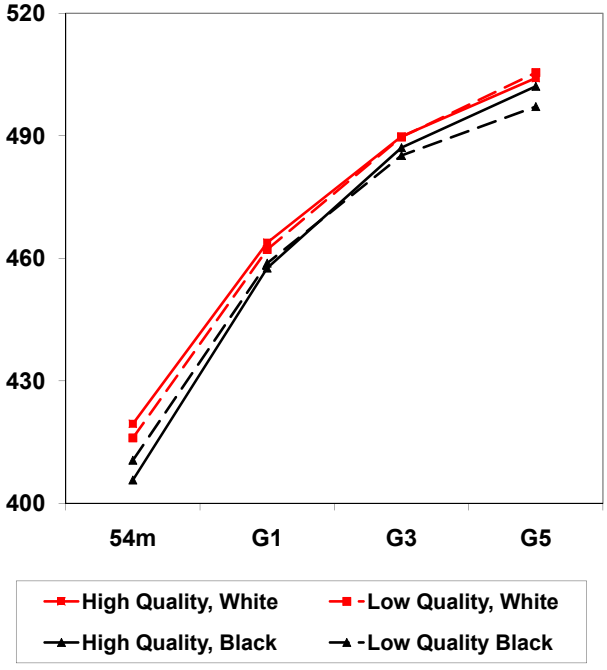

Figure 1. Classroom Quality × Race × Age interaction on WJ Math W scores.

Discussion

Our analyses of the achievement of low-income children in the NICHD SECCYD indicate that a substantial race gap was present by 3 years of age and, furthermore, that both family and school characteristics were related to the development, maintenance, and perhaps widening of this racial achievement gap. Following the integrative model (Garcia Coll et al., 1996), we explored achievement and achievement disparities in relation to an extensive set of family, neighborhood, and school characteristics measured both in early childhood and the elementary school years and tapping both structure and process. Such analyses demonstrated that the Black–White gap in low-income school-age children's achievement can be largely accounted for by the simultaneous consideration of a combination of factors from these three ecological settings over time.

This study was designed to address three questions related to the achievement gap. We asked to what extent do reading and math trajectories in primary school differ for Black and White low-income

children. Our findings are similar to those from analyses of other larger more representative data sets that suggest that differences, even among low-income children, are large from entry into school through the elementary school years (Condron, 2009; Duncan & Magnuson, 2005; Fryer & Levitt, 2004, 2005). We also asked to what extent are race differences in achievement trajectories accounted for statistically by differences in family and non-family experiences before entry into school or during the primary school years. Our analyses provide evidence that these experiences might account for more of the gap than reported in previous studies. This finding is likely a result of our focus on a single policy relevant income group, poor and near-poor families, and because our models included the distal measures of family and school used in prior analyses but also added measures of quality of adult–child interactions in both contexts. Finally, we asked to what extent do family and school characteristics after entry into school predict academic trajectories differently for Black and White children. We found that school, but not family, characteristics seemed to be stronger predictors of gains in mathematics skills over time for Black children than for White children. Each of these findings is discussed in more detail below.

Although previous studies have demonstrated that family, neighborhood, and school characteristics account for much of the achievement gap during early childhood and the elementary school years, this study might be the first to report that a set of such factors largely explained the observed gap. Two factors likely accounted for this. The NICDH SECCYD included repeated observations beginning in infancy of the children's child-care settings or elementary school classrooms and of parent-child interactions, which are necessary measurement techniques to capture the processes at the heart of the integrative model. Prior work with the ECLS–K or NLSY (Duncan & Magnuson, 2005; Fryer & Levitt, 2004) reported that family factors largely accounted for race differences at entry to school but that both family and school factors accounted for only part of the widening race differences during the elementary years. These studies, however, did not include observations of parent-child interactions or of children's child care and school classrooms. Second, unlike prior studies, we did not rely in this investigation on statistical methods alone to adjust for the substantial lack of overlap between Black and White children in their economic and family characteristics in our sample. Instead, we limited our analysis to only children from lower income families and tested whether, within low-income households, family and school factors operated differently in predicting academic trajectories for Black and White children.

The most important finding from this study is that the achievement gap in low-income children's reading and mathematics trajectories in primary school was largely attributed to family and school factors. The finding in this study that Black children face more social risk demographically, experience more traditional parenting beliefs and practices, and attend lower quality child care and schools than White children of the same low economic status provides further evidence suggesting long-term impacts of racial segregation and differential treatment (Garcia Coll et al., 1996). These setting-level differences completely accounted for the reading achievement gap and largely accounted for the mathematics achievement gap. Racial differences in family characteristics, especially parenting in early childhood, account for up to one half to three fourths of the achievement gap, replicating findings from studies of larger and more representative samples (Fryer & Levitt, 2004; Hanushek & Rivkin, 2006; Rouse et al., 2005). As in previous studies (Downer & Pianta, 2006; Hanushek & Rivkin, 2006; Murnane et al., 2006), our findings demonstrate that Black–White differences in school environments also contribute to achievement disparities, accounting for up to one third of the gap. In addition, poorer quality schools attended by Black children further appear to increase the gap in mathematics skills, as evidenced by the Race × Age × Instruction interaction in our analyses. That is, the interaction among race, classroom quality, and age suggests that that poor quality instruction may be especially deleterious and good quality instruction may be especially helpful for acquisition of mathematics skills for Black children.

These findings are consistent with the integrative model as well as with prior empirical research. Consistent with this conceptual model suggesting that social position and racism play an important role in the development of children of color in U.S. society (Garcia Coll et al., 1996), we found that the achievement gap is largely accounted for by differences in the distal factors such as parental education, income, and partner status and school risk and child–teacher ratios, and in the related proximal factors such as parenting beliefs and practices and quality of instruction. Incorporating this developmental theory into the examination of the Black–White achievement gap appears to extend our understanding of this gap and, perhaps, future

research can examine the issues of racism and segregation more explicitly.

Several limitations of the present analyses must be acknowledged. First, our sample size is moderate and results need to be replicated. For example, small differences are not statistically significant with moderate sample sizes and therefore we might be missing modest achievement gaps. Second, we did not measure summer activities, which have been implicated in accounting for at least some of the achievement gap between middle- and lower-income children (Alexander, Entwisle, & Olson, 2007). The inclusion of information on race differences in summer activities would likely further reduce the size of the gap in our models. Third, our analyses include many covariates, but cannot be viewed as causal.

The findings of this study in conjunction with other studies suggest that policies to address the achievement gap should begin early. Prior work indicates that the race gap emerges after the child's 1st year (Fryer & Levitt, 2006), and we found it well established by 3 years-of-age in our sample. Combined with our findings that differences in school readiness can be linked to family and child-care experiences, we hope that our results with those from other studies can assist in identifying both early childhood and school-age interventions that could reduce the achievement gap. Perhaps most important, they suggest that current compensatory programs such as Head Start or public prekindergarten can reduce some of the gap (Administration for Children and Families, 2002; Gormley, Gayler, Phillips, & Dawson, 2005; Magnuson et al., 2007), but these programs probably begin too late in the child's development to prevent race differences in school achievement. During the infant, toddler, and preschool years, programs should focus on parenting skills that promote cognitive and social skills (Sweet & Appelbaum, 2004) as well as on access to high-quality child care (Carneiro & Heckman, 2002). Programs such as Educare that provide both high-quality infant care and improve parenting appear to prevent the emergence of the gap during infancy and preschool years (Yazejian & Bryant, 2009). Programs like Early Head Start that provide a mixture of these programs appear to reduce the gap slightly during infancy (Love et al., 2005). During the school years, programs should focus on efforts to improve instructional quality. Reducing the achievement gap will no doubt require sustained efforts involving families and schools, beginning early in children's lives.

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