The Black-White Test Score Gap:

Lessons from the Panel Study of Income Dynamics

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Abstract

Based on two waves of panel data for three age cohorts of children from the Panel Study of Income Dynamics Child Development Supplements, we find large black-white test score differences among children of all ages. Even before children start formal schooling, black children score .8 and .5 of a standard deviation lower than whites in Applied Problem and Letter-Word tests respectively. Except for the oldest cohort, the gaps for all tests widened when children's cognitive skills were assessed again six years later. All achievement gaps before grade three can be accounted for when we control for the child's characteristics, home environment (both structural and cultural factors), and a proxy for mother's cognitive skills.

As children advance to higher grades, there is a diminishing role of these covariates in explaining the achievement gap. In preschool years, the gaps are reduced to less than .2 of a standard deviation when all covariates are controlled for. In the first three years of school, the gaps are reduced to about .3 of a standard deviation, whereas in high school years, the gaps remain a statistically significant .5 and .65 of a standard deviation for Applied Problem and Letter-Word scores respectively after all the covariates are controlled for (representing 63% and 88% of the raw test score gap).

Overall, family SES characteristics are important contributors to the gap between the test scores although the set of significant family characteristics varies across cohorts and across different tests. We also find that gender differences in Applied Problem scores start to emerge as soon as children enter formal schooling and remain prominent in middle and high school years, and that black boys lose more ground to their white counterparts than black girls.

Approximately a century ago, DuBois observed that the problem of the century is the problem of the color line (1903). Although the well-being of African Americans has substantially improved since then, inequality between black and white Americans in the past several decades has increased on many indicators of family and child well-being such as family income, employment rates, health, child poverty rates, and teenage pregnancy rates (Danziger and Gottschalk 1994; McDonough, et al. 1999; McLanahan and Casper 1995). Many scholars and policy makers see education as providing access to societal resources and a way to reduce social disparities. However, the achievement gap between black and white Americans has persisted in contemporary America (National Center for Educational Statistics, 1999).

Since the Coleman report (Coleman 1966) first documented the black-white achievement gap, research based on test results from the National Assessment of Educational Progress (NAEP) conducted from 1971 to 1996 has shown a substantial lag in the achievement of black students. Among other indicators, the study found that 17-year-old blacks had an average reading proficiency equivalent to that of 13-year-old whites (Hallinan 2001). Comparisons of math, science and writing scores revealed similar patterns. Analyses by Hedges and Nowell (1998), based on results from six major national surveys of students since 1965, showed a decline in differences though a slowed rate of decrease since 1988. Results from the early 1990s indicate that the gap had widened again for high school students (National Center for Education Statistics, 2000). These gaps have been observed to exist before children enter kindergarten, widen as they move through elementary and middle schools, and persist into adulthood (Phillips, Crouse, and Ralph 1998). Furthermore, even when comparing black and white students who enter school with the same test scores, blacks fall behind as they progress through school. In a

recent review of studies based on several national data sets, Duncan and Magnuson found that racial achievement differences appeared in all of them, although the size of the difference "varied with study and measure of achievement" (2004: 3). The differences ranged from half a standard deviation to more than a full standard deviation. Their review also revealed that family SES accounts for about half a standard deviation in the initial achievement gap, which either closes the gap or not depending on how big the initial gap is.

The early achievement gap between blacks and whites has important consequences for both individual and societal well-being. At the individual level, it is related to one's educational attainment, earnings (Jencks 1998; Johnson and Neal 1998), employment stability, and health (Reynolds and Ross 1998). At the societal level, cognitive achievement gaps have implications for the quality of our next generation, race relations, skills of the workforce, and for international competitiveness of the U.S. The recent increase in the achievement gap has raised grave concern for society as a whole. A better understanding of the causes of this test score gap has both theoretical and policy import.

Until lately, no empirical research has been able to explain away the black-white test score gap. Two recent studies, based on newly available national data, have demonstrated that the test score gap for preschool children disappears when a longer list of family and school covariates than those included in earlier studies are controlled for. Fryer and Levitt (2004b) based their findings on data from the Early Childhood Longitudinal Study (ECLS-K) for incoming kindergarteners in 1998, and Yeung and Conley (2005) examined test scores for children aged 3-5 from the 1997 Panel Study of Income Dynamics (PSID). A follow-up study by Fryer and Levitt (2004a), however, found that over the first four years of school, blacks lost substantial

ground relative to whites, and the gaps could not be explained away by the family and school covariates included in their first paper.

This paper contributes to this important line of research by replicating Fryer and Levitt's findings with another national data set with different test instruments, and extending their work by (1) adding two important groups of variables that are missing in their analysis – family culture and parents cognitive ability, and (2) extending child's age range by following three different age cohorts of children to better examine the pattern of black-white test score differences as children advance from preschool years to higher grades to investigate the extent to which the gap can be explained by various groups of individual, family, and school characteristics. We use data from two waves of the Child Development Supplement to the PSID, which collected data from a national sample of children under the age of 13 in 1997 and interviewed them again in 2003, when these children were between the ages of 8 to 17. These data allow us to follow children beyond Grade 3 to high school years for a subgroup of them. Consistent with Fryer and Levitt (2004b), we found that the black-white test score gap widens as children advance through schools, although we found that a set of family and school characteristics is able to explain differences before Grade 3 but not beyond that point. We also found some subgroup variations in the racial achievement gaps. In the next section, we review theoretical and empirical research in this field. Then we describe data and measures used in our analysis. Finally, we present results and end the paper with a discussion on theoretical and policy implications of our findings.

Theoretical Explanations for the Black-White Achievement Gap

Three major groups of theories have been developed to explain black-white achievement disparities. These theories can be broadly identified in the literature as: (1) biological determinism, (2) cultural determinism, and (3) structural determinism.

4

Biological determinism. Researchers such as Terman (1916), and Jensen (1969, 1973) claim that genes are ultimately responsible for the observed differences and that whites have superior cognitive ability compared to blacks. Critics of this biological explanation argue that most standard test instruments are racially biased and discriminate against blacks (Jencks, 1998; Scarr and Weinberg, 1976). Another objection raised by cognitive psychologists is that intelligence is a multidimensional factor that cannot be measured accurately by unidimensional ability tests (Gardner, 1983). Others cite the evidence of an overall increase in IQ scores over time to support the view that intelligence changes in response to learning opportunities (Fischer, et al., 1996).

Hernstein and Murray's work *The Bell Curve* (1994) rekindled the debate regarding biological determinism. Based on the NLSY data, they concluded that an innate dimension of human intelligence predicts the underachievement of blacks. Their conclusion provoked a strong outcry from the research community as well as the public, with most challenging their interpretation of the results. Fischer and colleagues (Fisher, Hout, Jankowski, Lucas, Swidler, and Vioss 1996), among others, argued that economic success was linked to structural and social factors in society, not to inherited intelligence. To this day, no direct evidence regarding genetic cognitive differences between blacks and whites is available. Indirect evidence from studies of twins, adopted children, or those with other research designs, seems to support the view that the type of environment in which children live has more impact on their test scores than their genes (see for example, Nisbett 1998).

Cultural determinism blames the low achievement of blacks on their own culture of poverty. Several theories fall under this category. *Cultural deprivation theory* asserts that the underachievement of black Americans is due to blacks' negative and self-defeating attitudes.

Proponents of this theory argue that black parents do not provide their children with the kinds of skills and educational aspirations that stress and encourage the value of success in school (Deutsch 1967). Thus, children in black families tend to reject the work ethic and grow up in a culture that is different from mainstream white culture (Loury 1985; Steele 1989). Another theory proposed by Ogbu (1978) asserts that black students live in a *"culture of oppression"* in which their educational and occupational opportunities are greatly constrained by mainstream society. The argument follows that while blacks may value education, their perception of limited educational and occupational opportunities leads them to disengage from the learning process and develop a culture that equates academic achievement with "acting white". Ogbu's perspective differs from cultural deprivation theory in that it relates structural constraints on behavior to individual motivation and effort. Limited empirical evidence has been found to support this perspective. In a study based on the National Education Longitudinal Study (NELS), Cook and Ludwig (1998) find that black high school students are not particularly alienated from school and on average spend about the same amount of time on homework as white students. Ainsworth-Darnell and Downey (1998) show that black students do not perceive fewer educational and occupational opportunities than whites.

Structural Contexts. Existing literature thus suggests that biological and cultural factors need to be examined in the structural contexts that tend to afford white children more resources than blacks. Most researchers seek to explain the black-white achievement gap in terms of the lower resources that black children have in the contexts of home, school, and neighborhood. There is a vast body of literature in different disciplines that investigates how family environment contributes to children's achievement. Economic theories stress the importance of parents' *income and time* as input to children's *human capital* development (Becker 1981; Juster and

Stafford 1985). Analyses by Becker and Lewis (1973) demonstrate that increases in parental incomes lead to relatively large increases in parental expenditures on children which affect what types of experiences parents provide for their children. High-quality day care, schooling, and a more stimulating home environment can all contribute to children's and adolescents' learning (Duncan and Brooks-Gunn 1997). Economic distress is also likely to limit the psychological resources parents can bring to bear on raising their children.

Sociological research has shown that parents with different levels of socioeconomic status instill different values in children, have different child-rearing practices, and vary in their aspirations for their children (Brazer and David 1962; Kohn 1969; Lareau 2003; Rubin 1976). A vast literature on intergenerational mobility shows that family background is a critical predictor of status attainment. Parents' education and occupational status influence children's socioeconomic status (Blau and Duncan 1967; Haveman and Wolfe 1994; Sewell and Hauser 1975) through parents' choices of resources and opportunities for children that reflect their own cultural values, disposition, and skills (Bourdieu 1977; Coleman 1990). High SES parents tend to spend more time and effort in shared activities, are more supportive of their children and are more attentive to children's whereabouts and activities, all of which are found to have a positive influence on children's achievement. As aforementioned, recent research suggests that family background likely explains at least part of the black-white test gap (Jencks and Phillips 1998; Roscigno 2000), and in some cases the entire gap (Fryer and Levitt 2004a; Fryer and Levitt 2004b; Yeung and Conley 2005).

Other researchers stress the importance of school and neighborhood factors in explaining the black-white test gap. For instance, Roscigno (2000) suggests that private school attendance, social class segregation, lower per-student expenditures for non-Whites, and higher crime rates

in the schools of African American students explain part of the racial gap in achievement for students in grades one through eight. In addition, Ferguson (1998) argues that teachers' perceptions, expectations, and behaviors likely explain part of the black-white gap, or at least help sustain it. Finally, Wilson (1998) argues that a broader conception of the environment, rather than individual-level analyses, is needed in order to explain the black-white test gap. Such analyses, according to Wilson, would capture the social structure on inequality, including the role of institutions in opportunity and mobility, the organization and operation of schools, the processes of racial segregation and social isolation in areas with high poverty levels, and government policies related to redistribution, public services, and investment, among other factors. Some studies provide evidence for the overall importance of neighborhoods in explaining black-white differences in school success (Rubinowitz and Rosenbaum 2000).

As aforementioned, few studies have explained the black-white test gap away, and those that have examined only the gap in early childhood (e.g. Fryer and Levitt, 2004a, b). This paper contributes to knowledge about this topic by extending the literature in the following ways: (1) use panel analysis instead of repeated cross-sectional analysis, a strategy that previous research has relied on that does not take advantage of the longitudinal strength of the data, (2) extend children's age beyond early childhood stage by following children from three different age cohorts to observe trends from preschool to high school years, (3) use higher quality family SES data with histories of family income, wealth, and family structure data, (4) adding two sets of proxies of parents' cognitive achievement and family cultural mediators that are missing in work by Fryer and Levitt.

Methods

8

For our analyses, we draw on data from the Panel Study of Income Dynamics (PSID) and its Child Development Supplement (CDS). The PSID is a longitudinal study that began in 1968 with a nationally representative sample of about 5,000 American families, with an oversample of black low-income families. For the past three decades, the study had collected annual data from these families and individuals about their demographic, economic, and employment behavior. In 1997, the PSID began collecting data on a random sample of the PSID families that have children under the age of 13 in a Child Development Supplement (CDS-I). Data from up to two children per family were collected. This sample represents American families with children from the age of 0 to 12 in 1997. The CDS collects information on child development and family dynamics, including parent-child relationship, home environment, indicators of children's health, cognitive achievement and social-emotional development, and time use, among other variables.

A follow-up study with these children and families were conducted in 2002 and 2003[1] (CDS-II). The attrition rate in the second wave of the CDS is about 91%. The entire sample size in 1997 is approximately 3,500 children in 2,400 households. Only children who were ages 3 and above received achievement assessments in 1997, and the response rate for the assessments was about 81%. These children were between the ages of 8-18 in year 2003. No new children were added to the study due to budget constraints. The total sample size in CDS-II is 2907 children (RR=85% at household level) in 2019 families (RR=91% at family level). Longitudinal sampling weights developed by the PSID staff will be used to help adjust for nonresponse and for the original selection probability. A more detailed discussion on sampling weights can be found in the technical report on the CDS website.

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[1] The majority of the children were interviewed in 2003 (61%) with a smaller proportion of children interviewed in 2002 (39%). For simplicity, we will refer to CDS II year as 2003 in subsequent text.

For the analysis in this paper, we include children who (1) received the cognitive assessments in both waves of the Child Development Supplements (n=2227), (2) are black and white only, due to the limited representation of other racial and ethnic groups in the CDS (n=1959), and (3) have a mother who are the primary caregiver of the target child (95% of the entire CDS sample) because most of the variables we need in the models are collected from the primary caregiver of a child. The final study sample in this paper is 1,794 children, 856 blacks and 938 whites.

Educational research shows that the patterns of test score differences vary and developmental theories suggests that the factors contributing to achievement gap in different childhood stages also vary. A longitudinal study that examines various age cohorts of children and follows them over time is ideal. We will conduct separate multivariate analyses for three different cohorts based on grade in school in 1997. We decide to examine three age cohorts of children separately and to follow them over time from CDSI to CDSII because developmental theories suggest that the pattern of test score differences and the factors that contribute to the achievement gap in different childhood stages vary. Our exploratory analysis also indicates that there is an interaction effect between race and birth cohorts on some of the test score measures. In the following analyses, the youngest cohort includes children who were not yet in school or were attending preschool or kindergarten in 1997. The middle cohort includes children who were attending grades one to three in 1997. Finally, the oldest cohort includes children who were attending grades four to eight in 1997.

We choose not to use individual fixed-effect models because we believe the race effect changes over time and we want to be able to observe how the racial gap changes at different developmental stages for each age cohort. It should also be noted that the PSID is not a school-

based sample so we can not conduct school fixed effects models. Moreover, since there are only two waves of CDS data, we cannot conduct growth curve analysis either.

We attempt to incorporate covariates from cultural and structural explanations for the black-white achievement gap in our models. There is no data for biological markers in the PSID. We use mother's verbal test score, controlling for many of her other characteristics, to proximate her cognitive achievement. It should be noted, however, that almost all covariates are endogenous to some extent, thus our ability to separate out the different views is limited. Our analysis, however, will help decompose the various components, which is useful to point us to more effective targeted intervention efforts.

Measures

Dependent variables

Children's cognitive skills are conceived broadly to include language skills, literacy and problem-solving skills and measured with the Woodcock Johnson Achievement Test-Revised (Woodcock and Johnson 1989). As the name of the test suggests, the W-J test is a measure of children's achievement, not IQ. Children under the age of 6 received only Letter-Word and Applied Problem subscales. Children aged 6 and above received Letter-Word, and Passage Comprehension subtests as well as Applied Problems and Calculation subtests in 1997. For children 6 or older, the Passage Comprehension and the Letter-Word subscales are combined to form a Broad Reading scores and Applied Problem and Calculation scores are combined to form a Broad Math score in 1997. However, in 2003, the Calculation subsets were not administered to the children. As a result, we use Applied Problem scores obtained in both waves as an indicator of the child's math skills. All assessments were conducted during school years. No data on children's skills during the summer months were available. These scores are standardized by

children's birth date. See User Guide for The Child Development Supplement (Hofferth, Davis-Kean, Davis, and Finkelstein 1998) for details about these measures. We have transformed the test scores so that they have a mean of 0 and a standard deviation of 1 on each of these tests to facilitate interpretation of the test gap coefficients.

Independent Measures and Control Variables

Parental SES measures include income, education, occupational prestige and wealth. These measures are described individually below in greater detail.

Family income. Our income measure is the total pre-tax income of all family members, inflated to 2001 price levels using the Consumer Price Index (CPI-UX1) and averaged over all of the years since the child's birth through 1996 (for CDS-I) and through 2002 (for CDS-II), one year prior to the time child well-being was assessed. These data are drawn from the annual reports of family income collected in the 1986-2002 waves of the PSID. We use income from multiple years because single-year measures of income are not particularly reliable given yearly fluctuations (Duncan, Brooks-Gunn, and Klebanov 1994). For our multivariate analysis, we use a logarithmic transformation of family income. Several other functional forms of family income, including dummy variables that capture 5 different income levels, separate income measures for early and middle childhood states, and the proportion of years a child lived in poverty, were also tested in our preliminary analysis. As basic patterns are similar, we show only the results with log family income.

Parental education is measured with years of parents' completed schooling, where 12 years is equivalent to a high school degree. In two-parent families, the higher of the two values is used in the model.

Parental occupational prestige is measured by a Hodge-Siegel-Rossi prestige score (see (Nakao and Treas 1990) and is recorded for the head of the child's household. This scale translates the 1970 three-digit U.S. Census occupational codes used by the PSID into a hierarchical scale with a minimum of seven and a maximum of 82 in our distribution. For those family heads who are not employed, a value of "0" is assigned to the prestige score. In the multivariate analysis, we include a dummy variable that indicates whether the household head is employed or not at the time of the interview. Central to most stratification theories is the notion that occupation is the most fundamental aspect of one's class identity (Blau & Duncan, 1967; Sewell, Haller, & Portes, 1969; Sewell & Hauser, 1975). It serves as a better proxy of permanent income than past income and education, and may capture some of the unobserved heterogeneity in parents' characteristics such as personality traits.

Wealth. Family wealth data were drawn from measures collected in 1994, 1999, and 2001. The PSID collected information about the value of owner occupied real estate, real estate other than main home, vehicles or other assets on "wheels," farm or business assets, shares of stock in publicly held corporations, mutual funds or investment trusts, including stocks in IRAs, checking and savings accounts, money market funds, certificates of deposit, savings bonds, treasury bills, and other investments in trusts or estates, bond funds, life insurance policies, and special collections. Family wealth is measured as the sum of all above items minus the value of debts, such as mortgage, credit cards, student loans, medical or legal bills, and personal loans. For models using outcomes from the first wave (CDS-I) in 1997, we use wealth data from 1994. For

models using outcomes from the second wave (CDS-II) in 2003, we average wealth data from 1999 and 2001. As the family wealth distribution is rather skewed, we use wealth quartiles to allow for nonlinear effects. We have also used a log form of the family wealth with a dummy variable indicating whether the family has no assets. The results show a generally insignificant effect for the log wealth variables, but some positive effect of the high wealth level, so we present the estimates with quartiles.

Demographic controls. An extensive battery of control variables is used in the present study including child's characteristics, parental characteristics, and family characteristics that may be associated with children's achievement and behavior. Characteristics of the child include age, gender, race, birth order and whether the child had a low birth weight. Other family characteristics include family structure, number of children in the family, whether a teen mother, whether mother received AFDC at the time the child was born, region of residence, and whether the family resided in a metropolitan area. We also include a proxy for mother's cognitive achievement, a measure that Fryer and Levitt (2004) did not have in their models. *Age of child* ranges from 3 to 12 years in 1997, and 8 to 18 in 2003. *Child's gender* is coded as 0=boy and 1=girl. *Child's race* was coded as 0=White and 1=Black. *Low birth weight status* was coded as 1=low birth weight (less than or equal to 5.5 lbs. at birth) or 0=birth weight greater than 5.5 lbs. [2] Birth order is measured using the child's location among all the children born to the mother. First-borns are coded as one, those born second are coded as 2, and those born third are coded as 3, etc.

For other family characteristics, number of children is a measure of the number of children under the age of 18 living in the household. Family structure is captured using dummy variables

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[2] A second measure of birth weight was created to indicate whether the child weighted less than 4.5 pounds at birth. As results are similar, we present only one set of the numbers.

for single mother and "other" family type, with "both biological parents present" the excluded category. Whether mother received AFDC at child's birth is a simple dummy variable coded as 1=yes and 0=no. Mother's age at child's birth is constructed by subtracting the mother's birth year from the child's birth year. A dummy variable indicating whether the mother was a teenager when the child was born is included in the analyses. A Beale scale is used to measure the degree of urbanicity. The code ranges from 1 to 10 with 1 indicating central counties of metropolitan areas of 1 million population or more and 10 indicating completely rural, not adjacent to a metropolitan area. For region, dummy variables are used for the Midwest, South, and West, with the Northeast being the excluded category.

We add two sets of covariates that were not included in Fryer and Levitt's models – proxies for the cognitive skill of child's mother and family culture. *Mother's cognitive skill* is assessed with a Passage Comprehension test of the Woodcock Johnson Achievement Test-Revised at the time of the CDS-I interview. Raw scores on the test range from 6 to 43. This variable has been used as a proxy for the genetic endowment of a child in other studies, though we recognize that mother's cognitive skill is affected by her family's resources as well as her genes. A number of school and family mediators are also used in our models in an attempt to capture the "cultural" explanations of the test score gap – i.e., black parents do not have high educational expectations or engage/invest in activities that promote high aspirations or a strong work ethic in their children. As these covariates are arguably endogenous to child's test scores, we use the 1997 measures (when the child was age 3-12). Doing this in models for the 2003 test scores allows for a lag effect of these mediators. Unfortunately, these data were not collected in the PSID before 1997. One should be cautious in interpreting results from models for the 1997 test scores that include these mediators. The first of these variables indicates whether or not the

child attended a private school in 1997. The second indicator assesses parental expectations with a question measured on an 8-point scale - "How much schooling do you expect this child will complete?", with 1 indicating "11th grade or less", and 8 indicating "MD, Law, Ph.D. or other degree". The third and fourth variables measure the extent to which parents provide cognitive stimulation and emotional support at home. *Cognitive stimulation* (or cultural capital) is measured with items from the HOME scale, reported by the primary caregiver. The HOME scale includes age-appropriate items such as how many books the child has (0=none; 4=20 or more), whether the child has the use of a CD or tape player and at least 5 CDs or tapes (0=no; 1=yes), and how many things of numbers, alphabet, colors and shapes/sizes, the primary caregiver used to help the child learn at home (0=none; 4=all). Another item in the cognitively stimulating materials scale is how many newspapers and magazines the family receives regularly (0=none; 2=3 or more newspapers/magazines). This item is a rough indicator of family engagement in everyday literacy activities, expected to be an important vehicle for parents to transmit cultural capital to their children. For older children, the HOME scale also includes participation in extracurricular activities, frequency of attendance at museums and musical or theatrical performances. To create the cognitive stimulation subscale in the present study, we standardize each item using z-scores and then take the mean of the items. This index is a proxy for the level of cultural capital to which a child has access.

Level of emotional support the child receives is assessed with a subset of the HOME scale. It is a combination of mother's report and interviewer's observation of the interaction between the primary caregiver and the child. On a scale of one to five, the interviewers assess items such as the extent to which the mother showed warmth in tone when talking with child, whether the

mother introduced the child by name, how the mother responded verbally to child's speech, questions or request, how often mother's voice conveyed positive feelings about child, and so on.

Two more variables were included to reflect the level of time and effort that parents and the child devote to academic work, one indicating whether a child watches more than 20 hours of TV per week, the other assessing how often the mother worked on homework with the child in the past month, measured on a 5-point scale, with 1 indicating "never" and 5 indicating "every day".

Results

Table 1 reports the weighted descriptive statistics by race for all variables used in our analyses, including both waves of the CDS. As evident in the table, black children's average scores are lower than white children's average scores on all achievement tests. The average achievement gaps span approximately twelve points for both tests in 1997 and approximately 15 points for both tests in 2003.

Consistent with national statistics, Table 1 reveals significant differences between black and white children in many of the child and family characteristics. On average, white children have families with a significantly higher socioeconomic background relative to black children. In both waves of the CDS, black children have lower average family income and wealth compared to white children. Moreover, average parental education for black children is almost two years lower than mean parental education for their white counterparts. White children also enjoy higher family head occupational prestige levels on average than black children, with the difference close to one standard deviation in both waves. Regarding assets, 40% of white children, compared to 10% of blacks, live in a family that is in the highest quartile of net wealth

level in 1997. In 2003, 12% of white children, compared to 45% of blacks, live in a family that is in the lowest quartile.

Five percent of white children have a low birth weight, compared to 11 percent of black children. Blacks also have a higher mean birth order position and live in households with more children than whites. Black children are significantly more likely to live in single-mother households (60% vs. 14% in 1997) and less likely to live in households with both biological parents present relative to white children (33% vs. 82% in 1997) in the sample. In addition, black children are more likely than whites to have a mother who was a teenager (14% vs. 4%) or who was receiving welfare at the time of the child's birth (31% vs. 5%). Geographically, the black children in our sample tend to reside in more urban environments and are more concentrated in the South than whites. Finally, mothers of white children, on average, score about one and a quarter standard deviations higher than those of black children on the verbal assessment.

Black-white differences in school and family "cultural" mediators are also significant in our sample. White children are more likely than black children to attend private school. Parents of white children have a higher expectation of completed schooling for their children. White children enjoy higher levels of cognitive stimulation and emotional support on average, relative to black children. A third of the black children, as compared to 16% of white children, watch more than 20 hours of TV per week. Parents of white children also work with the children on homework more frequently.

Multivariate Analysis

Our analyses were conducted separately for three different cohorts based on grade in school in 1997, as developmental theories suggest that different factors are important for children's

various developmental stages. Our preliminary analysis also indicates that there are interaction effects between race and birth cohorts on some of the test score measures. The youngest cohort includes children who were not yet in school or were attending preschool or kindergarten in 1997. The middle cohort includes children attending grades one to three in 1997. Finally, the oldest cohort includes children attending grades four to eight in 1997. We examine the test scores for these children when they were first assessed in 1997, then six years later when they were assessed again in 2003.

Table 2 shows the test score gaps (all statistically significant) between black and white children in 1997 and 2003, expressed in standard deviations and in raw scores, for the three cohorts. For the youngest cohort, the black children scored .78 and .43 of a standard deviation lower (translating to 13.6 and 7.8 points) than white children in Applied Problem and Letter-Word scores respectively. Compared to the ECLS-K data, which show a .6 and .4 standard deviation in math and reading respectively for children entering the kindergarten in 1998 (Fryer and Levitt, 2004), these gaps are slightly larger. Both the PSID and ECLS-K data, however, show smaller gaps than the NLSY data, which have been shown to have a gap of more than one standard deviation in vocabulary scores between black and white children aged 5-6 (Phillips et al., 1998). For the PSID preschoolers, these gaps grew 6 years later, to a gap of almost one and 0.7 of a standard deviation respectively (or about 16.7 and 13.3 points) by the time these children were in Grades 4 to 6.

For the middle cohort that consists of children who were in grades 1-3 in 1997, the gaps are about .7 and .8 of a standard deviation in 1997. These gaps also grew to one and .9 of a standard deviation by the time these children were in grades 7-9 in 2003. For the oldest cohort that consists of children who were in grade 4 to 8 in 1997, the gaps in 1997 are about .8 of a standard

deviation in both tests (about 13 points). The gaps for both tests remain at a similar level six years later. As seen in the table, the rate of growth in the gap is not as large as what Fryer and Levitt claim to average .10 of a standard deviation per school year.

To better understand the extent to which various groups of variables contribute to these test score gaps, we estimate six models for each test score. The first model (I) includes only race/ethnicity as a covariate. The second model (II) has only mother's verbal test score as a covariate, in addition to race. We then estimate a series of nested OLS regression models, adding to model I the following groups of independent variables subsequently - (1) four parental SES measures – income, education, occupation, and family wealth in Model III, (2) child and other family characteristics in Model IV, (3) mother's verbal test score in Model V, and (4) the family "cultural" proxies in Model VI. Our models use Huber-White adjusted standard errors that allow for multiple respondents from the same family. Results are summarized in Figures 1-3, with detailed estimates in each model presented in Tables 3-14.

Preschool Cohort (see Figure 1 and Tables 3-6)

Applied problem score in 1997 – When the four basic family SES variables are added to the model (III), the gap is reduced from .78 to .42 of a standard deviation, though still statistically significant. These four SES variables double the explanatory power of the model (from 10 to 20%). Both family income and parents' occupational prestige are significant predictors. When the child and other family characteristic are added to the model (IV), the difference remains at a similar level (with these additional variables explaining about 4% more of the total variance in the Applied Problem scores). The fact that the mother was a teenager when the child was born is negatively related to a child's AP score. When mother's test score is added to the model (V), the gap reduces to .3 of a standard deviation, indicating that it is important to into account the

20

endowment of a child in the test score gap research. However, the gap remains significant in this model, and the R^2 increases only by 1%. Family income and occupation remain significant predictors even though the endowment proxy is also significant. Finally, when the school and "cultural" proxies are added to the model (VI), the black-white difference becomes non-significant at less than .2 of a standard deviation. Parents' occupation and whether mother was a teenager when the child was born are significant predictors. Family income and mother's test score both become non-significant covariates in this final model, indicating their influence on the test scores is mediated through these family cultural proxies.

1997 Letter-Word score – In contrast to AP scores, the four basic SES measures alone reduce the difference from .43 to .08 of a standard deviation, a non-significant level (Model III). Parent's occupational prestige is the only significant predictor in this model. The R^2 increases from 4% to 14%. Parents' occupation becomes non-significant, however, when child and other family characteristics are added to the model (IV). In the rest of the models, the race difference remains non-significant. In Model V, mother's test score is a significant predictor, though the magnitude of the coefficient is small (.04 of a standard deviation). Two of the child's own characteristics – birth weight and birth order are the only covariates that remain significant predictors. Model VI explains approximately 28% of the variance in LW scores.

2003 Applied Problem score – As noted before, when the AP scores are assessed again six years later when this cohort of children is in grades 4-6, the gap between black and white children has increased to one standard deviation. This gap remains significant after all the variables are controlled for, though the black-white difference drops from .98 to .51 of a standard deviation after the 4 basic SES are controlled for (income and occupational prestige are significant factors). The gap then dropped to .45 of a standard deviation when child, other family

21

characteristics and the proxy are controlled for (Model V), and to .35 of a standard deviation after all the covariates are added (Model VI). Family income, whether the child has low birth weight, mother's test score, and the frequency of parents working on home work with the child have significant effects in an expected direction. Although the final model explains up to 38% of the total variance in the AP scores in 2003, the black-white difference remains statistically significant.

2003 Letter-Word score – Adding the four basic SES variables reduces the black-white difference in LW scores in grades 4-6 by about half and more than doubled the R^2. Parent's education and occupation are significant predictors in this model (III). The gap becomes non-significant when mother's test score is added to the model along with child's and other family characteristics (Model V). Parents' education also becomes nonsignificant. In the final model (VI), a child's birth weight and birth order, mother's test score, and how frequently the mother checks homework are significant predictors. Parents' SES becomes non-significant in the final two models, suggesting that child's endowment and some of the cultural explanations are important factors that contribute to the black-white differences. Adding mother's test score increases the R^2 by 8% and adding the cultural proxies explains an additional 6% of the total variance in LW scores in grades 4-6 for this youngest cohort.

***Middle Cohort - Grade 1-3 in 1997* (see Figure 2 and Tables 7-10)**

Applied Problem score in 1997 – The gap is reduced by half, though remains significant, when the four basic SES variables are added to the model (III). The difference became non-significant when child and other family characteristics were added to the model (IV). Parent's education, occupation, and wealth (highest quartile) are positively associated with the AP score in grades 1-3. Girls have lower AP scores by grades 1-3. After mother's test score is added, the

gap is reduced to .13 (from .67) of a standard deviation. Parent's SES, child's gender, number of children at home and whether mother was a teenager remain significant predictors of the AP scores. Mother's verbal score is also a significant predictor, though the magnitude of its effect is small (.04 of a standard deviation per point). In the final model (VI), several of the "cultural" proxies including whether a child attended a private school and parental expectations have some significant impact in the expected directions (and the R^2 increases by 5% to 37% when these proxies are added to the model). In addition to these variables, parent's education and occupational prestige, child's gender, number of child in the family remain significant predictors. In the final step, the gap was reduced to .26 of a standard deviation. Also noteworthy in this final model is that mother's test score does not have a significant net effect on AP scores in 1997, suggesting that the genetic factors can be overestimated if these variables are not taken into account.

Letter-Word score in 1997 – As for the middle cohort, the gap is eliminated once the 4 basic parental SES indicators are added (the R^2 more than doubled - from 10% to 22%) and remains non-significant in the rest of the models. Parent's education is significant in Models III and IV but became non-significant when mother's test score is added. Girls score .27 of a standard deviation higher than boys in LW scores. In the final model when the "cultural" proxies are added, the gender differences became non-significant but child's birth weight and birth order, and mother's test scores are significant predictors. Parental expectation is shown to be positively associated with the score. Adding the various groups of covariate increases the R^2 from the 10% in the base model (I) to 44% in the final model (VI), with the biggest increase occurring when family SES and other family and child characteristics are added to the model.

Applied Problem score in 2003 – Six years later, these children in the middle cohort are in grades 7-9 in 2003 with wider gaps in test scores. For the AP scores, the gap is reduced as groups of indicators are added to the models from one standard deviation in model I to .3 of a standard deviation in the final model (VI). However, unlike other test scores discussed earlier, the gap remains significant in all models. After controlling for mother's verbal score, parent's education and occupation remain significant predictors. In the final model, after the "cultural proxies" are added, the R^2 increases substantially to 49% (an 11% increase from the previous model) and mother's verbal score becomes non-significant. How often parents work with child on homework in 1997 are positively associated with the AP scores six years later. Also noteworthy is that girls have lower AP score than boys in middle school, a pattern not seen in earlier years.

Letter-Word scores in 2003 – Like the AP scores in 2003, LW scores for this middle cohort begin with a large difference of almost one standard deviation in middle school. This gap is reduced when different groups of variables are added to the model – by about a quarter when the four basic SES are added (Model III) and by about half when child and other family characteristics are added (IV). However, the difference cannot be explained away even with all the covariates in the final model (VI). A substantial and statistically significant gap remains – black children are .72 of a standard deviation lower than the whites at this stage. The only two significant covariates, other than race, are child's birth order and how often parents work with the child on homework in earlier years. Even though the R^2 in the final model is quite high - .42, neither parents' SES nor mother's test score is significantly associated with the LW score in 2003, when these children were in middle school.

***Oldest Cohort - grade 4 and up in 1997 (*see Figure 3 and Tables 11-14)**

A distinct pattern for this oldest cohort is that none of the covariates are able to explain away the gaps in test scores in both 1997 and 2003, except in Letter-Word scores in the final model where the "cultural" proxies are added[3], even though all the covariates together explain about a third of the total variance in these test scores. For the AP scores in 1997, parent's education and a high wealth level are significant factors except in the final models. The only other covariates that are significant predictors in the final models are the gender of the child and parental expectation. Girls score about .3 of a standard deviation lower than boys in AP scores in grades 4-7, a pattern also seen for the middle cohort.

Letter-Word score in 1997 - For the LW scores in 1997, the gap is eliminated when the family "cultural" mediators are added to the model (VI). Family income, wealth, gender, low birthweight, number of children in the family, mother's test score, and private school attendance are significant predictors, although the family income and low birthweight coefficients are in an unexpected direction. Parental expectations of child's educational attainment and cognitive stimulation are positively associated with the score. Emotional support, however, is significant in an unexpected direction. Girls score significantly higher (.23 of a standard deviation) in LW tests than boys in grades 4-7.

Applied Problem score in 2003 - Six years later when this oldest cohort is in high school, the black-white differences cannot be explained away by these covariates (Table 13). For the AP scores in 2003, parental education and occupational prestige and wealth became non-significant predictors of the test scores when mother's verbal score is added. It is noteworthy that mother's test score does not have a significant net effect either in these higher school years. Again, a significant gender difference is observed – girls scored a .21 of a standard deviation lower in AP

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[3] As noted, however, since the cultural proxies may be endogenous in the 1997 models, one should be cautious in interpreting the results from this final model.

in 2003. Child's birth weight and birth order, whether mother was a teenager when the child was born and parental expectation of child's educational attainment in early years remain significant predictors, although child's birth weight is again significant in an unexpected direction.

For the LW score in 2003, as in AP scores, the gap remains significant after all covariates are controlled for, though the difference is reduced from .74 to .65 of a standard deviation. Mother's test score is not significant while parental expectation, and the cognitive stimulation that parents provide for a child are significant predictors.

In another set of analysis, we include the lagged test scores measured at time 1 in equations for time 2 scores measured 6 years later to examine how test scores change from time1 to time 2. The correlation between the scores at the two time points ranges from .45 for the youngest cohort to .65 and .75. for the middle and the oldest cohorts respectively. The coefficients for the lagged test scores range from .33 for the youngest cohort to about .65 for the two other older cohorts. The coefficients of the race dummy are not significant for the youngest cohort, indicating the rate of change at this early life stage is not significantly different between blacks and whites. For the middle and older cohorts, 3 out of 4 coefficients for the race variable (2 tests for each cohort) are statistically significant, suggesting that blacks have a slower rate of increase than white. These results provide some insight on children's progression of academic performance and suggest that it is much harder to catch up in higher grades if students fall behind in the beginning. While it is still possible to catch up in the first few years of schools if family SES and cultural environment can somehow be equalized between blacks and whites, it is much harder to do that in middle or high schools.

Sensitivity Analyses

Using the full models, we examined separate sub-samples of the data in order to better understand the role of a wide range of factors that are associated with the achievement score gaps between black and white students. These sensitivity analyses produced some interesting results (see table 15). As in Fryer & Levitt (2004), we find that black females fare better against white females than black males fare against white males. Males have larger black-white test gaps than females on all measures of achievement. In three out of the four tests, the gaps are larger than one-half of a standard deviation for boys. There is a larger racial gap among students who are from higher SES families (with parents who have some college education and in upper half of the family income distribution) than among those from lower SES families. This pattern suggests that there is a lower rate of return of intergenerational transmission of SES for blacks particularly for those in the upper level. The lower returns to parental SES may result from difficulties black parents face in translating these gains into other benefits (such as quality neighborhood and schools, social esteem or self confidence) as a result of discrimination and segregation, or that these mostly newly minted middle-class black parents have not yet practiced middle-class parenting behavior to be actively involved in children's education and to instill high aspiration in children. It is also possible that discrimination occurs at the child level. Teachers may hold a lower expectation for black than for white students (whose parents are at a similar SES level) and this differential expectation may partially account for the black-white test score gap, a hypothesis advanced by scholars such as Ronald Ferguson (1998).

In addition, the black-white gap is larger for students residing in metro areas than in non-metro areas. We also find some regional differences in the racial gaps in achievement in that the gaps are wider in the South and particularly in the West than in other regions of the U.S. For children in the West, the gaps for 2003 AP and LW scores are .8 and about one standard

deviation respectively. Possible explanations for this regional difference await future research. In brief, the sensitivity analyses suggest that black-white achievement gaps are not always consistent across demographic subgroups and geographical areas.

Discussion

Based on two waves of the PSID-CDS data for three age cohorts, we find large black-white test score differences among children of all ages. Even before children start formal schooling, black children score .8 and .5 of a standard deviation lower than whites in Applied Problem and Letter-Word tests respectively. Except for the oldest cohort, the gaps for all tests widened when children's cognitive skills were assessed again six years later. We examine the extent to which child's characteristics, home environment (both structural and cultural factors), and mother's test scores account for these gaps.

We find that all black-white test score differences before grade three can be accounted for by these covariates. This finding is highly significant as it implies that it is possible to eliminate early childhood racial achievement gaps which often trigger larger and long lasting disparities. From grade 4 and up, however, these covariates became weaker predictors. In grades 4-6, the verbal (but not math) score gap becomes nonsignificant when mother's verbal score and the family "cultural" mediators are taken into consideration. This is somewhat different from the pattern reported by Fryer and Levitt based on the ECLS-K data that by the end of third grade the test-score gap cannot be explained by observable characteristics perhaps because these two sets of variables were not considered in Fryer and Levitt's analyses (2004). However, the general pattern of a diminishing impact of these covariates as children move to higher grades is consistent. In preschool years, the gaps are reduced to less than .2 of a standard deviation when all covariates are controlled for. In the first three years of school, the gaps are reduced to about .3

of a standard deviation, whereas at the high school level, the gap remains a statistically significant .5 and .7 of a standard deviation for AP and LW scores respectively after all the covariates are controlled for.

The set of family characteristics that are significant predictors of the black-white test score gap varies across cohorts and across different tests. In general, however, family SES characteristics are important contributors to the black-white gap between the test scores, reducing the gap by a third to a half, depending on which test it is. For pre-schoolers in 1997, the gap in Letter-Word score is almost entirely eliminated when the four basis SES characteristics are added to the model. Family income has a significant positive impact on AP scores in preschool years and six years later for the youngest cohort (but not on verbal scores). [4] Income, however, is generally not significant for older cohorts. This pattern suggests that programs that focusing on increasing family income before children start formal schooling, such as the EITC benefit, may be an effective strategy for improving black children's school performance. Parental occupation and education have some significant, though small, direct association on several test scores. These findings suggest that improving family SES is a critical step in reducing the racial achievement gap. In many models, these SES associations are mediated through the family "culture" variables. The fact that some of these family environment factors have direct impact on children's test score suggest that measures that directly influence cognitive stimulation at home, parental involvement and monitoring, and encourage higher educational aspiration may also be effective in raising the academic performance of black children.

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[4] The correlations between parental occupation and education, and family income are both about .5. A sensitivity analysis was done by removing the occupation variable in the model to observe changes in coefficients for parental education and family income. In most cases, the coefficients increase slightly but do not become significant (or non-significant) in the new models, except in the LW-1997 model for the youngest cohort where family income becomes significant.

Results presented here provide further refinement to Coleman's claim (based on cross-sectional data) that family environment plays a crucial role in children's academic success in that we show that family factors are particularly critical to early childhood school success but have a diminishing impact in higher grades. Our analysis also shows that early cognitive achievement has a cumulative impact on later success. Taken as a whole, our findings argue that investing in early childhood learning is more effective than in middle or high school reforms in improving the black children's test scores. Programs such as early home intervention, Early Head Start, Pre-kindergarten, quality early childcare will likely to have large long term payoff (Karoly et al., 1998; Heckman, 2000).

Being a teenage mother is negatively associated with children's AP score before formal schooling through high school years. Several child characteristics, such as birth weight, birth order and gender are significant factors to consider. Reducing teenage childbearing and the risk of having low-birth-weight babies with quality prenatal care may be important policy measures in reducing the black-white test score gap. Gender differences in AP tests (lower score for girls) start to emerge in the first three years of school (not in existence in preschool ages) and remain prominent in middle and high school years. Gender difference in LW scores (higher score for girls) is observed to be significant only in grades 4-7 when other covariates are controlled for. These patterns suggest that gender difference in math/science achievement is more likely a product of the social learning environment rather than genetic endowment.

Mother's test score, a proxy of her cognitive skill, when SES and other covariates are held constant, has a significant though weak association with child's test scores in early school years. This association weakens in later years and became insignificant in high school years. The black-white test score gap is substantially smaller when other covariates are entered in the model

than when only mother's test score is controlled for, indicating that many of the structural factors in the family and individual characteristics clearly contribute to a large portion of the gap in the test scores. The magnitude of the family SES influence, particularly parents' education, reduces somewhat though not drastically when mother's test score is added to the models.

Our results point to a puzzle and to the limitations in this body of research - what happens as children advance through higher grades that diminishes the impact of parental, social and economic factors on eliminating the racial gap? Do neighborhoods, schools, and peers become more important explanation of the achievement gap as children advance to higher grades? How do these factors interact with family covariates to affect racial differences in achievement? These are clearly vital and complicated factors that we have not considered in this paper. Our ability to answer these questions in future research is critical in informing public policies for interventions that help improve the academic performance level of black students. If achievement in higher grades is determined by a set of factors in out-of-home contexts, very different intervention strategies are called for to address the achievement gaps at various developmental stages.

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Table 1: Weighted Descriptive Statistics for Black and White Children

			Blacks			Whites	
Achievement Tests	Year	N	Mean	S.D.	N	Mean	S.D.
Letter-Word	97	722	96.48	16.03	813	108.21	17.50
	03	815	94.45	17.26	876	109.65	18.83
Applied Problems	97	719	98.92	14.97	811	111.80	16.84
	03	809	94.75	13.33	874	109.83	15.41
Parental SES							
Permanent income	97	836	10.04	0.81	925	10.92	0.63
	03	856	10.13	0.74	938	11.00	0.61
Education	97	823	12.52	2.20	922	14.26	2.18
	03	813	12.72	2.17	914	14.32	2.11
Occupational prestige	97	829	26.66	17.12	910	42.70	17.04
	03	846	29.19	16.03	921	43.13	16.33
Net wealth	97						
Highest quartile		835	0.10	0.30	920	0.40	0.49
Second quartile		835	0.19	0.39	920	0.25	0.44
Third quartile		835	0.31	0.46	920	0.23	0.42
Lowest quartile (reference group)		835	0.40	0.49	920	0.12	0.32
Net wealth	03						
Highest quartile		856	0.07	0.26	938	0.40	0.49
Second quartile		856	0.18	0.38	938	0.29	0.45
Third quartile		856	0.31	0.46	938	0.19	0.39
Lowest quartile (reference group)		856	0.45	0.50	938	0.12	0.32
Child Characteristics							
Gender (1=female)	-	856	0.42	0.49	938	0.49	0.50
Whether low birthweight	-	845	0.11	0.32	935	0.05	0.22
Birth order	-	833	2.40	1.43	927	1.87	0.92
Other Family and Parental Characteristics							
Number of Children	97	856	2.70	1.41	938	2.33	0.89
	03	856	2.49	1.39	938	2.24	0.91
Family Structure							
Both biological parents (reference group)	97	856	0.33	0.47	938	0.82	0.39
	03	856	0.32	0.47	938	0.73	0.45
Mother only	97	856	0.60	0.49	938	0.14	0.35
	03	856	0.53	0.50	938	0.16	0.36
Other type*	97	856	0.06	0.24	938	0.05	0.21
	03	856	0.16	0.36	938	0.12	0.32
Mom received AFDC at child's birth	-	833	0.31	0.46	912	0.05	0.21
Teen mom	-	836	0.14	0.35	927	0.04	0.20
Urbanicity (10=most rural; 1=most urban)	97	843	3.47	2.55	936	4.12	2.58
	03	856	3.25	2.46	935	3.97	2.47
Region							
Midwest	97	856	0.19	0.40	938	0.27	0.44
	03	856	0.18	0.39	935	0.28	0.45

South	97	856	0.58	0.49	938	0.32	0.47
	03	856	0.59	0.49	935	0.30	0.46
West	97	856	0.07	0.25	938	0.20	0.40
	03	856	0.07	0.26	935	0.20	0.40
Mother's test score	97	687	27.76	5.00	800	33.77	3.95
School and other Family Mediators							
Whether attend private school (0/1)	97	856	0.05	0.22	938	0.10	0.30
Parental educational expectations (1-8)	97	845	4.37	2.06	930	5.51	1.58
Cognitive stimulation (0-14)	97	856	9.43	2.07	938	11.01	1.76
Emotional support at home (0-14)	97	856	9.18	2.08	938	10.68	1.82
Whether weekly TV time GT 20 (0/1)	97	667	0.32	0.47	839	0.16	0.36
Parent work with child on homework (1-5)	03	812	2.16	1.47	885	3.05	1.53

* Indicates that black-white means are not significantly different at p=.05

Table 2: Differences in Test Scores between Black and White Children in 1997 and 2003, Expressed in Standard Deviations and Raw Scores (in parentheses)

	Applied Problem Score		Letter-Word Score	
	1997	**2003**	**1997**	**2003**
Youngest Cohort (preschool in 1997)	-0.78 (13.55)	-0.98 (16.7)	-0.43 (7.76)	-0.67 (13.32)
Middle Cohort (Grade 1-3 in 1997)	-0.67 (11.92)	-1.00 (16.41)	-0.84 (14.69)	-0.94 (18.2)
Oldest Cohort (Grade 4-7 in 1997)	-0.77 (13.75)	-0.78 (12.75)	-0.77 (13.44)	-0.74 (14.42)

Figure 1: Black-White Test Score Gap in Standard Deviation
Preschool in 1997,   Grade 4-6 in 2003

Legend:
- Unadjusted Model I
- Adj. mom's score only II
- Adj. for SES only III
- Add Child and other family IV
- Add mom's test score V
- Add resources & family process mediators VI
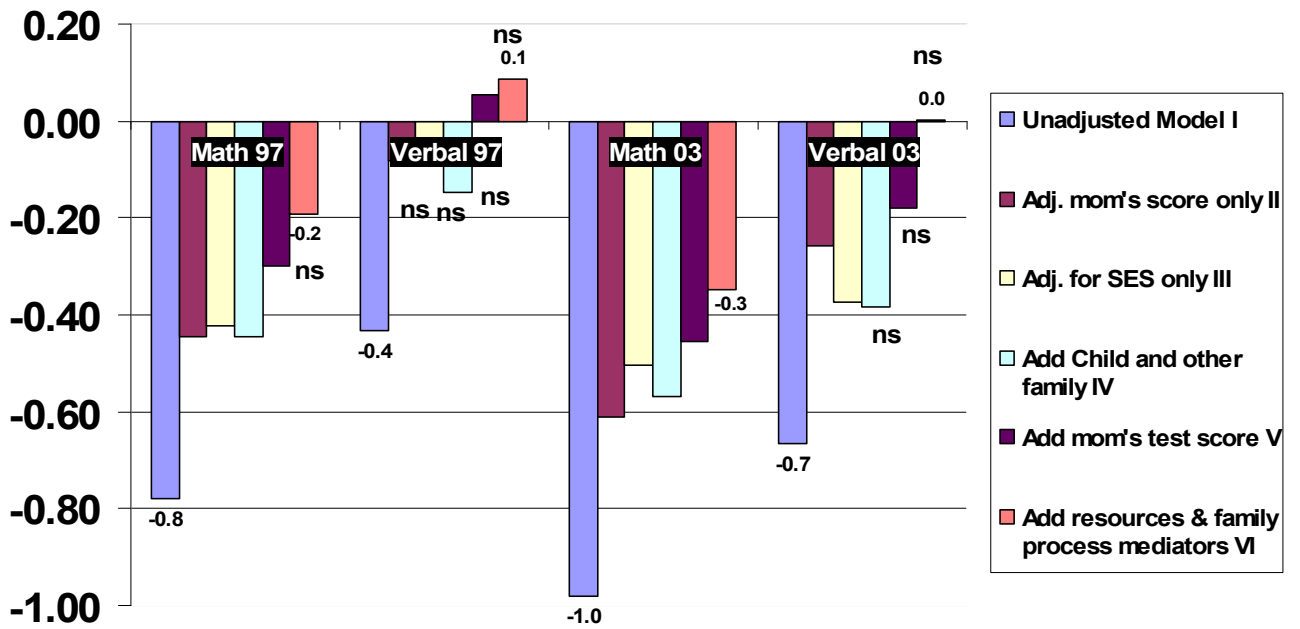
Figure 2: Black-White Test Score Gap in Standard Deviations, Children in Grades 1-3 in 1997, Grade 7-9 in 2003

Legend:
- Unadjusted
- Adj. mom's score only
- Adj. for SES only
- Add Child and other family
- Add mom's test score
- Add resources & family process mediators
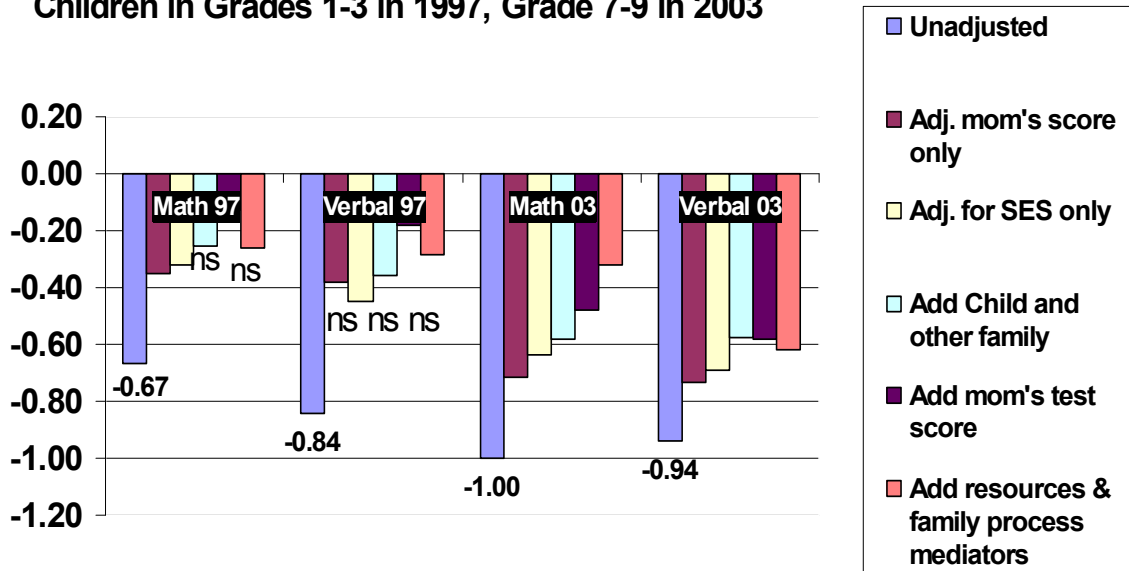
Figure 3: Black-White Test Score Gap in Standard Deviations, Children in Grades 4-7 in 1997, Grades 10-12 in 2003

Legend:
- Unadjusted
- Adj. mom's score only
- Adj. for SES only
- Add Child and other family
- Add mom's test score
- Add resources & family process mediators
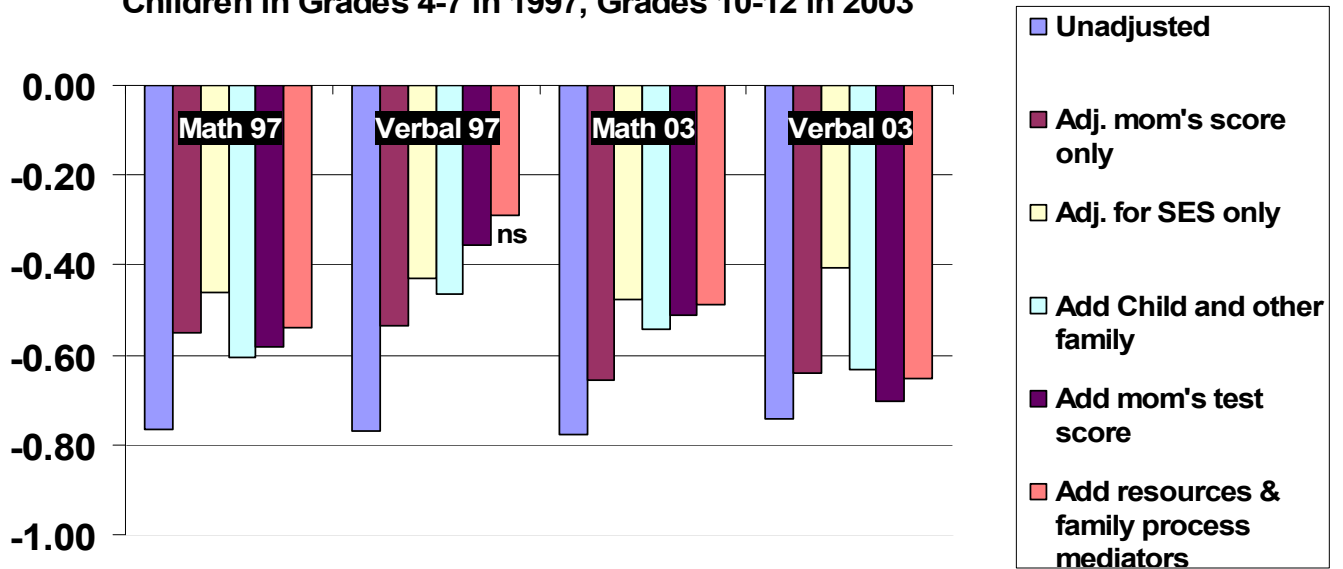
Appendix Tables
Table 3: 1997 Applied Problem Score for Preschoolers in 1997

	Model I		II		III		IV		V		VI	
1. RACE	-0.78	***	-0.45	***	-0.42	***	-0.45	**	-0.30	*	-0.19	
	(0.11)		(0.13)		(0.12)		(0.14)		(0.15)		(0.17)	
2. Parental SES												
Permanent Income					0.16	*	0.23	*	0.20	*	0.18	
					(0.08)		(0.10)		(0.10)		(0.12)	
Education					0.03		0.03		0.01		-0.01	
					(0.03)		(0.03)		(0.04)		(0.05)	
Occupational Prestige					0.01	**	0.01	*	0.01	*	0.01	*
					(0.00)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					-0.06		-0.06		-0.09		-0.07	
					(0.16)		(0.15)		(0.15)		(0.17)	
Second Quartile					0.08		0.11		0.13		0.14	
					(0.16)		(0.15)		(0.15)		(0.17)	
Third Quartile					-0.09		-0.10		-0.08		-0.01	
					(0.13)		(0.13)		(0.13)		(0.15)	
3. Child Characteristics												
Gender (1=female)							-0.06		0.00		-0.01	
							(0.09)		(0.10)		(0.10)	
Whether low birthweight							-0.32		-0.32		-0.40	
							(0.19)		(0.20)		(0.21)	
Birth Order							-0.02		-0.02		-0.04	
							(0.06)		(0.06)		(0.07)	
4. Other Family and Parental Characteristics												
Number of Children							-0.05		-0.07		-0.02	
							(0.06)		(0.07)		(0.07)	
Family Structure - mother only							0.11		0.10		0.09	
							(0.15)		(0.15)		(0.17)	
- other type							0.27		0.27		0.28	
							(0.20)		(0.19)		(0.21)	
Mom received AFDC while pregnant							0.15		0.16		0.16	
							(0.16)		(0.17)		(0.19)	
Teen mom at birth							-0.49	**	-0.49	**	-0.46	**
							(0.16)		(0.16)		(0.17)	
Urbanicity							-0.01		0.00		0.00	
							(0.02)		(0.02)		(0.03)	
Region –Midwest							0.00		-0.04		0.03	
							(0.16)		(0.17)		(0.18)	
South							0.17		0.14		0.24	
							(0.17)		(0.19)		(0.19)	
West							0.02		-0.02		-0.05	
							(0.16)		(0.17)		(0.17)	
5. Mother's Verbal test score			0.05	***					0.03	**	0.02	
			(0.01)						(0.01)		(0.02)	
6. School and other Family Mediators												

Whether attend private school						0.33
						(0.31)
Parental expectations (1-8)						0.03
						(0.03)
Cognitive Stimulation (1-14)						0.08
						(0.05)
Emotional Support at home (0-14)						-0.01
						(0.04)
Weekly TV time GT 20						0.02
						(0.13)
R-Squared	0.10	0.16	0.20	0.24	0.25	0.25

Table 4: 1997 Letter-Word Score for Preschoolers in 1997

	Model I		II	III	IV	V	VI
1. RACE	-0.43	***	-0.08	-0.08	-0.15	0.06	0.09
	(0.09)		(0.11)	(0.12)	(0.14)	(0.15)	(0.17)
2. Parental SES							
Permanent Income				0.14	0.15	0.08	0.05
				(0.09)	(0.10)	(0.10)	(0.12)
Education				0.04	0.04	0.03	0.02
				(0.03)	(0.03)	(0.03)	(0.03)
Occupational Prestige				0.01 **	0.01	0.01	0.01
				(0.00)	(0.00)	(0.00)	(0.00)
Net wealth							
Highest quartile				-0.02	-0.02	-0.01	0.01
				(0.16)	(0.15)	(0.15)	(0.18)
Second Quartile				-0.04	0.04	0.07	0.06
				(0.14)	(0.13)	(0.14)	(0.16)
Third Quartile				-0.06	-0.10	-0.06	-0.06
				(0.12)	(0.12)	(0.12)	(0.14)
3. Child Characteristics							
Gender (1=female)					0.09	0.13	0.14
					(0.09)	(0.09)	(0.09)
Whether low birthweight					-0.43 ***	-0.40 **	-0.42
					(0.12)	(0.13)	(0.14)
Birth Order					-0.09	-0.08	-0.13
					(0.06)	(0.06)	(0.06)
4. Other Family and Parental Characteristics							
Number of Children					0.04	0.03	0.07
					(0.07)	(0.07)	(0.07)
Family Structure - mother only					0.09	0.01	-0.05
					(0.15)	(0.16)	(0.19)
- other type					0.15	0.15	-0.10
					(0.27)	(0.26)	(0.21)
Mom received AFDC while pregnant					0.11	0.08	0.09
					(0.13)	(0.11)	(0.13)
Teen mom at birth					-0.12	-0.09	-0.07
					(0.13)	(0.13)	(0.14)
Urbanicity					-0.04 *	-0.04 *	-0.03
					(0.02)	(0.02)	(0.02)
Region –Midwest					-0.26	-0.24	-0.28
					(0.15)	(0.15)	(0.15)
South					-0.03	-0.01	0.04
					(0.14)	(0.15)	(0.16)
West					-0.14	-0.14	-0.16
					(0.15)	(0.15)	(0.16)
5. Mother's Verbal test score			0.05 ***			0.04 **	0.03
			(0.01)			(0.01)	(0.02)
6. School and other Family Mediators							

Whether attend private school (1=lowest, 8=highest)						0.34
						(0.32)
Parental expectations (1-8)						0.04
						(0.04)
Cognitive Stimulation (1-14)						0.03
						(0.03)
Emotional Support at home (1-14)						-0.04
						(0.04)
Weekly TV Time GT 20						-0.06
						(0.12)
R-Squared	0.04	0.11	0.14	0.21	0.24	0.28

Table 5: 2003 Applied Problem Score for who were in Preschools in 1997

	Model I		II		III		IV		V		VI	
1. RACE	-0.98	***	-0.61	***	-0.51	***	-0.57	***	-0.45	**	-0.35	**
	(0.13)		(0.14)		(0.14)		(0.14)		(0.14)		(0.14)	
2. Parental SES												
Permanent Income					0.34	***	0.43	***	0.39	***	0.35	***
					(0.09)		(0.09)		(0.10)		(0.11)	
Education					0.00		-0.01		-0.01		-0.03	
					(0.03)		(0.03)		(0.03)		(0.04)	
Occupational Prestige					0.01	**	0.01		0.00		0.00	
					(0.00)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.12		0.10		0.00		0.09	
					(0.14)		(0.14)		(0.18)		(0.17)	
Second Quartile					-0.08		-0.10		-0.13		-0.01	
					(0.13)		(0.14)		(0.16)		(0.17)	
Third Quartile					-0.03		-0.07		-0.09		-0.14	
					(0.16)		(0.15)		(0.16)		(0.15)	
3. Child Characteristics												
Gender (1=female)							-0.14		-0.15		-0.14	
							(0.10)		(0.10)		(0.10)	
Whether low birthweight							-0.39	**	-0.41	**	-0.47	***
							(0.14)		(0.14)		(0.14)	
Birth Order							0.02		-0.01		-0.03	
							(0.06)		(0.06)		(0.06)	
4. Other Family and Parental Characteristics												
Number of Children							0.01		0.00		-0.01	
							(0.05)		(0.06)		(0.06)	
Family Structure - mother only							0.20		0.20		0.18	
							(0.13)		(0.14)		(0.16)	
- other type							0.08		-0.01		0.08	
							(0.17)		(0.17)		(0.18)	
Mom received AFDC while pregnant							0.10		0.05		0.17	
							(0.18)		(0.19)		(0.19)	
Teen mom at birth							-0.25		-0.23		-0.13	
							(0.18)		(0.18)		(0.20)	
Urbanicity							-0.01		0.01		0.01	
							(0.02)		(0.02)		(0.02)	
Region –Midwest							0.09		0.05		-0.08	
							(0.15)		(0.15)		(0.17)	
South							0.21		0.24		0.21	
							(0.14)		(0.14)		(0.16)	
West							0.12		0.07		-0.02	
							(0.15)		(0.16)		(0.16)	
5. Mother's Verbal test score			0.07	***					0.04	***	0.03	*
			(0.01)						(0.01)		(0.01)	
6. School and other Family Mediators												

Whether attend private school						-0.18
						(0.19)
Parental expectations						0.07
						(0.03)
Cognitive Stimulation						0.04
						(0.04)
Emotional Support at home						-0.01
						(0.03)
Time watching TV						-0.14
						(0.14)
Parent checks homework						0.16 **
						(0.05)
R-Squared	0.15	0.25	0.27	0.29	0.34	0.38

Table 6: 2003 Letter-Word Score for Those in Preschools in 1997

	Model I		II		III		IV		V		VI	
1. RACE	-0.67	***	-0.26	*	-0.37	***	-0.38	*	-0.18		0.00	
	(0.09)		(0.11)		(0.11)		(0.16)		(0.15)		(0.13)	
2. Parental SES												
Permanent Income					0.13		0.11		0.04		0.04	
					(0.10)		(0.10)		(0.10)		(0.11)	
Education					0.07	*	0.06	*	0.05		0.04	
					(0.03)		(0.03)		(0.03)		(0.03)	
Occupational Prestige					0.01	*	0.00		0.00		0.00	
					(0.00)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.00		-0.07		-0.22		-0.28	
					(0.16)		(0.16)		(0.18)		(0.19)	
Second Quartile					-0.12		-0.22		-0.25		-0.30	
					(0.14)		(0.15)		(0.16)		(0.17)	
Third Quartile					-0.09		-0.17		-0.24		-0.28	
					(0.14)		(0.15)		(0.16)		(0.17)	
3. Child Characteristics												
Gender (1=female)							-0.04		-0.05		-0.02	
							(0.09)		(0.09)		(0.09)	
Whether low birthweight							-0.32	**	-0.33	**	-0.47	***
							(0.13)		(0.13)		(0.14)	
Birth Order							-0.08		-0.09		-0.10	*
							(0.05)		(0.05)		(0.05)	
4. Other Family and Parental Characteristics												
Number of Children							0.07		0.06		0.04	
							(0.05)		(0.05)		(0.06)	
Family Structure - mother only							-0.03		-0.11		-0.14	
							(0.15)		(0.16)		(0.18)	
- other type							-0.04		-0.15		-0.15	
							(0.18)		(0.17)		(0.18)	
Mom received AFDC while pregnant							-0.15		-0.27	*	-0.19	
							(0.14)		(0.13)		(0.14)	
Teen mom at birth							-0.37	*	-0.31	*	-0.28	
							(0.16)		(0.15)		(0.15)	
Urbanicity							-0.03		-0.03		-0.02	
							(0.02)		(0.02)		(0.02)	
Region -Midwest							-0.05		0.03		-0.13	
							(0.12)		(0.12)		(0.13)	
South							0.18		0.25		0.29	
							(0.15)		(0.14)		(0.15)	
West							0.00		0.00		-0.08	
							(0.13)		(0.13)		(0.14)	
5. Mother's Verbal test score			0.07	***					0.05	***	0.04	***
			(0.01)						(0.01)		(0.01)	
6. School and other Family Mediators												

47

Whether attend private school						-0.28
						(0.17)
Parental expectations						0.05
						(0.03)
Cognitive Stimulation						0.05
						(0.03)
Emotional Support at home						0.03
						(0.04)
Time watching TV						-0.17
						(0.11)
Parent checks homework						0.14 **
						(0.05)
R-Squared	0.09	0.22	0.20	0.24	0.32	0.38

Table 7: 1997 Applied Problem Score for Children in Grades 1-3 in 1997

	Model I		II		III		IV		V		VI	
1. Black	-0.67	***	-0.35	**	-0.32	*	-0.25		-0.13		-0.26	
	(0.11)		(0.13)		(0.16)		(0.16)		(0.16)		(0.18)	
2. Parental SES												
Permanent Income					-0.03		0.00		-0.04		-0.14	
					(0.10)		(0.10)		(0.10)		(0.12)	
Education					0.08	*	0.06	*	0.06	*	0.07	*
					(0.03)		(0.03)		(0.03)		(0.03)	
Occupational Prestige					0.01		0.01	*	0.01	*	0.01	*
					(0.00)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.52	**	0.47	**	0.45	**	0.27	
					(0.20)		(0.18)		(0.18)		(0.20)	
Second Quartile					0.20		0.13		0.21		0.15	
					(0.20)		(0.17)		(0.17)		(0.18)	
Third Quartile					0.13		-0.01		-0.06		-0.02	
					(0.17)		(0.16)		(0.17)		(0.17)	
3. Child Characteristics												
Female							-0.33	**	-0.28	*	-0.33	**
							(0.11)		(0.12)		(0.12)	
Low birthweight							-0.37		-0.32		-0.39	
							(0.23)		(0.22)		(0.21)	
Birth Order							0.02		0.04		0.11	
							(0.07)		(0.07)		(0.07)	
4. Other Family and Parental Characteristics												
Number of Children							-0.12	*	-0.15	**	-0.16	*
							(0.06)		(0.06)		(0.07)	
Family Structure - mother only							0.13		0.17		0.25	
							(0.16)		(0.17)		(0.21)	
- other type							0.22		0.22		0.17	
							(0.24)		(0.22)		(0.23)	
Mom received AFDC while pregnant							0.11		0.09		-0.05	
							(0.18)		(0.19)		(0.21)	
Teen mom at birth							-0.59	**	-0.65	**	-0.38	
							(0.21)		(0.23)		(0.25)	
Urbanicity							0.00		0.01		0.01	
							(0.02)		(0.02)		(0.02)	
Region –Midwest							-0.03		0.06		0.05	
							(0.16)		(0.17)		(0.17)	
South							-0.06		-0.03		-0.06	
							(0.15)		(0.16)		(0.16)	
West							-0.36		-0.28		-0.32	
							(0.19)		(0.19)		(0.17)	
5. Mother's test score			0.06	***					0.04	**	0.02	
			(0.01)						(0.01)		(0.01)	
6. School and other Family Mediators												

Whether attend private school						0.31	*
						(0.16)	
Parental expectations						0.11	**
						(0.04)	
Cognitive Stimulation						0.04	
						(0.04)	
Emotional Support at home						0.05	
						(0.05)	
Time watching TV						-0.27	*
						(0.14)	
R-Squared	0.08	0.16	0.21	0.29	0.32	0.37	

	Model I	II	III	IV	V	VI
1. Black	-0.84 ***	-0.38	-0.45	-0.36	-0.18	-0.28
	(0.18)	(0.20)	(0.26)	(0.21)	(0.19)	(0.20)
2. Parental SES						
Permanent Income			0.10	0.23	0.13	0.00
			(0.13)	(0.13)	(0.13)	(0.15)
Education			0.10 *	0.09 *	0.08 *	0.08
			(0.04)	(0.04)	(0.04)	(0.05)
Occupational Prestige			0.01	0.01	0.01	0.01
			(0.01)	(0.01)	(0.01)	(0.01)
Net wealth						
Highest quartile			-0.05	-0.09	-0.12	-0.20
			(0.26)	(0.20)	(0.20)	(0.21)
Second Quartile			0.21	0.14	0.17	0.17
			(0.22)	(0.20)	(0.20)	(0.21)
Third Quartile			-0.12	-0.24	-0.31	-0.33
			(0.21)	(0.22)	(0.22)	(0.23)
3. Child Characteristics						
Female)				0.23	0.27 *	0.23
				(0.12)	(0.13)	(0.14)
Low birthweight				-0.42	-0.37	-0.48 *
				(0.22)	(0.23)	(0.24)
Birth Order				-0.21 **	-0.21 **	-0.16 *
				(0.07)	(0.07)	(0.07)
4. Other Family and Parental Characteristics						
Number of Children				-0.05	-0.09	-0.09
				(0.07)	(0.07)	(0.08)
Family Structure - mother only				0.36	0.30	0.16
				(0.20)	(0.20)	(0.23)
- other type				-0.18	-0.24	-0.28
				(0.38)	(0.36)	(0.36)
Mom received AFDC while pregnant				0.25	0.09	-0.15
				(0.29)	(0.24)	(0.27)
Teen mom at birth				-0.30	-0.33	0.01
				(0.21)	(0.21)	(0.24)
Urbanicity				0.03	0.04	0.03
				(0.03)	(0.03)	(0.03)
Region –Midwest				-0.38 *	-0.21	-0.16
				(0.16)	(0.16)	(0.18)
South				-0.07	0.05	0.07
				(0.18)	(0.18)	(0.18)
West				-0.45	-0.32	-0.23
				(0.23)	(0.22)	(0.22)
5. Mother's Verbal test score		0.09 ***			0.06 ***	0.04 *
		(0.01)			(0.02)	(0.02)
6. School and other Family Mediators						

Whether attend private school						0.26
						(0.17)
Parental expectations						0.14 **
						(0.04)
Cognitive Stimulation						0.04
						(0.04)
Emotional Support at home						-0.03
						(0.05)
Time watching TV						0.09
						(0.18)
R-Squared	0.10	0.20	0.22	0.34	0.38	0.41

Table 9: 2003 Applied Problem Score for Those Who Were in Grades 1-3 in 1997

	Model I	II	III	IV	V	VI
1. Black	-1.00 ***	-0.72 ***	-0.64 ***	-0.58 ***	-0.48 **	-0.32 *
	(0.11)	(0.13)	(0.15)	(0.16)	(0.16)	(0.17)
2. Parental SES						
Permanent Income			0.05	0.02	-0.06	-0.07
			(0.11)	(0.11)	(0.12)	(0.12)
Education			0.09 **	0.08 **	0.08 *	0.07 *
			(0.03)	(0.03)	(0.03)	(0.03)
Occupational Prestige			0.01	0.01 *	0.01 *	0.01
			(0.00)	(0.00)	(0.00)	(0.00)
Net wealth						
Highest quartile			0.23	0.22	0.34	0.10
			(0.21)	(0.19)	(0.19)	(0.21)
Second Quartile			0.06	0.06	0.20	0.08
			(0.20)	(0.18)	(0.18)	(0.21)
Third Quartile			-0.09	-0.15	-0.15	-0.19
			(0.18)	(0.18)	(0.18)	(0.16)
3. Child Characteristics						
Female				-0.23 *	-0.21	-0.29 **
				(0.11)	(0.12)	(0.11)
Low birthweight				-0.47 *	-0.42	-0.55 *
				(0.24)	(0.25)	(0.26)
Birth Order				-0.02	-0.05	-0.01
				(0.05)	(0.05)	(0.06)
4. Other Family and Parental Characteristics						
Number of Children				-0.03	-0.02	-0.03
				(0.05)	(0.06)	(0.07)
Family Structure - mother only				-0.05	0.08	0.05
				(0.16)	(0.18)	(0.18)
- other type				-0.05	0.01	0.06
				(0.16)	(0.17)	(0.16)
Mom received AFDC while pregnant				0.15	0.04	0.05
				(0.22)	(0.23)	(0.26)
Teen mom at birth				-0.41 *	-0.42 *	-0.12
				(0.18)	(0.21)	(0.22)
Urbanicity				0.01	0.02	0.01
				(0.03)	(0.03)	(0.02)
Region –Midwest				-0.14	0.08	-0.01
				(0.15)	(0.15)	(0.15)
South				0.10	0.21	0.25
				(0.15)	(0.16)	(0.16)
West				-0.13	0.03	-0.03
				(0.18)	(0.18)	(0.18)
5. Mother's Verbal test score		0.07 ***			0.03 **	0.01
		(0.01)			(0.01)	(0.02)
6. School and other Family Mediators						

Whether attend private school						-0.06
						(0.14)
Parental expectations						0.06
						(0.04)
Cognitive Stimulation						0.08
						(0.04)
Emotional Support at home						0.05
						(0.04)
Time watching TV						-0.17
						(0.17)
Parent checks homework						0.23 ***
						(0.05)
R-Squared	0.17	0.26	0.28	0.32	0.38	0.49

Table 10: 2003 Letter-Word Score for Children Who Were in Grades 1-3 in 1997 (Grades 6-8 in 2003)

	Model I		II		III		IV		V		VI	
1. Black	-0.94	***	-0.73	***	-0.69	***	-0.52	**	-0.58	**	-0.62	***
	(0.14)		(0.16)		(0.21)		(0.19)		(0.19)		(0.19)	
2. Parental SES												
Permanent Income					-0.14		-0.05		-0.19		-0.23	
					(0.14)		(0.13)		(0.16)		(0.17)	
Education					0.08		0.06		0.03		0.05	
					(0.05)		(0.04)		(0.04)		(0.04)	
Occupational Prestige					0.02	**	0.02	***	0.01	**	0.01	
					(0.01)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.24		0.19		0.41		0.21	
					(0.22)		(0.23)		(0.26)		(0.28)	
Second Quartile					0.22		0.13		0.31		0.21	
					(0.22)		(0.20)		(0.22)		(0.24)	
Third Quartile					0.13		-0.02		0.06		-0.01	
					(0.21)		(0.21)		(0.23)		(0.22)	
3. Child Characteristics												
Female							0.16		0.23		0.21	
							(0.12)		(0.13)		(0.13)	
Low birthweight							-0.34		-0.30		-0.48	
							(0.31)		(0.33)		(0.34)	
Birth Order							-0.20	***	-0.21	***	-0.20	**
							(0.06)		(0.06)		(0.07)	
4. Other Family and Parental Characteristics												
Number of Children							0.02		0.04		0.02	
							(0.06)		(0.06)		(0.06)	
Family Structure - mother only							0.06		0.17		0.18	
							(0.18)		(0.20)		(0.21)	
- other type							-0.03		0.06		0.06	
							(0.17)		(0.19)		(0.20)	
Mom received AFDC while pregnant							0.04		-0.07		-0.26	
							(0.20)		(0.23)		(0.31)	
Teen mom at birth							-0.46	*	-0.39		-0.19	
							(0.19)		(0.22)		(0.25)	
Urbanicity							0.02		0.02		0.03	
							(0.03)		(0.04)		(0.04)	
Region –Midwest							-0.19		-0.04		-0.09	
							(0.14)		(0.16)		(0.16)	
South							0.16		0.30		0.34	
							(0.16)		(0.19)		(0.20)	
West							-0.34	*	-0.20		-0.13	
							(0.17)		(0.17)		(0.19)	
5. Mother's Verbal test score			0.06	***					0.04	**	0.03	
			(0.02)						(0.02)		(0.02)	
6. School and other Family Mediators												

Whether attend private school						0.27
						(0.18)
Parental expectations						0.07
						(0.04)
Cognitive Stimulation						-0.02
						(0.05)
Emotional Support at home						-0.03
						(0.05)
Time watching TV						-0.15
						(0.18)
Parent checks homework						0.16 ***
						(0.05)
R-Squared	0.14	0.21	0.22	0.31	0.35	0.42

Table 11: 1997 Applied Problem Score for Children in Grades 4-7 in 1997

	Model I		II		III		IV		V		VI	
1. Black	-0.77	***	-0.55	***	-0.46	***	-0.61	***	-0.58	***	-0.54	***
	(0.08)		(0.09)		(0.10)		(0.12)		(0.12)		(0.12)	
2. Parental SES												
Permanent Income					-0.03		-0.01		-0.02		-0.16	
					(0.08)		(0.10)		(0.10)		(0.11)	
Education					0.07	**	0.07	**	0.06	*	0.03	
					(0.02)		(0.02)		(0.03)		(0.03)	
Occupational Prestige					0.00		0.00		0.00		0.00	
					(0.00)		(0.00)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.28	*	0.39	**	0.37	**	0.24	
					(0.14)		(0.14)		(0.15)		(0.15)	
Second Quartile					0.01		0.06		0.04		0.01	
					(0.15)		(0.14)		(0.14)		(0.14)	
Third Quartile					-0.13		0.00		-0.03		-0.11	
					(0.13)		(0.14)		(0.14)		(0.14)	
3. Child Characteristics												
Female							-0.27	**	-0.26	**	-0.28	**
							(0.09)		(0.09)		(0.09)	
Whether low birthweight							0.18		0.17		0.16	
							(0.17)		(0.18)		(0.22)	
Birth Order							-0.01		0.00		-0.02	
							(0.05)		(0.05)		(0.05)	
4. Other Family and Parental Characteristics												
Number of Children							0.04		0.03		0.03	
							(0.06)		(0.07)		(0.06)	
Family Structure - mother only							0.06		0.11		0.01	
							(0.13)		(0.14)		(0.15)	
- other type							-0.13		-0.12		-0.10	
							(0.18)		(0.20)		(0.22)	
Mom received AFDC while pregnant							0.07		0.03		-0.09	
							(0.11)		(0.13)		(0.14)	
Teen mom at birth							-0.06		-0.10		-0.21	
							(0.23)		(0.22)		(0.16)	
Urbanicity							-0.03		-0.03		-0.03	
							(0.02)		(0.02)		(0.02)	
Region -Midwest							0.10		0.12		0.19	
							(0.13)		(0.13)		(0.14)	
South							0.14		0.16		0.23	
							(0.12)		(0.13)		(0.12)	
West							-0.02		0.03		0.12	
							(0.15)		(0.16)		(0.15)	
5. Mother's test score			0.04	***					0.02		0.02	
			(0.01)						(0.01)		(0.01)	
6. School and other Family Mediators												

Whether attend private school						0.12
						(0.16)
Parental expectations						0.19 ***
						(0.03)
Cognitive Stimulation						0.03
						(0.03)
Emotional Support at home						-0.02
						(0.03)
Time watching TV						0.00
						(0.11)
R-Squared	0.12	0.15	0.21	0.25	0.25	0.37

Table 12: 1997 Letter-Word Score for Children in Grades 4-7 in 1997

	Model I	II	III	IV	V	VI
1. Black	-0.77 ***	-0.54 ***	-0.43 ***	-0.46 ***	-0.36 *	-0.29
	(0.10)	(0.13)	(0.13)	(0.14)	(0.16)	(0.16)
2. Parental SES						
Permanent Income			0.00	-0.11	-0.17	-0.36 **
			(0.13)	(0.12)	(0.13)	(0.13)
Education			0.07 *	0.08 **	0.06 *	0.05
			(0.03)	(0.03)	(0.03)	(0.03)
Occupational Prestige			0.01	0.01	0.01	0.01
			(0.00)	(0.00)	(0.00)	(0.00)
Net wealth						
Highest quartile			0.41 *	0.46 **	0.47 **	0.45 *
			(0.19)	(0.19)	(0.19)	(0.19)
Second Quartile			0.08	0.08	0.04	0.10
			(0.16)	(0.17)	(0.17)	(0.17)
Third Quartile			0.01	-0.01	-0.03	-0.04
			(0.16)	(0.16)	(0.16)	(0.17)
3. Child Characteristics						
Female				0.26 **	0.30 **	0.23 *
				(0.10)	(0.10)	(0.10)
Low birthweight				0.46	0.53 *	0.59 *
				(0.27)	(0.28)	(0.26)
Birth Order				0.03	0.04	0.01
				(0.05)	(0.06)	(0.05)
4. Other Family and Parental Characteristics						
Number of Children				-0.16 **	-0.18 ***	-0.16 **
				(0.05)	(0.05)	(0.05)
Family Structure - mother only				-0.09	-0.09	-0.29
				(0.14)	(0.15)	(0.17)
- other type				-0.22	-0.22	-0.14
				(0.22)	(0.23)	(0.26)
Mom received AFDC while pregnant				-0.01	-0.02	-0.08
				(0.17)	(0.18)	(0.18)
Teen mom at birth				-0.19	-0.20	-0.31
				(0.17)	(0.18)	(0.21)
Urbanicity				-0.02	-0.03	-0.03
				(0.02)	(0.02)	(0.02)
Region -Midwest				-0.19	-0.17	-0.08
				(0.14)	(0.15)	(0.14)
South				0.14	0.13	0.22
				(0.14)	(0.14)	(0.14)
West				-0.04	0.01	0.13
				(0.16)	(0.17)	(0.16)
5. Mother's Test Score		0.04 **			0.03 *	0.03 *
		(0.01)			(0.01)	(0.01)
6. School and other Family Mediators						

Whether attend private school						-0.19
						(0.16)
Parental expectations						0.13 ***
						(0.03)
Cognitive Stimulation						0.08 *
						(0.03)
Emotional Support at home						-0.10 *
						(0.04)
Time watching TV						-0.12
						(0.12)
R-Squared	0.09	0.12	0.20	0.27	0.28	0.33

Table 13: 2003 Applied Problem Score for Children who were in Grades 4-7 in 1997

	Model I		II		III		IV		V		VI	
1. Black	-0.78	***	-0.66	***	-0.47	***	-0.54	***	-0.51	**	-0.49	**
	(0.10)		(0.14)		(0.12)		(0.15)		(0.16)		(0.17)	
2. Parental SES												
Permanent Income					-0.15		-0.08		0.00		-0.14	
					(0.12)		(0.12)		(0.11)		(0.13)	
Education					0.06	**	0.06	*	0.06		0.03	
					(0.02)		(0.03)		(0.03)		(0.03)	
Occupational Prestige					0.02	**	0.01	*	0.01		0.00	
					(0.01)		(0.01)		(0.00)		(0.00)	
Net wealth												
Highest quartile					0.31		0.37	*	0.08		0.14	
					(0.17)		(0.18)		(0.18)		(0.18)	
Second Quartile					0.19		0.19		-0.12		-0.13	
					(0.17)		(0.17)		(0.17)		(0.17)	
Third Quartile					0.11		0.10		-0.09		-0.03	
					(0.13)		(0.15)		(0.15)		(0.16)	
3. Child Characteristics												
Female							-0.32	***	-0.26	**	-0.21	*
							(0.09)		(0.10)		(0.11)	
Low birthweight							0.31		0.42	*	0.42	*
							(0.20)		(0.21)		(0.21)	
Birth Order							-0.02		-0.03		-0.04	
							(0.05)		(0.05)		(0.05)	
4. Other Family and Parental Characteristics												
Number of Children							0.03		0.05		0.07	
							(0.06)		(0.08)		(0.08)	
Family Structure - mother only							0.09		-0.11		-0.10	
							(0.12)		(0.14)		(0.15)	
- other type							0.16		-0.23		-0.36	
							(0.25)		(0.18)		(0.20)	
Mom received AFDC while pregnant							0.10		0.19		0.20	
							(0.13)		(0.15)		(0.16)	
Teen mom at birth							-0.29		-0.45	**	-0.62	**
							(0.15)		(0.16)		(0.20)	
Urbanicity							0.00		0.01		0.00	
							(0.02)		(0.02)		(0.03)	
Region –Midwest							-0.17		-0.19		-0.14	
							(0.13)		(0.15)		(0.15)	
South							-0.04		-0.08		-0.19	
							(0.16)		(0.14)		(0.14)	
West							-0.34	*	-0.27		-0.13	
							(0.15)		(0.17)		(0.17)	
5. Mother's Test Score			0.01						0.00		0.00	
			(0.02)						(0.02)		(0.02)	
6. School and other Family Mediators												

Whether attend private school						0.08
						(0.14)
Parental expectations						0.21 ***
						(0.04)
Cognitive Stimulation						0.01
						(0.04)
Emotional Support at home						-0.06
						(0.04)
Time watching TV						-0.09
						(0.11)
Parent checks homework						0.06
						(0.04)
R-Squared	0.12	0.10	0.22	0.27	0.24	0.34

Table 14: 2003 Letter-Word Score for Children who were in Grades 4-7 in 1997

	Model										
	I		II		III		IV		V		VI
1. Black	-0.74	***	-0.64	***	-0.41	**	-0.67	***	-0.70	***	-0.65	**
	(0.12)		(0.13)		(0.14)		(0.19)		(0.19)		(0.22)
2. Parental SES											
Permanent Income					-0.18		-0.14		-0.14		-0.24
					(0.15)		(0.13)		(0.12)		(0.13)
Education					0.08	**	0.09	**	0.05		-0.01
					(0.03)		(0.03)		(0.03)		(0.03)
Occupational Prestige					0.02	**	0.02	**	0.01	*	0.01
					(0.01)		(0.01)		(0.01)		(0.01)
Net wealth											
Highest quartile					0.55	**	0.40		0.34		0.21
					(0.21)		(0.21)		(0.22)		(0.21)
Second Quartile					0.30		0.07		0.02		-0.15
					(0.19)		(0.21)		(0.24)		(0.22)
Third Quartile					0.40	**	0.27		0.12		0.00
					(0.15)		(0.17)		(0.19)		(0.18)
3. Child Characteristics											
Female							0.09		0.23	*	0.14
							(0.10)		(0.11)		(0.12)
low birthweight							0.00		0.20		0.29
							(0.15)		(0.18)		(0.17)
Birth Order							0.04		0.06		0.04
							(0.07)		(0.07)		(0.07)
4. Other Family and Parental Characteristics											
Number of Children							-0.07		-0.06		-0.07
							(0.05)		(0.05)		(0.06)
Family Structure (reference group is living with 2 biological parents)											
- mother only							-0.10		-0.13		-0.06
							(0.17)		(0.20)		(0.23)
- other type							0.19		-0.11		-0.22
							(0.20)		(0.18)		(0.19)
Mom received AFDC while pregnant							0.38		0.45		0.50
							(0.33)		(0.38)		(0.41)
Teen mom at birth							0.06		-0.05		-0.18
							(0.21)		(0.20)		(0.22)
Urbanicity							-0.01		-0.01		-0.03
							(0.03)		(0.03)		(0.03)
Region -Midwest							-0.21		-0.21		-0.23
							(0.13)		(0.15)		(0.16)
South							0.44	**	0.33	*	0.30
							(0.16)		(0.16)		(0.18)
West							-0.22		-0.16		-0.04
							(0.16)		(0.17)		(0.19)
5. Mother's Test Score			0.02						0.02		0.03

		(0.01)			(0.02)	(0.02)

6. School and other Family Mediators

attend private school						0.04
						(0.17)
Parental expectations (1=lowest, 8=highest)						0.16 ***
						(0.04)
Cognitive Stimulation index						0.08 *
						(0.04)
Emotional Support at home						-0.06
						(0.05)
Time watching TV						-0.04
						(0.16)
Parent checks homework						0.04
						(0.04)
R-Squared	0.08	0.10	0.20	0.28	0.26	0.32

Table 15: Sensitivity Analyses for the Black-White Test Gap

Specification	Applied Problem				Letter-Word Score			
	1997		2003		1997		2003	
Baseline	-0.25	**	-0.38	***	-0.13		-0.48	***
	(0.09)		(0.10)		(0.13)		(0.13)	
Gender								
Females	0.08		-0.24		0.17		-0.24	
	(0.13)		(0.15)		(0.13)		(0.13)	
Males	-0.58	***	-0.54	***	-0.29		-0.61	***
	(0.12)		(0.13)		(0.18)		(0.17)	
Parental education								
Less than high school	-0.15		0.10		-0.13		0.00	
	(0.21)		(0.29)		(0.20)		(0.27)	
High school only	-0.12		-0.11		0.14		-0.22	
	(0.14)		(0.15)		(0.16)		(0.16)	
More than high school	-0.36	**	-0.61	***	-0.36		-0.59	***
	(0.14)		(0.13)		(0.21)		(0.18)	
Average family income								
Lowest quartile	0.23		-0.34		-0.02		-0.38	
	(0.19)		(0.21)		(0.22)		(0.26)	
Second quartile	-0.23		-0.09		-0.20		-0.33	
	(0.14)		(0.14)		(0.21)		(0.17)	
Third quartile	-0.46	**	-0.87	***	-0.25		-0.57	**
	(0.16)		(0.23)		(0.24)		(0.20)	
highest quartile	-0.66	***	-0.50	**	-0.64		-0.45	
	(0.19)		(0.19)		(0.38)		(0.34)	
Urbanicity								
Metropolitan area	-0.34	**	-0.49	***	-0.28		-0.55	***
	(0.11)		(0.10)		(0.16)		(0.15)	
Non-metropolitan area	-0.02		-0.28		0.32		-0.43	
	(0.20)		(0.25)		(0.19)		(0.27)	
Region								
Northeast	-0.40		-0.26		0.02		-0.36	
	(0.22)		(0.24)		(0.27)		(0.23)	
Midwest	-0.21		-0.25		-0.06		-0.15	
	(0.20)		(0.17)		(0.22)		(0.15)	
South	-0.25	*	-0.65	***	-0.09		-0.41	*
	(0.11)		(0.18)		(0.15)		(0.20)	
West	-0.20		-0.80	*	-0.96		-1.08	*
	(0.30)		(0.35)		(0.59)		(0.49)	

*p<.05, **p<.01, ***p<.001
Note: Robust standard errors in parentheses.