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A Quantitative Analysis of School-level Factors and Their Impact on the Racial Achievement Gap

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A QUANTITATIVE ANALYSIS OF SCHOOL-LEVEL FACTORS AND THEIR IMPACT ON THE RACIAL ACHIEVEMENT GAP

by

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Under the Supervision of Professor William Velez. PhD

Utilizing the National Center for Education Statistics (NCES) Early Childhood Longitudinal Study (ECLS) dataset, I examined the racial composition of schools and classrooms, disciplinary variables, levels of reading and math achievement, test scores, and other aspects of schools to analyze effectively the marginal effects of being a black student within schools. Focusing on the dependent variables of test scores, classroom ability level, and suspension rates, I controlled for non-school related factors in order to isolate the impact of school influences on academic achievement, utilizing Hierarchical Linear Models. The results of this study indicate that early school tracking as well as differential disciplinary treatment contribute to the black/white test score gap that has been persistent for decades. This research is important to understand fully the impact of the differential treatment that black students experience within schools. Without research such as this, integration reforms will continue to dismiss key issues within schools that are disproportionately hurting the achievement of black students.

To

my parents,

grandparents,

mentors,

and everyone who supported me through my academic journey

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ACKNOWLEDGEMENTS

I would like to express my deepest appreciation to my committee chair Professor William Velez, who has continually and convincingly conveyed a spirit of confidence in regard to my research and scholarship, and an excitement in regard to our shared academic interests. Without his guidance and persistent help this dissertation would not have been possible. I would like to thank my committee members, Professor Marcus Britton and Professor John Roberts, whose dedication and work with me helped inform my conceptual and methodological decisions. Finally, a special thank you to my committee member Professor Pat Goldsmith, who worked with me on one of my first independent research projects as an undergraduate student, served as chair of my master's thesis committee, and whose enthusiasm about my academic abilities informed my decision to get a doctoral degree. The lasting impacts of your consistent mentorship have been tremendously helpful to my academic career and life in general.

CHAPTER I: INTRODUCTION

In the wake of the historical and more recent displays of violence against black and brown bodies domestically and abroad, this study is concentrated in the notion that black Americans have not and still do not hold the same civil liberties as other groups in this country. Historical and present-day movements such as #blacklivesmatter are evidence that, on a societal level, marginalized groups are not treated equally and still have to fight for what is supposed to be rightfully theirs. When black people can be unlawfully killed by civil servants and then blamed for their own death, there is no question that racial discrimination is very much alive in 2016. With all of this taking place in the midst of this study, I find that it is relevant to acknowledge that when black lives do not matter in the streets of society, then one must acknowledge that black people deal with differential treatment in all of society's institutions. Within the United States, there has been growing inequality in all facets of society, and no organization nor institution can escape the impact of such disparities. Specifically, schools are complex organizations that are constantly under harsh scrutiny and experiencing rapid changes, and therefore, their complexity makes the problems of inequality within schools just as complicated to understand fully and solve as other inequality-related issues within other institutions. The racial achievement gap within schools has been a topic of focus for many disciplines, all of which are attempting to explain why such a gap continues to exist. One has to take into consideration racial inequality, class inequality, non-school factors, between and within school segregation, as well as school factors that impact black students to understand fully which mechanisms continue to perpetuate this gap. While this study focuses on specific

institutional mechanisms that aid in the differential treatment of black students, it must be understood that solutions lie at a larger societal level in addition to the school level.

When referring to the racial achievement gap, both within and between school differences are important to examine. It has been established that schools are still highly segregated, and therefore, the fact that black students typically attend lower-funded schools may contribute to the gap in test scores (Neckerman 2004, Jencks and Phillips 1998). However, within integrated schools, the same gap is present and also needs to be examined. When discussing previous literature on the black-white achievement gap, the Coleman report (Coleman et al. 1966) was the first national study that explains the differences in students' achievements based on race. This report suggested that there was a gap in achievement between black and white students and that the gap increased as students' progress through school (Coleman et al. 1966). Since the Coleman report, several studies have continued to examine this phenomenon with different data, using more recent samples, and incorporating more explanatory variables. While no study has explained the gap entirely, there have been established variables that account for a portion of the achievement gap (Fryer and Levitt 2004). Studies have explored the impact of socioeconomic status (SES) and poverty, in general, to further understand the gap (Brooks-Gunn et al. 1993, 1994, 1997; Mayer 1997). However, even though most studies account for SES and other poverty-related variables, there is still a substantial portion of the gap that is unexplained. What has been established is that this difference in test scores emerges before children enter kindergarten, yet it widens as they progress through school (Phillips et al. 1988).

Studies Utilizing ECLS

In recent years when examining the black-white achievement gap, many researchers have utilized data from the Early Childhood Longitudinal Study (ECLS) (Fryer and Levitt 2004; Reardon and Robinson 2008; Palardy 2015). Some of these studies show that when examining achievement gaps, SES is a large factor in the explanation of the difference (Palardy 2015). Lower SES students disproportionately attend lower quality, underfunded schools that are located in disadvantaged neighborhoods. To put my work into context, it must be understood what conclusions have been made from previous studies focusing on the racial achievement gap and utilizing the ECLS dataset.

It has been understood that, historically, it was expected that the achievement gap would narrow and eventually close (Grissmer and Eiseman 2008). However, gaps have stayed consistent for long periods of no progress. A key study that set the tone for this type of research around racial disparities and achievement was conducted by Fryer and Levitt in 2004. Utilizing ECLS and Ordinary Least Squares (OLS) regression, Fryer and Levitt established that the black/white test score gap is present at the start of kindergarten. However, by controlling for a series of child and environment characteristics prior to entering kindergarten, such as SES, Fryer and Levitt were able to explain a significant portion of the black/white test score gap. Yet, their study indicated that when black students begin progressing through school, they lose ground and the gap widens. None of their previous explanatory factors could explain the racial disparities after kindergarten. Chatterji (2006), utilized ECLS and nested regression models to establish that, after kindergarten, the black students' reading scores were .51 standard deviations below that of white students.

To examine this trend further, Grissmer and Eiseman utilized the ECLS data to examine three factors that they felt would help explain the more complex dynamics of the empirical data. Grissmer and Eiseman believed that early childhood environments create achievement gaps and limit future achievement, that behavior and cognitive development may be different for different racial groups, and that cognitive development measures may be too narrow for examining cognitive achievement. Grissmer and Eismans' made their assumptions based on data from previous research done by Lee and Birkam, (2002) published in *Inequality at the starting gate: Social background differences in achievement as children begin school*. This book examines the inequalities of children's cognitive abilities in literacy and math and acknowledge the substantial differences in test scores beginning in kindergarten. Socioeconomic status was a large contributor to many of the achievement differences that Lee and Birkam examined; however, there was a major focus on the family and home conditions that left the impression that there are family or cultural differences among racial groups that are limiting achievement despite any efforts of the educational system (Lee and Birkam, 2002). These assumptions led Grissmer, Eiseman, and other scholars to conclude that genes interacting with environment between birth and kindergarten entrance may account for the achievement gap (Dickens 2005; Grissmer and Eiseman 2008). These conclusions have skewed the lens of past research to rely on the assumption that schools are not the source of a significant proportion of the test score gap between black and white students. These assumptions led to research where scholars have utilized the ECLS to focus on individual-level characteristics of black students, such as their socioemotional development—a child's experience, management of emotions, and ability to create positive relationships with others (Evans et al. 2005). The lack of socioemotional

development has been attributed to chaotic living environments and the negative implications of poverty (Evans et al. 2005). Conclusions such as these have steered research to focus on the social and economic inequality in family characteristics and environments in the pre-school years. Studies have relied on such conclusions and assumptions when explaining the formation of the test score gap. However, this study will disrupt that notion with the rigorous examination of school-level explanations.

Condron (2009) utilized the ECLS and two level HLM models to examine the complexities of the intersection between class and race in order to disentangle the impact of these constructs on achievement gaps. Within his models, Condron tested several within-school and non-school factors to determine which covariates can help explain the black/white achievement gap. Condon concluded that "school factors play a more pivotal role in generating the black/white achievement gap, while non-school factors primarily drive social class disparities" (699). Condron was able to establish that school factors increase the pace in which black students fall behind their white peers.

From these types of studies, other scholars have begun to utilize the ECLS to examine within-school differences between black and white students. Lleras and Rangel (2009) utilized ECLS data and hierarchical linear models to establish that black students are placed in lower ability groups more often, and as a result, learn less over time between first and third grade. Desimone and Long (2010) utilized the ECLS and multilevel growth models to examine how students' teacher instruction differs. Students that enter school with lower test scores are assigned to teachers that administer basic instruction in comparison to students that are perceived to be higher achieving students. Higher achieving students are assigned to teachers

that emphasize more advanced instruction (Desimone and Long 2010). These findings indicated a direct correlation between time spent on advanced procedural instruction for math and academic achievement growth. These results were found for students regardless of race or SES (Desimone and Long 2010). Research further concludes that there are no statistically significant differences between students that are placed in high ability groups versus students that are not placed in ability groups at all, which negates the notion that ability groups and tracking are always necessary (Lleras and Rangel 2009).

In addition, Mathews et al. (2010) utilized ECLS data from kindergarten through fifth grade and growth-curve modeling to examine the treatment of black students, and black boys in particular, within schools. Mathews et al. found that many of the schools that black boys attend focus more on authoritarian disciplinary systems and external regulation to manage and educate students. These findings were significant despite the fact that problem behaviors, SES, and the home literacy environment were controlled for and not key factors in explaining academic development (Mathews et al. 2010). Their findings suggest that family background is less important than learning-related skills that are developed within schools. (Mathews et al. 2010). These sets of skills are necessary to help students regulate their own academic achievement and have been recognized to increase academic achievement (Mathews et al. 2010). However, it has been established that when it comes to black students, many schools focus more of their efforts on behavior problems and disciplinary measures (Skiba et al. 2000).

These studies establish how the ECLS data have been used to establish a racial gap and a pattern of differential treatment of black and white students. Yet, scholars, such as Reardon et al. (2008), utilized the ECLS to establish the complexities of whether within- or between-school

differences can explain the perpetuation of the racial test score gap. Because schools are still heavily segregated, and black students are more likely to attend lower quality schools (Reardon et al., 2008), one would expect to see a between-school component to the racial achievement gap. However, black students also receive differential instructional opportunities when attending the same school as their white peers (Reardon et al. 2008). This indicates that there is also a within-school component to the racial achievement gap. As previously stated, the gap can be observed at the start of kindergarten, which can be explained by unequal family resources, neighborhood contexts, and other unequal societal opportunities (Fryer and Levitt 2004; Reardon et al. 2008; Condron 2009). Yet, the initial gap begins relatively small and grows exponentially by third grade (Reardon et al. 2008). This pattern suggests that it is not solely family SES characteristics that are responsible for the test score gap that continues to widen as students' progress through school. Reardon's (2008) examination of the data concluded that between-school differences in school quality cannot account for a larger proportion of the widening gap and that within-school factors further perpetuate this trend.

While many of the studies that utilize the ECLS data focus on the early kindergarten through third grade years, Watson et al. (2010)—utilizing the ECLS, t-tests, and an eighth grade data sample—established that the racial achievement gap is still present in eighth grade. When examining math test score data in the eighth grade, Watson's results indicated that black students' test scores are still significantly behind the test scores of white students.

There are numerous other studies that utilized the ECLS data and examined variables such as parental education, family type, region of the school, gender, school minority enrollment, school size, and so forth (Musu-Gillett et al. 2015). However, individual- and school-

level variables from kindergarten through eighth grade must be examined extensively to understand fully what factors impact these racial disparities. Without this examination of the differential treatment of marginalized groups within institutions, institutional discrimination will not be acknowledged, interrogated, or dismantled.

The Racial Achievement Gap Beyond ECLS

Beyond the previous research utilizing ECLS, much of the research on the racial achievement gap has focused on the secondary years and how segregation at the high school level impacts students' test scores and graduation rates. However, there is a large body of literature that suggests that many of the causal factors for the racial achievement gap begin much earlier than high school (Coleman et. al 1966; Entwisle et al. 2005; Rampey, Dion, and Donahue 2009). Children's educational status in the first grade has been linked to their level of education in their early twenties (Entwisle et al. 2005). Thus, the initial years of schooling are critical periods for children; these years constitute a predetermining factor that impacts achievement. These critical years include the transition into the school culture and rules, the adjustment from part-time to full-time, and the change of being away from their parents (Entwisle et al. 2005). Those that acclimate quickly to these new environments will be perceived by teachers better than those who do not. Being a minority student or a student with a lower SES has been shown to impact this transition period (Coleman et. al 1966; Rampey, Dion, and Donahue 2009). The early perceptions from teachers are critical, and at these early stages, the child's academic skills are not developed enough to impact how teachers view them (Entwisle et al. 2005). Therefore, students are judged on their behavior and demeanor, and this too is shown to shape how well the student achieves. It is within these early years of schooling

that non-cognitive resources impact a student's education tremendously. During the first few years of a child's education, curricular differentiation occurs, and different knowledge and pedagogies is offered to various students (Entwisle et al. 2005). This results in an achievement gap starts when students are young and expands as students' progress through school, since mechanisms and structures within schools separate students and keep them separated throughout their secondary years (Entwisle et al. 2005).

Phillips et al. (1988) argued that the gap persists because poor black students come to school with fewer skills than middle-class white students. They claim that poor black students are less likely to attend pre-school and are not exposed to other resources that may prepare them for school, and that initial deficits keep black students consistently behind white students. However, the black/white achievement gap widens as students' progress through school; it does not stay constant (Entwisle et al. 2005). The achievement gap progressively becomes larger with each grade level, so that by the time a black student is a senior in high school, their average performance on test scores is that of a white eighth grader (Entwisle et al. 2005). This trend is visible regardless of the class or socioeconomic status of black students. The data point to the fact that factors within schools facilitate the perpetuation of racial academic differences.

The consequences of differential treatment among black and white students do not only impact their academic achievement, but have a much more detrimental long-term impact on black student's lives. While these consequences will not directly be the focal point of the analysis in this research, it is important to mention them because they highlight the importance of this topic. While much of the research demonstrates that the achievement gap is consequential in preparing black students to enter into higher education, preparing them for

careers, and bringing down average test scores, the real-world consequences include that fact that the failure of a proper education perpetuates the school-to-prison pipeline (Kim et al. 2010).

Purpose

The goal of this study is to examine additional school factors that contribute to the unequal outcomes within integrated public schools that help to explain portions of the black/white achievement gap. Researchers continue to debate whether racial inequalities arise because the schools are biased against poor and black students or because poor and minority students have fewer skills than more advantaged students. The main question is, when all else is controlled for that impacts a student's learning, how much of the black/white achievement gap can be explained by differential treatment of black and white students in schools during the early years of schooling?

This analysis will examine rigorously whether the achievement gap is impacted by the differential treatment regarding ability-group placement and discipline within schools. Previous research established that black students are more likely to be placed in lower track ability groups (Milner and Howard 2004) and disproportionately receive more suspensions (Gregory et al. 2010). This research will examine if those are factors contribute to the widening of the gap between white and black students as they progress from kindergarten through eighth grade. This research will focus on individual, classroom, school factors, because it is integral that all factors that impact the racial achievement gap are understood fully.

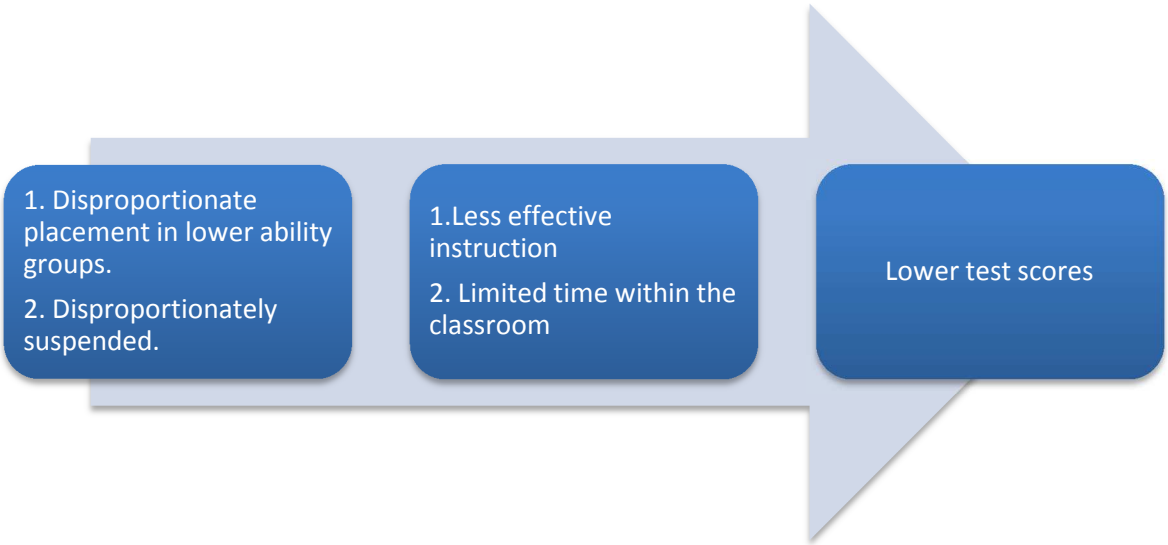
Significance and Conceptual Framework

The importance of this study is that it seeks to explain the portion of the gap that is still unexplained by previous studies. The theoretical framework that I am basing some of my analyses on is the role that opportunity to learn (OTL) plays in the formation of achievement gaps. OTL was coined in the 1960's by John Carroll and conveys the idea that students' learning in schools is a result of the opportunity and time they spend engaged in learning (Carroll 1963). This framework is informed by the previous research summarized in the literature review; this research has identified aspects of schools and treatment of students in regards to discipline and ability grouping that impact achievement. While the research provided also shows that students enter school with a variety of family, academic, and other background characteristics that influence performance, this study aligns with the OTL framework.

Previous research has attributed a significant proportion of OTL to classroom effects (Palardy 2015). Palardy identified three aspects of schools in which racial and ethnic inequality may impact OTL and lead to the formation of achievement gaps. These issues include the contextual characteristics of the classroom and access to qualified teachers (Palardy 2015). In addition to the literature on classroom-based inequality, this study adds to the body of research on the impact of suspensions and ability-group placement as contributors of inequities to OTL. If OTL conveys the idea that a student's ability to learn is based on opportunity, both suspensions and being placed in lower skill groups hinder that opportunity. Suspensions keep children out of the classroom and impact their ability to engage with academic material (Arcia 2006), both of which affect their opportunity to learn. Previous research (Coleman et. al 1966) has shown how placement in lower ability groups impacts the amount of learning a student

obtains throughout the school year, access to quality teachers, and changes a student's academic instruction throughout the rest of their schooling. This study will explore how differential treatment in regards to ability grouping and discipline impact the opportunity to learn for black students, while the results of this study will detail the consequences that these actions have on the overall black-white achievement gap. Figure 1 demonstrates the conceptual trajectory of this framework.

Figure 1. CONCEPTUAL FRAMEWORK



Research Questions

The following are the specific research questions that guided this study:

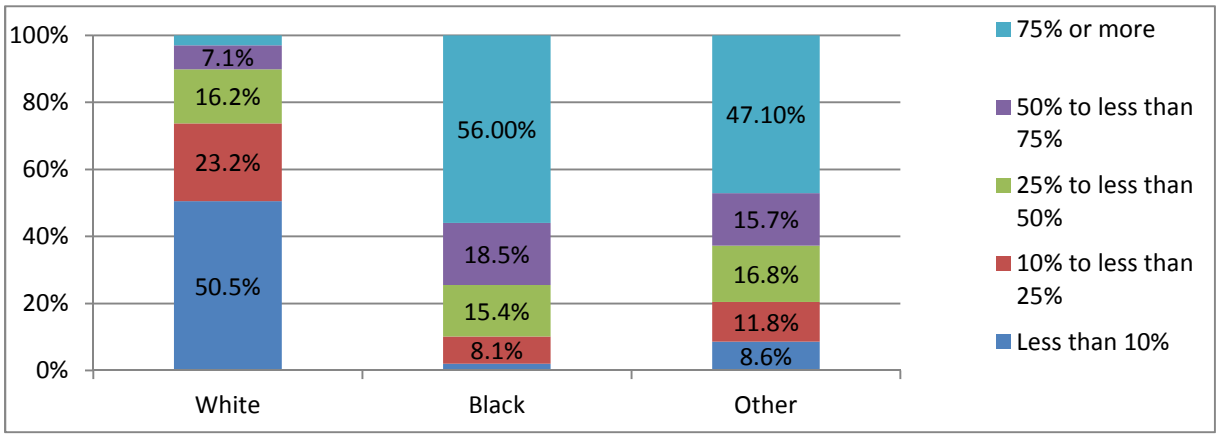
1. How does the test score gap differ when examining kindergarten, 5th grade, and 8th grade?
    a. Is there a variation in average students test scores across schools in kindergarten, 1st, 5th, and 8th grade? If so, what school variables are associated with that variation?

2. Does tracking between K-8th grade impact the racial achievement gap?
    a. Is there variation in the average ability group level placement of black students across schools? If so, what school variables are associated with that variation?
    b. Is there a difference in student's test scores on average by ability group placement? What school variables are associated with that variation?
    c. Is there a difference in ability level placement by the percentage of minority students within schools? What school variables are associated with that variation?
3. Do disproportionate discipline methods impact the racial achievement gap?
    a. Is there variation is average number of suspensions across schools? If so, what school variables are associated with that variation?
    b. Is there a difference in student's test scores on average by obtained suspensions? What school variables are associated with that variation?
    c. Is there a difference in student's test scores on average by the percentage of minority students within schools? What school variables are associated with that variation?
    d. Is there a difference in obtained suspensions by the percentage of minority students within schools? What school variables are associated with that variation?

Initial Descriptive Statistics: Inequality Within the Sample

Within ECLS, percentage of minority students is categorized as follows: less than 10%, 10% to less than 25%, 25% to less than 50%, 50% to less than 75%, and 75% or more. As shown in Figure 2, over 55% of black students attend a school that has 75% or more minority students. It would have been preferable to use a less crude definition of integration; however, the elimination of the students that attend a school with 75% or more minority students would eliminate over half of my black student sample. Within the unweighted sample, black students make up 15.1% of the population, 3,224 students. To eliminate half of that would make my sample N too small to make accurate estimates and assumptions. As the literature has suggested, many of the issues of racial discrimination impact students more within integrated schools. Therefore, within my analysis I will include interaction terms to examine the results based on different levels of integration.

Figure 2. PERCENTAGE OF MINORITY STUDENTS IN SCHOOLS BY RACE OF STUDENT

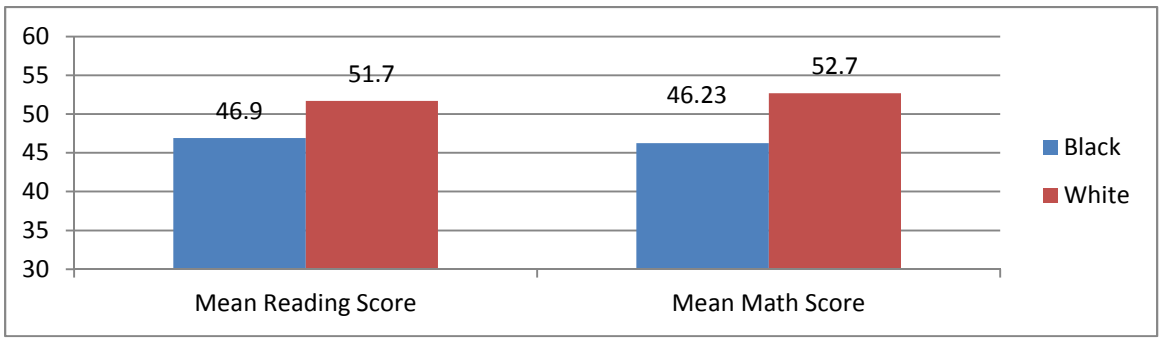


*All other racial categories have been collapsed into the 'other' category

Racial achievement gap

In my preliminary analysis, I sought out to understand if an achievement gap was present within this sample, what role poverty played in the racial achievement gap, the student's attitudes about schools, as well as if there were observed differences in disciplinary experiences. To analyze this data properly, it was crucial to ensure that there was a racial achievement gap present within this sample. To examine this, I compared the mean reading and math testscores of black and white students from kindergarten to eighth grade, as shown in Figure 3. The results indicate is a gap beginning in kindergarten for both reading and math test scores. The gap initially is 4.8-points, with black students averaging a 46.9 and white students averaging a 51.7. This initial difference in reading is almost a one-half standard deviation difference. The math test scores follow a similar trend with a 6.47-point difference, which is over a one-half standard deviation difference. The literature attempts to explain this initial gap by focusing on the different resources that black and white students typically are exposed to prior to entering kindergarten (Jencks and Phillips 1998).

Figure 3. FALL KINDERGARTEN TEST SCORES

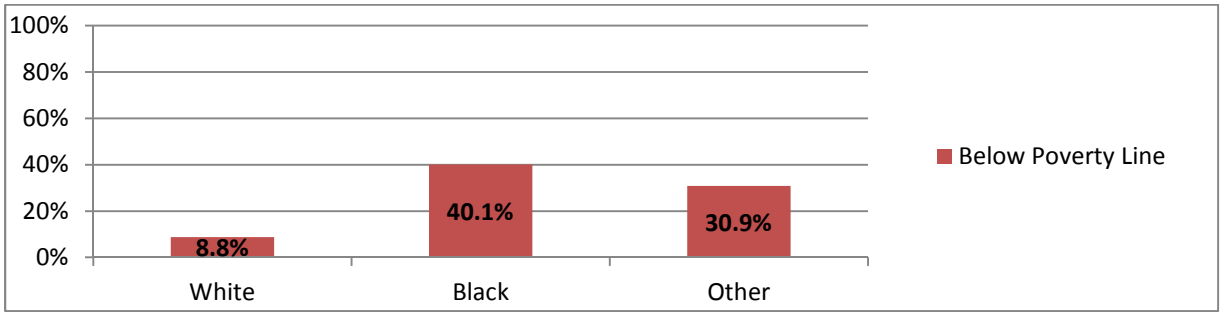


When examining how this this gap developed as the students progressed through school, the results indicated that, for both the reading and math test scores, the gap persisted.

Impacts of poverty

Much of the literature explains that a large portion of the racial achievement gap can be explained by the fact that a large percentage of black students are living in households that are below the poverty line. As seen in Figure 4, within this sample, over 40% of the black students live below the poverty line, compared to 8.8% of the white students.

Figure 4. PERCENTAGE OF STUDENTS BELOW THE POVERTY LINE



*All other racial categories have been collapsed into the 'other' category

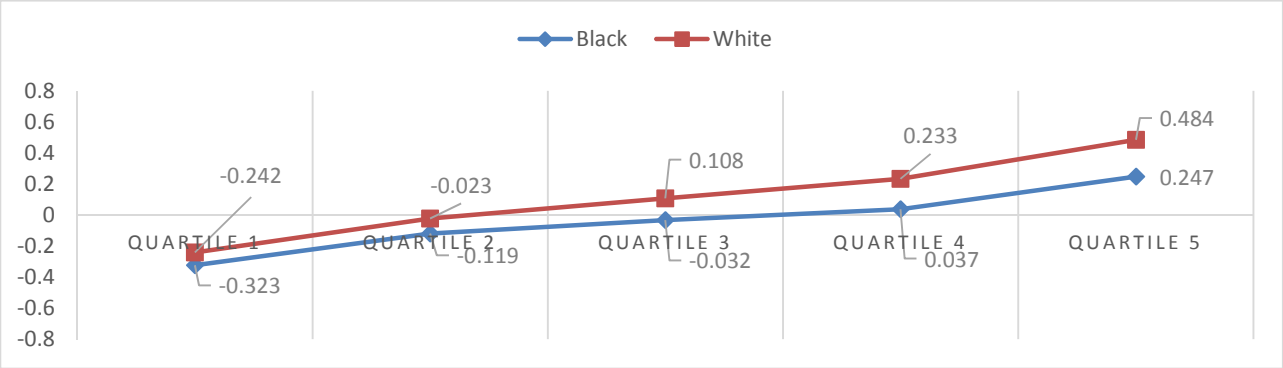
Because of this disparity and the fact that a major argument within the literature is that the one of the larger factors impacting black students is the prevalence of black students having lower a lower SES in comparison to white students, I also looked at the impact of test scores when accounting for race and SES.

I examined the reading and math test scores of black and white students when separated by the five SES quartile groupings. Socioeconomic status was computed at the household level using data from the set of parents who completed the parent interview in the spring semester of kindergarten, 1st, 3rd, 5th, and 8th grade. (Tourangeau et al. 2009). The SES variable reflects the socioeconomic status of the household at the time of data collection. The components used to create the SES variable were as follows: Father/male guardian's education, Mother/female guardian's education, Father/male guardian's occupation,

Mother/female guardian's occupation, and Household income (Tourangeau et al. 2009). The SES variable was then split into five quartiles, where one represented the lowest SES scores and 5 represented the highest SES scores.

The test scores used are broad-based scores using the full set of assessment items in reading and mathematics that were calculated into item response theory scale scores (IRT[1]) (Tourangeau et al. 2009). Figures 5 and 6 display that, regardless of SES, black students are still behind white students in reading and math test scores in kindergarten. Figures 7 and 8 show that this gap is persistent as they progress through school. For instance, in fifth grade, this gap is still prevalent at every SES quartile level. In all five SES groups, black students perform lower than their white peers from the same SES backgrounds. This indicates that there are other factors specifically impacting black students.

Figure 5. KINDERGARTEN READING TEST SCORES BY SES QUARTILES



[1] The IRT utilizes "the pattern of right, wrong and omitted responses to the items actually administered in an assessment and the difficulty, discriminating ability, and 'guess-ability' of each item to place each child in a continuous ability scale" (Tourangeau et al. 2009: 3-6). The advantage to using the IRT score is its ability to compensate for the possibility of children with low-ability guessing several questions correctly (Tourangeau et al. 2009). For the comparison, the standardized versions of the IRT scores were used in order to see the differences between the scores when the mean score is zero. Scores were taken from a assessments constructed by ECLS.

Figure 6. KINDERGARTEN MATH TEST SCORES **BY SES QUARTILES**

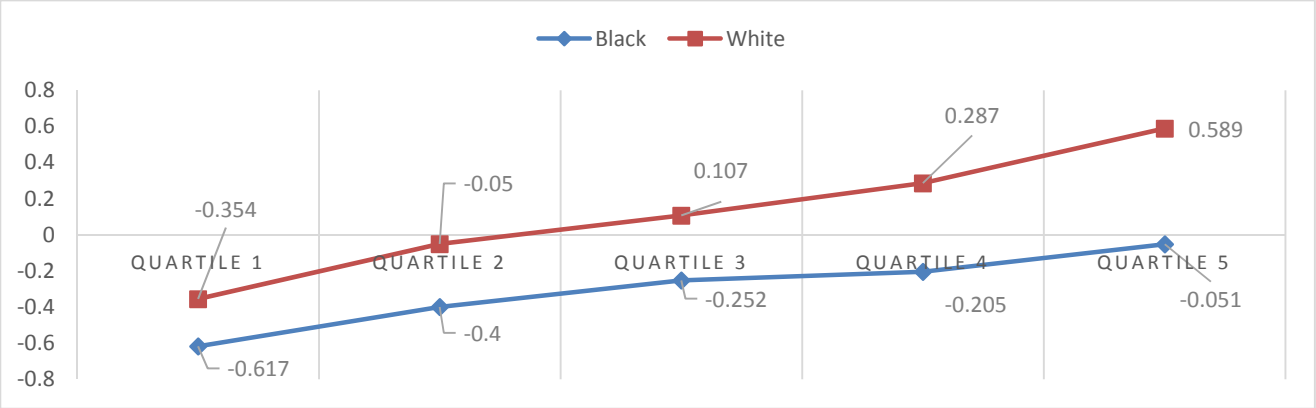


Figure 7. FIFTH GRADE READING TEST SCORES **BY SES QUARTILES**

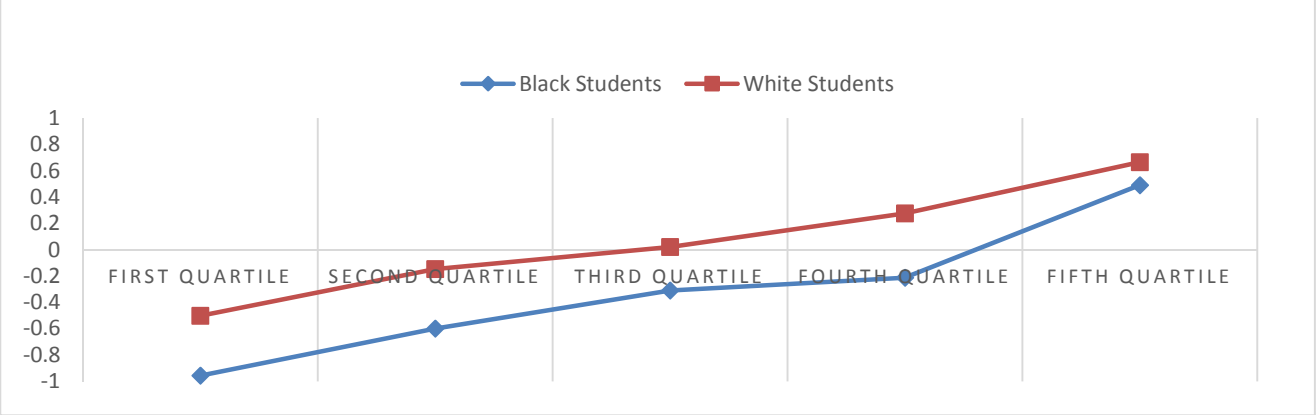
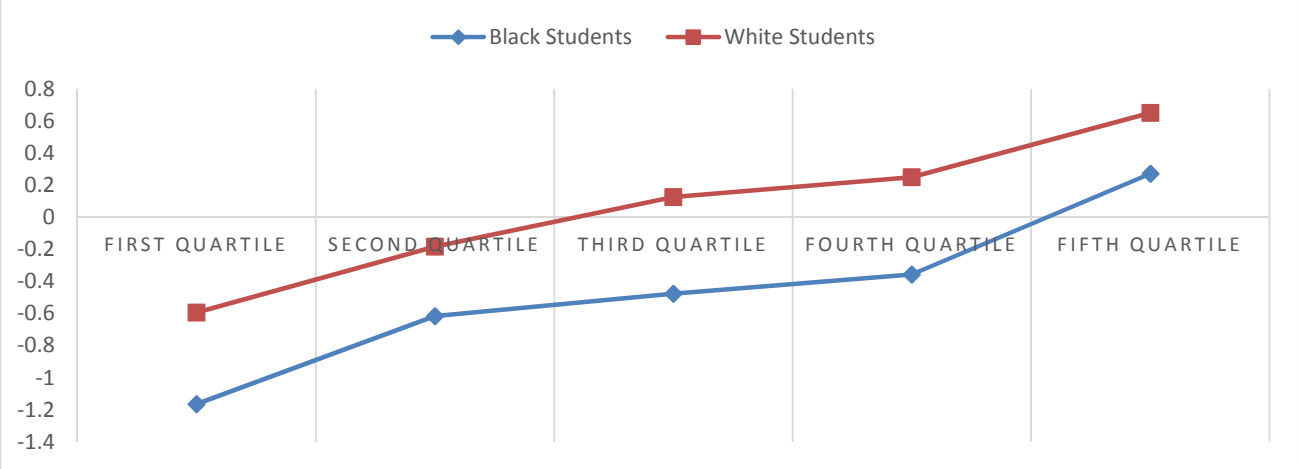


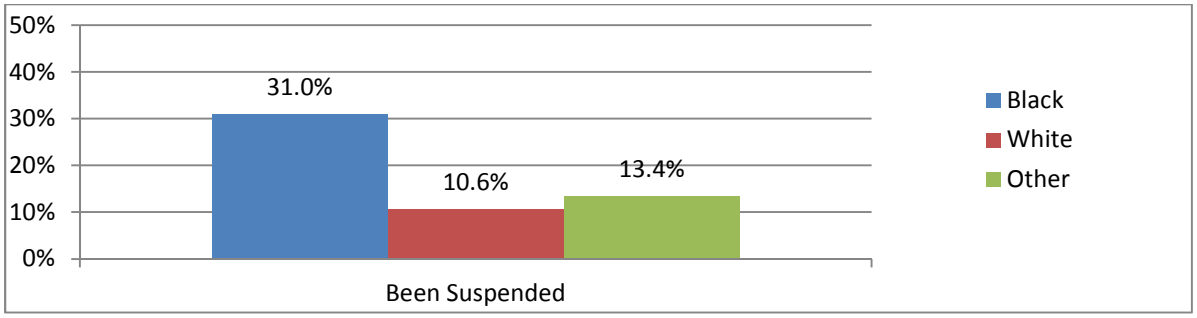
Figure 8. FIFTH GRADE MATH TEST SCORES **BY SES QUARTILES**



Disciplinary experiences

The literature establishes that black students have different disciplinary experiences within schools. To examine if this differential treatment was present in the ECLS sample, I examined the percentage of students that have been suspended. Figure 9 demonstrates that within this sample, black students are three times more likely to be suspended than white students, and over twice as likely to be suspended in comparison to other minority groups. This type of finding is not surprising, but ensures that there is differential treatment occurring within this sample for further exploration.

Figure 9. PERCENTAGE OF STUDENTS THAT HAVE BEEN SUSPENDED



*All other racial categories have been collapsed into the 'other' category

Discussion

The methodological plan used in this research allowed me to analyze effectively which school factors impact black students' achievement during the early years of their schooling. While other models have attempted to understand the role of the outside-school factors, the role of school segregation, and the role of class-specific factors, my goal is to investigate the effect of schools on specific variables that the literature has demonstrated impact students differently based on race. The main goal is to focus on the school as an institution that possesses the same racial injustices that occur within other institutions in society. The

literature review will demonstrate the consequences of the Brown versus Board of Education implementation, and that is relevant because of the drastic changes that took place during that time to separate black students from the white student body. That same type of systematic tracking still occurs, and the racial achievement gap has persisted throughout the decades. The preliminary results I have provided demonstrate that there are stark differences in test scores and disciplinary experiences.

There is a complex intersection between race and class that must be considered when discussing the racial achievement gap. As the literature and my preliminary results demonstrate, the racial achievement gap persists independently of household poverty status of the black students. Regardless if the black students within this sample were living in poverty or not, `their test scores lagged behind their white student counterparts as they progressed from kindergarten through later grades. There is evidence of differential treatment within the schools, and white students living in poverty are not experiencing the same decline in test scores as black students.

With the rigorous HLM regression models implemented in this research, I demonstrate that it is not solely background and personal skills that determine a student's achievement in school. Schools are not institutions within a vacuum. In the same way that personal skills are not the only determining factors in who gains broader societal rewards, social interactions based on race can affect a student's outcome in schools. The goal of this study was to distinguish whether racial inequalities arise because there are institutional biases that negatively impact black students, or if the real culprit is the fact that poor and black students have fewer skills than more advantaged students starting out. Distinguishing between those

two factors could impact the future school policies and reforms in regards to black students' achievement.

CHAPTER II: LITERATURE REVIEW

Background

The crux of this problem is complex, which is highlighted in Orfield (1996). The overlapping income distributions and patterns of residential segregation make it impossible to disentangle race and poverty in American schools. Orfield found that most African American and Latino schools are dominated by poor children, while 96% of white schools have a middle class majority. The link between household poverty and academic success is clear. Students that attend these poor schools have lower test scores, higher dropout rates, fewer students in honors classes, less prepared instructors, and a lower percentage of students that go on to college (Orfield 1996). There are tremendous disparities among segregated schools. He finds that African American and Latino students in a segregated school are more than 14 times more likely to be at a high poverty school where more than 50% of the students are poor. Beyond the between school differences of race and class, within-school separation also occurs to disproportionally impact black students (Ogbu 2003). Therefore, when talking about the impacts of racial isolation on black students, one must discuss the consequences of segregated schools, as well as the correlation between segregated neighborhoods and household poverty. While residential segregation and school segregation are directly correlated, this next section will discuss non-school factors that contribute to students' academic achievement. These factors include class, neighborhood, and inequities in capital. When discussing the achievement gap that continues to persist between black and white students, there are claims that neighborhood, family background, and the levels of segregation of schools perpetuate this problematic trend. The following is literature on previous research tackling this issue, setting it

in the historical context that black Americans have never been granted equal treatment in any institution, schools included. Understanding the full scope of this issue at a societal and school level is crucial in setting the tone for why the lens of many past scholars have focused more on individual-level, deficit-based explanations and not on the institution as a whole. Deficit-based approaches locate the problem in the students, their families, and communities. Those often ignores or gives insufficient weight to social and structural forces like racism and discrimination that systematically create barriers to black/brown student success (McClaurin 2016). While there are definitely non-school factors that contribute to the black/white test score gap, a holistic examination is the only appropriate approach to utilize.

Non-School Factors

Class inequality is just as complex as racial inequality. Class inequality encapsulates the vast disparities in neighborhood environments, cultural capital, family background, household poverty, and school opportunities. The literature demonstrates that poor and working class students will perform worse than middle class students because of inequities in household resources, childrearing approaches, the family's residential mobility, quality of housing, and a host of other class-based factors (Rothstein 2004). Cashin (2014) argued that those who are able to occupy certain neighborhoods are the most likely to enter better schools. These individuals can unintentionally block access to those outside their advantaged networks.

Place has always mattered when it comes to education. Everyone wants to live in areas that can help them be academically successful, and those that cannot afford to live in those areas are stuck in the high poverty neighborhoods and segregated schools. Those that attend

these types of school will most likely not have the opportunities to get ahead as their more economically well off counterparts.

The literature has many explanations about the lack of resources that hinder the academic achievement of students that live in these areas. In addition, some literature looks at what "good" neighborhoods provide that help children prosper academically. These include institutional influences, epidemic effects, competition effects, relative deprivation, and collective socialization (Entwisle et al. 2005). Institutional influences include the presence of small businesses, good schools, and other positive institutions. These types of institutions imply that there are "gainfully employed" individuals in the community that could help foster and support the children's development. These types of institutions provide structure and role models for children that aid in developing academic skills (Entwisle et al. 2005). The epidemic effect refers to the children's peers, who may be involved in constructive activities such as reading and travel, and the other children may "catch" these good habits. Competition effects refer to fact that some children have to compete for resources and are more likely to receive fewer resources. Relative deprivation refers to the children comparing their economic standing of themselves to others; those that perceive themselves as better off have more confidence. Finally, collective socialization refers to the fact that, in "good" neighborhoods, the children are monitored by role models and neighbors, and they benefit from the networking and knowledge of how to gain upward mobility. In neighborhoods with high amounts of poverty, joblessness, and poor schools, the children lack many of these positive factors that help promote education.

All of these characteristics are crucial for an environment that effectively fosters a student's academic achievement. Yet, many of these characteristics are lacking in the

neighborhoods that are racially concentrated because of the link between racial segregation and household poverty. Racially segregated neighborhoods that are populated by majority black and Latino residents are usually lacking the proper capital, resources, and social networks to provide all that is necessary to give the children of those neighborhoods the advantages given to children that live in middle-class neighborhoods.

Decades of research explain the detrimental impact of living in impoverished neighborhoods and its impact on life outcomes (Coley and Baker 2013, Cashin 2014, Ravitch 2013, Goldsmith 2009). Within these neighborhoods, even children with the most motivation may not be able to overcome their family dysfunction, dangerous streets, lack of networks and positive mentors, and minimal job leads. Beyond that, these types of environments create a general depression that also impedes on the ability to achieve. The Pew Research Center found that living in these types of neighborhoods almost guarantees downward mobility, impedes verbal cognitive ability, correlates with a loss in a year of school, and lowers high school graduation rates by 20% (Coley and Baker 2013).

The concentration of human capital raises expectations and provides a steady flow of shared wisdom about how to get to college. In neighborhoods with a majority of professionals, the networks are extremely deep and useful. Cashin (2014), like Ravitch (2013), believed that if we deconcentrate poverty within neighborhoods, we would not have to struggle so much with school reforms. With the deconcentration of poverty, the government and society would have fewer problems to respond to, and it would make it easier and not harder for middle-class families and parents to raise high-achieving children.

While the neighborhood is critical in the academic success of students in middle and secondary schools, Goldsmith found that it is not the most important factor. Goldsmith highlights the consequences of race and ethnic segregation for educational attainment, but finds that disadvantaged students from predominantly black and Latino schools fare worse educationally than disadvantaged students that attend predominantly white schools. This suggests that while neighborhoods do negatively impact black and Latino students' achievement, desegregating schools would improve the long-run educational attainment of black and Latino students from segregated areas (Goldsmith 2009).

Family-Related Factors

Within the home and the family unit, literature has shown that particular parenting styles impact a student's achievement (Entwisle et al. 1997, Lareau 2011). These factors are important to include in any research about achievement because many attribute a large proportion of a student's success to outside-of-school factors that occur in homes. One factor that has been mentioned to impact a child's achievement is the child-rearing style used by parents. Concerted cultivation is the type of child-rearing style that Annette Lareau discussed in *Unequal Childhoods* (2011). Lareau attributed this approach to the way middle-class parents raise their children. This consists of enrolling children in numerous organized activities in order to transmit what the parents believe to be very important life skills. Within concerted cultivation, specific language use is used to ensure the child develops reasoning skills. The parents also ensure that the child has a wide range of experiences and has the opportunity to cultivate individualism. While this style does not directly contract the child-reading style that Lareau witnessed in many working class and poor families, it is different than the style that she

labeled as Natural Growth. Within this learning style, parents believe that as long as they provide love, food, and safety, their children will thrive. The children are involved in fewer organized activities and have more free time.

Beyond just the learning styles, middle class parents also have the resources to give their children numerous advantages in life. They have the money to make sure that their children are well-rounded and involved in activities that expand their social networks. They also usually have the educational resources to have larger vocabularies and the know-how to intervene within academic institutions. Many working class and poor parents do not have the resources to send their children to camps and on trips, and their children's closest social ties may not surpass their extended family. In addition, the education of many working class or poor families do not give the parents confidence to navigate many academic institutions (Lareau 2011).

These child-rearing styles and resources already give middle class students an advantage, yet the advantage expands when considering their relationships with schools. Entwisle et al. (1997) examine how middle and working class parents differ in how they approached schoolwork with their children. The literature suggests that most working class parents feel that education takes place at school, on school time, under the direction of the teacher. They do not believe that children's learning also depends on the activities within the home. They often encourage that the children plan and entertain themselves after school instead of spending all of that time studying. Middle class parents, however, look at themselves as partners with the teachers and actively work in conjunction with the school to promote their children's academic growth. Because they frequently visit the school, middle class parents learn

about the curriculum, how teachers approach various topics, what kinds of projects are suitable for children of various ages, and the academic strengths and weaknesses of their children (Entwisle et al. 1997). Lareau found that general parental involvement was different between classes as well. She found that 100% of parents in one of her middle-class samples appeared for parent-teacher conferences and attended open houses at the school. The working-class parents appeared at conferences 65% of the time, and only 35% attended open houses. Because of these interactions, middle-class parents are more prepared to continue their child's learning over the summer, which proves to be a tremendous advantage for students (Lareau 2011).

The faucet theory supports the summer growth of children (Entwisle et al. 2001). When school is in session, the "faucet" is turned on for everyone, and all children gain. Yet when school is not in session, poor children stop gaining because the faucet has been turned off. The faucet is not just the knowledge that the children are exposed to, but it is the structure of the school, the access to role models, the escape from certain home stresses they may be experiencing, and other negative neighborhood effects. The faucet theory is supported by research done on seasonal learning. This literature demonstrates how important summer learning is. A study by Heyns (1978) demonstrated that the distance between the achievement of well-off and poor students narrows during the school year. Yet, in the summer time, better off students gain knowledge, while less well-off students lose knowledge throughout the summer months. Because middle- class parents are so involved in their children's learning at schools, they also gain the knowledge to promote summer learning activities successfully. This differs with working-class parents who are usually less prepared to help during the summers (Entwisle et al. 1997).

When talking about where students end up according to class, we must keep in mind that students are tracked between schools and in schools. Schools generally reflect the characteristics of neighborhoods, especially the socioeconomic status. Middle-class parents can prevent their children from being in the lower track between schools by having the resources to move to middle-class neighborhoods with better schools. School tracks are claimed to be based on ability yet are usually stratified by socioeconomic status as well. There are disproportionately more low-income students being held back, in special education classes, lower reading and math groups, and in lower achieving classes (Entwisle et al. 1997). Middle class parents often ensure that their children are placed in advanced classes. Lareau (2011) suggests that this occurs at every level of education for children. Lareau attributed this to how middle-class parents view their relationship with teachers and schools. Middle-class parents view teachers as their equals, or at times subordinates, and therefore reject any negative judgments the teachers make about their child. Middle-class parents are more likely to go over the teacher to ensure that their child gets what the parents believe is in his or her best interest. These types of interactions are different from what lower-class or lower-middle parents experience. Many times, these parents lag behind the teacher in terms of education and are not as comfortable navigating educational institutions as middle-class parents. They are much more likely to accept the teacher's evaluation of their children, even if they are frustrated with the assessment.

Oakes (2005) argued that middle-class parents work to maintain tracking. She stated that there is a fear amongst middle-class parents that if tracking ended, their children would be forced to receive an inferior education. This directly coincides with Lucas's theory of effectively

maintained inequality (EMI), which suggests that actors that have a socioeconomic advantage will "secure for themselves and their children some sort of advantage wherever advantages are commonly possible" (Lucas 2001: 1652). This means that middle-class parents will do whatever is necessary to secure their child's place in higher classes, and therefore middle-class students have increased chances into better placement classes. If this is true, then this means that one's social background can potentially move an average student into a higher placement class regardless of ability. Once that happens, social background effectively maintains inequality.

This argument is supported by the fact that Lucas (2001) found that, in schools with higher socioeconomic diversity, there are higher levels of association between student's class placements. Oakes (2005) attributed this to class conflict. She argued that middle-class parents undermine detracking initiatives by providing the political legitimacy that schools need to stay in business and that administrators need to stay in office, providing the political and economic ability to make real threats of retaliation or school abandonment, as well as using their capital to manipulate the system in their favor. These class-based actions inevitably uphold in-school stratification. From what we know about the differing relationships that working-class or poor parents have with the schools, it is clear that middle-class students have the ability to reduce the chances of more deserving students from attending higher-level classes.

All of these class and parental influences coincide directly with the social and cultural capital that is attached to a student's family. One of Bourdieu's major insights on educational inequality was that students with more valuable social and cultural capital fare better in school than do their otherwise comparable peers with less valuable social and cultural capital. Lareau

(2011) discussed in-depth how the social reproduction perspective has been useful in understanding how race and class influence the transmission of educational inequality. Race and class have a complex relationship, and Lareau and Horvat (1999) demonstrate that race highlights the importance of class and has an independent theoretical significance in shaping family-school relationships. The literature also suggests that it is more difficult for black parents than white parents to comply with the institutional standards of schools. In particular, educators are relentless in their demands that parents display positive, supportive approaches to education. Although social class seems to influence how black and white parents negotiate their relationships with schools, for blacks, race plays an important role independent of social class in framing the terms of their relationship with their child's school and teachers (Lareau and Horvat 1999).

Capital

Lareau (1999) suggested that parents' cultural and social resources become forms of capital when they facilitate parents' compliance with dominant standards in school interactions. Lareau defined cultural capital as parents' large vocabularies, sense of entitlement to interact with teachers as equals, time, transportation, and child-care arrangements to attend school events during the school day. All of these interactions are important for the academic achievement of students.

Lareau and Horvat (1999) examined how being white acts as a cultural resource that white parents unwittingly draw on in their school negotiations. Being white becomes a type of cultural capital that blacks do not have available to them. The historical legacy of racial discrimination makes it far more difficult for black parents than white parents to fulfill these

demands. They did not argue that blackness is a disadvantage in the cultural sense, but that the rules of the game are built on race-specific interactions. Many black parents cannot presume or trust that their children will be treated fairly in school. Yet, these interactions determine how the educators define desirable family-school relationships, which are based on trust, partnership, cooperation, and deference. These rules are more difficult for black than white parents to comply with.

Thus, one must fully understand the intersection of race and class when discussing the racial achievement gap. While much of the literature focuses on the negative impact of being black and poor, the racial achievement gap is present at every socioeconomic level. Therefore, while non-school factors are integral to consider when explaining portions of the racial gap, there is still a large portion unexplained. There are factors impacting students beyond their neighborhood, income, and family capital. Specifically, for black students, there are school factors contributing to their achievement issues independent of class and their background. There is no evidence that suggests that demographic factors can sufficiently explain away the racial achievement gap (Gregory et al. 2010).

The evidence is clear that there are out-of-school factors that can hinder significantly the academic achievement of a student. When children start school, what neighborhood they are from, what their family income is, and what their family structure looks like are all factors that can cause them to start off behind. However, these factors do not paint the entire picture as to why there is a persistent gap in test scores when comparing black and white students. These factors do not explain why the gap continues to grow as students' progress through higher grade levels. This study focused on the within-school factors that complete the full

explanation of the gap. Within-school factors, such as disproportionate discipline sanctions and group ability division, can help us further understand why this test score gap persists. The first question I explored in this study involved examining fall kindergarten children: Is there a black-white test score gap in math and reading in my sample? If there is, what are the covariates that can help explain this gap?

Gender and Achievement

Gender also has a complex impact on achievement. As mentioned earlier, when discussing discipline, there is a higher prevalence of black males being suspended. This should adversely impact their test scores. However, there is also a significant amount of literature that claims that there is a significant gender gap in terms of math scores (Entwisle et al. 1983, 1990, 1994). These studies find a perpetuating gap amongst female and male test scores, where males appear to surpass females during the early years of schools, and this gap widens as student continue into school. The result of this gap is seen in the limited amount of females within many math-heavy majors and disciplines within higher education (Xu 2008).

Tracking and Oppositional Culture

Another detrimental consequence of the integration on black students was the emergence of tracking. Within nominally integrated schools, while there were in fact both black and white students attending, the school had two different missions for these students. Within this plan, black students were tracked into the lowest academic areas, which in turn made white children "gifted" (Milner and Howard 2004).

Tracking is known to disadvantage poor students as well as students of color. School tracking occurs in the form of skill grouping, which like all other curriculum differentiation

mechanisms, disproportionately sorts economically and racially disadvantaged students into lower-skill academic routes (Oakes 2005). Rosenbaum (1976, 9) defined tracking as "the fundamental organizational instrument by which the school reproduces and reinforces the inequalities of the society at large." He used an excellent metaphor, the tournament, to describe how tracking works in schools. In this tournament, the sequence of "contests" allows students to move down to a vocational, business, or general track, but not up to advanced placement classes. The data supports this analogy demonstrating that the direction in which a student is tracked appears to be almost irreversible in the large majority of cases. This process is so important because curriculum placement constitutes fundamental distinctions within schools; it is the very spine of the social organization. Tracking is related in important ways to friendship choices, to extracurricular activities, and to the attitudes and perceptions of both staff and students (Rosenbaum 1976). College-track students receive the most privileges, encouragement, and resources available; they occupy the best classes and teachers, they have access to the most field trips, and they have the most access to better instruction (Rosenbaum 1976).

While this research will focus on students in the early years of schooling, it is important to note that once a child is tracked into a lower level group or class, it is very unlikely that they will get out of that track. Therefore, the track that you are put into in your first few years of school directly ties into your track in high school. Rosenbaum presents data which suggest that the IQ of students exposed to the vocational or general track declines between the tenth and twelfth grades. These findings highlight the fact that we need to give a closer analysis to what is

going on within schools, because these factors can be just as detrimental as negative out-of-school factors.

There is a complex relationship between tracking and other explanations of the racial achievement gap. Oppositional culture theory has been one of the most prevalent explanations for explaining racial differences in educational achievement. This theory suggests that black students perceive limited returns to their educational investments and therefore develop poor school-related attitudes and behaviors. Specifically, Buck (2010) discussed the phenomena of "acting white" and the different perceptions and opinions of its effects on black student achievement. This notion is based on the assumption that high-achieving black students are accused of acting white by other black students. Buck explained that, while many studies have conflicting results, there is something occurring within integrated schools. Black students in integrated schools who are high achievers are less popular and more susceptible to being labeled as "acting white." This labeling is said to deter other black students from trying to reach their full academic potential. While all races bully the "nerd' or "geek," within the black community, the insult insinuates that you do not belong in the black race. Buck stated that this is the most negative accusation that can be given to black adolescents.

Buck (2010) stated that this should be a concern to many because of the large achievement gap between black and white students. While the gap has narrowed over the last 30 years, the average black senior in high schools is still performing at the about the same level of the average white eighth grader. While research has acknowledged that "acting white" is a factor, researchers do not believe that it is the only factor (Fordham and Ogbu 1986, Buck 2010). There are other aspects to take into account such as socioeconomic status, school

spending, stereotype threat, and family environment. Yet, even when all of those factors are controlled, not enough of the achievement gap is explained.

Buck (2010) debunked many theories of the causes that prevent black students from trying to reach their full academic achievement, such as popular culture, employment discrimination, the concentration of poverty, involuntary minorities, and black nationalism. He believed that there is not enough historical evidence to demonstrate that these theories are reliable and stated that black students have not always had these feeling about education.

It is important to acknowledge that these types of patterns and explanations are mainly observed in integrated settings where there is an apparent difference in the demographics of upper-level classes and lower-level classes (Buck 2010). Education scholars debate the explanations, and many witness patterns among African American students that directly contradict the oppositional culture model. Some suggest that the oppositional culture theory for racial disparities in school performance posits that individuals from historically oppressed groups signify their antagonism toward the dominant group by resisting school goals. Yet, the fundamental flaw of Ogbu's (1978; 1991) oppositional culture explanation is that African American students do not perceive fewer returns to education and more limited occupational opportunities than do whites. In fact, African American students report more pro-school attitudes than do white students, and rather than suffering sanctioning from peers, black students who are viewed by their peers as high achieving are more likely to be popular than are their white counterparts (Buck 2010).

While it may be true that some of the most disadvantaged black students may see little profit in continuing their educations, in part because they perceive limited opportunities in the

labor market, we must analyze a representative group of black students. Buck (2010) shows patterns that contradict the oppositional culture model, yet the racial achievement gap still persists independent of social class. It is important not to misinterpret the problems of the most disadvantaged black students as necessarily characteristic of the experiences of all black students.

Exploring this particular factor in the analysis can help to determine how much tracking impacts black students and the racial achievement gap in general. There are documented differences between the treatment of white students and black students academically and disciplinarily, and those factors impact the achievement gap as well. Therefore, while outside-school factors and ability factors contribute to achievement, there are school factors that also impact learning and the ability to perform at the same level as other students. These mechanisms must be addressed and examined to understand all of what really contributes to the racial achievement gap.

Further Consequences of Racial Discrimination Within Schools

Kim et al. (2010, 17) defined the school-to-prison pipeline as "the intersection of K-12 educational system and a juvenile justice system, which too often fails to serve our nation's at-risk youth." They believed that this outcome is a result of public institutions failing to provide adequate education and fulfill social development needs to large segments of their student body. They believed the lack of adequate educational services sets students up for failure because of overcrowded classrooms, the isolated environments based on race and class, a lack of effective teachers, and a lack of funds for hiring adequate numbers of counselors and special education educators. All of these issues further disengage students and increase their chances

of dropping out. This has become worse over the past few decades with the increase in test-driven accountability, with more pressure being put on low-performing students to increase their scores.

Over the past decades, education reforms have been involuntarily hurting the students that need the most help. A consequence of the Bush Administration budget for 2003 was that 8000 homeless children were denied educational benefits, 50,000 children were cut out of after-school programs, 33,000 young people were cut from child care, 20 percent of children were poor during the first three years of life, and millions lacked affordable child care and decent early childhood education (Giroux 2003). Hirshfield (2008) stated that a troubled domestic economy, the mass unemployment and incarceration of disadvantaged minorities, and the resulting fiscal crises in urban public education shifted school disciplinary policies and practices and staff perceptions of poor students of color in a manner that promotes greater punishment and exclusion of students perceived to be on a criminal justice "track." Wokusch (2002) stated it perfectly stating: "Instead of providing a decent education to poor young people, we serve them more standardized tests and house too many of them in under-funded and under-served schools; instead of guaranteeing young people decent health care, jobs, and shelter, we offer them the growing potential of being incarcerated, buttressed by the fact that the U.S. is the only industrialized country that sentences minors to death and spends three times more on each incarcerated citizen than on each public school pupil" (1).

Schools are social institutions charged with the task of preparing and socializing young people for adult roles, and schools generally reflect many of the characteristics of the society in which they are located (Noguera 2003). In this society, the most frequently punished and

incarcerated individuals are people of color, and throughout the United States, schools most frequently punish the students who have the greatest academic, social, economic, and emotional needs. Noguera (2003) and Giroux (2003) both concluded that black students are vastly overrepresented in students who are frequently suspended, expelled, or removed from the classroom for punishment. Both pointed to the fact that, while black students are overrepresented in school disciplinary action, they are devastatingly underrepresented in gifted classes throughout school in the United States. In a study conducted by Skiba et al. (2011), school disciplinary data were drawn from over 4000 elementary and middles schools during the 2005-06 academic school year. Within this study the authors investigated the racial and ethnic differences in disciplinary referrals, infractions, and consequences. The results of this study indicate there are racial disparities in the initial disciplinary referrals and the office and administrative disciplinary decisions (Skiba et al 2011). At the classroom level, the disproportional referral results are consistent despite the little evidence to support that the black and Latino students act out more within classrooms (Skiba et al 2011). At the administrative level, the results indicate that students of color receive more serious consequences for the same infractions as white students (Skiba et al 2011).

The students that tend to do the most poorly in schools and suffer the most from all of these practices are usually the students that need the most help and support. Among the various types of students that do need more attention are students of color and low-income students. These students are often punished within schools instead of being provided with more help. This has gotten worse over the past few decades, and data on suspensions within public schools support this. Between 1973 and 2006 the percentage of black students in public

schools that were suspended at least once increased from 6% to 15% (Kim et al. 2010). As suspensions in general have risen over the past few decades, the racial disparities have also increased. Thirty years ago, black students were twice as likely to get suspended when compared to white students; currently, black students are three times as likely to be suspended. Amongst black students, black males are suspended at higher rate (Kim et al. 2010).

More recently, the adoption of zero-tolerance policies has contributed to a significant increase in the number of children suspended and expelled from school. Zero-tolerance policies and laws appear to be designed for "mobilizing racialized codes and race-based moral panics that portray black and brown urban youth as a frightening and violent threat to the safety of 'decent' Americans . . . and the most high-profile zero-tolerance cases generally involve African American youth, and as a result they reinforce the racial inequities that plague school systems across the country" (Giroux 2003: 58). Beyond the fact that these students are losing valuable classroom time, labeling and exclusion practices can create a self-fulfilling prophesy and result in a cycle of antisocial behavior that can be difficult to break (Hirshfield 2008). Depriving students of instructional time definitely contributes to the underachievement of many black students. If behavioral issues are the reason for all of these disciplinary actions for black students, these actions are not worthwhile considering that the literature shows little to no evidence that these practices change or improve behavior (Hirshfield 2008). Nonetheless, zero-tolerance policies and laws have become a way of quickly removing students from school.

Given these documented practices in schools, I inquired how this differential treatment towards black students impacts the overall racial achievement gap. Based on the clear

evidence that black students are disproportionately targeted for school disciplinary sanctions, this study examined if there are differences in achievement based on disciplinary actions.

CHAPTER III: METHODS

Data

The data used for the next three chapters of this study are from the Early Childhood Longitudinal Study (ECLS-K). The spring of kindergarten sample was used (National Center for Education Statistics [NCES] 2004). The ECLS-K is a nationally representative sample of kindergarteners, their parents, teachers, and schools all across the United States (National Center for Education Statistics 2004). The ECLS-K followed the same children from kindergarten through the eighth grade. This dataset focuses on children's early school experiences and provides descriptive information on children's status as they enter into school, their transition into school, as well as their progression through middle school. This data are ideal for my analysis when examining how racial inequality within schools begins as soon as students enter schools.

The ECLS-K is a longitudinal dataset that was utilized for a series of cross-sectional analyses. These analyses allowed me to examine how family, school, community, and individual factors are associated with school performance to isolate the specific school factors over time. This analysis requires an examination of variables that can shed light on all of the aspects within a child's life that impacts his or her academic achievement. The ECLS-K offers information on children's cognitive, social, emotional, and physical development, as well as the children's environment, home educational activities, school environment, classroom environment, and the qualifications of their teachers. Information was collected in the fall and the spring of kindergarten (1998-99), the fall and spring of 1st grade (1999-2000), the spring of 3rd grade

(2002), the spring of 5th grade (2004), and the spring of 8th grade (2007) (U.S. Department of Education).

For each grade level, a different round of the ECLS was utilized. Within chapter 4, round two of the ECLS-K data was utilized. This round allowed me to examine the sample's test score achievement during the spring of their kindergarten year. The subsample selected for that chapter was limited to students who attend public schools and had no missing data for age, gender, race, and reading and math scores. Since the purpose of that chapter was to investigate the black/white test score gap, all analysis is restricted to students from those two racial categories.

To examine the fifth grade data, round six of the ECLS-K was used, and the subsample selected for that chapter was limited to students who attend public schools and had no missing data for age, gender, race, reading and math scores, and math and reading ability groups. Finally, to examine the eighth grade data, round seven of the ECLS was used. The subsample selected for that chapter was limited to students who attend public schools and had no missing data for age, gender, race, reading and math scores, and suspension data.

Analytic Strategy: Hierarchical Linear Models

Mixed effects multiple linear regressions were used to conduct the analysis for all three grade levels. Utilizing multilevel models within this analysis allowed the ability to account for the amount of dependence between observations, and allowing the examination of the effect of data clustering on outcomes (Diez-Roux 2000). This was necessary because there is a strong possibility that the outcomes for students taught within one school might be more similar to each other than the outcomes for students from a different school. For this particular analysis,

it is important to understand the variation at different levels. Not taking the different level correlations into account runs the risk of underestimating the standard errors, which would make my significance tests invalid. Multi-level models improve the estimation of individual effects, and it allows the association of school-level factors with test scores differences by student-level factors. In many cases, students that are nested within schools are more similar to each other than they are different; therefore, the observed effect of included variables on their test scores may depend in part to their shared membership in the same schools (Anderson 2012).

Within each grade-level analysis, the first model looked at the effect of the control variables separately, and then together with individual-level variables on student reading and math test scores. After this initial analysis, classroom-level variables were then separately analyzed with the controls. The next model included looking at school-level variables with the controls. Finally, a model included the controls, individual-level, classroom-level, and school-level variables to predict reading and math reading scores. Analyses of reading and math test scores were conducted separately to separate out the effects of covariates on each subject. It should be noted that in each chapter, there are variations in the variables used because of the different questions asked in each wave of the ECLS.

Centering: Group Mean Variables

Group means were included into the models in order to examine the differences between between-school and within-school effects. Group centering refers to subtracting the average score from a higher-level group (Schools) for all students within that group. The group-

centered variables represent the average score for the school that the individual students attend.

My original HLM model for test reading and math test scores can be simplified and demonstrated through the notation:

Level 1

$$TESTSCORE_{jk} = b_{oijk} + \beta_0 * X_{ijk} + r_{ijk}$$

- $TESTSCORE_{ijk}$ = Reading/Math test scores of the individual student i, nested in classroom j, nested in school k
- b_{oijk} = The unobserved classroom-specific intercepts
- $\beta_0 \times X_{ijk}$ = Overall fixed intercept x individual level covariates
- r_{ijk} = The residual variance that is unique to the student and not captured by the model.

Level 2

$$b_{ojk} = b_{0k} + \beta_5 \times X_{jk} + u_{0j}$$

- b_{oijk} = assumes that the intercept for the classroom j nested within school k, depends on the unobserved intercept specific to the k-th school
- $\beta_5 \times X_{jk}$ = Overall fixed intercept x classroom level covariates
- U_{0j} = the random component related to the school the student attends. This is the difference between the overall average school achievement and the average achievement for school j, the school the student attends. This is what differentiates HLM from single level regression. It allows the intercepts of schools to vary (Hoffman and Gavin 1998).

Level 3

$$b_{0k} = \beta_{0\,x}\ X_{k} + u_{k}$$

- $\beta_{0\,x}\ X_{k} =$ Overall fixed intercept x school level covariates
- $u_{k} =$ the random effect

My model is a three-level model that includes individual, classroom, and school-level variables. This equation is a simplified version of the reading test scores of individual students in schools being equal to the individual-, classroom-, and school-level predictor variables and error.

The equation for centering would include $X'_{1ij} - X_{j,}$ the subtraction of the average score from the higher level. Group means were created for the variables, SES, the number of books a child owns, parental education, teacher education, the number of years a teacher has taught, and the frequency of reading and math groups. Instead of just using raw values of X, I used school-level variables for the school mean of X and a student-level variable showing the deviation of that student's value of X from the school mean. This allowed me to separate the between-school and within-school effects. While the group mean variable allows me to discuss the effect of the school mean of X on the school's average performance (Y), the centered variable allows me to discuss how being above or below average within the school on X affects the individual's predicted performance.

Determining Significance

In fifth and eighth grade the inclusion of the focal variables that measure ability groups placement and suspensions will be included into the multilevel models. When considering what impact the focal variables have on the test score gap, one must acknowledge that a large portion of the gap is created by non-school factors before student's reach kindergarten. Before

fifth and eighth grade, student's achievement is impacted by cumulative impacts of non-school and school level factors. Schools should not be increasing achievement gaps at all. As an institution where the main objective is to educate, schools should be decreasing any gaps present. Within this study, any evidence of an increase in the test score gap between black and white students would be substantively significant. Therefore, any percentage of the explanation that my models can inform would also be significant.

It is beyond the scope of this analysis to find all of the factors that are associated with the test score gap and thereby reduce the coefficient measuring this gap to zero. That would require finding all of the non-school and school level variables that are associated with test scores. Instead this research seeks to explore school level variables, and focus on ability grouping and suspensions within that examination. This changes the scope of what would be significant within this study to just the portion of the test score gap that is associated with school level factors.

When examining how much of the test score gap my model can explain, I qualify that a school level explanation of 5% or higher would be substantively significant. If we could focus our attention on factors that are widening racial test scores gaps within schools, and know that a single factor explains 5% of the associations, this would be an important contribution to the literature. To calculate if the associations of my focal variable are substantively significant, I will calculate the difference in model coefficients between models that include the focal variables and models that exclude the focal variables. This percentage will tell me how much more we are informed about the black/white test score gap with including my focal variables. If this percentage is equal to or higher than 5%, I will qualify this as a substantively significant finding.

Variables

Kindergarten Variables

Below are the descriptions and descriptive statistics for the variables that were analyzed in kindergarten, fifth, and eighth grade. Many of the variables are very similar, but some are unique to specific grade analyses. All variables and their descriptive statistics can also be found in Tables 1-6.

Dependent Variables

The focal dependent variables throughout the chapters are the reading and math test scores. These variables are broad-based scores using the full set of assessment items in reading and mathematics that were calculated into item response theory scale scores (IRT) (Tourangeau 2009). The IRT utilizes "the pattern of right, wrong and omitted responses to the items administered in an assessment and the difficulty, discriminating ability, and 'guess-ability' of each item to place each child in a continuous ability scale" (Tourangeau 2009: 3-6). The advantage to using the IRT score is its ability to compensate for the possibility of children with 'low-ability' guessing several questions correctly (Tourangeau 2009).

To gain a better ability to interpret test score differences, the IRT test scores were normalized to have a mean of zero and a standard deviation of one. When looking at the test scores descriptively, black students' scores are substantially lower than white students in both reading and math in Kindergarten, Fifth grade, and Eighth grade.

Controls

The control variables for this analysis include race, gender, age (in months), socioeconomic status (SES), and WIC benefits for the child during the kindergarten year. As

Table 1 demonstrates, in this sample, 59.1% of the students are white and 15.5% of the students are black. For both white and black students, the gender proportions were very close to the overall sample mean. Within the whole sample, as well as the black and white student sample, the average age in months was just over 67 months. The SES variable is computed at the household level and derived from parents who completed the parent interview at the time of data collection. The components used to create the SES variable are the father/male guardian's education and occupation, the mother/female guardian's education and occupation, and finally the household income (Tourangea et al. 2009) For this research, the SES variable has been standardized to have a mean of zero and a standard deviation of one. The SES mean for the entire sample was 0. When focusing just on white students, their average SES is .107 above the mean, while for black students, their SES is -.430 below the mean. Lastly, within the sample, 49.95% of the students' parents receive WIC benefits for the child. Among the white students, 36.99% of students' parents received WIC benefits for the child, while it was 79.01% for the black students.

Focusing just on this descriptive information, it appears that when it comes to SES and WIC benefits, black students fared worse than the white students. Black students are much more likely to live in a home where the income is low enough that the parents are eligible for WIC, indicating that much larger proportion of black students are living in poverty.

Individual-Level

Individual-level variables include parental education attainment, family type, the number of books in the home, and the age of the mother at the child's birth. Table 1 demonstrates that, in the full sample, 25% of parents have at least a bachelor's degree. When

focusing on white students, 33.7% of their parents have obtained a bachelor's degree, while 10.5% of black students parents have achieved a bachelor's degree. The variable used for family type consisted of asking if the child lived in a single parent home with no siblings, a single parent home with siblings, a two-parent home without siblings, and a two-parent home without siblings. This variable was recoded to distinguish between two-parent homes and single parent-homes. Within the full sample, 74.5% of students are from two-parent homes. When just focusing on white students, over 83% of students live in a two-parent household. When examining black families, 39% of the black students lived in a two-parent home. Within the full sample, the average number of books in the homes of students was 71.28 books; when just focusing on white students, this increased to 90.51 books. On average there were 37 books in homes of black students. Finally, the average age of the mother when the child was born was 21.38 in the full sample, 22.93 for white students, and 17.32 for black students.

From these descriptive statistics, it appears that black students are less likely to live in homes where one of their parents has a bachelor's degree, are less likely to live in two-parent homes, and on average have fewer books in the home. Previous literature has linked these types of attributes to lower test-scores (Brooks-Gunn et al. 1993, 1994, 1997; Mayer, 1997).

Classroom-Level

The list of classroom-level variables corresponds to the teacher's credentials. The classroom-level variables include the years the teacher has taught kindergarten, and whether the teacher possessed a master's degree or some advanced teaching degree. Table 2 reports that, on average, the kindergarten teachers taught kindergarten for 9.17 years within the full sample. When just focused on the white students, this number slightly increases to 9.92 years,

and for black students, this number slightly decreased to 8.21 years. In the full sample, 30.9% of teachers had a master's or advanced teaching degree. For white students, this percentage increase to 32.2%, while for black students, this percentage decreases to 29.1%.

School-Level

The school-level variables correspond to the size and location of the school, as well as the funding and safety. The school-level variables include total school enrollment, percentage of minority students, percent of students from the neighborhood, the race of the principal, the safety of the surrounding area of the school, and a variable encompassing if the school receives Title 1 funds. Table 2 conveys that the total school enrollment variable consisted of five categories related to how many students were enrolled in the school. These categories were 0-146, 150-299, 300-499, 500-749, and 750 and above. For this analysis, the focal point was on the 750 and above, all of the other categories were combined for the creation of a dichotomous variable. The percent of black students within the school variable is a categorical variable that specifies if the school has zero black students, within 1-5%, 5-10%, 10-25%, or more than 25% (Tourangeau 2009). On average, when looking at the category that describes a school with more than zero but less than five percent black students, 40.8% of students in the full sample attend schools such as these. When we just focus on white students, almost 50% of white students attend school with less than five percent of black students. When focusing on black students, less than three percent of black students attend a school with less than five percent black students. The majority of black students attend schools with over 25% black students. This finding is consistent with the reality of the high levels of racially segregated schools in this sample and society.

The school disadvantaged neighborhood scale ranges from 0-21 and is devised from the following seven variables: neighborhood tension surrounding the school, litter surrounding the school, drug availability, gang activity, violent crime frequency around the school, abundance of vacant buildings surrounding the school, and crimes around the school. Schools reported whether these issues were "no problem," "somewhat of a problem," or a "big problem" (Tourangeau et al. 2009). The higher the score, the less safe the surrounding area of the school is perceived. A Cronbach's alpha test conducted to test the internal consistency of reliability produced a coefficient of .90. In the full sample, the average school has a safety scale of 9.35; this decreases to 8.41 for the schools that white students attend, yet increases to 10.94 for the schools that black students attend.

The percentage for the school surrounding area safety scale variable was derived from a series of questions that inquired about the percentage of students that attend the school who also live in the same community where the school is located. Within the full sample, 77.2% of the students live in the same neighborhood that their school is located. For white students, almost 80% of students live in the neighborhood their school is located, while for black students, 72% of student live within the neighborhood their school is located.

Finally, the last variable describes the how many schools within the sample receive Title 1 funds. Title 1 funding is based on the percentage of the school population that is low-income (Tourangeau et al. 2009) This is a reliable variable to gauge the overall income of the student's population in schools. In the full sample, 67.5% of the schools received Title 1 funding. When just focused on the white student sample, 62% of the schools that white students attended

received Title 1 funding. When focused on the black student sample, 82.1% of the schools that black students attended received Title 1 funding.

Fifth grade Variables

Dependent Variables

Beyond the IRT test score variable, another variable utilized as a dependent variable as well as an individual-level independent variable in multiple models is the reading ability level. This variable measures the type of reading ability group that a student has been tracked into by the time they reach fifth grade. This variable is utilized to compare students that were tracked in ability groups in kindergarten through fifth grade, in comparison to students that were not tracked. One of the main research questions is what factors impact which reading ability group a student is placed in, as well as if this differs by the percentage of minority students that attend the school. On average across the entire sample, 16.5% have been tracked into the primarily high-ability reading group. Yet, when you look at the race break downs, 18.6% of white students were tracked into primarily high-ability groups, 9.1% of black students, and 16.5% of non-black minority students. The majority of the students are places in primarily average-ability reading groups, with 48.7% of the entire sample being placed in average groups, 50% of white students, 51% of black students, and 44% of non-black minority students. As previously stated, black students are disproportionately placed in lower-ability groups in comparison to their white student counterparts (Slavin 1987). This is clear when you look at the percentages of the students that are primarily tracked in to low-ability reading groups. When analyzing the sample as a whole, 16.5% of students are placed into primarily low-reading ability groups. Yet, when the individual races are examined, 12.9% white students are tracked into

low-ability groups, 22.7% of black students, and 19.9% of non-black minority students. When just focusing on proportions, black students are almost twice as likely to be placed in a low reading ability group. When focusing on math ability groups there is a similar trend. The majority of the students in the overall sample are in an average math ability group. Yet, when looking at the low-ability groups, black students are disproportionality placed in low math ability groups.

Controls

The control variables for this analysis include race, gender, and socioeconomic status (SES). Table 5. demonstrates that in this sample, 55% of the students are white, and 17.1% of the students are black, and 27.8% of students are non-black minorities labeled "other." For all of the races, the gender proportions were very close to the overall sample mean of 51.8% male. The SES variable was computed at the household level and was derived from parents who completed the parent interview at the time of data collection. The components used to create the SES variable are the father/male guardian's education and occupation, the mother/female guardian's education and occupation, and finally the household income (Tourangeau 2009). For the purposes of this research, the SES variable has been standardized to have a mean of zero and a standard deviation of one. When focusing just on white students, their average SES is .240 above the mean; for black students, their SES is -.504 below the mean, and for students classified as other, their mean SES is -.404 below the mean. Focusing just on this descriptive information, it appears that when it comes to SES, black students fared worse than the white students and other non-white minorities.

Individual Level

Individual-level variables include the number of books child owns, the mother's age, if one of their parents/guardians has Bachelor's degree, and their family configuration. Table 1 demonstrates that in the full sample 18.7% of parents have at least a bachelor's degree. When focusing just on white students, 23.9% of white student's parents have obtained a bachelor's degree, while 11.4% of black student's parents have achieved a bachelor's degree. The variable used for family configuration consisted of asking if the child lived within a single-parent home with no siblings, a single-parent home with siblings, a two-parent home without siblings, and a two-parent home without siblings. This variable was recoded to distinguish between two-parent homes and single-parent homes. In the full sample, 68.7% of students are from two-parent homes. When just focusing on white students, over 78% of students live in a two-parent household. When examining black families, 35.6% of the black students live within a two-parent home. For students categorized as other, 70.9% of the students live within a two-parent home. In the full sample, the average number of books students own 93.7; when just focusing on white students, this increased to 120.21. For black students, the average is 55.40; students in the other category own an average of 64.43 books. Finally, the average age of the mothers in this sample is 37.31 in the full sample, 37.94 for white students, 36.35 for black students, and 36.61 for students categorized as other.

From these descriptive statistics, it appears that black students are less likely to live in homes where one of their parents has a bachelor's degree, are less likely to live in two-parent homes, and on average have fewer books in the home when compared to white students and non-black minority students. Previous literature has linked these types of attributes to lower test scores (Brooks-Gunn et al. 1993, 1994, 1997; Mayer, 1997).

Classroom Level

The list of classroom-level variables corresponds to the teacher's credentials and the facilitation of reading and math achievement groups. The classroom-level variables include the number of years the teacher has taught fifth grade, whether the teacher possesses a master's degree or some sort of advanced teaching degree, and how many days a week the teacher splits students up into separate reading and math achievement groups. Table 2 demonstrates that, on average, the fifth-grade teachers had taught fifth grade for 7.35 years in the full sample. When just focused on the white students, this number increased slightly to 8.11 years, and for black students, this number decreased slightly to 6.68 years. For the other category, teachers taught the fifth grade an average of 6.27 years. In the full sample, 46.8% of teachers have a master's degree or an advanced teaching degree. For white students, this percentage increased 49.9%, while for black students, this percentage decreased to 44.0%, and for other students, 41.8%.

Table 6 goes into detail about the frequency of reading and math achievement groups. These variables measure how often a teacher splits the class into reading and math achievement groups. When examining the reading groups, on average 29.4% of teachers never utilized reading achievement groups, yet 14.7% utilized reading groups daily. The percentage of daily utilization of reading groups differed by race. For white students, 10.6% were in classes that had daily reading achievement groups. For non-black minority students, 18.9% were in classrooms that utilized daily reading achievement groups. However, for black students, 21.6% were in classrooms that utilized daily reading achievement groups. There was not a similar trend for the math scores. On average, a larger percentage of students were in classrooms that

never had math achievement groups. This further demonstrates the differences between math and reading practices within schools, as well as showing the ways in which these differences may translate in differences in test scores.

School Level

The school-level variables include total school enrollment, the percentage of minority students, the region in which the school is located, the types of city or town in which the school is located, the safety of the surrounding area of the school, and a variable encompassing if the school receives Title 1 funds. On average, 24.8% of the full sample attended schools with less than 10% minority students. 40.7% of white students attended school with less than 10% minority students, while less than three percent of black students attended a school with less than ten percent minority students. The majority of black students attended schools with over 75% of minority students. This finding is consistent with the reality of the high levels of racially segregated schools in this sample and in society. A similar trend aligns with non-black minorities; they too mostly attended schools where the majority of the student body is a minority.

When focusing on region, 17% of students were from the Northeast, 22.4% were from the Midwest, 38.1% were from the South, and 22% were from the West. The largest regional differences were in the South, where 35% of white students were from the South, yet 67.4% of black students are from the South. Thus, the majority of black students in this sample were from the south.

As far as communities, 34.9% of students attended schools in large and mid-size cities, 41.7% attended schools in large and mid-sized suburbs and large towns, and 23.2% attended

schools located in small towns and rural areas. When looking at the racial differences, the largest percentage of white students attended schools in large and mid-sized suburbs and large towns, while the majority of black students and non-black minorities attended schools located in large and mid-size cities.

The school disadvantaged neighborhood scale was included, and ranges from 0-21. The higher the score, the less safe the surrounding area of the school is perceived. Finally, the last variable describes how many schools within the sample received Title 1 funds. In the full sample, 67.6% of the school received Title 1 funding. 59.2% of the schools that white students attended received Title 1 funding, while 80.7% of the schools that black students attended received Title 1 funding. For non-black minorities, 76.6% attended schools that received Title 1 funding.

Moderating Variables

In the sample, moderating variables were included into the model to assess the research questions of whether a difference in reading and math test scores was based on the percentage of minority students within schools, and if so, whether the differences varied across schools. In order to create the moderating variables, I included the variable, race, that indicated if the student was white, black, or a non-black minority, and the variable of percentage of minority students. The moderating variable then consisted of the following:

- Less than 10% * black *(omitted)*
- Less than 10% * Other (*omitted)*
- 10% to less than 25% * black
- 10% to less than 25% * Other
- 25% to less than 50% * black
- 25% to less than 50% * Other
- 50% to less than 75% * black

- 50% to less than 75% * Other
- 75% or more * black
- 75% or more * Other

Eighth Grade Variables

Dependent Variables

Beyond the IRT test score variables, another dependent variable that was also used as an individual-level independent variable was the variable that measured if the student had been suspended between kindergarten and eighth grade. On average, 17.5% of students have been suspended by the time they are in eighth grade. When examining each race, 13% of white students have been suspended, 15% of non-black minority students have been suspended, and 35% of black students, a disproportionate amount, had been suspended by the time they were in eighth grade. These descriptive results indicate that black students are suspended at rates disproportionately higher than other students. This chapter also examined the impact of these suspensions.

Controls

The control variables for this analysis include race, gender, and socioeconomic status (SES). Table 1 demonstrates that in this sample, 56.9% of the students were white, and 17.2% of the students were black, and 25.7% of students were non-black minorities labeled 'other.' For all races, the gender proportions were very close to the overall sample mean of 52.2% male. For the purposes of this research, the SES variable has been standardized to have a mean of zero and a standard deviation of one. The average SES for white students was .186 above the mean; for black students, their SES was -.523 below the mean. For students classified as other, their mean SES was -.494 below the mean. When it comes to SES, as with results for

kindergarteners and fifth graders, black students fared worse than the white students and other non-white minorities.

Individual Level

Individual-level variables include the number of books child had read in the past year, the mother's age, if at least one of their parents/guardians had a Bachelor's degree, their family configuration, and if the student had been suspended by the time they were in eighth grade. Table 1 demonstrates that in the full sample, 36.5% of parents had at least a Bachelor's degree. 48.4% of white student's parents had obtained a bachelor's degree, while 14.7% of black student's parents had achieved a bachelor's degree. For non-black minority students, 24.9% of their parents had bachelor's degrees.

The variable used for family configuration variable reported if the child lived within a single-parent home with no siblings, a single-parent home with siblings, a two-parent home without siblings, and a two-parent home without siblings. This variable was recoded to distinguish between two-parent homes and single-parent homes. In the full sample, 73.6% of students are from two parent homes: 81.1% of white students live in a two-parent household, 44.7% of the black students live within a two-parent home, and 75.6% of the students categorized as other lived in a two-parent home.

In the full sample, the average amount of students who read more than one book in the past year was 87.2%: When just focusing on white students this increased to 90.5%, 82.3% for black students and 81.9% of non-black minority students. The average age of the mothers in this sample is 41.48 in the full sample, 42.08 for white students, 40.14 for black students, and 40.61 for students categorized as other.

From these descriptive statistics, it appears that black students are less likely to live in homes where one of their parents has a bachelor's degree and are less likely to live in two-parent homes than students in the other groups. Previous literature has linked these types of attributes to lower test scores (Brooks-Gunn et al. 1993, 1994, 1997; Mayer, 1997).

Classroom Level

The list of classroom-level variables corresponds to the teacher's credentials and facilitation of reading and math achievement groups. The classroom-level variables include the number of years the teacher had been a school teacher, and whether the teacher possessed a master's degree or some sort of advanced teaching degree. Table 2 demonstrates that on average, the eighth grade teachers had been teaching for 13.62 years in the full sample. For white students, this number slightly increases to 14.58 years, and for black students this number slightly decreased to 12.47 years. For non-black minority students, the teachers had been school teacher an average of 12.31 years. In the full sample, 50.3% of teachers had a master's degree or an advanced teaching degree: For white students, this percentage increased to 53.1%, while for black students it decreased to 47.1%. For other students, it decreased to 46.3%.

School Level

The school-level variables correspond to the location of the school, safety, and the percentage of minority students. The school-level variables include the percentage of minority students, the region the school is located, the types of city or town the school is located, the safety of the surrounding area of the school. The percentage of minority students in the school variable is a categorical variable that specifies if the school less than 10% of minority students,

10% to less than 25% minority students, 25% to less than 50% minority students, 50% to less than 75% minority students, and 75% or more minority students (Tourangeau et al. 2009). 23.9% of the full sample attended schools with less than 10% of minority students. 38.6% of white students attended schools with less than 10% minority students, while less than one percent of black students attended schools with less than ten percent minority students. The majority of black student's students attended schools with over 75% of minority students. This finding is consistent with the reality of the high levels of racially segregated schools in this sample and in society. A similar trend aligns with non-black minorities; they too mostly attend schools where the majority of the student body is a minority.

When focusing on region, 17% of students were from the Northeast, 23% were from the Midwest, 39.8% are from the South, and 19.5% were from the West. The largest region differences were in the South, where 35.8% of white students are from the South, yet 68.3% of black students are from the South. Thus, the majority of black students in this sample were from the South.

32.7% of students in the sample attended schools in large and mid-size cities, 42.4% attended schools in large and mid-sized suburbs and large towns, and 24.8% attended schools located in small towns and rural areas. When looking at the racial differences, the largest percentage of white students attended schools in large and mid-sized suburbs and large towns, while the majority of black students and non-black minorities attended schools located in large and mid-size cities.

The school disadvantaged neighborhood scale ranges from 0-21 and in the full sample, the average school scored 6.79 on the safety scale. This decreased to 6.23 for the schools that

white students attended, yet increased to 7.81 for the schools that black students attended and 7.46 for schools that non-black minorities attended.

Moderating variables & Group mean variables

In the sample, moderating variables were included into the model in order to assess the research questions of whether there were differences in reading and math test scores based on the percentage of minority students within schools, and if so, whether the differences varied across schools. In order to create the Moderating variables, I included the variable, race, that indicated if the student was white, black, or a non-black minority, and the variable of the percentage of minority students. In addition, group means were included into the models in order to examine the differences between between-school and within-school effects

Table 1. Descriptive Statistics by Race: Student Characteristics in Kindergarten			
Variable	Full Sample (N=9315)	White (N=4977)	Black (N=1198)
	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Test Scores:			
Spring Kindergarten Reading	0 (1)	.221 (.834)	-.098 (.662)
Spring Kindergarten Math	0 (1)	.239 (.956)	-.353 (.773)
Race:			
White	59.11	1.00	0.00
Black	15.5	0.00	1.00
Controls:			
Male	52.2	52.8	50.4
Age (in months)	67.22 (11.03)	67.72 (10.36)	67.38 (9.92)
SES	0 (1)	.247 (.939)	-.453 (.966)
WIC benefits for child	49.95	36.99	79.01
Individual-Level			
Number of books in the home	71.28 (58.84)	90.51 (59.13)	37.87 (38.83)
Mother's age at first birth	21.38 (8.14)	22.93 (7.69)	17.32 (8.62)
Parent has Bachelor's Degree	.257	.337	.105
Family type (Two Parent Home)	.745	.837	.393

Table 2. Descriptive Statistics by Race: Classroom and School Characteristics in Kindergarten			
Variable	Full Sample (N=9315)	White (N=4977)	Black (N=1198)
	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Classroom Level			
Teacher Gender (Female)	.979	.982	.983
Teacher Age	39.9 (13.2)	40.6 (12.2)	37.3 (15.0)
Teacher Race (white)	.890	.957	.743
Years teacher taught kindergarten	9.17 (7.9)	9.82 (8.1)	8.21 (7.52)
Teacher highest level of education (Master's Degree)	.309	.322	.291
School Level			
Total Kindergarten Enrollment	88.37 (47.0)	85.08 (46.6)	88.31 (42.2)
School total enrollment			
0-146	.025	.034	.009
150-299	.144	.164	.132
300-499	.294	.312	.311
500-749	.349	.337	.371
750 and above	.185	.151	.174
Percent Black Students			
Zero	.078	.092	.001
More than 0 and less than 5	.408	.497	.024
5 to less than 10	.104	.103	.039
10 to less than 25	.174	.183	.145
25 and more	.234	.123	.788
Percent eligible for free lunch	23.82 (30.36)	18.01 (24.15)	39.01 (38.66)
Percent from neighborhood	77.20 (37.17)	79.63 (35.79)	72.01 (39.05)
Principals race			
White	.875	.937	.613

Black	.106	.050	.382
Other	.018	.011	.004
Community school is located in			
Rural, farming community or Indian reservation	.238	.272	.194
A small city or town of fewer than 50,000	.218	.266	.129
A medium-sized city (50,000 to 100,000)	.130	.120	.137
A suburb of a medium-sized city	.053	.058	.044
A large city (100,001 to 500,000 people)	.117	.062	.294
A suburb of a large city	.076	.088	.052
A very large city (Over 500,000 people)	.059	.026	.062
A suburb of very large city	.105	.104	.085
School disadvantaged neighborhood scale	9.35 (3.10)	8.41 (2.11)	10.94 (3.59)
Receives Title 1 funds	.679	.620	.821
Children in school with weapons	.204	.179	.249
Children stealing	.103	.098	.109
Children fighting	.427	.411	.472
Security guards in schools	.090	.063	.123
Metal detectors in schools	.025	.010	.105

Table 3. Descriptive Statistics by Race: Student Characteristics in Fifth Grade				
	Full Sample (N=5272)	White (N=2822)	Black (N=674)	Other (N=1776)
	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Test Scores:				
Spring Fifth Reading	0 (1)	.236 (.938)	-.510 (1.01)	-.277 (1.08)
Spring Fifth Math	0 (1)	.206 (.927)	-.629 (.945)	-.211 (1.00)
Reading Ability Level				
Primarily High Ability	.165	.186	.091	.165
Primarily Average Ability	.487	.501	.511	.444
Primarily Low Ability	.165	.129	.227	.199
Widely Mixed Ability	.182	.182	.170	.190
Math Ability Level				
Primarily High Ability	.130	.147	.095	.120
Primarily Average Ability	.535	.541	.556	.504
Primarily Low Ability	.174	.148	.212	.205
Widely Mixed Ability	.158	.161	.135	.170
Race:				
White	.550	1.00	0.00	0.00
Black	.171	0.00	1.00	0.00
Other	.278	0.00	0.00	1.00
Controls:				
Male	.518	.530	.520	.488
SES	0 (1)	.240 (.951)	-.504 (.879)	-.404 (.895)
Individual Level				
Number of books child owns	93.7 (141.46)	120.21 (156.78)	55.40 (94.97)	64.43 (120.61)
Mother's age	37.31 (9.56)	37.94 (9.34)	36.35 (10.14)	36.61 (9.50)
Parent has Bachelor's Degree	.187	.239	.114	.125
Family type (Two Parent Home)	.687	.781	.356	.709

Table 4. Descriptive Statistics by Race: Classroom and School Characteristics in Fifth Grade				
Variable	Full Sample (N=5272)	White (N=2822)	Black (N=674)	Other (N=1776)
	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Classroom Level				
Years teacher taught fifth grade	7.35 (6.87)	8.11 (7.05)	6.68 (6.99)	6.27 (6.27)
Teacher highest level of education (Master's Degree)	.468	.499	.440	.418
Reading Achievement Groups				
Never	.294	.343	.195	.252
Less than once a week	.165	.175	.157	.148
Once or twice a week	.233	.231	.255	.228
Three or four times a week	.159	.143	.175	.181
Daily	.147	.106	.216	.189
Math Achievement Groups				
Never	.365	.373	.334	.366
Less than once a week	.220	.224	.227	.212
Once or twice a week	.236	.230	.227	.251
Three or four times a week	.075	.063	.115	.076
Daily	.101	.108	.094	.093
School Level				
Percent Minority				
Less than 10%	.248	.407	.026	.071
10% to less than 25%	.169	.256	.034	.079
25% to less than 50%	.205	.226	.181	.171
50% to less than 75%	.123	.076	.176	.185
75% or more	.253	.033	.580	.491
Region				

Northeast	.171	.219	.114	.111
Midwest	.224	.282	.140	.166
South	.381	.351	.674	.259
West	.221	.146	.070	.463
Community school is located in				
Large and Mid-size City	.349	.228	.543	.466
Large and Mid-size suburb and large town	.417	.476	.339	.345
Small town and rural	.232	.294	.116	.187
Surrounding school disadvantage Scale	8.65 (2.73)	7.90 (1.84)	9.91 (3.53)	9.73 (3.31)
Receives Title 1 funds	.676	.592	.807	.766

Table 5. Descriptive Statistics by Race: Student Characteristics in Eighth Grade				
	Full Sample (N=5191)	white (N=2778)	black (N=664)	Other (N=1749)
Variable	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Test Scores:				
Spring Eighth Grade Reading	0 (1)	.160 (.919)	-.799 (1.03)	-.344 (1.09)
Spring Eighth Grade Math	0 (1)	.147 (.938)	-.737 (.987)	-.291 (1.10)
Race:				
white	.569	1.00	0.00	0.00
black	.172	0.00	1.00	0.00
Other	.257	0.00	0.00	1.00
Controls:				
Male	.522	.527	.515	.468
SES	0 (1)	.186 (.943)	-.523 (.804)	-.494 (.962)
Individual-Level				
Number of books child read in last year (More than 1 book)	.872	.905	.823	.819
Mother's age	41.48 (6.93)	42.08 (6.04)	40.14 (8.81)	40.61 (7.16)
Parent has Bachelor's Degree	.365	.484	.147	.249
Family type (Two Parent Home)	.736	.811	.447	.756
Child HAS had an out of school suspension	.175	.130	.357	.151
Number of suspensions	1.67 (1.06)	1.66 (1.10)	1.70 (1.00)	1.69 (1.69)

Table 6. Descriptive Statistics by Race: Classroom and School Characteristics in Eighth Grade				
	Full Sample (N=5191)	White (N=2778)	black (N=664)	Other (N=1749)
Variable	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)	Mean/Proportion (SD)
Classroom Level				
Number of years been a school teacher	13.62 (9.97)	14.58 (10.05)	12.47 (10.04)	12.31 (9.52)
Teacher highest level of education (Master's Degree/Specialized Degree)	.503	.531	.471	.463
School Level				
Percent Minority				
Less than 10%	.239	.386	.016	.066
10% to less than 25%	.193	.261	.088	.113
25% to less than 50%	.207	.221	.162	.201
50% to less than 75%	.139	.095	.187	.203
75% or more	.220	.035	.544	.415
Region				
Northeast	.174	.211	.125	.125
Midwest	.231	.295	.130	.160
South	.398	.358	.683	.296
West	.195	.134	.060	.417
Community school is located in				
Large and Mid-Size City	.327	.231	.476	.454
Large and Mid-size suburb and large town	.424	.472	.298	.388
Small town and rural	.248	.295	.224	.157

School disadvantaged neighborhood scale	6.79 (2.14)	6.23 (1.78)	7.81 (2.39)	7.46 (2.33)

CHAPTER IV: KINDERGARTEN

Contextual Background

The literature review goes in depth for all the factors that contribute to the academic success of a student. For my model to isolate the influences of the within-school factors, all other factors must be controlled. Within my analysis, it was crucial that I separate class from race, because they have two distinctive roles. While many other studies treat social class as a moderating variable that confounds other non-school factors when discussing the black/white achievement gap, like Condron 2009, I viewed class inequality between blacks and whites as the primary non-school source of the black/white achievement gap (Condron 2009). Using this theoretical framework, Condron states that the non-school sources of class differences between the races explains roughly 1/3rd of the achievement gap. This leads me to believe that school factors can explain a significant portion of the remaining 2/3rds of the black/white achievement gap.

Most studies that examine the black/white achievement gap use SES when analyzing class. I will not solely use SES to explain individual-level factors because doing that collapses information about parental education, occupation prestige, and income into one continuous measure (Condron 2009). The point of including class into the equation is to demonstrate that children living in different levels of the stratification hierarchy have "categorically unequal and qualitatively different life and educational experiences" (Condron 2009: 685). Instead, I also used variables that indicate social class; this is important because children living in poverty experience distinct material hardships, environmental disadvantages, and other disparities that SES cannot capture, which can impact their academic development. Utilizing other variables

was especially important in my analysis because more than just class and outside-of-school factors impact the racial achievement gap. Gender is another variable that was of particular importance in my analysis. When observing test scores, ability groups, and different discipline experiences, the literature suggests that black males are at more of a disadvantage than black females. It could be the case that many of the significant findings only apply to black males.

Research Questions:

1. In the spring of kindergarten, is there a black/white test score gap in math and reading in this sample? If so, what covariates can explain this gap?
2. Is there a variation in average students test scores across classrooms? If so, what classroom or individual variables are associated with that variation?
3. Is there a variation in average students test scores across schools? If so, what school or individual variables are associated with that variation?

Results

Model 1

Tables 3 and 4 provide the results from the mixed model regression for reading and math test scores. Model 1 looks at the influence of the control variables on predicting the reading and math scores. All of the controls except the variables related to being male exert a significant and expected influence on the reading and math test scores. The coefficient for being a black student indicates a -.144 with a standard error of .022 for reading test scores, and a coefficient of -.338 with a standard deviation of .030 for math test scores.

Model 2

Model 2 adds individual-level predictors to the controls. As a result, the size of all the significant control variables for both reading and math test scores stayed the same or were reduced. When examining the reading test scores, the black coefficient reveals a reduction in the gap from -.144 in model 1 to -.103 in model 2. When examining the math test scores, the black coefficient reveals a reduction from -.388 in model 1 to -.277 in model 2.

Regarding the individual-level indicators, for both reading and math test scores, all are significant except the variable regarding the child being in a two-parent home. The directionality and significance of the other variables are consistent with the literature. The results indicate that more books in the home have a positive relationship on test scores, parents with less than a bachelor's degree have an adverse impact with test scores, and finally, the mothers who were older when their children were born positively affected their children's test scores.

Model 3

Model 3 combines control variables with classroom-level variables. The two focal variables were the number of years that the kindergarten teacher has taught kindergarten and whether the teacher possessed an educational specialist degree or any advanced teacher training. When examining the reading and math test scores, neither of these variables were statistically significant. An LR test indicates that the combination of the controls and individual level variables (model 2) are a better model than Model 3. When examining the reading test scores the black coefficient increased in model 3 to -.161, and increased to -.353 for the math test score.

Model 4

Model 4 combines the control variables and the school variables. The school variables included the total school enrollment, the percent black students, the percent of students that are from the neighborhood that the school is located in, the school disadvantaged neighborhood scale, and finally whether the school received Title 1 funds. When looking at the reading score models, the only significant variable is if the school enrollment was over 750 students. A larger school enrollment increased the test scores .176. The black coefficient in model 4 is -.176; this rose from .-161 in Model 3.

When looking at the math scores, the total school enrollment was not statistically significant. In model 4, the only school-level variable that was statistically significant was if the school received Title 1 funding, and this has a negative correlation with the test scores. This may be because schools that receive Title 1 funding typically have a higher percentage of lower-income students attending the school. Therefore, this variable may be a hidden proxy for the unknown effects of poverty that are not measured by my models.

Model 5

The final model combines the individual, classroom, and school variables. Of the control variables, the black coefficient, the students' age, and student SES are statistically significant. When focusing on the reading test scores, the black coefficient is -.129. Of the individual level variables, the number of books in the home, as well as the age of the mother at first birth is statistically significant. No classroom level variables are significant, and the only school-level variable that is statistically significant is the total school enrollment being above 750 students. Therefore, the results indicate that when looking at reading scores, black students and poorer students are predicted to have lower test scores. Students who are older in kindergarten, with

older mothers, and those who have more books within their home are predicted to have higher test scores. When focusing on the math score model, the black student coefficient, age, SES, and WIC benefits control variables are all statistically significant. In the individual-level variables, the number of books in the home, as well as the age of the mother when the child was born was statistically significant. No other school-level variables are significant in this model. The math test score results indicate that older kindergarten students, with a higher family socioeconomic status and more books in the home, are predicted to have better math test scores.

Table 7. Multilevel Regression Analysis: Spring Kindergarten Reading Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	N=9315	N=9315	N=9315	N=9315	N=9315
Controls					
Black	-.144 (.022)***	-.103 (.024)***	.-161 (.024)***	-.176 (.031)***	-.129 (.035)***
Male	-.139 (.071)	-.156 (.071)	-.121 (.077)	-.080 (.081)	-.091 (.084)
Age (in months)	.005 (.0007)***	.005 (.0008)***	.005 (.0008)*	.005 (.000)***	.006 (.001)***
SES	.212 (.011)***	.155 (015)***	.208 (.011)***	.199 (.013)***	.138 (.019)***
WIC benefits for child	-.147 (.016)***	-128 (.017)***	-144 (.017)***	-.166 (.020)***	-.146 (.022)***
Individual Level					
Number of books in the home		.0006 (.0003)***			.0006 (.0001) ***
Mother's age at first birth		.032 (007)***			.034 (.008)***
Parent has less than Bachelor's Degree		-.056 (.022)**			-.038 (.027)
Family type (Two Parent Home)		-.018 (019)			-.008 (.024)
Classroom Level					
Years teacher taught kindergarten			.000 (.001)		.000 (.001)
Education Specialist			.011 (.792)		.050 (.055)
School Level					
School total enrollment					
750 and above				.176 (.083)*	.188 (.086)*
Percent black students					
More than 0 and less than 5				-.015 (.050)	-.021 (.052)
Percent from neighborhood				.000 (.000)	.000 (.000)
Principals race					
Black				-.081 (.058)	-.126 (.064)
School disadvantaged neighborhood scale				-.004 (.006)	-.007 (.007)
Receives Title 1 funds				-.062 (.033)	-.060 (.034)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

* A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models

Table 8. Multilevel Regression Analysis: Spring Kindergarten Math Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	N=9315	N=9315	N=9315	N=9315	N=9315
Controls					
Black	-.338 (.030)***	-.277 (.033)***	-.353 (.033)***	-.366 (.043)***	-.306 (.050) ***
Male	-.072 (.093)	-.089 (.093)	-.093 (.099)	-.087 (105)	-.128 (.108)
Age (in months)	.013 (.001)***	.012 (.001)***	.001 (.001)	.012 (001)***	.014 (.001)***
SES	.300 (.015)***	.223 (.021)***	.299 (.016)***	.283 (.018)***	.230 (.026)***
WIC benefits for child	-.211 (.023)***	-.177 (.025)***	-.205 (.024)***	-.234 (.028)***	-.189 (.031)***
Individual Level					
Number of books in the home		.001 (.000)***			.001 (.000)***
Mother's age at first birth		.035 (.010)***			.036 (.004)**
Parent has less than Bachelor's Degree		-116 (.031)***			-.054 (.038)
Family type (Two Parent Home)		-.006 (.027)			-.007 (.033)
Classroom Level					
Years teacher taught kindergarten			-.000 (.001)		.000 (.002)
Education Specialist			-.063 (.058)		.110 (.071)
School Level					
Total Kindergarten Enrollment					
750 and above				.041 (.100)	.007 (.104)
Percent black students					
More than 0 and less than 5				-.024 (.684)	-.021 (.062)
Percent from neighborhood				.000 (.000)	.000 (.000)
Principals race					
Black				-.048 (.070)	-.117 (.078)
School disadvantaged neighborhood scale				.007 (.008)	.000 (.008)
Receives Title 1 funds				-.094 (.067)**	-.063 (.041)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

** A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models.

Discussion

The primary focus of this chapter is to determine if there is a black/white test score gap present in the spring of kindergarten. The second main point of the analysis is to examine which factors contribute to the test score gap in kindergarten. More specifically, this chapter sought out to examine whether individual-, classroom-, or school-level variables help predict the test score gap during the early years of students schooling.

When focusing on the control variables, for both reading and math scores race, age, SES, and WIC benefits are statistically significant. Being male does not appear to significantly impact test scores in kindergarten in this sample. While being a black student decreases the test score by -.144, having a higher SES increases the test scores by .212. While this does align with previous research that suggests that in kindergarten, SES is one of the largest contributing factor to the racial achievement gap, my models do not indicate a full elimination of the test score gap. This finding indicates that previous research would have benefited from additional predictors.

These results also indicate that math and reading test scores must be analyzed separately to see the how the black/white test score gap differs in relation to the school subject. In Table 1, descriptively we can see that the test score gap in is much wider for math test scores than it is for reading test scores. While black student reading scores were -.031 below the mean, there is a .300 gap between the white and black student scores. For math test scores, black students score -.341 below the mean, and this translates to a .598 gap between white and black students. In this sample, the gap for math scores in kindergarten is half of a

standard deviation. This is crucial because the literature states that this gap will only continue to grow.

When examining the individual-level factors, for both math and reading, the number of books in the home, the age of the mother at the child's first birth, and the parents' education were all statistically significant. The age of the mother and parental education seem to affect test scores more than the number of books in the home as well. The findings suggest that for every additional year of age at the moment of birth, a student will score an extra .032. In addition, these findings suggest that parents not having a bachelor's degree can negatively impact a child's reading score by -.056.

None of the classroom-level factors were statistically significant in any of the models. This suggests that these factors are not relevant to reading and math score in kindergarten; however, these factors may have a bigger impact in later grade levels. In the school-level variables, when examining the findings for the reading scores, the results suggest that the size of the school impacts test scores. These findings indicate that schools that have more than 750 students had a positive impact on test scores. However, this was not the case in the models predicting math scores, the only school-level variable that was statistically significant for the math score models is if the school received Title 1 funding, which is allocated to schools that have a large proportion of low-income students. Attending a school receiving Title 1 funding negatively impacts math test scores, which means that schools with higher percentages of lower-income students have lower test scores.

The final model is very similar for both reading and math test scores. This model demonstrated that when all factors are considered, the statistically significant factors that aid in

the prediction of reading and math test scores are, race, age, SES, the number of books in the home, and the mother's age. These variables have consistently been significant factors in all of the models and contribute to the overall explanation of what are the main factors that impact students' test scores in kindergarten.

Previous research suggests that one of the main factors that affect students early on in school is SES. The findings from this chapter analysis are mostly consistent with previous findings. Examining the control and individual-level variables within this sample suggests that the largest factors when predicting reading and math test score in kindergarten are individual-level factors. These primary factors include race, age, SES, WIC benefits, the number of books in the home, the age of the mother, and parental education. When examining which of these factors impacts student test scores the most, race, SES, and being eligible for WIC benefits had the largest effects. Within the classroom and school level variables, school size does matter, as does as Title 1 funding. The findings suggest that larger schools positively impact reading test scores while schools receiving Title 1 funds negatively impacts math test scores.

Overall, the results suggest that in the spring of kindergarten, there is a black/white test score gap in both reading and math scores. The gap for math is much more substantial than for reading. The variables that were statistically significant are race, SES, WIC benefits, the number of books in the home, the age of the mother, parental education, the size of the school, and whether the school receives Title 1 funds. SES appears to have one of the larger impacts on the test scores with higher SES scores contributing to the higher test score. This finding is consistent with the literature that finds that in kindergarten, a family's financial situation has one of the biggest impacts on a child's academic achievement (Palardy 2015).

This chapter also highlights the fact that there are differences in the black/white gap depending on the academic subject one is focused on. While previous research focuses on reading or math test scores, this chapter's analysis discussed the differences between the two. The gap is different for the two subjects; race has a larger impact on math score than for reading test scores, and different school factors influence math and reading test scores differently. The predictive analysis in subsequent chapters consider this finding.

CHAPTER V: 5TH GRADE & TRACKING

Contextual Background

Prior research establishes an achievement gap between black and white students beginning before kindergarten (Rampey, Dion, and Donahue 2009; Coleman et. al 1966). The previous chapter results indicated that within this sample, there is a black/white test score gap during the spring of kindergarten. The academic differences between these two groups continue to grow throughout the grades in every subject (Neal 2004). While poverty has been a factor that many turn to in response to account for this gap, this trend is also present even in affluent areas (Ogbu 2003).

A factor that is gaining momentum with researchers is the effect of tracking or ability-group placement in the first few years of schooling. During the early years of education, it is a common practice to have in-class ability groups. These groups are there to create more homogenous learning environments so that, in theory, teachers can reduce disparities by tailoring their instruction according to ability level (Slavin 1987). A common assumption is that students will learn more in grouped settings and outperform those in non-grouped settings. However, researchers have reported conflicting results on the actual impact of grouping students by perceived ability. Some studies find that students do learn slightly more in homogenous groups (Kulik and Kulik 1992), while others have found that higher-ability students experienced no statistically significant differences in achievement based on the homogeneousness of the group, while lower-ability students achieved more in heterogeneous groups (Schofield 2010).

Students that are placed in lower-ability groups learn significantly less than students who are not groups accordingly to ability (Lleras and Rangel 2009). When compared to students who are placed in high-ability groups, there is an even larger gap in the material that students learn compared to when they are placed in low-ability level groups (Lleras and Rangel 2009). While all students that are tracked at such a young age are impacted by this system, the relevance of this study is that black students are disproportionately placed in lower-ability groups in comparison to their white counterparts (Slavin 1987). This practice is a new way of resegregating students in schools and persistently perpetuates the racial achievement gap. While previous research has documented that students of color are disproportionately placed in lower reading and math classes in comparison to white students, little research has been conducted on whether tracking in elementary and middle school has a significant impact on students' academic achievement. Thus, this chapter seeks that information.

Research Questions

1. Is there variation in average reading and math test scores across classrooms or school for students in the spring of fifth grade? If so, what individual, classroom, or school variables are associated with that variation? Are there differences between kindergarten and fifth grade?
2. Is the variation in the average reading and math test scores based on the average reading and math ability level placement of black students?
3. Is there a difference in reading and math test scores based on the percentage of minority students within schools? If so, do the differences vary across schools? What school variables are associated with that variation?

Results

Chi-Square Results

To test if race impacted what reading and math ability group students were placed in, a chi-square test was run on race and ability groups. The p-value for the reading ability group test was less than .000, indicating a statistically significant relationship between race and which reading ability group students were placed in. Being black was associated with being placed in lower-ability groups. When examining the results for predicting which reading ability group students will be placed in, the results indicate that the majority of students were placed in an average reading group. As Table 7 shows, 17.36% of white students in the sample were placed in primarily high reading ability groups between kindergarten and fifth grade. In comparison, that percentage dropped tremendously to 9.65% for black students. When examining non-black minorities, 17.10% of the sample was placed in primarily high reading ability groups. White students and non-black minority students were placed in high-ability groups at a similar rate; it is only the black student who were disproportionately not placed in the high-ability groups.

11.62% of white students were primarily placed in low reading ability groups, 21.70% of black students were primarily placed in those groups. Again, black students experience a disproportionate placement. Figure 10 contains a comparison among white, black, and non-black minority students, and the reading ability group they were primarily placed in. This clearly demonstrates how white and black students are tracked differently, and how black students had substantially lower proportions of the population in high ability groups in comparison to all other races. When looking at the math ability groups, Table 7 and Figure 10 show a similar pattern. A higher proportion of white students and non-black minority students were

consistently placed in higher ability math groups. When examining the primarily low-ability groups, black students were twice as likely as white students to be placed in primarily low math ability groups. As previously stated, student tracked into lower ability classes achieve less than if they were put into heterogeneous ability groups (Schofield 2007).

Figure. 10

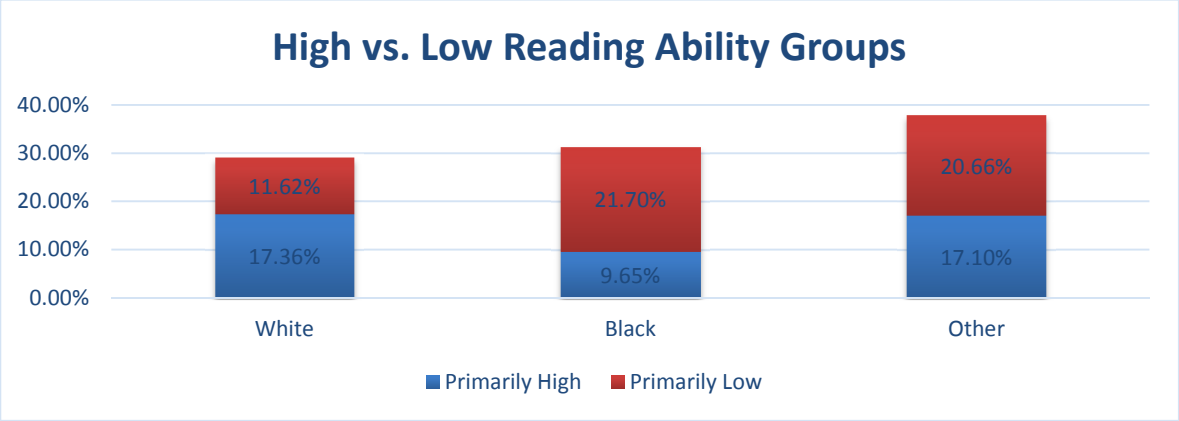


Table 9. Percentages of Students Place in Ability Groups by Race				
	Primarily High	Primarily Average	Primarily Low	Widely Mixed
White	17.36%	51.23%	11.62%	19.79%
Black	9.65%	51.46%	21.70%	17.18%
Other	17.10%	44.73%	20.66%	17.52%
p<.001				

Figure 11.

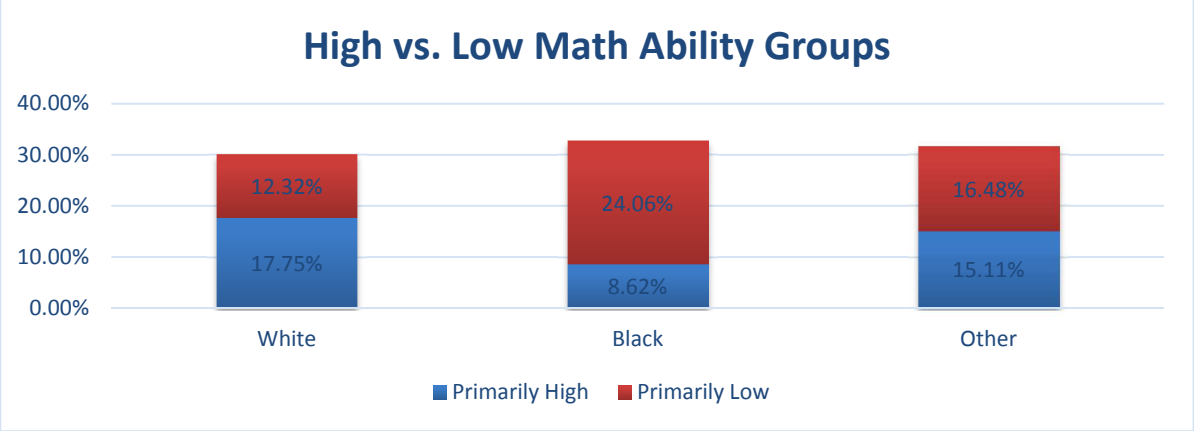


Table 10. Percentages of Students Place in Math Ability Groups by Race				
	Primarily High	Primarily Average	Primarily Low	Widely Mixed
White	17.75%	53.70%	12.32%	16.23%
Black	8.62%	51.89%	24.06%	15.44%
Other	15.11%	49.72%	16.48%	15.63%
p<.001				

Moderating Variable Results

To partially answer the research question of whether there was a difference in the reading and math ability groups students were placed in based on the percentage of minority students in schools, I ran two logit regression models with a moderating variable measuring race and the percent of minority students in the school. The dependent variable for the first model was ability groups. The variable was transformed into a dichotomous variable that measured if the student was placed in a low reading ability group or a high or average ability group.

When examining the results of the moderating variable, the results suggest that white students have higher predicted odds of being placed in low ability groups. This coincides with the reality that there are higher percentages of students of color in low ability groups. When we focus on math ability groups, the results indicate a similar pattern. However, there were no statistical results from the moderating variable. It should be noted that there are fewer schools with math ability groups, and therefore, the lack of significance could be due to the small sample size. From the overall results, it appears that within this sample, how black students are tracked is not directly correlated with the proportion of black students within the school.

Table 11. Moderating Variables Reading Test Score Results	
	Coefficient (SE)
Low Ability Reading Group	
Percent minority students	
Less than 10% (Omitted)	
10% to less than 25%	.129 (.144)
25% to less than 50%	-.165 (.160)
50% to less than 75%	.573 (.210)**
75% or more	.623 (.272)*
Race	
Black	.459 (.773)
Other	-.592 (.373)
Moderating Variable %Minority*Race	
Less than 10% * black *(omitted)*	
Less than 10% * Other (*omitted)*	
10% to less than 25% * black	.099 (.874)
10% to less than 25% * Other	.980 (.446)*
25% to less than 50% * black	.155 (.826)
25% to less than 50% * Other	.816 (.445)
50% to less than 75% * black	-.286 (.844)
50% to less than 75% * Other	.556 (.460)
75% or more * black	-.190 (.830)
75% or more * Other	1.10 (.462)*

*p<0.05, **p<0.01, ***p<0.001, two-tailed

Table 12. Moderating Variables Math Test Score Results	
	Coefficient (SD)
Low Ability Math Group	
Percent minority students	
Less than 10% (Omitted)	
10% to less than 25%	-.106 (.208)
25% to less than 50%	-.005 (.205)
50% to less than 75%	.691 (.279)*
75% or more	1.01 (.329)**
Race	
black	.192 (.367)
Other	.210 (.374)
Moderating Variable %Minority*Race	

Less than 10% * black *(omitted)*	
Less than 10% * Other (*omitted)*	
10% to less than 25% * black	--No Data--
10% to less than 25% * Other	.195 (.518)
25% to less than 50% * black	.456 (.517)
25% to less than 50% * Other	-.201 (.490)
50% to less than 75% * black	-1.04 (.690)
50% to less than 75% * Other	-.667 (.532)
75% or more * black	--No Data--
75% or more * Other	-.121 (.499)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

HLM Regression Model Results

Model 1

Tables 13 and 14 provide the results from the mixed model regressions for reading and math test scores in fifth grade. Model 1 examines the influence of the control variables on predicting reading and math scores. All variables exerted a significant statistical significance. When looking at the coefficient that demonstrated the impact of being a black student, the results indicated a -.436 difference. When looking at the "other" category, which includes all non-black racial minorities, test scores were impacted by -.230. This demonstrates that when compared to white students, other racial minorities' test scores were significantly lower in the fifth grade. When comparing males to females, being male had a negative impact on test scores. Gender impacted test scores by -.162. Finally, as with all previous models, the results indicate that the higher the family SES, the higher the test scores.

The math scores had results similar to those of reading. The results indicate that all of the control variables were statistically significant. However, there are a couple of key differences to note. While being a black student was negatively associated with test scores for

both reading and math, the coefficient when examining the math scores was larger. Being a black student impacted test scores by -.576, larger than a half of standard deviation. These results indicate that when just controlling for race, gender, and SES, black students fared more poorly in math compared to white students. The other key difference between the math and the reading score was the direction of the association of gender. In the reading scores, being male had a negative correlation with test scores; however, when examining math test score results, there was a positive relationship. This indicates that gender impacts math and reading scores differently, and that males in fifth grade fared better on math test than their female counterparts when controlling for race and SES.

Model 2

Model 2 adds individual-level predictors to the control variables. When examining reading test scores, all of the statistically significant control coefficients were slightly reduced in comparison to model 1. Of the individual-level variables, students placed in lower reading ability groups are predicted to have lower reading test scores than students placed in widely mixed heterogeneous-ability groups. These results suggest that students that are placed in the lower ability groups have test scores over half a standard deviation lower on reading test scores than those that were not placed in ability groups. In addition, older mothers and children with several books in the home are predicted to have slightly higher test scores.

When examining the results for the math test scores, similar to the reading test score results, all of the control variables was still statistically significant, yet the coefficients were slightly reduced for most of the control variables. Of the four individual level variables, only the primary ability grouping variable were statistically significant. When examining the variable that

measures the primarily math ability group a child is tracked into, the results indicate that in comparison to being placed in a widely mixed heterogeneous math ability group, when placed in a lower ability group, the students are predicted to have lower test scores, and this is the most drastic difference of the-ability math group results. While being placed in the high ability math ability group does predict higher test scores, the lower ability group coefficients indicate detrimental influences on students placed in lower ability groups.

Model 3

Model 3 combines the controls with classroom-level variables. When examining the reading test score prediction results, the control variables were all still statistically significant, and all of the coefficients increased slightly. Of the classroom variable included in the model, the only statistically significant variables were the number of years a teacher has been teaching and the frequency of achievement groups for reading. The results indicate that the higher the frequency with which students are placed in reading achievement groups, the lower their test scores will be. This finding coincides with previous literature indicating that tracking does not promote academic achievement amongst students placed in lower ability tracks. When examining the results for the math test scores, the results indicated the similar pattern. The results for the math scores indicate that being placed in achievement groups three to four times a week or daily has a negative correlation with math test scores. These results also coincide with previous research that indicated that tracking adversely impacts achievement.

Model 4

Model 4 combines the controls with school-level variables and group mean variables. When examining the school level variables, school location, the surrounding school

disadvantage scale, the percentage of minority students, and schools that receive Title 1 funding were statistically significant. When compared to a school being located in a large or mid-size city, schools located in a rural town are predicted to have lower test scores. In addition, schools that are located in unsafe neighborhoods are also predicted to have lower test scores. In addition, schools that have more than 75% of minority students are predicted to have lower test scores, while schools that receive Title 1 funding are predicted to have slightly higher test scores.

When examining the reading test score group means in model 4, the results indicate that the average teacher education was statistically significant. The group mean variable that measures the average teacher education was statistically significant and negatively correlated with test scores. This finding may be due to teachers with a specialized degree working at schools with lower performing students who need specialized instruction.

Math test score results in model 4 display similar trends with the school location, the surrounding school disadvantage school scale, and the Title 1 variable being statistically significant. The results indicate that in comparison to a school being located in a large or mid-size city, a school located in a small or rural town is predicted to score worse on math tests. Schools that have a higher surrounding school disadvantage scale are predicted to have lower math test scores. This finding may be a result of schools in less safe areas were typically not highly funded. When examining the math test score results for the group mean variables, the average SES, is statistically significant. When focusing on the individual SES, there was a positive correlation. As previously mentioned, students who had a higher SES were predicted to have better test scores. When focusing on the SES group mean, the results indicate that schools with

higher percentages of students who had higher socioeconomic statuses are predicted to have higher test scores than schools who had higher amounts of students with low SES statuses.

Model 5

Model 5 combines the control variables, individual variables, classroom-level variables, and school-level variables. The results when predicting reading test scores indicate that when all of the individual-level, classroom-level, and school-level variables were held constant, race, gender, and SES are all still statistically significant. Males were still predicted to have lower reading test scores than females, and a higher SES still predicted a higher reading test score. The results from model 5 also indicate that older mother's age is associated with higher test scores.

Of the classroom-level variables, the frequency of the achievement reading groups was statistically significant. When compared to never being in achievement reading groups, the categories of less than once a week through daily were all statistically significant and negatively correlated with reading test scores. This indicates that students tracked into achievement groups are predicted to have lower test scores. When focusing on the school level variables, rural areas still predict negative test scores, and the surrounding school disadvantage scale was statistically significant. As in model 4, schools with higher scale scores are predicted to have lower reading test scores. Finally, schools that receive Title 1 funding is statistically significant, and the results indicate that schools that do receive this funding have higher test scores on average. When examining the results for the group mean variables in model 5, none of the variables were statistically significant.

When examining model 5 for predicting math test scores, the results tell a similar story when compared to the results for predicting reading test scores. The main difference with the math results is that the findings indicate that schools with more than 75% minority student have higher math test scores on average.

Table 13. Multilevel Regression Analysis: Spring of Fifth Grade Reading Test Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Controls					
black	-.436 (.045)***	-.399 (.044)***	-.406 (.034)***	-.384(.046)***	-.323 (.047)***
Other	-.230 (.029)***	-.204 (.028)***	-.200 (.029)***	-.169 (.032)***	-.131 (.032)***
Male	-.162 (.018)***	-.132 (.022)***	-.157 (.023)***	-.156 (.021)***	-.126 (.021)***
SES	.385 (.013)***	.309 (.013)***	.372 (.013)***	.313 (.016)***	.260 (.016)***
Individual Level					
Number of books child owns		.0001 (.000)*			.0001. (.000)
Mother's age		.005 (.001)**			.004 (.001)*
Parent has less than Bachelor's Degree		.005 (.011)			.006 (.011)
Family type (Two Parent Home)		-.026 (.029)			-.027 (.028)
Reading Ability Level					
Primarily High Ability		.386 (.040)***			.385 (.045)***
Primarily Average Ability		.057 (.032)			.061 (.038)
Primarily Low Ability		-.633 (.042)***			-.583 (.046)***
Widely Mixed Ability (*omitted*)					
Classroom Level					
Number of years been a school teacher			003 (.001)**		.001 (.001)
Education Specialist			-.002 (.026)		.003 (.032)
Achievement groups for reading					
Never *(omitted)*					
Less than once a week			-.67 (.036)		-.060 (.035)
Once or twice a week			-.095 (.035)**		-.084 (.034)**
Three or four times a week			-.205 (.040)***		-.185 (039)***
Daily			-.344 (.041)***		-.249 (.040)***
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.032 (.035)	-.030 (.036)
Small town and rural				-.144 (.041)***	-.124 (.044)**

School Region					
Northeast *(Omitted)*					
Midwest				.007 (.043)	.002 (.044)
South				.018 (.043)	-.021 (.045)
West				-.059 (048)	-.069 (.050)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.037 (.043)	.062 (.045)
25% to less than 50%				-.057 (.046)	-.048 (.047)
50% to less than 75%				-.061 (.059)	-.009 (.059)
75% or more				-.013 (.059)*	-.094 (.059)
School disadvantaged neighborhood scale				-.017 (.005)**	-.010 (.005)
Receives Title 1 funds				.085 (.036)**	.079 (.037)*
Group Mean Variable SES				.153 (.049)	.113 (.061)
Group Mean Variable Number of book child owns				.0004 (.000)	.0002 (.000)
Group Mean Variable Parental education				-.015 (.099)	-.034 (.100)
Group Mean Variable Teacher education				-.095 (.041)*	-.076 (.053)
Group Mean Variable Number of years a teacher a taught				.002 (.001)	-.0002 (002)
Group Mean Variable Reading groups				-.002 (.053)	.051 (.065)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

* A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models.

Table 14. Multilevel Regression Analysis: Spring of Fifth Grade Math Test Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
Controls	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Black	-.576 (.046)***	-.505 (.061)***	-.579 (.062)***	-.571 (.049)***	-. 530 (.066)***
Other	-.154 (.030)***	-.114 (.038)**	-.134 (.040)**	-.145 (.035)***	-.138 (.046)**
Male	.190 (.023)***	.178 (.031)***	.171 (.033)***	.191 (.023)***	.182 (.031)***
SES	.375 (.013)***	.318 (.019)***	.395 (.018)***	.309 (.016)***	.259 (.023)***
Individual Level					
Number of books child owns		.0001 (.000)			.000 (.000)
Mother's age		.001 (.002)			.001 (.002)
Parent has less than Bachelor's Degree		-.022 (.016)			-.014 (.016)
Family type (Two Parent Home)		.025 (.042)			.029 (.042)
Math Ability Level					
Primarily High Ability		.475 (.059***			.521 (.077)***
Primarily Average Ability		-.031 (047)			.099 (.069)
Primarily Low Ability		-.617 (.059)***			-.542 (.077)***
Widely Mixed Ability (*omitted)*					
Classroom Level					
Number of years been a school teacher			.001(.001)		.001 (.002)
Education Specialist			.001 (.036)		.023 (.049)
Achievement groups for math					
Never *(omitted)*					
Less than once a week			-.065 (.046)		-.045 (.044)
Once or twice a week			.008 (.045)		.016 (.043)
Three or four times a week			-.222 (.070)**		-.171 (.067)**
Daily			-.117 (.062)		-.025 (.059)
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.024 (.037)	-.053 (.044)
Small town and rural				-.123 (.045)**	-.135 (.054)**
School Region					

Northeast *(Omitted)*					
Midwest				.003 (.044)	-.032 (.053)
South				-.010 (.045)	-.043 (.054)
West				-.087 (.051)	-.116 (.061)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.048 (.045)	.059 (.054)
25% to less than 50%				.039 (.047)	.067 (.057)
50% to less than 75%				.071 (.060)	.143 (.073)*
75% or more				.103 (.060)	.161 (.073)**
School disadvantaged neighborhood scale				-.014 (.006)**	-.014 (.006)*
Receives Title 1 funds				.096 (.037)**	.099 (.044)**
Group Mean Variable SES				.148 (.063)**	-.083 (.073)
Group Mean Variable Number of book child owns				.0003 (.000)	-.000 (.000)
Group Mean Variable Parental education				.022 (.102)	.039 (.115)
Group Mean Variable Teacher education				-.075 (.042)	-.055 (.069)
Group Mean Variable Number of years a teacher a taught				-.002 (.002)	-.001 (.003)
Group Mean Variable math groups				.117 (.050)	.125 (.090)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

* A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models.

Discussion & Significance

The main focus of this chapter was to answer three main research questions, the first of which is determining whether there were any variation in average reading and math test scores for students in the spring of fifth grade. If so, what individual, classroom, or school variables are associated with that variation? The answer to this question is yes. Similar to the kindergarten results, there was variation by race in fifth grade. After controlling for individual-, classroom-, and school-level factors, black students are predicted to score significantly lower than white students on both reading and math tests.

In chapter 4, the results for kindergarten test scores indicated that different factors impact reading and math test scores, and this section further demonstrated these conclusions. The final model predicting reading test scores indicates that race, gender, SES, the reading ability level a student is placed in, frequency of reading achievement groups, school location, and schools receiving Title 1 funds all influence test scores. Thus, these factors contribute to the black/white reading test score gap in fifth grade. When examining the results for predicting math test scores, additional factors impacted test scores. In the final models when predicting math test scores, race, gender, SES, ability level a student is placed in, frequency of achievement groups, location, percentage of minority students, school disadvantaged neighborhood scale, and receiving Title 1 funds all impact math test scores. For both reading and math the results indicate that the number of books in the home, the parents' education, and the family construction does not negatively impact test scores. When researchers attempt to figure out why black students do poorly on tests, there are often assumptions that students from single-parent homes, with guardians who have low levels of education, and who never

read outside of school, will score poorly because of their background. However, these results indicated that these individual-level factors are not contributing to the gap between black and white students.

The second main aim of this chapter was to determine if there was the variation in the average reading and math test scores based on the average reading ability level placement of black students. The results indicate that there was a variation among test scores based on ability groups. To test this, a chi-square test was first conducted to establish a statistically significant correlation between black students and being placed in predominantly low reading and math ability groups. The results indicate that the majority of all racial groups are placed in average reading and math ability groups. However, almost twice the percentage of black students are placed in low-ability groups when compared to the percentage of white students placed in these groups. Previous research claims that students in lower-ability groups learn significantly less when compared to students placed in heterogeneous ability groups (Lleras and Rangel 2009). These findings indicate that schools are perpetually separating students despite the detrimental impacts to their learning.

The results from the previous chapter indicated that black students are starting off behind regarding reading and math test scores. These results of tracking suggest that the schools are not narrowing that gap. The multilevel regression model results indicate that being placed in ability groups, in general, does not have a positive impact on narrowing the racial achievement gap. This is further demonstrated by the fact that the majority of students placed in primarily low reading ability groups are predicted to score -.583 points below students in that are not tracked into ability groups.

Beyond being placed in ability groups, the frequency of ability group placement was also examined. The results indicate that for both math and reading the more frequently students are placed into separate ability groups, the lower their reading and math scores will be. More specifically for reading test scores, the results suggest that if a student is placed in a separate reading class once or twice a week, that student is predicted to have a -.084 reading test score reduction. However, if that student were to be placed in a reading ability group daily, his or her reading test score would be predicted to fall -.249 points. Overall, these findings suggest that the more frequently students are placed in ability groups, the worse their test scores are predicted to be.

Finally, the last research question for this chapter examined if there are reading and math test score differences based on the percentage of minority students within schools. None of the reading test score results indicated that test scores are impacted by the percentage of minority students, yet, math test scores are impacted when students attend schools with 75% or more minority student. However, the logit regression results do show that students that attended school with more than 50% minority students were more likely to be placed in lower reading and math ability groups.

There are several different ways that one could have modeled this analysis. The rational for utilizing this five model approach was based off of other studies that examined the test score gap using similar nested models such as Fryer and Levitt (2004), Chatterji (2006), and Condron (2009). In addition, because a multilevel model was utilized, special attention had to be paid to the different levels of the dataset, the individual, classroom, and school levels while simultaneously differentiating variables that have already been researched and associated with

the test score gap, such as SES. By separating non-school from school related variables, I was able to examine if racial gaps are indeed influenced differently by non-school versus school related variables. However, another approach could have been to include all of the individual level variables into all of the models, and have a set of models that completely excluded the focal independent variables. This modeling provides additional emphasis on the impact and association of ability groups and the inclusion of the chosen variables are instructive rather than definitive assessments of the importance of different factors in explaining the gap. The additional models can be reviewed in Appendix A & B.

These models did not drastically change the final results of the models. When comparing the model with the ability group variables to the one without the ability group variables, in the final model, the "black" coefficient is slightly higher in the model that does not include the ability group variables. In addition, without the ability group variables, the LR tests suggests that individual level variables alone do not provide a better fitting model. This indicates that the inclusion of the variables has provided additional information on what is associated with the black/white test score gap when controlling for all of the other included variables.

To test the exact percentage of explanation that the ability group variable provides, I calculated the difference in model coefficients between models that include the ability group variables and models that exclude those variables. To test how ability groups impact reading test scores the following equation was used: (-.358- -.323)/-.358 = 0.098. This tells me that the addition of ability group variables helps to explain almost 10% of what is associated with the black/white reading test score gap. This finding of 10% is higher than the 5% that I qualified as

substantively significant. Therefore, within this sample the findings suggests that ability groups a substantively and statistically associated with the black/white reading test score gap[2].

To test how ability groups impact math test scores the following equation was used: (-.560- -.530)/-.560=0.053. This tells me that the addition of ability group variables helps to explain 5% of what is associated with the black/white math test score gap. This finding of 5% is equal the 5% that I qualified as substantively significant. Therefore, within this sample the finding suggests that similar to the reading test score results, ability groups are substantively and statistically associated with the black/white math test score gap.

When framing these results within the opportunity to learn (OTL) framework, the results suggest that placement into low ability groups is negatively associated with test scores. The variable used to examine ability score groupings compares being placed in these groups versus being placed in classrooms that are heterogeneous by skill level. This association alone suggests this practice is negatively associated with test scores. Palardy (2015) identified contextual characteristics of the classroom, access to qualified teachers, and access to effective teachers as negative contributions to students' learning that lead to the formation of achievement gaps. I would suggest that ability grouping is also a factor that hinders a student ability to learn effectively. Therefore, since black students are disproportionally placed in lower-ability groups, this is affecting the black/white test score gap.

[2] Please note that this significance is based off of crude measurements of tracking that consists of a set of dummies to measure reading groups that may be a flawed assessment of the child's ability.

CHAPTER VI: 8th GRADE & DISCIPLINE

Contextual Background

Schools mimic the same racially disproportionate discipline tactics as the larger society. It is common knowledge that 1 in 3 black males will go to prison in their lifetime, versus 1 in 17 white males, according to the Pew Research Center. In the same regard, 1 in 5 black students are suspended from school compared to 1 in 10 white students (Gregory et al. 2010). In a national study done by Wallace et al. (2008), in a sample of over 74,000 10th grade students, about 50% of black students reported being suspended or expelled. Within that same study, only 20% of white students reported being suspended or expelled.

This increasing differential treatment of black students within itself is problematic, but its impact on black students' achievement is the primary cause of concern within this research. The causes of suspensions are directly linked to missed instructional time, a cycle of academic failure, disengagement, and escalating rule breaking (Arcia 2006). Considering that students can miss up to 10 days of schools during one suspension, this lost classroom time is crucial to the academic success of any student. In educational literature, there is a clear positive relationship between class time engagement and academic achievement (Fisher et al. 1981; Brophy 1988; Greenwood, Horton, and Utley 2002).

In a study done by Arcia (2006), researchers followed two demographically similar cohorts for over two years. The only main differences between the two cohorts were that within one cohort, everyone had received at least one suspension. After year one, the cohort with suspensions were three grade levels behind their non-suspended counterparts in reading skills. During the second year follow-up, it was discovered that the cohort that experienced

suspensions was now five years behind in reading skills. Arcia linked the suspensions and loss of crucial classroom time to a continuing process of withdrawal from the class, and from this a negative impact on academic achievement.

Previous research has documented an achievement gap between white and black students. Research has also documented that students of color are disproportionately disciplined within schools in comparison to white students (Gregory et al. 2010). Little research has been conducted on whether significant disciplinary actions experienced by students of color have a significant effect on the black/white test score gap. Thus, this chapter seeks to fill this gap in the current research.

Research Questions

The purpose of this chapter is (1) to develop the HLM models to determine the effects of school-level variables and student-level variables on student's test scores, and (2) to investigate students' test scores variability by the disciplinary actions the students have experienced. The following research questions are addressed in this chapter:

1. Is there a variation in average students' test scores across schools? If so, what school variables are associated with that variation?
2. Is there a difference in students' test scores on average by obtained suspensions? If so, do the differences vary across schools?
3. Is there a difference in students' test scores on average by the percentage of minority students within schools?
4. Is there a difference in obtained suspensions by the percentage of minority students within schools?

Results

Moderating Variable Results

To answer partially the research question of whether there is a difference in suspensions based on the percentage of minority students within schools, logit regression models were run with a moderating variable measuring race and a variable measuring the percentage of minority students within the school. The dependent variable for the first model was a dichotomous variable measuring if the student had received a suspension by the time he or she was in eighth grade. The results of the regression indicate that students attending schools with 75% or more minority students were more likely to be suspended. However, none of the moderating variable coefficients were statistically significant. In the regression measuring, if the number of suspensions was impacted by percentage of minority students and race, nothing was statistically significant.

These results indicate that the prevalence of black students getting suspended is not dependent on the percentage of minority students that attend the school. From these models, it can be established that black students that attended schools that are not very diverse were suspended at the same rate as black students attending schools where they were the majority.

Table 15. Logit Regression Results : Been Suspended and Moderating Variables	
Percent minority students	Mean/Proportion (SD)
Less than 10% (Omitted)	
10% to less than 25%	-.000 (.011)
25% to less than 50%	-.056 (.012)
50% to less than 75%	-.025 (.017)
75% or more	-.071 (.027)**
Race	
Black	-.070 (.076)
Other	-.017 (.026)

Moderating Variable %Minority*Race	
Less than 10% * black *(omitted)*	
Less than 10% * Other (*omitted)*	
10% to less than 25% * black	-.091 (.086)
10% to less than 25% * Other	-.013 (.034)
25% to less than 50% * black	-.089 (.081)
25% to less than 50% * Other	.057 (.033)
50% to less than 75% * black	-.102 (.082)
50% to less than 75% * Other	-.030 (.035)
75% or more * black	-.098 (.082)
75% or more * Other	.038 (.039)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

Table 16. OLS Regression Results : Number of Suspensions and Moderating Variables

Percent minority students	Mean/Proportion (SD)
Less than 10% (Omitted)	
10% to less than 25%	-.022 (.118)
25% to less than 50%	.128 (.111)
50% to less than 75%	.170 (.169)
75% or more	.018 (.227)
Race	
Black	-.213 (.599)
Other	.015 (.267)
Moderating Variable %Minority*Race	
Less than 10% * black *(omitted)*	
Less than 10% * Other (*omitted)*	
10% to less than 25% * black	-.134 (.655)
10% to less than 25% * Other	.105 (.338)
25% to less than 50% * black	.379 (.624)
25% to less than 50% * Other	-.238 (.322)
50% to less than 75% * black	.305 (.638)

50% to less than 75% * Other	-.256 (.333)
75% or more * black	.402 (.642)
75% or more * Other	-.018 (.354)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

Model 1

Tables 17 and 18 provide the results from the mixed model regression for math and reading test scores in eighth grade. Model 1 examines the influence of the control variables on predicting the reading and math scores. All variables exerted a significant and expected statistical significance. When looking at the coefficient that demonstrated the impact of being a black student, the results indicate a -.664 average point difference when compared to white students.

In this instance, the coefficient indicated a racial test score gap over half of a standard deviation. When looking at the other category, which includes all non-black racial minorities, test scores were impacted by -.197. This demonstrates that, when compared to white students, other racial minorities' test scores were significantly lower. When comparing males to females, being male had a negative impact on test scores. Being male impacted test scores by -.181. Finally, as with all previous models, the results indicate that the higher the family SES, the higher the test scores.

Analysis of the math scores yielded similar results as analysis of the reading scores. All of the control variables are statistically significant. However, there are key differences to note. One of the main key differences is the direction of the association of gender. In the reading scores being male had a negative correlation with test scores; however, being male a positive correlation with math scores. This indicates that gender impacts math and reading scores

differently, and that males in eighth grade fared better on math tests than their female counterparts when controlling for race and SES.

Model 2

Model 2 adds individual-level predictors to the control variables. For reading test scores, all of the statistically significant control coefficients were slightly reduced in comparison to Model 1. Of the individual-level variables, reading more than one book in the past year was statistically significant and positively correlated with test scores. Also, older mothers had a positive impact on reading test scores. Finally, when examining the results measuring if the student was suspended, there was a statistically significant negative correlation.

Similar to the reading test score results, for the math scores, all of the control variables were statistically significant, yet most of the coefficients were slightly reduced for most of the control variables. In the case of gender, the coefficient increased slightly from .125 to .150. Of the four individual-level variables, the number of books a child a child read in the past year was not statistically significant and did not impact math test scores in the same that it impacts reading test scores. The age of the mother was statistically significant and positively impacted math test scores, as did living in a tw-parent/guardian home. Finally, similar to the reading test score results, students that have been suspended at least once are expected to have a lower test score than students score than students that have never been suspended.

Model 3

Model 3 combines the controls with classroom level variables. When examining the reading test score prediction results, the control variables were all still statistically significant, and all of the coefficients had slightly increased. Of the classroom variables included in the

model, the only statistically significant variable is the number of years the teacher had been a school teacher. These results indicate that with each year a teacher has taught increases reading test scores by .005. When examining the results for the math scores, the results indicate the same pattern.

Model 4

Model 4 combines the controls with school-level variables and group mean variables. Being a black student, gender, and SES were all statistically significant for both reading and math test scores. When examining the school-level variables, school region was statistically significant for reading test scores, while location was statistically significant for math test scores. When examining the reading test score group means in model 4, the results indicate that the school average SES and the school average of students that had been suspended were statistically significant. The group mean variable that measures the average amount of suspensions within the school indicates that schools that had high percentages of students who were suspended are predicted to do worse on reading tests in comparison to schools that had a low average of suspended students. These findings suggest that, for students attending a school where there are large numbers of suspended students, that student's test scores will be lowered by 1/3 of a standard deviation. Further, the results indicate that schools with 75% or more minority students are also predicted to have lower reading test scores on average.

When examining the math test scores in model 4, the math test score results for the group mean variables, the average SES and the average number of students that had been suspended were statistically significant. These results indicate that students that attended schools where there was an average high SES among the student body are predicted to do

slightly better on math tests, yet students that attended schools where there is a high amount of suspension among the student body are predicted to do worse on math tests.

Model 5

Model 5 combines the control variables, individual variables, classroom-level variables, and school-level variables. The results when predicting reading test scores indicate that when all of the individual-level, classroom-level, and school-level variables are held constant, the black student coefficient, gender, and SES are statistically significant. These results suggest that when all else is held constant, there is a factor still negatively impacting black students' test scores. Males are still predicted to have worse reading test scores than females, and a higher SES still predicts a higher reading test score. Of the individual level variables, the mother's age was statistically significant, indicating that students with older mothers are predicted to have higher test scores. If the student had read more than one book in the past year, they are predicted to have a higher test scores. In addition, if a student has been suspended by the time they reach eighth grade, the results indicate that there is a negative impact on student's test scores.

Of the classroom-level variables, the number of years that a teacher had been a school teacher, as well as if the teacher had an advanced degree, were both statistically significant. The findings suggest that the length of time a teacher has taught increases test scores. Yet teachers having a higher degree, or being a teacher specialist, had a negative impact on test scores. As stated in previous chapters, this may be an indication that teachers that have advanced degrees are specialized in order to deal with students with special needs or learning disabilities, student populations which often score lowly on tests.

When examining the school-level variables, nothing was statistically significant except the percentage of minority students within the school. The results indicate that students that attended schools with 75% or more minority students were more likely to be to have lower test scores. Finally, when examining the group mean variables, the school average SES, as well as the school's average of teachers with advanced degrees was statistically significant. As with previous findings, schools where the average student SES was high is predicted to have higher reading test scores. Also, schools that had more teachers with higher degrees are predicted to have higher test scores. This finding is particularly interesting because at the classroom-level teachers with advances or specialized degrees have a negative impact on reading test scores. These findings indicate that schools with more teachers with advanced degree may also have more money. Therefore, the group mean variable for teachers with advanced degrees may be masking levels of school funding within that variable.

When examining the results for eighth grade math test scores, there are many similarities to the reading test score results. All of the control variables were statistically significant, with similar themes as the reading test scores. Of the individual-level variables, the results indicate that when all else is held constant, students with older mothers, living in two-parent households, and who have never been suspended, are predicted to get higher test scores. When examining the classroom-level variable, the results indicate that for every year a teacher has taught, that classroom's math test scores are predicted to increase by .008 standard deviations. When examining the school-level variables, the results indicate that students who live in small and rural towns are predicted to have lower test scores, students.

Finally, when examining the groups mean variable, a high average school SES is associated with higher test score. An interesting finding to note is that the variable indicating the average number of years teachers have taught within the school indicates that schools that have teachers that have taught a very long time are predicted to do worse on math test scores.

Table 17. Multilevel Regression Analysis: Spring of Eighth Grade Reading Test Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Reading Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
black	-.664 (.048)***	-.581 (.049)***	-.653 (.048)***	-.520 (.052)***	-.464 (.053)***
Other	-.197 (.032)***	-.189 (.032)***	-.190 (.032)***	.126 (.035)***	-.104 (.035)
Male	-.181 (.023)***	-.156 (.024)***	-.180 (.023)***	-.171 (.023)***	-.155 (.023)***
SES	.372 (.013)***	.313 (.019)***	.372 (.013)***	.278 (.018)***	.225 (.023)***
Individual Level					
Student has read more than one book in the past year		.091 (.038)*			.086 (.039)**
Mother's age		.011 (.002)***			.010 (.002)***
Parent has less than Bachelor's Degree		-.057 (.035)			-.062 (.040)
Family type (Two Parent Home)		.022 (.033)			.022 (.033)
Has Been Suspended		-.284 (.039)***			-.265 (.047)***
Classroom Level					
Number of years been a school teacher			.005 (.001)***		.008 (.002)***
Education Specialist			-.031 (.028)		-.120 (.043)**
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.061 (.035)	-.065 (.035)
Small town and rural				-.064 (.044)	-.062 (.044)
School Region					
Northeast *(omitted)*					
Midwest				.006 (.042)	.001 (.043)
South				-.092 (.044)*	-.084 (.044)
West				-.085 (.050)	-.082 (.050)
Percent minority students					

Less than 10% (Omitted)					
10% to less than 25%				.007 (.042)	.004 (.042)
25% to less than 50%				.003 (.047)	-.006 (.047)
50% to less than 75%				-.084 (.057)	-.094 (.057)
75% or more				-.162 (.061)**	-.180 (.061)**
School disadvantaged neighborhood scale				-.000 (.008)	-.000 (.008)
Group Mean Variable SES				.193 (.049)***	.233 (.051)***
Group Mean Variable Child has read more than one book				.004 (.031)	-.005 (.032)
Group Mean Variable Parental education				.051 (.070)	-.033 (.080)
Group Mean Variable Teacher education				.008 (.035)	.131 (.056)*
Group Mean Variable Number of years a teacher a taught				.004 (.031)	-.005 (.002)
Group Mean Variable Has been suspended				-.286 (.068)***	.011 (.082)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

* A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models.

Table 18. Multilevel Regression Analysis: Spring of Eighth Grade Math Test Score Results					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Math Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
Black	-.640 (.049)***	-.549 (.050)***	-.633 (.049)***	-.577 (.053)***	-.511 (.054)***
Other	-.134 (.032)***	-.130 (.032)***	-.130 (.032)***	-.116 (.036)***	-104 (.036)**
Male	.125 (.024)***	.150 (.024)***	.126 (.024)***	.133 (.024)***	.152 (.024)***
SES	.336 (.014)***	.317 (.019)***	.366 (.014)***	.301 (.018)***	.258 (.023)***
Individual-Level					
Student has read more than one book in the past year		.036 (.038)			.031 (.039)
Mother's age		.006 (.002)**			.005 (.002)*
Parent has less than Bachelor's Degree		-.041 (.035)			-.041 (.040)
Family type (Two Parent Home)		.095 (.034)***			.095 (.034)**
Has Been Suspended		-.276 (.039)***			-.298 (.047)***
Classroom Level					
Number of years been a school teacher			.003 (001)*		.008 (.002)***
Education Specialist			-.028 (.028)		-.067 (.044)
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.039 (.036)	-.042 (.036)
Small town and rural				-.105 (.046)*	-.107 (.042)**
School Region					
Northeast *(omitted)*					
Midwest				.033 (.045)	.039 (.045)
South				-.036 (.046)	-.031 (.046)
West				-.035 (.052)	-.030 (.052)
Percent minority students					
Less than 10% (Omitted)					

10% to less than 25%				-.022 (.044)	-.023 (.044)
25% to less than 50%				-.012 (.049)	-.017 (.049)
50% to less than 75%				.045 (.059)	.037 (.059)
75% or more				-.072 (.063)	.083 (.063)
School disadvantaged neighborhood scale				-.002 (.008)	-.001 (.008)
Group Mean Variable SES				.130 (.050)**	.162 (.053)**
Group Mean Variable Child has read more than one book				.008 (.032)	.006 (.033)
Group Mean Variable Parental education				.044 (.072)	-.010 (.082)
Group Mean Variable Teacher education				-.017 (.036)	.053 (.057)
Group Mean Variable Number of years a teacher a taught				.0002 (.001)	-.007 (.002)**
Group Mean Variable Has been suspended				-.220 (.070)**	-.086 (.084)

*p<0.05, **p<0.01, ***p<0.001, two-tailed

* A LR test was performed with each model by estimating two models and comparing the fit of one model to the fit of the other. (Fox 1997) Model 5 was the best fit in comparison to all other models.

Discussion

The primary focus of this chapter was to answer four main research questions. The first question examined if there were a variation in average students test scores across schools in eighth grade. If so, what school variables are associated with that variation? Like the kindergarten and fifth grade results, there is variation in the reading and math test scores of students by race. In eighth grade, the results indicate a negative correlation between being a black students and test scores, which indicates the continued prevalence of the black/white test score gap.

Model 5 in Table 17 suggests that in eighth grade, black male students that have been suspended are predicted to have lower reading test scores. It may help students to have read more than one book in the past year, as well as having an older mother. The number of years that a student's teacher has taught is also correlated with higher test scores, and there was a slight difference in the average number of years' teachers have taught when comparing black and white students. Black students on average within this sample had less experienced teachers. These findings also suggest that schools that on average have a student body with an overall high SES are predicted to have better test scores than other schools with poorer students.

Another goal of this chapter was to investigate whether there is a difference in student's test scores on average by obtained suspensions. The results indicate that students that had been suspended are predicted to have a -.265 reading test score difference, and a -.298 math test score difference, in comparison to students that had never been suspended. This suggests that suspensions have a negative impact on test scores and hinder students' ability to have an

equal opportunity to learn. Anything that prohibits children from being inside the classroom hinders their ability to learn effectively. Suspensions, in general, keep students out of the classroom and hinders their ability to engage with the material like the students who are not suspended (Arcia 2006). All of this contributes to the main framework of opportunity to learn and the factors that perpetuate this.

In eighth grade, the findings do not suggest that there is a difference in student's test scores on average by the percentage of minority students within schools. Yet, there is a difference in the rate of suspensions by the school's percentage of minority students. OLS and logit regressions were conducted while examining the percent minority variable, as well as a moderating variable created, to examine the intersection of race and percentage of minority students. The results indicate that students that attended schools with 75% or more minority students had an increased likelihood of being suspended. This again adds to the fact that minority students, and more specifically black students, had a higher probability of being suspended, which led to a higher probability of missing class time, and therefore these results suggest that this impacted their test scores. The negative impact on these student's test scores perpetuated the black/white test score gap emerged in kindergarten.

Similar to the analytical modeling conducted in fifth grade, in the eighth grade chapter I also included models that include all of the individual level variables into all of the models, and have a set of models that completely excluded the focal independent variables. This modeling provides additional emphasis on the impact and association of suspensions. The additional models can be reviewed in Appendix C & D.

Similar to the fifth grade results, these models did not drastically change the final results of the models. When comparing the model with the suspension variables to the one without the suspension variables, in the final model, the "black" coefficient is slightly higher in the model that does not include the suspension variables. This indicates that the inclusion of the variables provided additional information on what helps to inform the black/white test score gap when controlling for all of the other included variables.

To test the exact percentage of explanation that the suspension variable provides, I calculated the difference in model coefficients between models that include the suspension variables and models that exclude those variables. To test how suspensions impact reading test scores the equation used was: (-.501- -.464)/-.501=0.073. This tells me that the addition of suspension variables helps to explain 7% of what is associated with the black/white reading test score gap. This finding of 7% is higher than the 5% that I qualified as substantively significant. Therefore, within this sample the finding suggests that suspensions are substantively and statistically associated with the black/white reading test score gap.

To test how suspensions impact reading test scores the equation used was: (-.547- -.511)/-.547=0.065. These findings suggest that the addition of suspensions variables helps to explain almost 7% of what is associated with the black/white math test score gap. This finding of 7% is higher than the 5% that I qualified as substantively significant. Therefore, within this sample, suspensions are substantively and statistically associated with the black/white math test score gap. While black students may have come into kindergarten behind, these findings suggest that school-level disciplinary mechanisms are not increasing their opportunity to learn and narrowing the test score gap.

CHAPTER VII: DISCUSSION & IMPLICATIONS

Introduction

This study set out to explore the school-level factors that impact the racial achievement gap through a lens that does not utilize a deficit approach. The racial achievement gap and the factors that perpetuate it have been a topic of discussion for decades. In addition to the neighborhood, parental, student, and teacher factors that have been previously explored, this current research sought to provide evidence that early-age tracking and early-age suspensions also impact and perpetuate the racial test score gap. Beyond those initial findings, this research examined previous notions of the gender differences in test scores, while evaluating how within-school and non-school factors impact reading and math test scores differently. The models in this research were able to isolate factors that impacted reading scores, and the results of this research supported my hypotheses pertaining to ability grouping and disproportionate suspensions negatively impacting black students' opportunity to learn, and in turn perpetuating the racial achievement gap.

Research Questions

This study sought to answer several questions pertaining to the racial achievement gap and the causative factors. One of the initial questions examined through this study focuses on how the test score gap differs when examining the scores from kindergarten, 5th grade, and 8th grade. The test score gap differs in size as well as in the factors that impact the test scores when examining all three grade levels. The findings imply that while there is a black/white test score gap from kindergarten through eighth grade, one cannot attribute the same individual or school factors to the explanation of the gap for each grade. The intersection of out-of-school

and within-school factors are complex, and one cannot assume that that the same within-school solutions will be effective from one grade to the next.

Another key question was examining if tracking between K-8th grade impacted the racial achievement gap. The results from this research indicate that the tracking that occurs between kindergarten and 5th grade is negatively associated with reading and math test scores. Finally, the last key research question examined if disproportionate disciplinary methods impacted the racial achievement gap. The descriptive statistics presented in earlier chapters demonstrate that black students were disproportionately suspended in comparison to other races. The results from this research indicate that suspensions are negatively correlated with test scores. However, the inclusion of the suspension variable does not provide a full explanation of the black/white test score gap. Returning back to the original theoretical framework of the opportunity to learn, it is reasonable to assume that having large numbers of a racial group out of the classroom because of suspensions is not providing them the same opportunity to learn as the other students, and this research indicates that this is impacting the racial achievement gap.

Within- and Between-School Results

Beyond the initial analysis, this research also differentiates the within- and between-school factors that have been previously conflated in other studies done on the racial achievement gap (Lee and Birkam 2002; Grissmer and Eiseman 2008; Evans et al. 2005; Lleras and Rangel 2009), The results of this study suggest that in fifth grade, there are differences when comparing between- and within-school results. Therefore, in fifth grade, when analyzing the reading test scores, the between-school results indicated that female students with high

SES scores and are placed in high-ability groups, yet do not meet frequently in these reading ability groups, and whose school is located in a large or mid-size city, are expected to have higher test scores. However, students being within schools with the majority of other students with high socioeconomic statuses has no statistical significance on the average school test score. For the math test scores, the between-school and within school results tell a very similar story.

When the eighth grade data was analyzed, different trends were found. This suggests that when focusing on factors that impact the achievement gap and test scores in general, the impact of relevant factors are not constant, but constantly changing with each grade level.

Differences in Math and Reading Test Score Results

The results of this study demonstrate that the black/white gap for math test scores is more substantial than the reading test score gap for all three grade levels. In addition, there are different factors associated with the test scores depending on the subject. This suggests that we cannot make assumptions about achievement gaps in general without separating subject areas.

One of the major differences between math and reading test scores results were how the focal variables impacted them differently. When examining the results for fifth grade reading test scores, the inclusion of the ability groups variables helped to explain 10% of the of the reading black/white test score gap, while only 5% of the math test score black/white test score gap. This indicates that the ability grouping variables were able to explain more of the associations for the reading black/white test score gap than the math test score gap. However, in eighth grade the results indicate that the inclusion of the suspensions variable has similar

impacts on reading and math scores. Including the suspension variables in the models helps to explain about 7% of the association between my both sets of models. These results suggest that suspensions may impact student's overall achievement, while ability grouping may impact certain subjects over others.

These research findings provide sufficient evidence that math and reading test score gaps in general should be analyzed separately, and that any solutions to narrowing the gaps must acknowledge that some interventions may only impact one subject, and not the entire achievement gap in its entirety.

The Family

In this study, several individual and family variables were added to understand their role in the achievement gap. Past literature has put an emphasis on family roles and "cultural" roles within the black community in an effort to explain why the racial achievement gap is so persistent (Lee and Birkam 2002). This deficit approach to this research has led to many scholars dismissing institutional- and school-level variables while focusing on individual-level factors. My findings indicate that SES is always a significant factor that impacts both reading and math test scores. For each grade level, there are some consistent themes. In kindergarten, the two significant individual/family-level factors in the final multilevel model are the number of books that a child had in his or her home and the age of the mother when the child was born. Neither the makeup of the family nor parental education were significant factors that impacted reading or math test scores in kindergarten. In the examination of eighth grade results, home literacy, family type, and other family characteristics were significant. These findings are in line with previous research; however, these results should be examined in the context that there

are additional school-level variables that can explain racial disparities, and in many cases, these school-level variables provide a better explanation than the individual and family variables.

Gender

The results for gender for this study were very much in line with previous research that found no significant differences for math and reading scores in kindergarten (Robinson and Lubienski 2011). However, by fifth grade, females have significantly higher reading test scores than male students, and male students have significantly higher math test scores than female students. This trend continues into eighth grade and clearly continues beyond secondary years with the underrepresentation of women in the STEM fields in general (Beede et al. 2011). The interesting contribution from this research is that it seems clear that it is not gender socialization before kindergarten that creates these gender gaps, but something that is maintained and perpetuated within school as students' progress through higher grade levels. There are mechanisms within schools as early as 1st grade that are impacting gender gaps in STEM fields at the college level. Further research needs to be done in order to better understand what institutional mechanisms are contributing to this phenomenon.

Classroom Level Variable

It is worth noting that the focus of this research was not to shed light on any inadequacies of teachers but to provide further explanation of potential institutional impacts that are seen at the classroom level. The few classroom level variables that are included were not statistically significant within the model 5 during the kindergarten or fifth grade analyses. However, during eighth grade, the number of years that a teacher has been instructing is statistically significant and positively correlated for both math and reading scores. These

findings may imply that experience of teachers impacts students learning differently at different grade levels.

In model 5 in the eighth grade reading test score results suggest that teachers that students that are taught by teachers with more than a bachelor's degree are predicted to have lower test scores. This finding may be due to certain educational specialists who only work with academic struggling students. While this particular data cannot tease out the true nature of this finding, I would not suggest that the more education a teacher has obtained leads to poorer student test scores.

Beyond the classroom levels, when one examines the groups mean variables for teacher education in eighth grade, a slightly different story is told. While at the classroom it appears that education negatively impacts reading test scores. On average, schools that have teachers with higher levels of education have students with higher reading test scores. The opposite effect occurred when examining the number of years a teacher has been an instructor. The classroom level math test score results suggest a positive correlation with test scores, but the groups mean results suggest that on average, schools with teachers that have instructed for several years have students with lower test scores. While this was not the focal point of my research, further research should be done to examine how teacher education and experience, directly and indirectly, impact student learning outcomes.

Further Implications

The findings of this research suggest that school-level factors such as ability grouping and disproportionate disciplinary practices negatively impact black students' test scores and perpetuate the black/white test score gap. One must not conflate the impacts of both of these

factors, as they both impact students in very different ways. However, when answering the original research question of this study, both of these factors should be considered when investigating the black/white test score gap. Previous research has acknowledged that poverty and segregation are large factors that have continuously impacted the racial gap for decades (Dickens, 2005; Grissmer and Eiseman, 2008). This research adds the additional indication that there are mechanisms within schools that are also perpetuating the racial gap. This research should encourage the interrogation of alternative methods in how we instruct children based on ability level and ensuring that instructional practices are equitable to all racial groups. In addition, schools should address the implications of zero-tolerance policies for black students. There must be other interventions that should be incorporated in order to address the racial differences in disciplinary practices while also reforming in how problem behaviors are handled in schools. Alternative solutions that previous scholars have established are effective include such policies as restorative justice. Restorative justice challenges the notion that when something is perceived as a misbehavior in a school, it should automatically be matched with a punishment (Hopkins 2002). Within restorative justice, there are several formal and informal approaches that are used to repair the harm after a behavior has negatively impacted other people (Hopkins 2002). Methods such as these should be considered when interrogating the current disciplinary actions within schools. These methods address the issue while keeping the child in the classroom, which is crucial for a student's academic achievement.

When examining how this study fits within the literature, there were additional complexities examined between the racial achievement gap for both reading and math test scores across three grade levels. Where many other studies only focus only on reading or math,

and just a couple of grade levels, this study expanded that examination. The research findings also provide evidence that math and reading test score gaps in general should be analyzed separately.

This study emphasizes the negative association of ability groups and suspensions with test scores on general. With contributions of how black students are disproportionately impacted by both of these associations. Additional evidence was provided that disproportional disciplinary practices appear before high school. Literature on zero tolerance policies and negative impacts of punitive measures usually focus on high school. This research highlights these practices within elementary and middle schools.

Finally, this study provides more exploration of complexities within gender dynamics with test scores between kindergarten, 5th, and 8th grade. This study suggests that girls fall behind boys in math after kindergarten, which indicates that future research should interrogate what mechanisms within and outside of school impact this phenomenon.

Limitations

In this study, not all variables were consistent within the models at each grade level. Accommodations in the form of recoding variables were made to attempt to have similar variables in each grade level model. However, this is a drawback to this particular dataset and study. For example, the ability group tracking variable is only included in fifth grade and not any previous grades or later grades, and suspensions data was only acquired in eighth grade, which made it more difficult to track behavior problems prior to eighth grade.

In addition, it is a limitation that I utilized the data cross-sectionally and not longitudinally. A longitudinal analysis could have allowed for time-series analysis, or a better

examination of lag scores. Finally, there are factors that I could not explain within the constraints of this dataset. Certain variables were not included in this dataset that may have provided more insight on the black/white test score gap. These include peer effects, political structures, and variables that indicate how rules are enforced within schools. Future research should explore datasets that may be able to provide ways to measure these factors.

Future research

Future research should focus on the differences of math and reading test scores in order to fully understand what mechanisms and differential treatment within schools are impacting the racial and gender differences. These types of inquiries may require qualitative analyses in order to investigate the institutional biases fully. In addition, future researchers must acknowledge that factors that impact students are consistently changing throughout grade levels, and that solutions must also align with those changes. Finally, more research must acknowledge the mechanisms within schools that are impacting students based on race and gender. Future research must utilize a lens that incorporates historical, societal, and general implicit biases that perpetuate differential treatment of students within schools and create achievement gaps.

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APPENDIX A: ADDITIONAL FIFTH GRADE READING TEST SCORE MODELS					
Multilevel Regression Analysis: Spring of Fifth Grade Reading Test Score Results: Without Ability Group Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
Controls	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Black	-.661 (.049)***	-.440 (.046)***	-.438 (.046)***	-.355 (.049)***	-.358 (.049)***
Other	-.395 (.032)***	-.222 (.029)***	-.216 (.029)***	-.137 (.034)***	-.137 (.034)***
Male		-.160 (.023)***	-.159 (.023)***	-.155 (.023)***	-.155 (.021)***
SES		.374 (.014)***	.372 (.014)***	.310 (.017)***	.260 (.016)***
Individual Level					
Number of books child owns		.0001 (.000)*	.0001 (.000)*	.0001 (.000)	.0001 (.000)
Mother's age		.005 (.001)**	.005 (.001)**	.004 (.001)*	.004 (.001)*
Parent has less than Bachelor's Degree		-.000 (.012)	-.001 (.012)	-.000 (.012)	.006 (.011)
Family type (Two Parent Home)		-.033 (.031)	-.034 (.031)	-.030 (.031)	-.026 (.029)
Reading Ability Level					
Primarily High Ability					
Primarily Average Ability					
Primarily Low Ability					
Widely Mixed Ability (*Omitted)*					
Classroom Level					
Number of years been a school teacher			.003 (.001)*		-.006 (.034)
Education Specialist			-.004 (.026)		.003 (.001)*
Achievement groups for math					
Never *(omitted)*					
Less than once a week					
Once or twice a week					
Three or four times a week					
Daily					
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.050 (.026)	-.049 (.036)

Small town and rural				-.167 (.044)***	-.167 (.044)***
School Region					
Northeast *(Omitted)*					
Midwest				.006 (.043)	.005 (.043)
South				.032 (.045)	.033 (.045)
West				-.033 (.050)	-.033 (.050)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.037 (.044)	.037 (.044)
25% to less than 50%				-.059 (.046)	-.059 (.046)
50% to less than 75%				-.069 (.059)	-.068 (.059)
75% or more				-.149 (.059)*	-.148 (.059)*
School disadvantaged neighborhood scale				-.017 (.005)*	-.017 (.005)**
Receives Title 1 funds				.083 (.036)	.083 (.036)*
Group Mean Variable SES				.121 (.062)	.120 (.062)
Group Mean Variable Number of book child owns				.000 (.000)	.000 (.000)
Group Mean Variable Parental education				.011 (.101)	.011 (.101)
Group Mean Variable Teacher education				-.090 (.041)*	-.084 (.054)
Group Mean Variable Number of years a teacher a taught				.001 (.002)	-.001 (.002)
Group Mean Variable math groups					

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

Multilevel Regression Analysis: Spring of Fifth Grade Reading Test Score Results: With Ability Group Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
Controls	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Black	-.661 (.049)***	-.399 (.044)***	-.413 (.046)***	-.355 (.049)***	-.323 (.047)***
Other	-.395 (.032)***	-.204 (.028)***	-.194 (.029)***	-.137 (.034)***	-.131 (.032)***
Male		-.132 (.022)***	-.155 (.023)***	-.155 (.023)***	-.126 (.021)***
SES		.309 (.013)***	368 (.014)***	.310 (.017)***	.260 (.016)***
Individual Level					
Number of books child owns		.0001 (.000)*	.0001 (.000)*	.0001 (.000)	.0001. (.000)
Mother's age		.005 (.001) **	.005 (.001)*	.004 (.001)*	.004 (.001)*
Parent has less than Bachelor's Degree		.005 (.011)	.000 (.012)	.000 (.012)	.006 (.011)
Family type (Two Parent Home)		-.026 (.029)	-.038 (.030)	-.030 (.031)	-.027 (.028)
Reading Ability Level					
Primarily High Ability		386 (.040)***			.385 (.045)***
Primarily Average Ability		.057 (.032)			.061 (.038)
Primarily Low Ability		-.633 (.042)***			-.583 (.046)***
Widely Mixed Ability *(omitted)*					
Classroom Level					
Number of years been a school teacher			.003 (.001)**		.001 (.001)
Education Specialist			-.004 (.026)		.003 (.032)
Achievement groups for math					
Never *(omitted)*					
Less than once a week			-.065 (.036)		-.060 (.035)
Once or twice a week			-.093 (.035)**		-.084 (.034)**
Three or four times a week			-.204 (.040)***		-.185 (039)***
Daily			-.343 (.041)***		-.249 (.040)***
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.050 (.036)	-.030 (.036)
Small town and rural				-.167 (.044)***	-.124 (.044)**
School Region					

Northeast *(Omitted)*					
Midwest				.005 (.043)	.002 (.044)
South				.032 (.045)	-.021 (.045)
West				-.033 (.050)	-.069 (.050)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.037 (.044)	.062 (.045)
25% to less than 50%				-.059 (.046)	-.048 (.047)
50% to less than 75%				-.069 (.059)	-.009 (.059)
75% or more				-.149 (.059)*	-.094 (.059)
School disadvantaged neighborhood scale				-.017 (.005)**	-.010 (.005)
Receives Title 1 funds				.083 (.036)*	.079 (.037)*
Group Mean Variable SES				.121 (.062)	.113 (.061)
Group Mean Variable Number of book child owns				.000 (.000)	.0002 (.000)
Group Mean Variable Parental education				.011 (.101)	-.034 (.100)
Group Mean Variable Teacher education				-.090 (.041)	-.076 (.053)
Group Mean Variable Number of years a teacher a taught				.001 (.002)	-.0002 (002)
Group Mean Variable math groups				-.003 (.053)	.051 (.065)

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

APPENDIX B: ADDITIONAL FIFTH GRADE MATH TEST SCORE MODELS					
Multilevel Regression Analysis: Spring of Fifth Grade Math Test Score Results: Without Ability Group Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
Controls	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Black	-.819 (.050)***	-.561 (.047)***	-.561 (.047)***	-.559 (.050)***	-.560(.050)***
Other	-.348 (.033)***	-.147 (.030)***	-.146 (.030)***	-.139 (.035)***	-.139 (.035)**
Male		.191 (.023)***	.191 (.023)***	.194 (.023)***	.195 (.023)***
SES		.361 (.014)***	.361 (.014)***	.300 (.017)***	.300(.023)***
Individual Level					
Number of books child owns		.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Mother's age		.006 (.001)**	.006 (.001)**	.005 (.001)**	.005 (.001)**
Parent has less than Bachelor's Degree		-.024 (.012)*	-.024 (.012)	-.024 (.012)	-.024 (.012)
Family type (Two Parent Home)		.017 (.031)	.017 (.031)	.024 (.031)	.024 (.031)
Reading Ability Level					
Primarily High Ability					
Primarily Average Ability					
Primarily Low Ability					
Widely Mixed Ability (*Omitted)*					
Classroom Level					
Number of years been a school teacher			.000 (.001)		.001 (.001)
Education Specialist			.009 (.027)		.017 (.035)
Achievement groups for math					
Never *(omitted)*					
Less than once a week					
Once or twice a week					
Three or four times a week					
Daily					
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.028 (.037)	-.028 (.037)

Small town and rural				-.120 (.045)**	-.120 (.045)**
School Region					
Northeast *(Omitted)*					
Midwest				.007 (.044)	.007 (.044)
South				-.001 (.045)	-.001 (.045)
West				-.079 (.051)	-.079 (.051)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.052 (.045)	.052 (.045)
25% to less than 50%				.039 (.047)	.039 (.047)
50% to less than 75%				.076 (.060)	.077 (.060)
75% or more				.092 (.060	.093 (.060)
School disadvantaged neighborhood scale				-.014 (.005)*	-.014 (.005)*
Receives Title 1 funds				.099 (.037)**	.100 (.037)**
Group Mean Variable SES				.169 (.064)**	.169 (.064)*
Group Mean Variable Number of book child owns				.000 (.000)	.000 (.000)
Group Mean Variable Parental education				-.043 (.103)	-.043 (.103)
Group Mean Variable Teacher education				-.073 (.042)	-.090 (.055)
Group Mean Variable Number of years a teacher a taught				.002 (.002)	-.003 (.002)
Group Mean Variable math groups					

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

Multilevel Regression Analysis: Spring of Fifth Grade Math Test Score Results: With Ability Group Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
Controls	(N=5272)	(N=5272)	(N=5272)	(N=5272)	(N=5272)
Black	-.819 (.050)***	-.542 (.061)***	-.550 (.064)***	-.559 (.050)***	-. 530 (.066)***
Other	-.348 (.033) ***	-.114 (.038)**	-.127 (.040)**	-.139 (.035)***	-.138 (.046)**
Male		.178 (.031)***	.171 (.033)***	.192 (.023)***	.182 (.031)***
SES		.318 (.019)***	.383 (.019)***	.301 (.017)***	.259 (.023)***
Individual Level					
Number of books child owns		.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Mother's age		.001 (.002)	.003 (.002)	.004 (.001)*	.001 (.002)
Parent has less than Bachelor's Degree		-.022 (.016)	-.030 (.017)	-.024 (.012)	-.014 (.016)
Family type (Two Parent Home)		.025 (.042)	.039 (.045)	.023 (.031)	.029 (.042)
Reading Ability Level					
Primarily High Ability		.475 (.058)***			.521 (.077)***
Primarily Average Ability		.031 (.047)			.099 (.069)
Primarily Low Ability		-.617 (.000)***			-.542 (.077)***
Widely Mixed Ability (*Omitted)*					
Classroom Level					
Number of years been a school teacher			.001 (.001)		.001 (.002)
Education Specialist			.000 (.036)		.023 (.049)
Achievement groups for math					
Never *(omitted)*					
Less than once a week			-.062 (.042)		-.045 (.044)
Once or twice a week			.012 (.045		.016 (.043)
Three or four times a week			-.222 (.070)**		-.171 (.067)**
Daily			-.111 (.061)		-.025 (.059)
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large town				-.026 (.037)	-.053 (.044)
Small town and rural				-.123 (.044)**	-.135 (.054)**
School Region					

Northeast *(Omitted)*					
Midwest				.002 (.044)	-.032 (.053)
South				-.007 (.045)	-.043 (.054)
West				-.087 (.051)	-.116 (.061)
Percent minority students					
Less than 10% (Omitted)					
10% to less than 25%				.048 (.045)	.059 (.054)
25% to less than 50%				.037 (.047)	.067 (.057)
50% to less than 75%				.070 (.060)	.143 (.073)*
75% or more				.097 (.060)	.161 (.073)**
School disadvantaged neighborhood scale				-.013 (.005)	-.014 (.006)*
Receives Title 1 funds				.096 (.037)**	.099 (.044)**
Group Mean Variable SES				.165 (.064)**	-.083 (.073)
Group Mean Variable Number of book child owns				.000 (.000)	-.000 (.000)
Group Mean Variable Parental education				-.025 (.103)	.039 (.115)
Group Mean Variable Teacher education				-.075 (.042)	-.055 (.069)
Group Mean Variable Number of years a teacher a taught				-.002 (.002)	-.001 (.003)
Group Mean Variable math groups				.113 (.050)*	.125 (.090)

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

APPENDIX C: ADDITIONAL EIGHTH GRADE READING TEST SCORE MODELS					
Multilevel Regression Analysis: Spring of Eighth Grade Reading Test Score Results: Without Suspension Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Reading Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
black	-.874 (.052)***	-.628 (.049)***	-.617 (.049)***	-.507 (.053)***	-.501 (.053)***
Other	-.331 (.034)***	-.188 (.032)***	-.181 (.032)***	-.103 (.035)**	-.101 (.035)**
Male		-.185 (.023)***	-.183 (.023)***	-.182 (.023)***	-.182 (.023)***
SES		.320 (.019)***	.319 (.019)***	.231 (.023)***	.229 (.023)***
Individual Level					
Student has read more than one book in the past year		.090 (.038)*	.091 (.038)*	.083 (.039)*	.085 (.039)*
Mother's age		.012 (.002)***	.012 (.002)***	.011 (.002)***	.011 (.002)***
Parent has less than Bachelor's Degree		-.066 (.035)	-.067 (.035)	-.070 (.040)	-.069 (.040)
Family type (Two Parent Home)		.033 (.033)	.035 (.033)	.030 (.033)	.033 (.033)
Has Been Suspended					
Classroom Level					
Number of years been a school teacher			.005 (.001)***		.000 (.002)***
Education Specialist			-.031 (.027)		-120 (.043)**
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.067 (.035)	-.068 (.035)
Small town and rural				-.063 (.044)	-.063 (.044)
School Region					
Northeast *(omitted)*					
Midwest				-.000 (.043)	-.001 (.043)
South				-.094 (.044)*	-.094 (.044)*
West				-.075 (.050)	-.077 (.050)
Percent minority students					

Less than 10% (Omitted)					
10% to less than 25%				.004 (.042)	.004 (.042)
25% to less than 50%				-.014 (.047)	-.015 (.047)
50% to less than 75%				-.103 (.057)	-.101 (.057)
75% or more				-.188 (.061)**	-.186 (.061)**
School disadvantaged neighborhood scale				-.002 (.008)	-.002 (.008)
Group Mean Variable SES				.234 (.052)***	.235 (.052)***
Group Mean Variable Child has read more than one book				-.004 (.032)	-.007 (.032)
Group Mean Variable Parental education				-.030 (.080)	-.028 (.080)
Group Mean Variable Teacher education				.008 (.035)	.130 (.056)*
Group Mean Variable Number of years a teacher a taught				.003 (.001)	.004 (.002)
Group Mean Variable Has been suspended					

Multilevel Regression Analysis: Spring of Eighth Grade Reading Test Score Results: With Suspension Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Reading Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
black	-.874 (.052)***	-.581 (.049)***	-.617 (.049)***	-.489 (.053)***	-.464 (.053)***
Other	-.331 (.034)***	-.189 (.032)***	-.181 (.032)***	-.112 (.035)**	-.104 (.035)
Male		-.156 (.024)***	-.183 (.023)***	-.174 (.023)***	-.155 (.023)***
SES		.313 (.019)***	.319 (.019)***	.232 (.023)***	.225 (.023)***
Individual Level					
Student has read more than one book in the past year		.091 (.038)	.091 (.038)*	.081 (.039)*	.086 (.039)**
Mother's age		.011 (.002)***	.012(.002)***	.010 (.002)***	.010 (.002)***
Parent has less than Bachelor's Degree		-.057 (.035)	-.067 (.035)	-.070 (.040)	-.062 (.040)
Family type (Two Parent Home)		.022 (.033)	.035 (.033)	.025 (.033)	.022 (.033)
Has Been Suspended		-.284 (.039)***			-.265 (.047)***
Classroom Level					
Number of years been a school teacher			.005 (.001)***		.008 (.002)***
Education Specialist			-.031 (.027)		-.120 (.043)**
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.065 (.034)	-.065 (.035)
Small town and rural				-.062 (.043)	-.062 (.044)
School Region					
Northeast *(omitted)*					
Midwest				-.002 (.042)	.001 (.043)
South				-.082 (.044)	-.084 (.044)
West				-.080 (.050)	-.082 (.050)
Percent minority students					
Less than 10% (Omitted)					

10% to less than 25%				.005 (.042)	.004 (.042)
25% to less than 50%				-.004 (.047)	-.006 (.047)
50% to less than 75%				-.094 (.056)	-.094 (.057)
75% or more				-.176 (.061)**	-.180 (.061)**
School disadvantaged neighborhood scale				-.000 (.008)	-.000 (.008)
Group Mean Variable SES				.223 (.051)***	.233 (.051)***
Group Mean Variable Child has read more than one book				-.003 (.032)	-.005 (.032)
Group Mean Variable Parental education				-.040 (.080)	-.033 (.080)
Group Mean Variable Teacher education				.010 (.035)	.131 (.056)*
Group Mean Variable Number of years a teacher a taught				.002 (.001)	-.005 (.002)
Group Mean Variable Has been suspended				-268 (.968)***	.011 (.082)

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

APPENDIX D: ADDITIONAL EIGHTH GRADE MATH TEST SCORE MODELS					
Multilevel Regression Analysis: Spring of Eighth Grade Math Test Score Results: Without Suspension Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Reading Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
black	-.866 (.052)***	-.595 (.050)***	-.589 (.050)***	-.552 (.054)***	-.547 (.054)***
Other	-.292 (.034)***	.129 (.032)***	-.125 (.032)***	-.105 (.036)**	-.103 (.036)**
Male		.122 (.024)***	.123 (.024)***	.124 (.024)***	.125 (.024)***
SES		.324 (.019)***	.324 (.019)	.265 (.023)***	.263 (.023)***
Individual Level					
Student has read more than one book in the past year		.035 (.038)	.035 (.038)	.028 (.039)	.029 (.039)
Mother's age		.006 (.002)**	.006 (.002)**	.005 (.002)**	.005 (.002)**
Parent has less than Bachelor's Degree		.106 (.034)**	.107 (.034)**	.104 (.034)**	.105 (.034)**
Family type (Two Parent Home)		-.050 (.035)	-.050 (.035)	-.048 (.041)	-.048 (.040)
Has Been Suspended					
Classroom Level					
Number of years been a school teacher			.003 (.001)*		-.000 (.008)***
Education Specialist			-.029 (.028)		-.067 (.044)
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.043 (.036	-.044 (.036)
Small town and rural				-.108 (.045)*	-.108 (.045)*
School Region					
Northeast *(omitted)*					
Midwest				.037 (.045)	.037 (.045)
South				-.038 (.046)	-.038 (.046)
West				-.024 (.052)	-.026 (.052)
Percent minority students					

Less than 10% (Omitted)					
10% to less than 25%				-.022 (.044)	.022 (.044)
25% to less than 50%				-.023 (.049)	-.024 (.049)
50% to less than 75%				.031 (.059)	.032 (.059)
75% or more				-.087 (.063)	-.086 (.063)
School disadvantaged neighborhood scale				.000 (.008)	-.000 (.008)
Group Mean Variable SES				.158 (.053)**	.160 (.053)**
Group Mean Variable Child has read more than one book				.007 (.033)	.005 (.033)
Group Mean Variable Parental education				-.011 (.082)	-.009 (.082)
Group Mean Variable Teacher education				-.015 (.036)	.052 (.058)
Group Mean Variable Number of years a teacher a taught				.000 (.001)	-.007 (002)*
Group Mean Variable Has been suspended					

Multilevel Regression Analysis: Spring of Eighth Grade Math Test Score Results: With Suspension Variables					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Spring Eighth Grade Reading Score	B/(se)	B/(se)	B/(se)	B/(se)	B/(se)
	(N=5191)	(N=5191)	(N=5191)	(N=5191)	(N=5191)
Controls					
black	-.866 (.052)***	-.549 (.050)***	-.589 (.050)***	-.539 (.054)***	-.511 (.054)***
Other	-.292 (.034)***	-.130 (.032)***	-.125 (.032)***	-.111 (.036)**	-104 (.036)**
Male		.150 (.024)***	.123 (.024)***	.130 (.024)***	.152 (.024)***
SES		.317 (.019)***	.324 (.019)***	.266 (.023)***	.258 (.023)***
Individual Level					
Student has read more than one book in the past year		.036 (.038)	.036 (.038)	.027 (.039)	.031 (.039)
Mother's age		.006 (.002)**	.006 (.002)**	.005 (.002)*	.005 (.002)*
Parent has less than Bachelor's Degree		-.041 (.035)	-.050 (.035)	-.048 (.041)	-.041 (.040)
Family type (Two Parent Home)		.095 (.034)**	.107 (.034)**	.100 (.034)**	.095 (.034)**
Has Been Suspended		-.276 (.039)***			-.298 (.047)***
Classroom Level					
Number of years been a school teacher			.003 (.001)*		.008 (.002)***
Education Specialist			-.029 (.028)		-.067 (.044)
School Level					
School location					
Large/mid-size city *(omitted)*					
Large/mid-size suburb and large Town				-.042 (.036)	-.042 (.036)
Small town and rural				-.107 (.045)*	-.107 (.042)**
School Region					
Northeast *(omitted)*					
Midwest				.039 (.044)	.039 (.045)
South				-.029 (.045)	-.031 (.046)
West				-.029 (.052)	-.030 (.052)
Percent minority students					

Less than 10% (Omitted)					
10% to less than 25%				-.021 (.044)	-.023 (.044)
25% to less than 50%				-.016 (.049)	-.017 (.049)
50% to less than 75%				.038 (.059)	.037 (.059)
75% or more				.038 (.059)	.083 (.063)
School disadvantaged neighborhood scale				.002 (.008)	-.001 (.008)
Group Mean Variable SES				.150 (.053)**	.162 (.053)**
Group Mean Variable Child has read more than one book				.008 (.033)	.006 (.033)
Group Mean Variable Parental education				-.019 (.082)	-.010 (.082)
Group Mean Variable Teacher education				-.014 (.036)	.053 (.057)
Group Mean Variable Number of years a teacher a taught				.000 (.001)	-.007 (.002)**
Group Mean Variable Has been suspended				-203 (.070)**	-.086 (.084)

*Highlighted columns indicate models that LR test results indicate are not better fit models than the previous numerical model.

CURRICULUM VITAE
ATIERA LAUREN COLEMAN

EDUCATION

- **University of Wisconsin-Milwaukee, Milwaukee, WI**
  PhD, Sociology – 2012-2016
  Dissertation: A Quantitative Analysis of School Level Factors and their Impact on the Racial Achievement Gap

- **University of Wisconsin-Milwaukee, Milwaukee, WI**
  Masters of Arts, Sociology - May 2012
  Thesis: Intervention and Outcomes: The Impact of Upward Bound and Talent Search on Occupational Prestige.

- **Beloit College, Beloit, WI**
  Bachelor of Arts, Sociology- May 2010

RELEVANT SKILLS

- Leadership and organizing
- Assessment
- Program planning, implementation, and evaluation
- Writing, editing, and public speaking
- Lecturing and presentations
- Computer applications: Microsoft Word, Excel, PowerPoint, Prezi, Publisher, SPSS, STATA

STUDENT SERVICES AND EVALUATION EXPERIENCE

Director, McNair Scholars Program **2015- Present**
Beloit College

- Directed and facilitated recruiting, placing, and mentoring McNair Scholars
- Managed a department
- Managed a 1.1-million-dollar budget
- Prepared regular compliance reports
- Executed the grant to assure that the program is meeting its benchmarks
- Represented the program to internal and external stakeholders
- Taught a Research Methods course to acclimate students to academic research
- Taught a Senior Seminar catered to helping student navigate graduate school applications

Graduate Researcher & Survey Center Supervisor **2014-2016**
Center for Urban Initiatives and Research (CUIR)

- Conducted applied evaluation research projects for nonprofit and governmental agencies
- Supervised daily operations of the survey center and related projects
- Hired, trained, and supervised 3 shift leaders and 30 survey interviewers
- Created reports and presentations for clients and other center stakeholders

Lecturer **2013-2015**
University of Wisconsin-Milwaukee /Milwaukee Public Schools GEARUP

- Conducted a 32 session lecture series for 9th and 10th graders attending Milwaukee Public Schools
- Developed and facilitated hands-on engaging activities to introduce sociology, helped foster a sociological perspective, develop students critical thinking, and discuss and highlight career opportunities related to sociology

Program Assistant **2013-2015**
University of Wisconsin-Milwaukee Upward Bound Program

- Developed assessment tools for student achievement to track academic progression and improvement
- Aided in the development and implementation of a $20,000 mobile iPad cart and Mac lab to aid in classroom instruction and make technology more accessible to students throughout the program
- Assisted with supervising, training, and creation of tutoring teams
- Monitored and enforced rules for all student participants, attended field trips, meetings, and other program related activities
- Managed work-study newsletter editors, yearbook student committees, and other student employees

Tutor **2012-2015**
University of Wisconsin-Milwaukee Upward Bound Program

- Met with students during academic year and summer sessions on a regular basis to review and assist with class work, while helping students develop effective study habits and techniques
- Enforced appropriate behavior from participants and program staff
- Assisted in program workshops and chaperoned field trips
- Helped instructors prepare for lessons, and instructed life skills sessions when needed

McNair Office Administrator **2010**
Beloit College McNair Program

- Aided in workshop development for underrepresented undergraduates with aspirations of going to graduate school

- Advised McNair scholars with their summer research goals, and mentored on academic goals
- Coordinated trips and McNair Program events, and facilitated office and administrative duties
- Assessed applications for new student enrollment

Tutor **2009-2010**
Beloit Memorial High School/Beloit College Upward Bound Program
- Met with students on a regular basis to review and assist with class work
- Helped students develop effective study habits and techniques
- Monitored & enforce rules for student participants
- Assisted in program workshops and chaperoned field trips when needed

Wisconsin Alliance for Minority Participation (WiscAMP) Coordinator **2008**
Beloit College
- Coordinated an intensive summer program for underrepresented incoming freshman with focuses within the science, technology, engineering, or mathematics (STEM) fields
- Facilitated student and parent orientations, meetings, and tutoring sessions
- Coordinated all workshops and fieldtrips, and assisted the teachers within the classroom
- Coordinated the residential arrangements for the students, and served as live-in residential advisor
- Provided mentorship to students during and after the program , and evaluated students' academic progress throughout the program

RELEVANT PROFESSIONAL EXPERIENCE

Survey Methodologist **2014**
Bullying Summit Sponsored by Milwaukee Public Schools and Department of Public Instruction
- Served on the bullying summit planning committee to develop a public summit addressing the complexities of bullying and possible solutions
- Scheduled speakers and workshop presenters, and coordinated presentations
- Developed a survey to gauge the impact of bullying on the MPS students
- Developed focus group scripts to engage students in a conversation of how bullying impacts their daily lives
- Facilitated 4 focus groups with 5^{th}-12^{th} graders and their teachers
- Reported the impacts of bullying on adolescents to summit planning committee members

Research and Technical Assistant **2011**
University of Wisconsin-Milwaukee
- Assisted Nancy Mathiowetz with the redesign options for the consumer expenditure survey

- Researched and implemented new ways to utilize technology within social research
- Trained research team on iOS based technology

Teaching Assistant for Introduction to Sociology **2010-2011**
University of Wisconsin-Milwaukee Department of Sociology
- Lead three discussion courses on relevant sociological concepts
- Developed lesson plans, graded assigned course work, and attended weekly office hours

RELEVANT RESEARCH PROJECTS

Team GEARUP survey, Co-investigator **2014**
- At the request of Milwaukee Public Schools and Team Gear Up, developed and implemented a telephone survey for parents and guardians of children participating in Team Gear Up on their student's college awareness and readiness

Boys & Girls Clubs of Greater Milwaukee SPARK survey, Co-investigator **2014**
- At the request of the Boys & Girls Clubs, developed and implemented a telephone survey to assess the literary development of children that have participated in the literacy program SPARK

Community Building Milwaukee Evaluation, Co-investigator **2014**
- The goal of this evaluation was to determine the impact of citywide Community Building Workshops on participants' self-reported attitudes and behaviors, as well as the impact workshops have on complimentary subsequent programming

Public Allies National Evaluation, Co-investigator **2014**
- This study examines the impact of the AmeriCorps Public Allies program on participants and partnering nonprofits

City of Milwaukee Police Satisfaction Survey, Co-investigator **2014**
- At the request of the City of Milwaukee Fire & Police Commission, developed and implemented a telephone survey to measure resident perceptions of satisfaction, trust, safety, and police visibility

PROFESSIONAL SERVICE
Beloit College McNair Exploratory Program **2016**
- **Mentor**

Beloit College McNair Scholars Symposium **2014**
- Presenter: "My Graduate School Journey"

National Ronald E. McNair Scholars Program Conference **2012-2014**
- Graduate Panelist & Presentation Moderator

Beloit College McNair Scholars Workshop **2012**

- Graduate Panelist

University of Wisconsin-Milwaukee McNair Scholars Workshop **2011-2014**

- Graduate Panelist

PRESENTATIONS

NATIONAL

Coleman, A. (2012). Interventions and Outcomes: The impact of Upward Bound and Talent Search on Occupational Prestige. Oral Presentation at the Midwestern Sociological Society Conference (MSS), Minneapolis, Minnesota.

Coleman, A. (2009). "Coming Out Stories:" Generational Effects of Identity Construction. Poster Presentation at the National Conference for Undergraduate Research (NCUR), Lacrosse, Wisconsin.

Coleman, A. (2009). Residential Segregation: Origin Neighborhood Effects on Future Location Choices. Poster Presentation at the Committee on Institutional Cooperation/ Summer research opportunity program Conference, Michigan.

Coleman, A. (2009). "Coming Out Stories:" Generational Effects of Identity Construction. Roundtable Paper Presentation at the American Sociological Association (ASA) Honors Program Conference, San Francisco, California.

Coleman, A. (2008). "Coming Out Stories:" Generational Effects of Identity Construction. Poster Presentation at the National McNair Conference, Delavan, Wisconsin.

LOCAL

Coleman, A. (2009) Residential Segregation: Origin Neighborhood Effects on Future Location Choices. Oral Presentation at UW Milwaukee Symposium, Milwaukee, Wisconsin.

Coleman, A. (2008). "Coming Out Stories:" Generational Effects of Identity Construction. Oral Presentation at Beloit College Symposium, Beloit, Wisconsin.

AWARDS & HONORS

- Advanced Opportunity Program (AOP) Fellowship, 2011-2014
- Chancellor's Graduate Student Award, 2012-2013
- Edward A. Fergus Award: For Outstanding McNair Achievement, 2010

- CIC/SROP Scholars Program, 2009
- American Sociological Association Honors Program, 2009
- McNair Scholars Program, 2008- 2010

PROFESSIONAL MEMBERSHIPS

- American Sociological Association, 2009 to present