The Role of Health on Understanding the Black-White Test Score Gap
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Abstract

This study examines to what extent health disparities between white and black children account for the black-white test score gap. We connect two bodies of research – the elusive but persistent achievement gap between black and white children and the increasingly documented impact of early health conditions on educational success in adolescence and beyond. The analysis is based on nationally representative data from the Early Childhood Longitudinal Study-Kindergarten Class of 1998-99 (ECLS-K), which has followed children from kindergarten through fifth grade. Compared to non-Hispanic white students, non-Hispanic blacks have systematically worse health conditions, come from more disadvantaged family backgrounds and display lower scores in reading and math cognitive assessments. Childhood health conditions account for a non-trivial proportion of the black-white test score gap – between a fifth and half of the gap. The contribution of health to understanding the black-white test score gap, and educational inequality more generally, deserves further investigation.

Introduction

There are two seemingly unrelated bodies of literature in stratification research. On one hand, researchers have consistently documented an achievement gap between black and white children. On the other hand, researchers have increasingly paid attention to the short and long term effects of early health conditions. In this study we connect these two bodies of research to examine to what extent health disparities between white and black children account for the black-white test score gap.

By examining the impact of health on the black-white test score gap we contribute to research on racial inequality on several fronts. Test scores are important predictors of adult socioeconomic conditions, including schooling, occupational attainment, and earnings (Cawley, Heckman, Lochner, and Vytlacil 2000; Sewell, Haller, and Portes 1969; Sewell and Hauser 1975). Test scores are also important predictors of adult health (Deeg, Hofman, and van Zonneveld 1990; Korten et al. 1999; Smits, Deeg, Kriegsman, and Schmand 1999; Snowdon et al. 1996; Whalley et al. 2000; Whalley and Deary 2001). Therefore, by analyzing inequality in test scores, we shed light on a crucial root of social and health inequalities in adult life. Furthermore, by focusing on racial inequality in test scores, we advance the understanding of how the accumulation of advantages and disadvantages may work differently for black and white children.

Previous Research

A decade ago, Jencks and Phillips edited a volume on the black-white test score gap (1998). They reported that the black- white test score gap had been diminishing in the last decades, reaching a level of .69 standard deviations in reading and .75 in math in the mid-1990s. They documented that the lower achievement of black students had long-term consequences. Contrary to what Jencks had concluded in 1972 – when he argued that equalizing cognitive skills between students would contribute only marginally to the reduction of socioeconomic inequalities — Jencks and Phillips maintained that cognitive ability is quite consequential to later occupational and educational attainment, as well as for earning capacity. Importantly, the authors showed that half of the achievement gap of high school students is already present when children enter school.

Most attempts to document and explain the black-white test score gap have followed the tradition of Jencks and Phillips (1998), although increasing attention is being paid to educational inequalities among Hispanics and immigrants relative to whites. Fryer and Levitt (2004) documented that the black-white test score gap is substantial and that it widens as children progress through the educational system. Furthermore, they found that the black-white gap observed at the beginning of children's schooling (i.e. the start of kindergarten year) is explained away when they consider a small number of covariates. This is not the case at later grades, when the black-white gap is not explained by observable characteristics like family socioeconomic status, WIC participation, mother's age at first birth, birthweight, and the number of children's books in the home. Although Hispanic children begin at a deficit in kindergarten, they make ground in tests scores relative to their whites peers as they advance through school. Just as unexplainable as the growth in the gap between blacks and whites is the lack of a similar growth in the gap between Hispanics and whites, despite the fact that Hispanics are also disadvantaged in many of the same aspects as blacks, such as lower socioeconomic background.

Early health is increasingly identified as an important predictor in the educational success of children (Theis 1999; Currie and Hyson 1999; Case, Lubotsky and Paxson 2002; Currie 2005; Case, Fertig and Paxson, 2005). It is well documented that health conditions vary by racial and ethnic groups, and that educational experiences vary by racial and ethnic groups (Cramer, 1995; Hummer, 1993; Rogers et al, 1996; Manton and Gu, 2001; Harrison and Bennett, 1995; Iceland, 2003). However, the intersection of these experiences is still not well-understood (Crosnoe 2006). Few studies have explicitly tested the role of health in explaining educational inequalities, even though research documenting health inequalities among advantaged and disadvantaged groups suggests that differences in the distribution of poor health may be a potential unexplored explanation. For instance, Crosnoe's (2006) used data from the Early Childhood Longitudinal Study-Kindergarten cohort (ECLS-K) in kindergarten and in 1st grade to explore the role of health in racial/ethnic and immigrant disparities in achievement scores. He extended Alexander and Entwisle's (1988) school transition model and argued that health is just as important a predictor in the explanation of achievement differentials for blacks, Latino/a immigrant and Asian immigrant families as are the other components of the school transition model.

Another issue pertains to the mechanisms underlying the linkages of health to early achievement. Previous research has suggested that there are a number of consequences that children with health problems face in school. Disease processes may have biological consequences, for example, that affect brain or motor skill development (Theis 1999). Furthermore, side effects of medications can have serious effects like weight gain (which can be detrimental for self-esteem, especially for girls), and fatigue. These processes can severely affect educational outcomes by means of teacher's expectations, teacher attachment, peer-relationships, self-confidence, motivation, absenteeism, falling behind in school work, disliking school, orientation to learning, failing grades, and having low educational goals or expectations (Magnuson and Ruhm 2004; Needham, Crosnoe, and Muller 2004; Currie 2005; Theis 1999). Insight into these mechanisms is essential in order to understand the potential role of health in explaining educational inequality.

A note on racial classification

The conventional way of classifying people into racial grouping follows a geographic, continental criterion. This conceptualization of race does not capture biological distinctiveness in population groups, as genetic variability within groups is greater than the variability between

them, and even diseases that have a clear genetic component account for only a tiny part of racial disparities in health (King, 1981; Williams and Collins, 1995; Williams, 1997). Therefore, we understand black and white as social, rather than biological categories. This distinction is important because, even though the definition of race as a sociopolitical construct is almost a consensus in social sciences, in biomedical sciences and public health race is still often used as a proxy for unmeasured biological factors (Williams, 1997; Mays et al, 2003). Thus, if childhood health conditions play a different role in educational achievement among whites than blacks, we do not expect this difference to be rooted in genetic conditions particular to these "races," but in the dissimilar access these groups have to societal resources and rewards.

The racial classification we use in this study includes non-Hispanic whites, non-Hispanic blacks, Hispanics (regardless of race), non-Hispanic Asians, and "other race", which includes Hawaiian, other Pacific Island, American .Indian, Alaska Native, and children who belong to more than one racial category. For now, we focus on the difference between non-Hispanic black and white children.

Data

We use publicly-available data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), the only nationally representative study that provides data on children's status at kindergarten entrance and their trajectory through the elementary school years. The sample consists of 21,260 children enrolled in about 1,000 kindergarten programs during the 1998-99 school year, including children from public and private kindergartens, as well as from full-day and part-day kindergarten programs. The sample includes children from different racial-ethnic and socioeconomic backgrounds, with oversamples of Asian children, private kindergartens, and private school kindergartners. So far, there are six waves of data available: Fall and Spring of Kindergarten, Fall and Spring of 1st grade, Spring of 3rd grade and Spring of 5th grade. This dataset is well-suited for our purposes because it includes measures of cognitive achievement, school experiences, and childhood health as well as a broad set of relevant covariates.

Data on children's social background come from interviews with their parents or guardians at the different waves. Data on children's schools stem from interviews with teachers and school personnel at the different grades. Data on students' cognitive achievement come from children's assessments at each of the six waves. These assessments consisted of untimed one-on-one computer-assisted personal interviews in three cognitive domains, namely reading, mathematics, and general knowledge. We use data on students' performance in the reading and math assessments. Specifically, we use the reading and math item response theory (IRT) scores, which reflect children's overall performance in each cognitive domain. We use the scores that NCES re-calibrated in fifth grade to allow us to compare scores across different waves.

Variables and measures

We use several measures of the child's health conditions, including:

i. birthweight, categorized as low (less than 5.5 pounds at birth), very low (less than 3 pounds), high (more than 8.8 pounds), and normal (between 5.5 and 8.8 pounds), with the latter as the reference category;
ii. an indicator of whether the child was premature, that is, born more than two weeks before he/she was due;
iii. an indicator of whether the child was born as part of a multiple birth;

iv. a set of indicators reporting whether the child has been diagnosed with a speech, hearing, and/or a vision problem by a professional;
v. parents' evaluation of child's overall health, categorized as poor and fair versus good, very good, and excellent;
vi. parents' report on whether the child has ever had frequent or repeated ear infections;
vii. individual assessment of child's fine motor skills and gross motor skills;
viii. percentile of body mass index for age and sex, categorized according to CDC standards of underweight (BMI below 5^{th} percentile), risk of overweight (BMI between 85^{th} and 95^{th} percentile), overweight (BMI above 95^{th} percentile), and normal weight (BMI between 5^{th} and 85^{th} percentile), the latter of which serves as the reference category;
ix. an indicator of short stature, defined as being below the 10^{th} percentile of height for age and sex.

Given the association between children's health and their family socioeconomic conditions, it is important to include a good set of family background variables. In this case, we include:

i. family socioeconomic index (SES), a continuous, standardized variable that ranges from –4.75 to 2.75. NCES computed SES as an average composite of up to five measures: father/male guardian's education and occupation, mother/female guardian's education and occupation, and household income;
ii. an indicator of whether the child's household is below the poverty threshold;
iii. an indicator of whether the child lives in a single parent family;
iv. four categories of mother's education level: less than high school, high school (reference category), some college, and bachelor's degree or more;
v. an indicator of whether the primary language spoken at the child's home is not English.

Child's demographic characteristics include:

i. age (in months) at the date of the cognitive assessment;
ii. an indicator of whether the child lives in a city or suburban area versus a rural area;
iii. a set of four indicators reflecting the region of the country where the child is located: Northeast, South, West, and Midwest, the latter of which is the reference category;
iv. an indicator of whether the child was born in the United States or elsewhere.

As school characteristics we consider:

i. racial composition of the school, categorized as a set of five variables indicating whether the school has less than 10, less than 25, less than 50 or less than 75 percent of racial/ethnic minority students, with the reference category being schools that have between 75 and 100 percent minority students;
ii. proportion of children in the school who are eligible for free or reduced-priced lunch;
iii. an indicator of whether the child attends public or private schools;
iv. an indicator of whether the child attended a full- or a half-day kindergarten program;
v. the ratio, at the school level, of number of internet connections to students;
vi. the number of students in the kindergarten class the child attends to (i.e. class size);
vii. an indicator of whether the child's teacher has a master's degree;
viii. evaluation of how much of a problem are gangs in the school;
ix. evaluation of how much of a problem is teacher turnover in the school;
x. assessment of the amount of litter around the school;

xi. evaluation of how much of a problem is loitering around the school;
xii. an indicator of whether the school receives supplemental funding from their PTA;
xiii. an indicator of whether hall passes are required to ensure the safety of the children in school.

Finally, as measures of parental health we consider:

i. parent's self-reported score on a standard depression scale, the Center for Epidemiological Studies-Depression Scale (CES-D) developed by the National Institute of Mental Health (NIMH);
ii. parent's self rated health, categorized as fair or pair versus good, very good and excellent.

Descriptive Analyses

Table 1 compares the estimated means of key variables for health, social background, and achievement from the black and white samples in the ECLS-K. These descriptive tests of mean differences reveal health, class, and achievement differentials among whites and blacks. These analyses are done separately by gender, that is, black males are compared with white males and black females are compared with white females. The existence of several health differentials by gender underscores the importance of considering separate models for girls and boys.

In most cases, the direction of health differences is as expected; blacks experience poor health conditions at a higher rate than whites. However the analyses suggest that not all health differentials are in the expected directions. Overall, blacks are more likely to be at risk of being overweight, to have been born at a low birthweight, and to be considered in poor health by their parents. However, blacks are less likely than whites to be in the shortest 10% of children their age and sex, to be diagnosed with a learning, speech, hearing or vision problem, and report having less frequent ear infections. There are several differences in the health differentials of black males and females relative to whites. Black females are more likely to be born premature and to be overweight, and are less likely to be normal weight than white females. Black males are no different than white males on these indicators of health.

Both black males and black females are more likely than their white peers to score lower on measures of family advantage, whether it be on a socioeconomic index score, family structure, or parental education. Almost every dimension of class disadvantage is higher for blacks than for whites, and in no case do whites suffer from higher rates of class disadvantage than blacks in this sample.

Lastly, both black males and black females score lower on every achievement test score for which we have data. In all six waves of data collection, from kindergarten to fifth grade, black children score lower on both reading and math achievement tests. At every time point, the black-white test score gap is bigger for math than for reading, although this gap differential narrows as students age. Although the achievement gap in math is fairly constant over time, the reading gap widens as kids progress.

Regression Analysis

Table 2 presents estimates from different OLS regression models, run separately for males and females. In the first panel (Table 2A) the dependent variable corresponds to reading scores and in the second panel (Table 2B) the dependent variable corresponds to math scores. In both cases, we are merely considering achievement at the beginning of children's schooling (i.e. fall kindergarten). We estimated equivalent models for each of the available six waves –

including fall and spring of kindergarten, fall and spring of first grade, spring of third grade and spring of fifth grade. While here we will only focus on children's status at school entry, the pattern of results is fairly consistent.

Model 1 does not include any covariates but the set of race and ethnicity dummies. Thus, the coefficients associated with each racial and ethnic group represent the raw mean difference in reading and math test scores between children from the named group and non-Hispanic white children (the reference group). The estimates show that, compared to non-Hispanic whites, black children score, on average, about 4 points lower in reading and about 6 points lower in math. In units of standard deviation, these estimates indicate that, compared to their white counterparts, the reading gap is .40 for black males and .47 for black females, and the math gap is .69 for black males and .64 for black females (the standard deviation is 9.8 points for the reading assessment and 9.1 for the math assessment). All these differences are statistically significant. It is important to mention that these estimates are comparable to those reported by Fryer and Levitt (2004) for the whole ECLS-K sample. As in Fryer and Levitt, the calculated gaps are smaller than those reported by Jencks and Phillips (1998). Fryer and Levitt interpret this as a result of the real gains that blacks born in recent cohorts have made with respect to blacks born a decade earlier – those include in Jencks and Phillips' account.

The main question guiding this study is whether observed health disparities between black and white children contribute to explain the black-white test score gap. There are two ways of answering this question. The first is to compare estimates from Model 2 to estimates from Model 1. Model 2 adds to Model 1 – which merely contained the race and ethnicity dummies – all the covariates related to children's health conditions. The comparison of these two sets of estimates shows that health conditions account for between a fifth and a third of the black-white test score gap. Between Model 1 and Model 2, the reading gap between white and black children decreases from .40 to .26 SD among males and from .47 to .31 among females. Similarly, the white-black math gap decreases from .69 to .53 among males and from .64 to .45 among females.

Health inequalities among blacks and whites may, at least in part, reflect differences in socioeconomic background and other demographic characteristics. Therefore, a second way to address this paper's main question is to compare estimates from Model 4 to estimates from Model 5. Model 4 includes the covariates related to child's demographic and family characteristics, while Model 5 adds to Model 4 the covariates related to children's health conditions. Thus, the comparison of these two sets of estimates reflects the contribution of health conditions *in addition* to the impact of children's demographic and socioeconomic background on test scores. In this stricter scenario, health explains between a fifth and a half of the black-white test score gap. Although the proportion of the residual black-white test score gap that is explained by health seems large, the gap has been substantially decreased by Model 4 – in fact, the difference between black and white males and females in reading is not longer statistically significant in Model 4. Thus, the actual contribution of health, in addition to child demographic and socioeconomic characteristics, is small. Between Model 4 and Model 5, the reading gap between white and black children decreases from .02 to -.03 SD among males (with a statistically *insignificant* advantage of black males over white males), and from .08 to .04 among females. Across these same models, the white-black math gap decreases from .27 to .22 among males and from .26 to .21 among females.

In both sets of comparisons (between Model 1 and 2, and between Model 4 and 5), the extent to which health explains the black-white test score gap is larger for reading than for math.

Importantly, even in the stricter comparison of the contribution of health to the test score gap, the role of health in understanding the white-black test score gap is clearly non-trivial.

Implications and future research

This study shows that the substantive test score gap between white and black children is partially explained by disparities in health conditions. This gap is likely to continue to grow as children progress through schooling. We expect that these educational racial inequalities are associated with physical and mental health differentials. The impact of the whole array of health conditions on achievement may take some years to actualize, either because the effect of health conditions strengthens over children's schooling or simply because it takes some time for these effects to compound and show up. The combination and chronicity of health problems may be especially salient.

The impact of health conditions may well vary among different children. For instance, the impact of health may be particularly salient for disadvantaged children or for children from a particular racial and ethnic group. These different aspects of the contribution of health to understanding the black-white test score gap, and educational inequality more generally, deserve further investigation.

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Table 1: Descriptive Statistics for Black and White samples on key health, family background, and achievement variables

	Males					Females				
	Black		White			Black		White		
	Mean	Std. D.	Mean	Std. D.	Z-Score*	Mean	Std. D.	Mean	Std. D.	Z-Score*
Child's health conditions										
Normal Weight	0.688	0.463	0.713	0.453	-1.741	0.660	0.474	0.728	0.445	-4.701
At Risk of Overweight	0.164	0.370	0.138	0.345	2.272	0.170	0.376	0.145	0.352	2.219
Overweight	0.111	0.314	0.109	0.312	0.173	0.128	0.334	0.089	0.285	3.820
<10 percentile of height for age	0.060	0.237	0.084	0.278	-3.461	0.047	0.213	0.080	0.271	-5.072
Birth weight (pounds)	7.057	1.327	7.671	1.317	-14.636	6.795	1.436	7.376	1.242	-12.759
High birth weight	0.082	0.274	0.179	0.383	-11.189	0.054	0.227	0.110	0.314	-7.792
Normal birth weight	0.811	0.391	0.768	0.422	3.523	0.800	0.401	0.828	0.377	-2.236
Low birth weight	0.116	0.320	0.055	0.227	6.228	0.149	0.357	0.063	0.244	7.733
Premature	0.180	0.384	0.173	0.378	0.647	0.194	0.395	0.159	0.365	2.991
Child diagnosed with either learning, speech, hearing, or vision problem	0.132	0.339	0.170	0.376	-3.618	0.085	0.279	0.118	0.322	-3.756
Child's health is poor	0.064	0.244	0.020	0.141	5.669	0.040	0.196	0.013	0.115	4.334
Child ever had frequent ear infections	0.272	0.445	0.384	0.486	-8.033	0.252	0.434	0.337	0.473	-6.253
Child's family background										
Socioeconomic index	-0.344	0.732	0.229	0.737	-26.730	-0.370	0.778	0.242	0.734	-26.715
Below poverty	0.419	0.494	0.087	0.282	22.944	0.433	0.496	0.096	0.295	23.112
Single parent family	0.522	0.500	0.132	0.339	25.001	0.496	0.500	0.144	0.351	22.518
Mother's Ed: Less than High school	0.184	0.388	0.066	0.248	10.320	0.181	0.385	0.055	0.228	11.091
High school diploma or equivalent	0.374	0.484	0.287	0.452	6.067	0.374	0.484	0.291	0.454	5.775
VOC/Tech program or some college	0.332	0.471	0.340	0.474	-0.567	0.342	0.475	0.348	0.476	-0.394
Bachelor or more	0.110	0.313	0.307	0.461	-21.341	0.102	0.303	0.306	0.461	-22.688
Child's cognitive assessment										
Fall Kindergarten: Reading IRT score	26.460	8.568	30.395	9.902	-11.119	27.163	7.393	31.783	9.537	-14.995
Fall Kindergarten: Math IRT score	19.528	7.071	25.799	9.742	-21.489	19.407	5.934	25.240	8.306	-23.635
Spring Kindergarten: Reading IRT score	36.640	12.003	41.784	13.431	-10.891	37.674	11.243	43.981	13.414	-14.114
Spring Kindergarten: Math IRT score	28.416	9.927	36.986	12.405	-21.943	27.878	8.227	36.021	10.383	-24.846
Fall First Grade: Reading IRT score	42.919	14.661	49.012	16.859	-6.275	43.398	12.388	51.831	17.670	-9.651
Fall First Grade: Math IRT score	34.959	11.533	44.524	14.865	-12.524	34.865	10.596	43.111	12.594	-11.033
Spring First Grade: Reading IRT score	61.882	20.017	74.097	21.979	-15.534	65.992	19.073	77.886	21.153	-15.714
Spring First Grade: Math IRT score	49.450	14.428	63.294	17.919	-24.425	49.004	12.596	61.073	15.269	-24.143
Spring Third Grade: Reading IRT score	103.721	23.959	123.604	23.490	-20.513	106.696	22.372	127.138	21.912	-22.752
Spring Third Grade: Math IRT score	80.216	20.426	100.221	19.958	-24.445	76.856	18.719	95.768	19.069	-25.279
Spring Fifth Grade: Reading IRT score	123.974	24.788	144.204	21.663	-20.484	127.960	21.914	147.070	19.253	-21.697
Spring Fifth Grade: Math IRT score	100.582	21.936	121.003	18.929	-23.385	96.984	21.125	116.927	18.654	-23.469

Descriptive statistics of unweighted ECLS-K longitudinal sample K-5th grade

*Z-scores are given as test of the difference of means comparing black males with white males and black females with white females.

Z-Score Values of 1.96 and above and 1.96 and below indicate that the difference in means is statistically significant at the p<.05 level

Table 2A: Estimated Racial and Ethnic Test Score Gaps in Fall Kindergarten, Reading IRT Scores

Males	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			Model 7		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
Racial and ethnic gaps (reference: non-Hispanic whites)																					
Non-Hispanic Black	-3.94	0.44	***	-2.59	0.49	***	-2.49	0.51	***	-0.16	0.52		0.32	0.54		0.82	1.03		0.38	1.09	
Hispanic	-3.95	0.42	***	-3.65	0.44	***	-4.18	0.46	***	-1.29	0.48	**	-1.37	0.49	**	-1.76	0.86	*	-1.39	0.92	
Asian	2.05	0.64	**	2.11	0.74	**	2.18	0.78	**	3.19	0.77	***	3.25	0.81	***	2.24	1.65		2.78	1.83	
Other Race	-3.27	0.60	***	-3.26	0.63	***	-2.54	0.66	***	-0.81	0.63		-1.16	0.64		-2.65	1.29	*	-2.23	1.35	
Covariates included in the regression?																					
Child's health conditions	N			Y			Y			N			Y			Y			Y		
Child's demographic charact.	N			N			Y			Y			Y			Y			Y		
Socioeconomic background	N			N			N			Y			Y			Y			Y		
School characteristics	N			N			N			N			N			Y			Y		
Parental health	N			N			N			N			N			N			Y		

Females	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			Model 7		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
Racial and ethnic gaps (reference: non-Hispanic whites)																					
Non-Hispanic Black	-4.62	0.45	***	-3.04	0.48	***	-3.29	0.50	***	-0.77	0.49		-0.39	0.50		-0.59	0.96		-0.31	1.02	
Hispanic	-4.07	0.42	***	-3.76	0.44	***	-4.42	0.46	***	-1.40	0.47	**	-1.55	0.48	**	-1.92	0.96	*	-1.84	1.01	
Asian	3.32	0.61	***	3.80	0.66	***	3.80	0.70	***	4.93	0.70	***	4.51	0.71	***	0.80	1.47		2.19	1.64	
Other Race	-3.74	0.59	***	-3.02	0.61	***	-2.47	0.63	***	-1.10	0.60		-1.10	0.60		-2.92	1.08	**	-3.01	1.13	**
Covariates included in the regression?																					
Child's health conditions	N			Y			Y			N			Y			Y			Y		
Child's demographic charact.	N			N			Y			Y			Y			Y			Y		
Socioeconomic background	N			N			N			Y			Y			Y			Y		
School characteristics	N			N			N			N			N			Y			Y		
Parental health	N			N			N			N			N			N			Y		

Table 2B: Estimated Racial and Ethnic Test Score Gaps in Fall Kindergarten, Math IRT Scores

Males	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			Model 7		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
Racial and ethnic gaps (reference: non-Hispanic whites)																					
Non-Hispanic Black	-6.27	0.41	***	-4.81	0.42	***	-4.39	0.44	***	-2.42	0.45	***	-1.99	0.45	***	-1.03	0.89		-1.00	0.95	
Hispanic	-6.80	0.33	***	-6.07	0.33	***	-6.12	0.36	***	-2.62	0.42	***	-2.63	0.40	***	-2.41	0.74	**	-1.90	0.80	*
Asian	1.27	0.59	*	0.71	0.64		1.18	0.66		2.43	0.66	***	1.99	0.67	**	1.81	1.40		2.49	1.56	
Other Race	-4.37	0.55	***	-4.61	0.55	***	-3.83	0.56	***	-2.02	0.55	***	-2.60	0.54	***	-1.37	1.12		-0.85	1.18	
Covariates included in the regression?																					
Child's health conditions	N			Y			Y			N			Y			Y			Y		
Child's demographic charact.	N			N			Y			Y			Y			Y			Y		
Socioeconomic background	N			N			N			Y			Y			Y			Y		
School characteristics	N			N			N			N			N			Y			Y		
Parental health	N			N			N			N			N			N			Y		

Females	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			Model 7		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
Racial and ethnic gaps (reference: non-Hispanic whites)																					
Non-Hispanic Black	-5.83	0.36	***	-4.11	0.36	***	-4.10	0.37	***	-2.41	0.38	***	-1.88	0.38	***	-0.52	0.71		-0.44	0.75	
Hispanic	-6.17	0.29	***	-5.37	0.29	***	-5.59	0.31	***	-2.27	0.36	***	-2.45	0.36	***	-1.60	0.71	*	-1.78	0.74	*
Asian	1.03	0.49	*	1.01	0.51	*	1.02	0.53		1.97	0.53	***	1.33	0.52	*	0.92	1.08		2.26	1.21	
Other Race	-4.28	0.48	***	-3.50	0.47	***	-3.08	0.47	***	-2.05	0.47	***	-2.03	0.45	***	-1.82	0.81	*	-1.90	0.83	*
Covariates included in the regression?																					
Child's health conditions	N			Y			Y			N			Y			Y			Y		
Child's demographic charact.	N			N			Y			Y			Y			Y			Y		
Socioeconomic background	N			N			N			Y			Y			Y			Y		
School characteristics	N			N			N			N			N			Y			Y		
Parental health	N			N			N			N			N			N			Y		