THE ACADEMIC IMPACT OF DESCRIPTIVE REPRESENTATION AND BUREAUCRATIC DISCRETION ON AFRICAN-AMERICAN AND LATINO STUDENTS

A Dissertation

Presented to

The Faculty of the Department

of Political Science

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree of

Doctor of Philosophy

By

Jasmine L. Jenkins

December, 2013

THE ACADEMIC IMPACT OF DESCRIPTIVE REPRESENTATION AND BUREAUCRATIC DISCRETION ON AFRICAN-AMERICAN AND LATINO STUDENTS

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THE ACADEMIC IMPACT OF DESCRIPTIVE REPRESENTATION AND BUREAUCRATIC DISCRETION ON AFRICAN-AMERICAN AND LATINO STUDENTS

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ABSTRACT

This dissertation explores the manner in which descriptive representation in the classroom affects academic achievement for African-American and Latino students. Long-standing problems of both equality of access and equality of outcomes have caused a trend toward a greater level of centralized authority in public education. This centralized authority is particularly powerful in making decisions for schools that serve low-income, African-American and Latino students, who have historically lagged behind their White and Asian counterparts in academic performance. The lack of autonomy in low-income, urban schools may be precisely what is keeping teachers and administrators in these schools from being effective.

Although much of the literature on bureaucratic representation indicates that same race-bureaucrats are able to produce desired policy outcomes for those whom they represent, I find that black and Hispanic teachers are not able to turn descriptive representation of their students into substantive results, given the present policy environment. I argue that much of the influence that teachers would have on their students is limited by factors beyond their control. These factors include a lack of administrator autonomy, which ties the hands of administrators and teachers, keeping them from making decisions that might otherwise result in better outcomes for their students. I further find that in certain cases, descriptive representation does have a positive impact on student performance when it is paired with a high level of administrator autonomy.

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As I have gone through this process, I've learned nearly as much about myself as I have about representation and education policy. I thank God for the opportunity to take on the biggest intellectual pursuit of my life (so far!) and for giving me the strength and endurance to complete it.

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Dedication

For George & Eva Jenkins and Cary & Florence McClendon

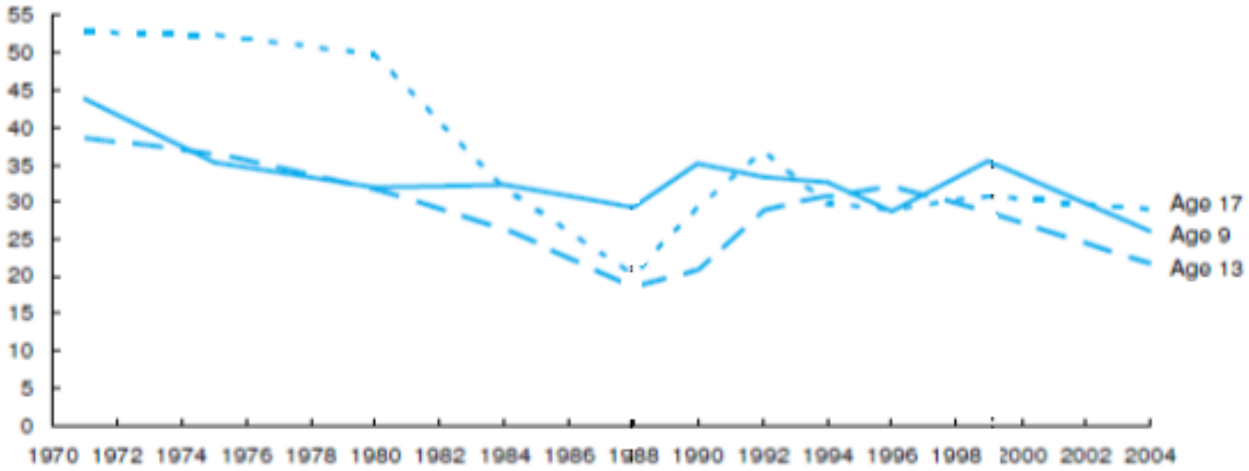
I am grateful for their many sacrifices and honored to be a part of their legacy.

CHAPTER 1 – INTRODUCTION: ACADEMIC OUTCOMES OF AFRICAN-AMERICAN AND LATINO STUDENTS

Ever since the Reagan Administration report, *A Nation at Risk*, was published in 1982, the many problems of the United States' system of public education have been very publically exposed, dissected, diagnosed, and debated. Most prominent among these problems is the inequality of both access and outcomes that exists between low-income and non-Asian minority students and their more affluent counterparts. For the past three decades, journalists, educators, and scholars have written volumes on the achievement gap and the factors that may or may not be responsible for its existence. Jonathan Kozol, author of *Savage Inequalities*, writes, "The dual society, at least in public education, seems in general to be unquestioned… In public schooling, social policy has been turned back almost one hundred years."

Although it has been more than twenty years since Kozol documented his observations about the education disparities between inner city African American and Hispanic students and suburban white students, many of the themes that he discusses continue to be relevant in the current discourse on educational equality. In fact consulting firm McKinsey & Company published a report in 2009, which showed that the achievement gap – which has remained relatively unchanged over the last ten years – was actually *wider* in 2004 than it was in 1988 (2009).

Figure 1.1: Point Difference in black-white NAEP Reading Scores from 1970 – 2004



Source: McKinsey & Company, 2009 "Detailed Findings on the Economic Impact of the Achievement Gap in America's Schools."

Despite the efforts of well-meaning individuals in the educational and political communities, the achievement gap has persisted over the last twenty years. This persistence has prompted a number of scholars to explore the conditions under which students – particularly low-income and minority students – will produce the best academic outcomes. One such condition is one in which students are taught by a teacher who is a member of the same race. That is, students perform better when they are taught by teachers who *look like them*. While this theory has been widely accepted in number of fields, it fails to explain why African-American and Latino students continue to under-perform. The achievement gap persists and has even worsened during a time when the number of Black and Latino teachers has actually increased (Ingersoll and May 2011). Do students from these ethnic groups truly perform better when they are taught by same-race teachers, or are there other factors, which mitigate the effect that same-race teachers have been thought to have on their students?

Black and Latino students are likely to be found in school environments where teachers – even those who share the race of their students – face major challenges in trying to improve their students' test scores. Nationwide, non-Asian minority students are primarily concentrated in low-income, "at-risk" schools, where a number of factors contribute to their low performance on standardized tests. These students are both less likely to succeed academically and more likely than their white and Asian peers to be taught by a black or Hispanic teacher. Consequently, all of the positive effects of having a same-race teacher are probably limited by the other mitigating factors. Despite these mitigating factors, the question remains: Is there a situation in which same-race teacher effects *could* overcome the negative impact of being in a low-income school?

This dissertation explores the manner in which descriptive representation in the classroom affects academic achievement for African American and Latino students. Further, it examines the impact of policy decisions that emphasize state control over schools on the influence that teachers can have over their students. Specifically, I ask whether or not descriptive representation at the classroom level leads to better student performance on standardized exams. Given the continued low performance of non-Asian minority students, I expect that descriptive representation alone does not make a difference in academic outcomes. In order to explore some of the conditions that lead to the inability of same-race teachers to have the expected additional impact on their students, I also test whether or not administrator autonomy, that is de-centralized control over schools, makes a difference in teacher impact.

In a widely cited article from the *American Journal of Political Science*, Meier, Stewart, and England assert that the bureaucracy's ability to make important decisions on

what services to deliver and how to deliver those services gives bureaucrats the ability to influence policy outcomes. Because education is the "urban policy most likely to be controlled by bureaucratic decision rules and the least likely to be influenced by electoral politics" (1991, 162), they use educational outcomes as a measure of bureaucratic influence. Using data from 140 school districts to show the impact that the representative bureaucracy has on policy outcomes for students, Meier and his colleagues find that black administrators are more likely to hire black teachers. Further, they find that that the graduation rate for black high school students increases as the proportion of black teachers in a school increases. They also associate higher proportions of black teachers with lower levels of disciplinary action taken against black students and higher numbers of black students being placed in gifted and talented classes (1991). A number of studies on the additional impact that minority teachers have on minority students have been conducted since 1991, many resulting in the same conclusions (Polinard, Wrinkle, and Meier 1995; Meier et al 1999; Weiher 2000; Bali, Anagnostopoulos, and Roberts 2005).

These results are reaffirmed by economist Thomas Dee, who finds that students of all races perform better when they are taught by same-race teachers. In his noted 2004 article, Dee uses data from Tennessee's Project STAR experiment to measure students' outcomes based on the race of their teachers. From 1985 to 1989, the state of Tennessee engaged in an experiment to make determinations about the impact of class-size on student outcomes. As part of the study, schools in the larger metropolitan areas (Knoxville, Memphis, Nashville, Chattanooga, and the surrounding suburbs) were randomly selected, and kindergarteners were randomly assigned to classes of either 15 or 22 students. Teachers were also randomly assigned to different sized classes. Using Stanford

Achievement Test scores for the students at the end of the 4-year experiment, Dee finds that test scores for both black and white students are higher among those who were assigned to a same-race teacher.

While a number of authors have found that descriptive representation does have a positive impact on aggregate student outcomes, analyses at the individual level have produced mixed results. Studies using data from the National Educational Longitudinal Study of 1988 show that a teachers' race, gender, and ethnicity does not have a statistically significant impact on student performance (Eherenberg et al 1995). Some scholars have also attributed Meier's findings to inconsistencies in his statistical modeling (Neilsen and Wolf 2002).

The work of Meier, Dee, and others also fails to take into account the present policy environment in education. The question of whether or not students perform better when they are taught by same-race teachers, when all other factors are held constant is both interesting and important. However, the implications that stem from the answer to this question cannot be properly applied in a real-world context. Dee's findings demonstrate that black teachers have a positive impact on black student performance under experimental conditions – and only in Tennessee. While the Tennessee Project STAR experiment provides a great test case, it is in no way representative of the way that students are actually assigned to schools and classrooms nationwide. For most students, assignment to a particular school depends on two predominant factors: neighborhood and parental choice. While school zoning is still the most common way that students are placed in schools, parental choice has increasingly become a factor, particularly given the rise of public charter schools in the mid-late 1990s. The experience of a particular student in a

particular school is greatly influenced by the type of school that student attends and that school's interaction with state and district policies.

In this work, I offer an updated individual-level analysis with data from the 2002 NELS Study. Not only do I include variables to determine the relationship between teacher race and student success – if indeed one exists – but I also measure school-level factors that may influence teacher impact. Black and Latino teachers are more concentrated in public schools serving high-poverty, urban communities (Ingersoll and May), where they face a number of other factors (poverty, parent education, track-record of low academic performance, etc.) that negatively impact student achievement. In addition to incorporating these factors, I question whether or not educators actually have the bureaucratic discretion necessary to make an impact on their students' performance. Given the highly centralized nature of public education and the disproportionate level of state influence over school matters in low-performing schools, I am particularly interested in the impact of administrator autonomy. Chubb and Moe find that "autonomy has the strongest influence on the overall quality of school organization of any factor that [they] examined" (1990, 183).

Because black and Hispanic students are concentrated in urban areas, their school experience will be shaped by the issues that urban schools face. They are more likely to be taught by a black or Hispanic teacher than their white peers. They are also more likely to be in schools with a large population of students qualifying for free and reduced lunch. Finally, they are more likely to attend schools that struggle to meet state mandates for student performance, which means that many of the decisions made at the school and classroom levels come from state-appointed officials, rather than teachers and

administrators. It is this final point that could provide insight into the question of teacher impact. What happens to all of the potential teacher influences when restrictive policies on curriculum and pedagogy make their way into the classroom?

As it stands, black and Hispanic students are more likely to deal with the challenges associated with lower academic performance. At an individual level, non-Asian minority students are more likely to come from households with lower levels of parent education and lower household income. As shown in Table 1.1 below, the 2002 NELS data indicate that both household income and parent education are significantly lower for African-American and Hispanic students. The average income categories for each race group indicate that these students are more likely to come from homes that earn between $15,000 and $25,000 less per year than those of their white peers. Parent education categories indicate that black and Hispanic students are much less likely to come have parents with any formal education beyond high school.

Table 1.1: Household Income and Parent Education by Race

Race	**Mean Income Level**	**Mean Parent Education Category**
White	9.675	3.758
Black	7.873	3.250
Hispanic	8.119	2.588

Source: National Center for Education Statistics, Education Longitudinal Study 2002

In addition to being more likely to come from low-income households with lower levels of parent education, African-American and Hispanic students are more likely to attend schools with a higher proportion of students qualifying for free and reduced lunch.

According to a 2005 Pew Report, one-in-four Hispanic and 1-in-10 black high school students attends one of the 300 largest public high schools with the highest proportion of students eligible for free and reduced lunches (2005). This is compared to 1-in-100 white students. As we would expect, black and Hispanic students who participated in the 2002 NELS study were concentrated in low-income schools at a much higher rate than their white counterparts. Table 1.2 shows the mean category for free and reduced lunch for each race group. Descriptive statistics for all independent variables are provided in Chapter 3.

Table 1.2: School Poverty by Student Race

Race	**Mean Free & Reduced Lunch Category**
White	1.609
Black	3.203
Hispanic	3.127

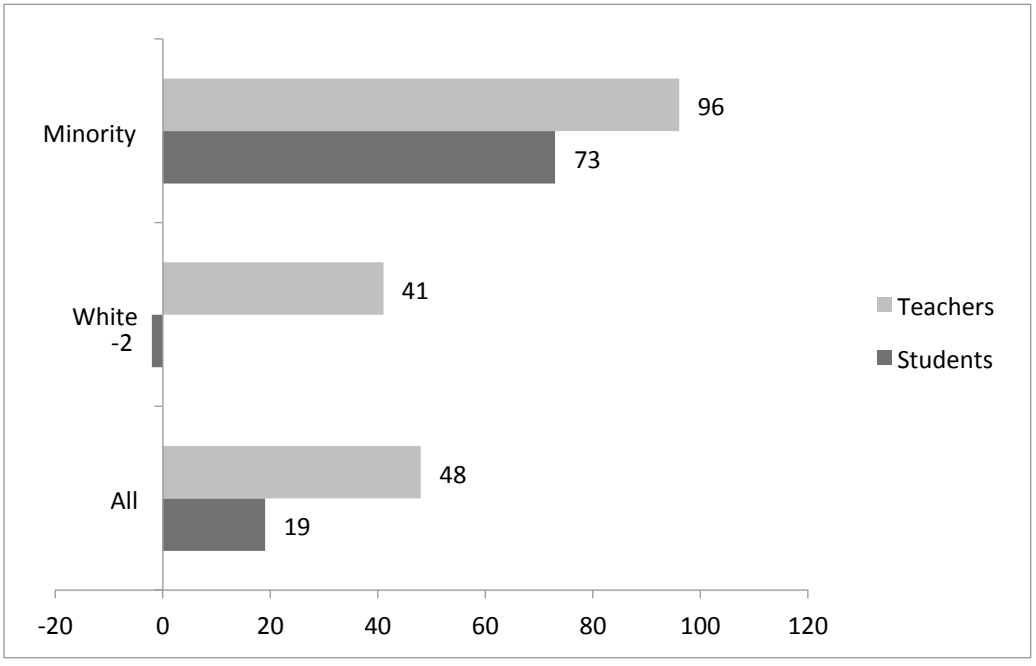
Source: National Center for Education Statistics, Education Longitudinal Study 2002

Given the long history of students underperforming as a result of poverty, parent education, and school environment, it is quite possible to imagine that outside of experimental controls, same-race teachers do not produce the expected positive academic outcomes in their students. If the additional impact of same-race teachers on their students does not hold when students are not randomly assigned to classrooms, there may factors in the way schools are governed, which impede the ability of the teacher to have this impact. In addition to presenting an individual-level analysis of student outcomes based on the race of bureaucratic representatives, I offer discussion about the influence of administrator

autonomy and how centralized control over curriculum and accountability play a role in the day-to-day interactions between teachers and students.

The present analysis may also offer insight into why the achievement gap persists, despite attempts at all levels of government to address it. The low performance of black and Latino students is particularly puzzling, given the increase in the number of black and Latino teachers. In fact, growth in the number of minority teachers has outpaced growth in the number of both white teachers and minority students in public schools over the last 25 years (Ingersoll and May 2011).

Figure 1.2: Percentage Increase in Students and Teachers from 1987-88 to 2007-08



Source: Ingersoll and May, 2011, "Recruitment, Retention, and the Minority Teacher Shortage"

The basis of this dissertation rests on two theories:

1. Bureaucratic descriptive representation at the classroom level leads to improved academic outcomes for Black and Latino students.

2. Administrator autonomy leads to improved outcomes for all students.

It is worth noting that the first theory is highly disputed in the literature. In fact, scholars have provided quantitative evidence indicating that descriptive representation has no effect on student outcomes. I explore both arguments and discuss the impact of administrator autonomy in greater detail in the next chapter. In the third chapter, I provide my own hypotheses on the impact of descriptive representation and administrator autonomy on academic outcomes for Black and Latino students and present a more detailed description of the data and methodology that I use to test these hypotheses. I present the results of these tests in Chapter 4 and provide a discussion of the implications and questions for future research in Chapter 5.

CHAPTER 2 – DESCRIPTIVE REPRESENTATION AND BUREAUCRATIC DISCRETION

Representation

There is an on-going debate about whether or not descriptive representation (representation of groups by individuals who share the same physical characteristics) actually leads to substantive representation (representation by groups of individuals who share the same conviction/ideology and pursue the policies desired by the group). Although the reach of minority politicians extends beyond minority communities, it is clear that many of them feel a responsibility to specifically address the needs of those communities. Studies on minority descriptive representation have shown that constituents respond accordingly. Even when controlling for political party and ideology, black voters report a higher level of satisfaction with black representatives in Congress (Tate 2001). Voters are more satisfied with representatives who *look like them*, even more than those who may *think like them*.

While a number of representation scholars have focused on the manner in which elected officials descriptively represent their constituents, a growing body of literature shifts focus from elected officials to members of the bureaucracy. Although they are not elected into office, bureaucrats still impact policy outcomes by implementing policies in ways that are likely to benefit the public that they serve. Bureaucrats, particularly those who are able to make policy decisions at their own discretion, greatly influence policy outcomes. The theory of representative bureaucracy asserts that a bureaucracy that descriptively represents the public that it serves will implement policies in a way that will benefit that public (Meier 1975; Thielemann and Stewart 1996). Research has shown that

bureaucrats who have a significant amount of discretion are more likely to produce positive outcomes for minority communities (Meier and England 1984, Meier et al. 1999, Sowa and Selden 2003).

In education, research concerning the effects of the local bureaucracy on student access to educational resources has shown that increased numbers of black school board members, administrators, and teachers lead to an increase of black students being placed in gifted classes and a decrease in placement of black students in classes for the mentally retarded (Meier, Stewart, and England 1991, Polinard, Wrinkle, and Meier 1995). Other studies have shown that higher percentages of black/Hispanic teachers have a positive impact on standardized test passage rates for black/Hispanic students (Weiher 2000, Meier et al. 1999). Additionally, research has shown that the cultural make-up of the school leadership also has an effect on grade retention rates and high school graduation rates (Bali, Anagnostopoulos, and Roberts 2005; Meier et al. 1991).

Scholars have raised a number of possibilities for why students – particularly black and Latino students – perform better with teachers and principals who share their racial identity. First, it is possible that teachers and school leaders serve as role models for students, motivating them to achieve at higher levels (King 1993, Cole 1986, Meier et al. 1999). Another theory is that black and Hispanic teachers, particularly those who work at schools that have historically served black and Hispanic students, are better equipped with the skills to work with students from those populations (Cole 1986, Meier et al. 1991). Some experimental evidence points to the possibility that students perform better when they perceive that they are not being negatively stereotyped by authority figures. The presence of teachers who share the race of their students thus limits the potential of

"stereotype threat" (Steele 1997). Finally, some have posited that having more black/Hispanic teachers protects students from unfair treatment. This works in two ways: 1. More minority teachers and administrators means fewer white teachers to treat minority students unfairly and 2. Minority teachers can influence the decisions that their white colleagues make when dealing with minority students (Meier et al. 1991).

Decisions about education are made at the political level by elected representatives in the federal and state governments, but policy choices are typically understood to be at the discretion of the local political actors: school board members and other members of the educational bureaucracy. They make choices about budgeting, teacher standards, alternative certification, and the level of autonomy with which school leaders can operate.

Given the high level of bureaucratic discretion in education, it would seem that the public school system would be an ideal institution to examine the effect that a representative bureaucracy can have on the people it represents. Because hiring, school budgeting, curricular, and pedagogical decisions are often handled at the school and classroom levels, it stands to reason that representation at these levels matters. The literature shows that those who regularly interact with students (teachers and principals) do have an impact on those students (Coleman 1966; Rivkin, Hanushek, and Kain 2005; Rockoff 2004; Hanushek 1992). In theory, employees, particularly at the school and classroom levels, are able to operate with a great deal of autonomy and make decisions, which should have a major impact on those whom they serve.

These findings are not without criticism, however. While some scholars have found that classroom descriptive representation has a positive impact on student outcomes, these results have been called into question a number of times over the years. Studies using data

from the National Educational Longitudinal Study of 1988 show that a teachers' race, gender, and ethnicity does not have a statistically significant impact on student performance (Eherenberg et al 1995).There is a positive correlation, however, between the race, gender, and ethnicity of a teacher and that teacher's *subjective evaluations* of students of the same race, gender, and ethnicity. Whether or not teacher evaluation impacts a particular student's future academic outcomes (performance in later grades, high school graduation, college enrollment, etc.) remains to be seen. Studies on individual student outcomes still leave a number of unanswered questions.

Others have found that teachers and principals have a limited ability to improve the performance of low-income minority students. Some go as far as to state that there are virtually no classroom-level adjustments that can be made to significantly impact academic outcomes for black and Latino students because the characteristics, traits and values of the students' families more accurately determine their academic outcomes (Clark 1983; Bempechat 1998; Furstenberg et al 1999; Sampson 2002). While these authors do acknowledge certain factors, such as dramatically reduced class-size and expansive early childhood education programs are associated with higher levels of minority student achievement, they explain that neither of these factors is implemented in a way that would make a broad and meaningful impact on the current state of education. The impact of teacher experience, ethnicity, and even "quality," is diminished when students' family characteristics and background are considered.

In addition to the mixed results of studies on the impact of classroom variables on student performance, some scholars have directly refuted the notion that descriptive representation has a significant impact in education. Neilsen and Wolf (2001) take issue

with the methodology used by Meier and his colleagues (1999), focusing primarily on the use of a Substantively Weighted Least Squares analysis and the grouping of African-American and Latino teachers to form the key independent variable in their analysis of the impact of minority teachers on standardized test passing rates. Using the same data, Neilsen and Wolf actually find that the relationship between overall student achievement and minority representation is consistently negative, though not statistically significant. When they separate the percentages of African-American and Latino teachers, they find no significant correlation between the percent of African-American or Latino students passing and the percent of teachers from the same ethnic group in the district. The authors ultimately conclude that, "[The assertion that] an increase in minority teachers is without cost in terms of student achievement is not supported by a more proper and fine-grained analysis of the data. In our judgment, we can and should draw no firm conclusions about representative bureaucracy and student achievement from the data" (599).

Cizek reaches similar conclusions about the impact of African-American teachers on African-American students (1995), claiming that research on such an impact is inconclusive at best. While some authors do find that an increase in minority teachers has a long-term impact on college matriculation rates in urban school districts, there is also reason to believe that the ethnic makeup of faculty is actually a proxy for system behavior, such as a targeted effort to improve the performance of low-income and minority students (Hess and Leal 1997).

Despite the fact that some have raised issue with the assertion that descriptive representation leads to substantive results in the classroom, the findings of Meier, Dee and others cannot be ignored. Descriptive representation does indeed seem to work in isolated

cases. Although it has not been shown to improve individual student testing outcomes in national studies, there are other ways that having a same-race teacher has led to improved student outcomes. As mentioned, it has been shown to significantly lower instances of disciplinary action taken against black students (Meier 1991). Even in studies that show no academic impact, there is still an indication of improved relationships between same-race teachers and students through teacher perception (Ehrenberg 1995). These outcomes indicate that the mechanisms that cause descriptive representation to lead to improved student outcomes may still be effective, but there may be other factors that keep them from leading to improved test scores.

It is important to note that bureaucratic representation relies on bureaucratic discretion. If schools and teachers are not granted a certain level of independence in their decision-making, it would be difficult to make any accurate assertions about the ability of a representative bureaucracy to make an additional impact on the population that it serves. It is possible that the lack of teacher impact – that is, the effects of "role model leadership" and "stereotype blocking" – stems from the fact that restrictive policies on curriculum and pedagogy have made their way into the classroom, limiting any potential teacher influence.

A policy environment that emphasizes centralized authority – one that is hostile to school leader and classroom teacher autonomy – would limit effect of a representative bureaucracy by taking the day-to-day decisions out of the hands of the bureaucrats who directly interact with the public. In an attempt to address the problems of the educational system over the last 30 years, the government, at both the federal and state levels, has imposed policies that centralize authority and take decisions out of the hands of those who directly interact with students. Consequently, the widely accepted effect of minority

teachers and administrators on minority students is limited by their ability to make decisions that would allow them to have the aforementioned influences.

The Road to Centralized Authority in Education

Although increasing the presence of minority teachers is an aspect of the more recent attempts at school reform, concern about the state of public education is not a new issue, nor is it limited to the African American and Latino communities. Debates about education and calls for education reform date back nearly as far as the inception of the public education system in the United States. Education, specifically improving curriculum and increasing the levels of student achievement, has been a priority for every presidential administration from Eisenhower to Obama. Many scholars trace the calls for major improvements in the educational system to the space race of the 1950's and 60's (Tyack and Cuban 1995). The successful Soviet launch of the *Sputnik* space satellite served as a catalyst, shifting the attention of many American politicians to the deficiencies in public education, particularly in the areas of mathematics and science.

This time period was marked by a concern for the general gap in content knowledge and demonstrated ability between American students and students from other parts of the industrialized world. During this time, many Americans called for a return to the "basics" of schools – rigorous curriculum, stringent graduation requirements, and more strict disciplinary rules, including dress codes and mandatory attendance (Tyack and Cuban 1995).

In addition to an increased focus on improved student performance, this era was marked by calls for equality of educational access and resources for all students. The landmark *Brown vs. Board of Education* case of 1954 and subsequent efforts to desegregate public schools illuminated the numerous inequalities in the education system. Demand for reform came not only on behalf of black students, but also on behalf of female students and the mentally and physically disabled. Because local authorities, particularly in former slave states, could not be trusted to provide all students with adequate educational resources, the federal government took on a larger role in providing both resources and oversight. The shift to centralized authority in education was seen as a way to ensure equality.

Legislation passed during this era, such as Title I of the Elementary and Secondary Education Act of 1965, laid the foundation for both federal involvement in the way that states choose to educate their students and establishing school accountability. Requirements from the government without provisions for enforcement could have been easily ignored. Consequently, these laws established a precedent of tying school funding to policy mandates. Largely due to federal involvement in education during the Civil Rights Era, the educational access issues of the first half of the 20th century greatly diminished by 1980. In fact, the proportion of African-Americans enrolled in all-black schools decreased from two-thirds to one-third from 1968 to 1980 (Tyack and Cuban 1995). The discussions about desegregation began to diminish; however, problems in public education persisted.

Despite the focus of several previous administrations on improving schools, Terrell Bell, Secretary of Education under Ronald Reagan, created the National Commission on

Excellence in Education very early on in Reagan's first term in order to re-evaluate the state of public education. Much like those in previous years, the Commission found that the content, expectations, time, and teaching of public schools were creating students who would not be equipped to compete in commerce, industry, science, or technological innovation on the world stage. The Commission's April 1983 report, *A Nation at Risk*, states, "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war" (1983, 3).

One indication of a troubled educational system: the average achievement of high school students on most standardized tests in the early 1980's was actually lower than when Sputnik was launched (Friedman 2011). Members of the committee outlined four areas of focus for improving public education: content, expectations, time, and teaching. They thought it necessary to once again focus on the curriculum across grade levels and the various academic subjects. In addition to calling for a return to setting higher standards for student performance and increasing the amount of time that American students spent in school, the Commission called for an examination of the teaching profession, seeking higher standards for teacher qualification and more competitive, performance-based salaries.

In addition to presenting a very progressive approach to reforming the public education system, *A Nation at Risk* marked the beginning of a targeted focus on measuring student achievement using a prescribed set of academic standards. Although governments at both the state and federal levels essentially ignored most of the Commission's

recommendations, these recommendations established the foundation for education reform efforts that continue to the present day. The focus on academic standards is still a primary part of legislation affecting students and schools.

Many of the efforts to improve student outcomes attempted to address two of the four areas outlined in the Reagan administration's report: content and expectations. Throughout the 1980's and 90's, politicians and experts in education looked to student performance on tests like the National Assessment of Educational Progress (NAEP) to gauge student mastery of math, reading, science, social studies, and geography. States were required to establish rigorous academic standards, measure student performance when tested on those standards, and take action when school demonstrate trends of unacceptable results.

Following the publication of *A Nation at Risk*, politicians at even the federal level – and on both sides of the isle – felt the need to emphasize their commitment to improving public education. In 1994, a bipartisan majority in Congress passed the GOALS 2000: Educate America Act. This legislation, which actually stemmed from efforts during the Bush administration, sought to identify education as a national priority. While it did lead to some improvements in professional development for teachers and drug and alcohol policies on school campuses, GOALS 2000 did little more than establish national committees and boards to facilitate and oversee changes implemented by the states. Responsibility for student outcomes and school reform still belonged to the state and local governments.

Although the federal government had no teeth in implementing the various elements of GOALS 2000, it did much to influence the states' behavior in addressing education. A focus on parity in student outcomes was a central element in this legislation. Through the 1990s, federal policy makers continued to prioritize establishing strict educational standards and holding schools accountable for meeting them. Consequently, states established and maintained control over creating and measuring academic standards, and they became more active in holding schools responsible for their student outcomes.

Despite the modest improvements made after the implementation of GOALS 2000, the issue of how to handle public education continued to be a cause for national concern. With the presidency of George W. Bush came another initiative to improve student outcomes. The No Child Left Behind Act (NCLB) of 2001 introduced a new era of federal involvement in the educational system. With NCLB came a greater level of state regulation of district and school activity. Studies have shown that the level of accountability to which the states hold school districts impacts student outcomes. Some research has shown that higher levels of state accountability are associated with higher rates of graduation and better performance on national standardized tests (Schiller and Muller 2000, Carnow and Loeb 2002, Swanson and Stevenson 2002). This association of strict accountability standards with student success naturally led state policy makers to become more active in school governance and more inclined to use take-over power as a form of ensuring the improvement of the schools not meeting the established standards (McDermott 2007).

Because NCLB required states to set and maintain school accountability standards, states in turn were held accountable to the federal government and held responsible for

school and even student-level outcomes. While several states already held high accountability standards before NCLB, after 2001, others were forced to increase their level of involvement in district – and school – activity. Provisions of the Act include mandated reporting of student outcomes by race and income level and school accountability for standardized test scores. Kenneth Wong marks NCLB as the "paradigm shift," that moved federalism, "toward outcomes-based accountability" (2008). In this way, NCLB demonstrates the federal government's vested interest in state, district, and school policies that affect student outcomes.

Budgeting, curriculum, accountability, and teacher qualification requirements, all of which have an impact on student performance (Darling-Hammond 1997, Valenzuela et al. 2000, Wong and Lee 2004), are often the result of decisions at the different levels of government. It is true that both the state and federal government play a major role in shaping education policy; however, the local districts and school administrators have the ability to decide how and when to implement certain policies.

As the federal government holds states more accountable for student outcomes, states increase the level of district and school accountability. Standardized test scores and adequate yearly progress are closely monitored at the district level, and schools are mandated to be in compliance with countless federal and state regulations. Research on the student-level impact of increased state accountability and regulation shows that political activity at the state level significantly affects both school policy and student achievement (Carnoy and Loeb 2002; Reschovsky 2004).

The prominent role of state government has not gone unnoticed by local governments. Studies have found that community leaders place a great deal of emphasis on state-controlled factors when identifying ways to improve their public schools. This relationship between state policy pressure and local government activity is even more pronounced in cities where leadership roles are predominantly held by African Americans (Henig, Hula, Orr, and Pedescleaux 1999). States are rarely involved in direct governance of schools; they only get involved when schools have a long-standing pattern of poor student outcomes. However, the pressure that city and school district leaders feel is particularly pronounced when they fear that local schools are in danger of being taken over by the state.

Because some research indicates that higher levels of accountability lead to higher student performance, schools and school districts – particularly those that have struggled with the level of their students' performance in the past – are more likely to strictly adhere to the prescribed academic standards of the state. Districts that most faithfully adhere to state-outlined guidelines for curriculum and instruction tend to be low-income, low-performing, and predominantly minority (Ascher 1990; McNeil 2000; Moon, Callahan, and Tomlinson 2003; Achinsten, Ogawa, and Speiglman 2004). While state accountability tends to have a positive association with student outcomes, a highly centralized system of school governance seems to have the opposite effect. Chubb and Moe convincingly argue that when school administrators have the autonomy to make their own decisions about personnel, pedagogy, and curriculum, students perform at higher levels than when a central authority – typically an overseeing body at the state level – is making these decisions

(1990). In other words, better policy outcomes in education can be reached when street-level bureaucrats – those who directly interact with the recipients of policy actions – have the ability to make choices about when and how to implement policies.

Administrator Autonomy

In determining the factors that impact student outcomes, it is certain that school leadership matters. Building administrators have an important role in both implementing policy – by making decisions about budget, personnel, and curriculum – and in setting the general tone for teachers and students – by establishing a management style and building a support team of teachers and other leaders. Much of the literature on school principals and administrators indicates that school leaders have a major impact on teacher attitudes and on student performance (Marks and Printy 2003, Robinson et al 2008, Heck and Hallinger 2009, Johnson et al 2011). School leadership is a particularly important factor in schools where administrators are autonomous. Part of the success of some public charter schools comes from best practices that principals and school directors are able to implement at their discretion. In fact, Buddin and Zimmer find that the a major factor in determining whether or not charter schools will be more effective is the classroom set-up chosen by the school principal (2005). Student performance is both directly and indirectly affected by both the quality and the level of autonomy that school leaders have.

Studies on the impact of administrator and teacher autonomy have done more than explain the relationship between autonomy and student performance. Scholars have demonstrated that varying levels of bureaucratic discretion affect the types of teachers that a school is able to recruit and retain and that teacher's perception of her position (White

1992; Smith 2009; Achinstein et al. 2004). While the broad goals of public agencies are established by elected officials at various levels of government, much of the work in pursuing those goals is done by members of the bureaucracy. The level of autonomy that bureaucrats have in reaching those goals affects their approach and effectiveness in carrying out the mission of the public agency that employs them and ultimately the way that they serve the public. Smith shows that changes in administrative structure vis-à-vis school autonomy can affect teacher perception of his/her role in educating students (2009).

Although the mission and purpose of public education remains relatively consistent across the country, the goals of schools and school districts are – in theory – largely dependent on the educators who work there (Smith 2009; Tyack and Cuban 1995). With the onset of greater education reform efforts in the years leading up to NCLB, however, came an increase in centralized decision-making power. School goals have been increasingly established at the state level. At the same time, monitoring of progress towards those goals, and decisions about implementing those goals still varies from district to district and from school to school. At some schools, decisions about hiring, budgeting, and how to get students to meet state standards are largely made by the school's leadership. At other schools, these decisions, though traditionally made by teachers and administrators, are being made by state legislators and state-level bureaucrats. This is particularly true of under-performing schools in low-income communities (Achinstein et al 2004; White 1992).

Schools that have low-levels of autonomy at the administrator level also have low-levels of teacher autonomy. Not only does this impact the measurable affect that teachers

and principals can have on their students, it also affects the types of teachers that schools will be able to attract and the attitudes of staff members. Studies have shown that administrator autonomy impacts teacher morale and teacher recruitment efforts (White 1992). Schools that are bound by state accountability standards tend to recruit teachers who will fit within a culture of strictly adhering to policies and focusing on the goal of getting students to pass standardized tests. Often these schools have a history of struggling to meet these standards. At the same time, schools that have less need to be concerned with state standards are able to hire teachers who are more comfortable with varied approaches to instruction and flexibility in lesson content (Achinstein et al 2004). In this way, struggling schools continually reinforce a culture in which educators are very limited in the way they can approach teaching. The lack of school autonomy has a major impact on the relationships and interactions between teachers and students/families.

Black and Latino students are likely to be found in school environments where teachers – even those who share the race of their students – face major challenges in trying to improve their students' test scores. Nationwide, non-Asian minority students are primarily concentrated in low-income, "at-risk" schools, where a number of factors contribute to their low performance on standardized tests. These students are both less likely to succeed academically and more likely than their white and Asian peers to be taught by a black or Hispanic teacher. Consequently, all of the positive effects of having a same-race teacher are probably limited by the other mitigating factors. Despite these mitigating factors, the question remains: Is there a situation in which same-race teacher

effects *could* overcome the negative impact of being in a low-income school? This is the question I address in this dissertation.

The following are ways that the present work complements existing literature on bureaucratic representation in education: 1. As policy discussions about the best way to educate struggling students continue at all levels of government, the present analysis offers some additional insight into the academic performance of non-Asian minority students, using the most recent available data. 2. The majority of studies that analyze the impact of representative bureaucracy in education look at group-wide trends, rather than individual outcomes. I use individual – level data for both the independent and dependent variables, rather than grouping races together or measuring aggregate student performance. 3. I interact teacher race with administrator autonomy, strengthening the argument that discretion is a key lever in improving representation in the bureaucracy.

This work is particularly relevant given the continued under performance of low income and non-Asian minority students in this country. African American and Latino students, often concentrated in high-poverty schools, continue to fall behind in terms of standardized test scores, high school graduation rates, and college enrollment rates. School reform efforts over the last 20 years have shown little progress in improving this situation. While some have asserted that an increase in classroom descriptive representation would serve to increase levels of student achievement, this theory is incompatible with the actual trends of minority teacher presence and minority student performance (Ingersoll and May).

It is quite likely that individual analyses of data from a national sample set have not shown that descriptive representation has a positive impact on student performance

because the various factors that are typically associated with lower test scores – poverty, parent education levels, previous grade retention, school trends – are too all-encompassing to allow for teacher impact. The very same schools that face these challenges are also much more likely to defer to state-level bureaucrats, rather than rely administrators and teachers to make decisions about curriculum and pedagogy.

It is important to note that in addition to looking at results for African-American and Latino students separately, this analysis directly measures the impact of race and bureaucratic autonomy on each student's performance, rather than looking at outcomes in the aggregate. In some studies minority groups are lumped together (percent of African-American and Latino teachers is used as a single independent variable), and student outcomes are measured at the district level, limiting our ability to make inferences about a teacher's ability to impact a classroom or a student. To put it another way, "the racial representativeness of street level bureaucracies such as schools, and its distributive effects, ought to be analyzed *at the street level*, not at a higher level of statistical aggregation. It is in schools and classrooms where we will most likely uncover the true effect that minority teachers have on student achievement" (Neilsen and Wolf 2001, 612).

While this is not the first study to use individual-level data to measure student outcomes, it is the first to interact teacher characteristics with a variable measuring autonomy. By interacting descriptive classroom representation with administrator autonomy, I strengthen the argument that bureaucratic representation can only be effective with high levels of bureaucratic discretion.

Research has shown that the individual student characteristics that are typically associated with low academic performance can be overcome. Certainly there have been cases of schools that serve high-need populations where students perform quite well, meeting, even surpassing state averages on standardized tests (Merseth 2009; Johnson et al 2011). Previous research on classroom bureaucratic representation indicates that if there is a situation in which the impact of poverty can be overcome, that teachers sharing the race of their students would, in fact, lead to improved student results. Because the lack of bureaucratic discretion, which most clearly applies to decision-making ability in the school building, could be precisely what keeps teachers from impacting student results, it stands to reason that higher levels of discretion would lead to higher impact. It is possible that autonomy – the foundation of Chubb & Moe's proposed "new system of public education" – is the factor that would allow black & Latino teachers to produce the outcomes that we would expect to see in the students who they descriptively represent.

It is true that I use administrator, rather than teacher, autonomy to determine the level of bureaucratic discretion at a school. There are a number of reasons why measuring independence at the school, rather than the classroom, level is appropriate for this study: 1. Teachers do have decision-making authority about what they will say to and how they will interact with students, but most decisions – lesson content, pedagogy, disciplinary action, communication with families – are dependent on school policies. In terms of the classroom, teachers are always accountable to school administrators, so their actions are very dependent on administrator decisions. 2. Administrator autonomy sets the tone for the school because it impacts hiring, culture, and curriculum. All of these factors have a major

effect on teacher actions. While an individual teacher is responsible for teaching a particular content to a particular set of students, most teachers do not operate as "islands," and thus would be impacted by the culture of an entire school staff. 3. The NELS dataset does not include measures for teacher autonomy, so measuring decision-making authority at the school level is the closest way to determine bureaucratic discretion.

Long-standing problems of both equality of access and equality of outcomes have caused a trend toward a greater level of centralized authority in public education. This centralized authority is particularly powerful in making decisions for low-income, predominantly minority schools, which have a history of failing to meet state accountability standards. The lack of autonomy may be precisely what is keeping teachers and administrators in these schools from being effective. In this work, I argue that Black and Latino teachers are not able to turn descriptive representation of their students into substantive results, in part because they do not have the requisite discretion to implement decisions and pursue policy goals. I find evidence to support Chubb and Moe's assertion that the lack of school autonomy ties the hands of administrators and teachers, keeping them from making decisions that might otherwise result in better outcomes for their students.

CHAPTER 3 – MODELING DESCRIPTIVE REPRESENTATION AND BUREAUCRATIC DISCRETION

Model & Hypotheses

The purpose of this work is to examine the impact that African-American and Latino teachers – as members of the bureaucracy – have on the academic performance of their students. While previous studies have found that minority students perform better when they have teachers who share their ethnicity, these studies fail to account for the continued underperformance of low-income and minority students despite the growth in the number of minority teachers. It is possible that same-race teachers have an additional impact on the academic outcomes of their students but only under certain conditions and provided that these teachers are given a certain level of autonomy in their classrooms. When school employees are not able to make decisions about curriculum and instructional approach, their interaction with students is based solely on content decisions made at other levels of the educational bureaucracy. All of the mitigating factors that scholars have previously pointed to in explaining why black and Hispanic students fare better with same-race teachers and administrators (role-model effect, stereotype-blocking, culturally relevant pedagogy, etc.) would be completely nullified in an environment where teachers – and even administrators – have very little professional discretion.

Limitations to the discretionary power of street-level bureaucrats come from policy decisions made at various levels of government. In education, federal pressure on states to improve outcomes of students and hold schools accountable for student performance intensified throughout the 1990's, culminating in the formal mandates of the No Child Left Behind Act of 2001. This federal pressure compelled states to respond with higher

standards, more oversight, and threats to take over failing schools. Because accountability standards have been associated with higher levels of student performance, state legislatures saw these measures as a reasonable way to respond to the problem of low-performing public schools.

In response to state pressure, at-risk schools – often in urban centers with large minority student populations – follow state mandates very closely, adhering to state-prescribed curricula and relinquishing decision-making authority to leaders at the district and state levels. As Chubb and Moe and others have convincingly shown, schools that are controlled by a centralized authority produce lower student outcomes than schools where administrators and staff are granted the autonomy to make decisions about goals, personnel, curriculum, and pedagogy (1990). These findings are reaffirmed by the work of McNeil and Achinstein et al, who demonstrate that state and district mandates disproportionately affect low-income minority students and limit the amount of discretion that teachers have in making decisions about how to approach academic content and how to interact with their students. Achinstein finds that urban school districts, serving low-income students are "much more likely to adopt state-mandated instructional programs and emphasize scripted lessons to improve students' performance on standardized achievement tests" (2004, 561). Not only are these districts limiting the amount of decision-making authority that administrators and teachers have, but they are also building a culture in which teaching is shifted from an intellectual activity to a form of test preparation.

In these educational environments it would be unrealistic to expect that a teacher find ways to impact student performance through any sort of interaction outside of a very rigid test-preparation regimen. Consequently, African-American and Latino teachers,

despite their growing numbers, may not have the expected impact on outcomes for students that share their race. This is particularly true in urban schools, serving an at-risk population, which have traditionally under-performed on standardized tests. In this work, I explore both the question of descriptive representation in the classroom and the impact that school-leader autonomy has on the performance of African-American and Hispanic students.

This basis of this dissertation rests on two theories:

1. Bureaucratic descriptive representation at the classroom level leads to improved academic outcomes for Black and Latino students.
2. Administrator autonomy leads to improved outcomes for all students.

Given the conflicting evidence provided by previous research on the impact of teacher race on student performance, the null hypothesis of the first theory should also be explored. While some scholars have shown that same-race teachers produce better results for their students, it is possible that descriptive representation, like many other classroom/teacher variables, makes no substantial difference in academic outcomes for Black and Latino students. Current trends in minority student performance indicate that having a same-race teacher does not necessarily lead to improved academic outcomes. At the same time, results from certain studies indicate that there may be specific conditions that would allow Black and Hispanic teachers to have a greater impact on Black and Hispanic students. I propose that one of those conditions is a high level of administrator autonomy. In this work, I offer three hypotheses to address these questions. Using data

from the National Center for Education Statistics' Education Longitudinal Study (ELS) of 2002, I test the following:

Hypothesis 1: *African-American and Hispanic teachers are able to turn descriptive representation into substantive results.*

Although Dee has shown this hypothesis to be true under experimental conditions (2004) and others have demonstrated it to be true in the aggregate (Meier et al 1991, Polinard et al 1995, Meir et al 1999, Weiher 2000, Bali et al 2005), critiques of their work and national samples have shown that classroom descriptive representation has no significant effect on academic outcomes (Eherenberg et al 1995, Neilsen and Wolf 2001). I test this hypothesis again with the most recent NELS data, using individual student results on the Reading and Math exams administered as part of the survey.

Because black and Hispanic students are primarily concentrated in schools with large populations of low-income students, it stands to reason that they are in the schools most likely to strictly adhere to state-mandated decisions about curriculum and pedagogy. In these schools, students are more likely to encounter teachers who share their race, but they are also more likely to encounter teachers who do not have decision-making authority about their interactions with students. Consequently, all of the additional impact that we would expect to see disappears with teacher discretion about classroom matters. I predict that classroom descriptive representation will not be associated with improved academic results.

Hypothesis 2: *African-American and Latino Students perform better when their school administrators have a greater level of autonomy.*

Using more recent data, which takes into account the wave of increased centralized authority seen throughout the 1990's and early 2000's, I will retest Chubb and Moe's theory that students perform better in schools with higher levels of administrator autonomy. Because this work deals specifically with the performance of Black and Hispanic students, I test their theory with these two subgroups. Given the increasing trend toward centralized authority – particularly in at-risk schools – and the continued low performance of students in these schools over the last 15 – 20 years, I predict that Chubb and Moe's findings will be reaffirmed by the latest ELS data.

Hypothesis 3: *African-American and Latino students perform better with African-American/ Latino teachers when their school administrators have a greater level of autonomy.*

If Chubb and Moe are correct, we would expect to see that outcomes for students – even across certain specific subgroups – would be better in an environment where the school leader has a high level of professional discretion. Combining this theory with the work of McNeil and Achinstein, we would also expect that administrators who do not feel constrained to follow state-mandated curricula would in turn allow for teachers to have more discretion about their approach to content and their interactions with students. In this

type of environment, we would expect to see an influence of the previously mentioned factors that lead to an additional impact of same-race teachers on minority students.

NCES Data

Data for this work comes from the National Center for Education Statistics' Education Longitudinal Study (NELS). Started in 1972, the study was designed to monitor the transition of a national sample of students as they progress through high school. The study has provided longitudinal data for researchers and policymakers in order to provide insight into the link between high school experiences and adult life choices, such as entrance into the work force and college enrollment. NCES collects data in waves over a period of time. Individual students are followed for more than 10 years. Completed in the spring of 2002, the base year survey for the most recent NCES study includes a sample size of approximately 17,500 students from 750 schools. All students were randomly selected and were high school sophomores at the time of the first survey. In addition to gathering information from students, IES also surveys parents, teachers and school administrators. NCES conducted follow-up surveys in 2004 and 2006; however, this work only includes data from the 2002 survey.

The student perspective is central to this study, so students were asked to complete a questionnaire, which was divided into seven sections: locating information, school experiences and activities, plans for the future, non-English language use, money and work, family, and beliefs/opinions about self. In addition to gathering demographic information about students, this section provides insight into student mindsets and

behaviors. It also gives researchers more insight into the students' perspective on his/her own motivations and ambitions.

In addition to answering survey questions during the first wave, students also took tests in Reading and Mathematics. These assessments contained questions from the NELS 1988 survey, the National Assessment of Educational Progress (NAEP), and the Program for International Student Assessment (PISA). While previous studies on student performance have relied on school-specific outcomes (grades, disciplinary action, student-track placement, etc.) or student performance on state tests, the results from the NELS assessment is independently administered and allows for inferences to be made across schools and across states. Specific information about the administration and scoring of the Reading and Math assessments is provided in the student outcome section below.

In addition to student responses, the NELS includes responses from one parent/guardian for each student. The parent questionnaire, which was available in English and Spanish, addressed family background, the child's family life, and the parent's perceptions about the child's school life and aspirations for the future. Key to this work is the family background portion of the parent questionnaire. Because previous studies have shown that parents' education is a key indicator of a child's success in school (Sampson 2002), I include controls for parent education. I also include controls for household income. Parental perception of the child's school life and aspirations for the future are not included in the models for student achievement.

In addition to student and parent responses, NCES also gathered information about the Math and English teachers of the students surveyed. This part of the survey included the teacher's evaluation of each student, including his/her perception of the student's

behavior, motivation, academic performance, and potential to meet life goals. Respondents completed this section with respect to the selected students they instructed in a particular subject (Math or English). In addition to providing their evaluation of students, teachers also provided information about their own background. Central to this work is the demographic information provided – that is the race/ethnicity of each teacher. Additionally, teachers responded to questions about their educational credentials and professional experience. Variables for teacher education and experience are also used as controls in the model on teacher impact on student performance.

Finally, NELS data includes responses to a school administrator questionnaire. Administrators provided information on characteristics of the school (facilities), the student population, the teaching staff, programs and technology, school policies, and school governance/climate. Information from the administrator survey is included in models for all three hypotheses. First, the administrator survey provides vital information about the school population. Because students in schools with high populations of low-income students have traditionally performed worse on standardized tests that schools in more affluent communities, a control for the income level of the student population is included in every model. The administrator's perception of teacher morale is also included in the models measuring the impact that the race of the teacher has on student outcomes. Administrators were asked whether or not they agree with the statement, "Overall, staff morale is high," and responded on a 0 (strongly disagree) to 4 (strongly agree) scale. This measure gauges the general mood of the school's teaching staff.

In addition to assessing the general culture of their staff members, school administrators are asked to rate their own level of influence over curriculum, grading,

budgeting, and hiring/firing teachers. While there is very little variation in administrator response to the question of grading, budgeting, and discipline (all show that over 90% of administrators believe they have "major influence" over these matters), there are levels of variation in the question of the amount of independence that administrators feel about independence in curriculum. Because the issue of content and approach directly influence teacher interactions with students, I use this variable to measure administrator autonomy.

Hypothesis 1: Model and Variables

Because this the variables for this hypothesis come from both the school and the student level, I use a multi-level, mixed effects regression to measure the association between teacher race and outcomes for students of the same race. I chose a multilevel mixed effects regression in order to predict student test scores as a function of both the individual student fixed effects (past academic performance, parent education, income, and teacher variables) and of the random effects of the school that the student attends (Administrator variables, school poverty, school location, and teacher morale). In this way, the model captures the variations in fixed effects based on school-level variables.

Given that African-American and Latino students are more likely to face some of the challenges that keep students from achieving at higher levels and that they are more likely to have African-American and Latino teachers, the best way to compare identical groups (students who have same-race teachers with students who would be *just as likely* to have same-race teachers *but did not*) would be through propensity score matching. In an attempt to find an "apples-to-apples" comparison, I conducted a test of the impact of descriptive representation (Hypothesis 1) using propensity score matching. By controlling

for the factors that make students more likely to have same-race teachers and matching those who actually had same-race teachers with those who did not (treated group vs. untreated group), propensity score matching does allow for a direct comparison of groups of students solely on the basis of their teacher's race. Graphs of the balance between the treated group and the untreated group, however, indicate that there are not enough counterfactual cases to make accurate inferences using propensity score matching. Regressions using propensity-score matching (and graphs of counterfactuals) for Hypothesis 1 can be found in Appendix A.

This research is primarily concerned with the academic performance of black and Hispanic students, so I separate students into groups by race/ethnicity and measure same-race teacher impact within each group. I use each student's NELS Reading and Math assessment score as the dependent variable for this hypothesis. The purpose of using test scores as the dependent variable is two-fold: 1.) Much of the research on descriptive representation in schools has focused on aggregate passage rates and other measures of success, such as graduation rates and likelihood of being placed in special education classes. Examining individual test scores could help to fill a void in the current literature. 2.) This work is largely motivated by the persistent achievement gap between white and non-Asian minority students. The "gap" specifically refers to the distance between white student scores and minority student scores. While most state legislators are primarily concerned with just getting students to *pass* standardized tests, the broader concern about the academic performance of certain subsets of students is both interesting and important. An analysis of what conditions are associated with higher scores for African-American and Latino students directly addresses this issue.

The NELS assessments were administered in two stages. The first stage contained 15 questions for math and 14 questions for reading and was used to determine the level of test each student should receive in the second stage. This procedure was designed to minimize floor and ceiling effects of the scores. Once a student's level was determined, that student was given a low, mid, or high-level test to complete for the second stage. Once students completed both stages of the assessment, their tests were graded, and they were given both a raw score and a score based on Item Response Theory (IRT), which gives a range of 0-73 for Mathematics and 0-51 for Reading. Scores for mathematics and reading are estimates of the number of items students would have answered correctly if they had responded to all of the 73 questions in the math item pool (i.e. all items that appeared on the first-stage and any of the second-stage mathematics forms) and all 51 questions in the reading item pool. The ability estimates and item parameters derived from the IRT calibration can be used to calculate each student's probability of a correct answer for each of the items in the pool.

The Reading and Math results are given as percentage from 0 to 100. For each student, the estimated IRT score is divided by the maximum number correct (73 for Math and 51 for Reading), then multiplied by 100. This provides an outcome variable of percent correct for each student. Descriptive statistics for the dependent variables are included in Table 3.1 for African-American students and Table 3.2 for Latino students.

The key independent variable for the first hypothesis is the race of the Math or English teacher. Responses to demographic questions are included in the survey data, so teachers have self-identified as being Hispanic or Non-Hispanic and White, Black/African-American, Asian, Native-Hawaiian/Pacific-Islander, or American Indian/Alaska Native.

Teachers who did not self-identify were dropped from the sample. In addition to including the race of the teacher, I include variables that attempt to capture teaching ability. While it is impossible to determine a teacher's "style" or "impact" without actually observing that teacher and assessing his/her students, there are a few factors that school districts and policy-makers use to determine an educator's level of expertise. I include two of these factors in the models for Hypothesis 1.

The first teacher expertise variable that I use is Teacher Credential. This is a dichotomous variable that tells whether or not a student's Math or English teacher has a degree in Education. While certification is a prerequisite for teaching in most states, specialized education degrees are not. Given the difficulty that low-income and urban schools have in finding and retaining experienced teachers, it is not surprising that an overwhelming majority of the black and Latino students in this study are not taught by teachers with specialized degrees. This is not to say, however, that having teachers without this credential puts them at a disadvantage. Results studying the impact of teacher credential on student performance have been quite mixed.

In addition to including the specialization variable, I measure teacher experience. This variable is given as the number of years a teacher has been in the classroom, including the current academic year. Again, studies on the impact of teacher experience on academic outcomes for low-income and minority students have produced mixed results; however, this is one way to control for teacher level of expertise.

In measuring student outcomes, a number of factors outside of a classroom teacher's control must be considered. Teachers do have control over instructional content and their interactions with students, but naturally, students are affected by their own

ability, their home environment, and previous instruction. Consequently, I also use the data collected about each student's household income, their parents' level of education, and the number of times the student has been retained in order to capture the student's academic background. Because the outcome variable is based on the IRT calibration, it also captures some of the variance in student ability.

Hypothesis 2: Model and Variables

The models for this hypothesis use the same outcome variable – student performance on the ELS Reading and Math assessment. As an extension of the work of Chubb and Moe, this model measures the impact of bureaucratic discretion. Central to this argument is the question of school administrator autonomy. Do students achieve better academic outcomes when they attend a school that operates with a certain measure of autonomy - that is, when the building leader can make his/her own decisions about staffing, goals, and curriculum? The key independent variable, administrator autonomy, is measured by the level of influence that each administrator has over the school's curriculum. There are three levels of autonomy: 0 – No influence, 1 – Some influence, and 2 – Major influence.

Because academic performance for students of any race is related to many of the aforementioned factors (parent education, household income, school population, etc.), I retain the same student control variables from the previous models. I also use the measure for poverty of the school population. While teacher background and experience is important, many of the decisions about which teachers are best equipped to work with students in a particular school – based on educational background or professional

experience – are potentially made by the school administrator. When administrators have a greater level of autonomy, they have the freedom to select staff members who are more experienced and have the credentials that they believe will ultimately produce better student results. While administrator influence can have an effect on teacher actions, I do continue to include the other teacher background variables in order to maintain consistency in the classroom controls. Although these variables give us some insight into teacher ability, there are other factors, such as teacher "rapport" with students and "ability to motivate" students, which may also play a role in administrator decision making. Indeed, the factors that an administrator considers in hiring teachers are probably "squishy," and the overall impact on students may result from an administrator's ability – or inability – to build a staff that is better equipped to reach student outcomes, based on development, collegiality, morale, or belief that students can achieve.

Hypothesis 3: Model and Variables

The model for the third hypothesis includes variables from the previous two models for Black and Hispanic students. If centralized authority and strict adherence to state-mandated, test-centered curricula are indeed limiting the amount of professional discretion that teachers employ in carrying out their jobs, then we would expect to see a greater level of professional discretion for teachers working in a school environment where most decisions are made in-house. Does school autonomy allow teachers to have a greater impact on the academic outcomes of their students? More specifically, does school autonomy give way for African-American and Latino teachers to interact with same-race students in a way that will lead their students to better academic results?

In addressing these questions, I use the same outcome variable – Math and Reading standardized test scores – for Black and Hispanic students. The key independent variable is an interaction term between administrator autonomy and teacher race. Consistent with the previous hypotheses, I include all of the controls for teacher background, student characteristics, and school environment. The results from the final hypothesis will provide insight into whether or not a de-centralized educational environment, i.e. one in which school administrators have more control over their own schools, is more conducive to an effective representative bureaucracy.

Descriptive Statistics

Variables for African-American and Latino students are the same; however, there is one additional variable included for Latino students. Given the large increase of Latin American students in schools over the last 20 years, the difference between language spoken at home (Spanish) and language of school instruction (English) has created understandable problems in student performance. While it is true that some non-Hispanic Black/African-American students may speak a different language at home, this is a very small proportion of Black students. Among Latino students, however, over 50% do not speak English at home; that is, English is not their primary language. This factor must be considered when measuring student outcomes.

In addition to the variables the directly address student, teacher, and administrator-specific factors, I include two controls for school environment: school population, which represents the percent of students qualifying for free and reduced lunch, and the school's

urban classification. In addition to these controls, each school is given a unique identification number, which allowed me to measure the school-level effects on the other variables. Incorporating measures for the racial make-up of the school did not significantly impact the model and was excluded, as school ID more specifically targeted the necessary controls for school-level variables.

The tables of descriptive statistics for the dependent, key independent, and control variables for each hypothesis are included in Tables 3.1 and 3.2 below. The metrics for each variable are included in Table 3.3. In most cases survey responses from students, parents, teachers, and administrators were put into categories. The dependent variable for all models, student standardized test score in Math and Reading, is continuous. While the student-level variables are unique to each student, those variables come from parent surveys (parent education and household income) and student transcripts (grade retention and test scores).

Table 3.1: Descriptive Statistics for African-American Students

Variable	**Observations**	**Mean**	**Std. Dev.**	**Min**	**Max**
Reading Score	2020	48.51	16.77	20.32	93.22
Math Score	2020	41.54	13.45	17.30	89.07
Administrator Autonomy	1496	1.31	0.58	0	2
Black English Teacher	1527	0.22	0.42	0	1
Eng. Teacher Credential	1550	0.05	0.23	0	1
Eng. Teacher Experience	1531	13.76	10.70	1	40
Black Math Teacher	1575	0.19	0.39	0	1
Math Teacher Credential	1583	0.04	0.19	0	1
Math Teacher Experience	1563	15.41	10.97	1	40
Income	2020	7.87	2.64	1	13
Parent Education	2020	3.25	1.97	0	7
Grade Retention	1459	0.22	0.44	0	2
Teacher Morale	1529	2.71	0.83	0	4
Urban School	2020	0.48	0.50	0	1
School Population	1876	3.20	2.02	0	6

Table 3.2: Descriptive Statistics for Latino Students

Variable	**Observations**	**Mean**	**Std. Dev.**	**Min**	**Max**
Reading Score	2217	49.66	18.35	20.02	94.86
Math Score	2217	43.93	15.39	17.46	89.62
Administrator Autonomy	1641	1.39	0.60	0	2
Latino English Teacher	1680	0.12	0.33	0	1
Eng. Teacher Credential	1690	0.09	0.29	0	1
Eng. Teacher Experience	1673	12.90	10.81	1	40
Latino Math Teacher	1703	0.16	0.37	0	1
Math Teacher Credential	1725	0.08	0.28	0	1
Math Teacher Experience	1708	13.49	10.40	1	40
Income	2217	8.12	2.50	1	13
Parent Education	2217	3.59	2.14	1	8
ESL Student	2116	0.51	0.50	0	1
Grade Retention	1783	0.16	0.40	0	2
Teacher Morale	1664	2.61	0.91	0	4
Urban School	2217	0.47	0.50	0	1
School Population	2034	4.13	2.06	1	7

Table 3.3 Variable Metrics

Variable	**Measurement**
Reading Score	*Continuous* – A percentage based on the student's IRT estimated number correct out of a possible 51.
Math Score	*Continuous* - A percentage based on the student's IRT estimated number correct out of a possible 73.
Administrator Autonomy	*Categorical* - The amount of influence that an administrator has over "decisions about curriculum and instruction," according to the administrator survey: 0 – no influence 1 – some influence 2 – major influence
Teacher Race	*Dichotomous* 0 – other race 1 – race of student
Teacher Credential	*Dichotomous* 0 – no degree in education 1 – degree in education
Teacher Experience	*Continuous* - Number of years of teaching experience that each student's teacher has (including the current year); 1 through 40 years
Income	*Categorical* – Annual household income is broken into 13 categories, with the following parameters: 1 – None 2 – $1,000 or less 3 – $1,001-$5,000 4 – $5,001-$10,000 5 – $10,001-$15,000 6 – $15,001-$20,000 7 – $20,001-$25,000 8 – $25,001-$35,000 9 – $35,001-$50,000 10 – $50,001-$75,000 11 – $75,001-$100,000 12 – $100,001-$200,000 13 – $200,001 or more

Parent Education	*Categorical* - The highest level of education of either parent/guardian: 1 – did not finish high school 2 – graduated from high school or GED 3 – Attended 2-year school, no degree 4 – Graduated from a 2-year school 5 – Attended college, no 4-year degree 6 – Graduated from college 7 – Completed a Master's degree or equivalent 8 – Completed PhD, MD, or other advanced degree
ESL Student	*Dichotomous* 0 – English is the student's primary language 1 – English is not the student's primary language
Grade Retention	*Categorical* - The number of times the student has been retained; the sample did not include any students who had been retained more than twice at the time of the survey. 0 – never retained 1 – retained once 2 – retained twice
Teacher Morale	*Categorical* - Administrators were asked to rank their agreement with the statement, "Teacher morale is high," 0 – strongly disagree 1 – disagree 2 – neutral 3 – agree 4 – strongly agree
Urban School	*Dichotomous* - Schools located inside of a territory designated as "urban" by the U.S. Census Bureau are considered to be "urban schools." 0 – not urban (classified as "suburban" or "rural") 1 – urban
School Population	*Categorical* - Schools are placed into categories based on the percentage of the student population that qualifies for free and reduced lunch. 0 – 0-5% 1 – 6-10% 2 – 11-20% 3 – 21-30% 4 – 31-50% 5 – 51-75% 6 – 76-100%

CHAPTER 4 – THE IMPACT OF TEACHER RACE AND ADMINISTRATOR AUTONOMY ON STUDENT PERFORMANCE

Because determining the impact of teacher race and administrator autonomy requires the use of variables at both the individual and school level, I use a multi-level mixed effects model. Below, I outline the results for three hypotheses tested.

Hypothesis 1: African-American and Latino students will perform better when they are taught by a same-race teacher.

Based on previous findings in single-state studies and randomized experiments, one would expect to see that black and Hispanic students perform better, on average, when a teacher of the same race teaches them. In testing my first hypothesis, I use the student data from the NELS survey. Because the basis of comparison is the race of the teacher, for each model, I include only students from the particular race in question. The key independent variable is race of the teacher, which is dichotomous – black vs. non-black and Hispanic vs. non-Hispanic. In addition to the key variable in for this hypothesis, I include the control variables discussed in Chapter 3 for both teachers and students.

Because a teacher's race is certainly not the only factor that influences the performance of his/her students, I looked to include other variable that could have an effect on the outcome. All of the students were in the same grade at the time, and the testing process itself included controls for student level/ability. Those teaching students of the same ability would be covering roughly the same content; however, their teaching abilities may vary. Consequently, I include variables from the survey, which capture some of the

teachers' characteristics. It should be noted that teacher quality is notoriously difficult to measure, as discussed in Chapter 3. In an attempt to capture some type of control for teacher "quality," I include the variable, Teacher Credential (whether or not a teacher has a degree in the content that s/he is teaching with a specialization in education) and the variable, Experience (number of years teaching).

In addition to the teacher controls, I incorporate a number of variables that have been shown to be associated with student performance. These include the household income, level of education achieved by the parents, and the number of times the student has been retained in the past. The retention variable is the only direct measure of each student's previous failure or success.

Finally, I include three school-level controls. The first is one, which measures teacher "morale," is based on school administrator response and captures the administrator's feelings about the staff's level of enthusiasm and belief about student performance. While it does not directly measure teacher quality, it is a way to capture the general attitude of school personnel. Understanding that individual student performance may be the result of the broader school environment, I also include a variable to measure the level of poverty within the student body. This variable, School Population, represents the percent of students qualifying for free and reduced lunch. I additionally include the school's urban classification as control for school environment. Incorporating measures for the racial make-up of the school did not significantly impact the model and was excluded, as school ID more specifically targeted the necessary controls for school-level variables. Because urban (and very rural) schools tend to serve a poorer population on average, the school poverty measure is included in addition to the urban/non-urban variable.

African-American Students

As shown in Table 4.1, Black English teachers have no statistically significant impact on the Reading test performance of black students when all other factors are considered. Interestingly, teacher credential and years of experience do not make a difference in student performance when controls for student background and school context are included. In fact, individual student factors and school-wide factors seem to be the only variables that have a statistically significant impact on student performance. As expected, a higher family income and higher levels of parent education are associated with stronger student performance. At the school level, a higher percentage of the school population qualifying for free and reduced lunch seems to negatively impact student scores on the Reading exam. This result is consistent with all research on the achievement gap: on average, students at low-income school do not perform as well as students at higher-income schools. It should be noted that staff morale has a positive and marginally significant effect on the Reading scores of black students. In fact, being on a campus where staff morale is "high," is associated with larger improvements in test scores than household income and parent education.

Results for the Math scores of black students tell a slightly different story: having a black math teacher has a negative impact on Math scores for black students. African-American students with same-race teachers have an average score that is over 2.5% lower than those who do not share the race of their teachers. The impact of teacher experience, family background, and school environment on Math scores are similar to their impact on Reading scores. It is interesting to note that the coefficients associated with the teacher

race variables move in the opposite direction of what we would expect; however these results are not significant. Overall, this indicates that same-race teachers do not necessarily produce better academic outcomes for African-American students – and may even have a negative impact. Educators should find these results troubling, not just because they imply that Black English and Math teachers are do not have the expected impact, but also because black students are more likely to have black teachers.

These results seem to indicate that the factors which have the largest impact on student achievement are the things that are outside of the classroom teacher's control. For black students, a teacher's credentials and years of experience have virtually no impact on student outcomes. Similarly, race has no impact on Reading performance and is actually negatively associated with Math performance. The purpose of this study is not to imply that black Math teachers are somehow less capable of teaching black students, nor is it to imply that same-race teachers have no ability to influence their students' academic performance. Actually, this study doesn't include most of the elements that go into the practice of teaching – lesson planning, presenting information, assessing student progress, and building relationships with students and parents – so teacher *ability* is still an underlying factor that should be explored further. The data from these surveys do show, however, that descriptive representation at the classroom level is not sufficient to improve student academic outcomes for black students. In fact, the factors that have the most impact on student achievement come from outside the classroom.

Table 4.1: African-American Student Outcomes - Reading

Variable	**Coefficient**
Black English Teacher	-1.376
	(1.594)
Teacher Credential	0.650
	(2.338)
Teacher Experience	0.044
	(0.052)
Income	0.701***
	(0.217)
Parent Education	0.905***
	(0.291)
Grade Retention	-8.757***
	(1.197)
Teacher Morale	1.520*
	(0.837)
Urban School	3.145**
	(1.401)
School Population	-1.615***
	(0.360)
n = 774	
F = 24.81	
Adj. R^2 = .20	
* p<0.1	
**p < 0.05	
*** p < 0.01	

Table 4.2: African-American Student Outcomes - Math

Variable	**Coefficient**
Black Math Teacher	-2.669**
	(1.202)
Teacher Credential	-0.825
	(2.144)
Teacher Experience	-0.022
	(0.039)
Income	0.760***
	(0.165)
Parent Education	0.808***
	(0.223)
Grade Retention	-6.123***
	(0.920)
Teacher Morale	0.921
	(0.644)
Urban School	1.829
	(1.149)
School Population	-1.172***
	(0.284)
n = 864	
F = 27.68	
Adj. R^2 = .22	
* p<0.1	
**p < 0.05	
*** p < 0.01	

Latino Students

In terms of classroom descriptive representation, results for Latino students are very similar to results for Black students in Reading: the race of the teacher has no statistically significant impact on student outcomes, and in Math, we see that having a same-race teacher has a negative impact on student outcomes. This impact also illustrates a 3% drop in score. In addition to this finding, several of the other teacher variables reveal some interesting trends.

While one would expect that better credentials – in this case a degree in the academic content with a specialization in education – would lead to better student outcomes. Teacher credential seems to have the opposite effect for both Reading and Math: teachers with a specialization in education are associated with a 6% drop in student score. Conversely, experience seems to have a positive and statistically significant impact on student performance. These results may stem from impact of another variable that is necessarily included in the model for Hispanic students – English language ability.

The ESL (English as a Second Language) Student variable was included to capture another factor that could greatly impact a student's ability to perform on an academic assessment. Because the assessments were given in English, it is possible that the language barrier would cause difficulty for students. This would be true for both Reading and Math assessments. As part of the NELS survey, students are asked what language is primarily spoken in their homes. For a large number of Hispanic respondents (just over 50%), this language is Spanish. As expected, students whose first language is not English do not perform as well as their peers, on average. As one would expect, the impact of ESL status is larger in Reading than it is in Math.

Although teachers who have an education certification have a strong background in their content area and in pedagogy, they may not be fully prepared to meet the needs of ESL students. Not all schools of education allow for teachers to focus on how to teach content to students who do not speak English at home. Consequently, some teachers may be ill-equipped to work with these students. This may explain why teacher credential would have no impact on student performance, but there may be other factors that would indicate why it has a *negative* impact on student performance.

One explanation could be that many school districts – particularly those in large, urban centers – provide special incentives for new teachers to work with ESL students. These teachers gain certification through alternative certification programs and go through extensive professional development through their school district. This being the case, some of the most capable ESL teachers do not have a degree in education or the credentials being analyzed in this study. The impact of these teachers is captured, however, in the measure for years of experience. As a teacher's level of experience increases, whether or not s/he has an education degree, that teacher better learns how to adjust instruction based on the needs of the student. As we would expect, teachers with a greater level of experience are associated with higher student scores in both Reading and Math.

The impacts of the student and school-level factors are also significant and move in the expected directions: higher household income and level of education are associated with higher scores, and previous grade retention is associated with lower scores. Once again, we see that students in schools with a higher percentage of the student body receiving free and reduced lunch have a lower average performance, and teacher morale, as reported by the principal, has a positive and significant impact on student outcomes. Much

like the results for African-American students, we see that being in an urban school is associated with higher math scores for Latino students. While this finding conflicts with some of the literature on student performance in urban settings (Coleman 1966, Lleras 2008), it does align with some of the literature that argues that urban schools are better equipped to handle the unique issues of low-income and minority students (McDermott 2007)

Table 4.3: Latino Student Outcomes – Reading

Variable	**Coefficient**
Latino English Teacher	-1.990
	(1.948)
Teacher Credential	-6.304***
	(1.941)
Teacher Experience	0.083*
	(0.051)
Income	0.851***
	(0.247)
Parent Education	1.678***
	(0.290)
ESL Student	-3.417***
	(1.116)
Grade Retention	-8.271***
	(1.422)
Teacher Morale	1.413*
	(0.762)
Urban School	1.629
	(1.298)
School Population	-1.502***
	(0.365)
n = 939	
F = 28.97	
Adj. R^2 = 0.23	
*p<0.1	
**p < 0.05	
*** p < 0.01	

Table 4.4: Latino Student Outcomes - Math

Variable	**Coefficient**
Latino Math Teacher	-3.084**
	(1.528)
Teacher Credential	-3.154**
	(1.575)
Teacher Experience	0.108**
	(0.044)
Income	0.827***
	(0.204)
Parent Education	1.243***
	(0.241)
ESL Student	-1.634*
	(0.922)
Grade Retention	-6.471***
	(1.151)
Teacher Morale	1.157*
	(0.628)
Urban School	1.929*
	(1.088)
School Population	-0.927***
	(0.309)
n = 963	
F = 25.54	
Adj. R^2 = 0.20	
*p<0.1	
**p < 0.05	
*** p < 0.01	

Hypothesis 2: African-American and Latino students will perform better when their school administrator has a high level of autonomy.

AND

Hypothesis 3: African-American and Latino students perform better with same-race teachers when their administrators have a greater level of autonomy.

These hypotheses go together because both add the level of administrator autonomy to the discussion of student outcomes. In order to test these hypotheses, I include the same control variables from the previous models. Rather than using teacher race as the key independent variable for Hypothesis 2, I use administrator autonomy. In the ELS survey, administrators were asked to rank their level of control over instructional decisions made at their school. They could respond on a 1 ("I have no influence over curriculum/instructional decisions") to 3 ("I have major influence over curriculum/instructional decisions") scale. For the following models, their responses were adjusted to a 0 to 2 scale. Considering the shift to higher levels of administrative centralization in the public school system – particularly for urban schools – it is not surprising that a majority of the school administrators of Black and Latino students describe themselves as having "no influence" or "some influence" over instructional decisions at their schools.

Table 4.5: Administrators of African-American Students

Autonomy Level	Frequency	Percent
0	88	5.88
1	857	57.29
2	551	36.83

Source: National Center for Education Statistics, Education Longitudinal Study 2002

Table 4.6: Administrators of Latino Students

Autonomy Level	Frequency	Percent
0	100	6.09
1	808	49.24
2	733	44.67

Source: National Center for Education Statistics, Education Longitudinal Study 2002

According to Chubb and Moe, the lack of autonomy that those administrators have will ultimately lead to lower student performance. While they did not test this theory with specific racial/ethnic groups, it would stand to reason that the same conditions would lead to similar student outcomes across different subgroups. The question now becomes whether or not minority students perform better with administrators who have higher levels of control over the affairs of their own schools. I find that results for black and Hispanic students are different from one another. While black students tend to perform better when their school administrator has a greater level of autonomy, administrator influence by itself seems to have no significant impact on the performance of Latino students.

Beyond the importance of administrator autonomy by itself, I am also interested in whether or not same-race teachers have a greater impact in schools with a high level of autonomy (Hypothesis 3). I use the same methodology to test both of these hypotheses; however, I incorporate an interaction term to test the third hypothesis. Coefficients for variables tested for *Hypothesis 2* are listed under "Model 1" in the tables below. Coefficients for *Hypothesis 3* are listed under "Model 2." Both models use a variable for administrator autonomy, but the second one includes the interaction of administrator autonomy with teacher race (Admin. Autonomy*Teacher Race) in order to measure the impact of a same-race teacher at the three levels of autonomy. The interaction term is the

only reported coefficient in the second model. The impact of all other variables, including administrator autonomy by itself are reported in the first model.

African-American Students

As expected, increased administrator autonomy does lead to improved student outcomes in Reading. Results for Math, however, indicate that autonomy by itself has no significant impact on student outcomes. The interaction term, Administrator Autonomy combined with Teacher race, doesn't lead to significant improvement in student results in Reading or Math. Although the interaction term is not statistically significant, it should be noted that in Reading, the coefficient for the interaction term is positive, unlike the coefficient for a Black English Teacher without the interaction with administrator autonomy (Table 4.1). This could indicate that further examination of the relationship between administrator autonomy and teacher race is necessary. It is also worth noting that administrator autonomy is positively correlated with teacher morale, which continues to be statistically significant.

Much like the previous models, teacher background does not make a statistically significant difference in student performance. As expected, grade retention has the largest effect on student scores; each instance of grade-level retention is associated with a nearly five percent decrease in Reading score and a six percent decrease in Math score. These results indicate that for African-American students, school and classroom-level factors are not as effective in overcoming the impact of other variables, such as income level, parent education, and previous student performance.

TABLE 4.7: African-American Student Outcomes - Reading

Variable	**Model 1**	**Model 2**
Administrator Autonomy	1.824*	1.144
	(1.091)	(2.625)
Black English Teacher	---	-3.223
		(3.850)
AdminAutonomy*BlkEngTeacher	---	1.144
		(2.625)
Teacher Credential	1.317	1.166
	(2.362)	(2.362)
Teacher Experience	0.060	0.059
	(0.052)	(0.052)
Income	0.799***	0.731***
	(0.216)	(0.221)
Parent Education	0.858***	0.840***
	(0.288)	(0.294)
Grade Retention	-8.879***	-8.852***
	(1.173)	(1.201)
Teacher Morale	1.484*	1.386
	(0.834)	(0.858)
Urban School	2.454*	2.816**
	(1.409)	(1.425)
School Population	-1.594***	-1.662***
	(0.356)	(0.369)
	n = 843	n = 818
	F = 26.27	F = 20.62
	Adj. R^2 = 0.21	Adj. R^2 = 0.21

* p<0.1

**p < 0.05

*** p < 0.01

TABLE 4.8: African-American Student Outcomes - Math

Variable	**Model 1**	**Model 2**
Administrator Autonomy	0.446	0.548
	(0.893)	(0.739)
Black Math Teacher	---	-3.156
		(2.885)
AdminAutonomy*BlkMathTeacher	---	0.087
		(1.971)
Teacher Credential	-0.641	-0.830
	(2.137)	(2.139)
Teacher Experience	-0.011	-0.018
	(0.039)	(0.039)
Income	0.786***	0.777***
	(0.168)	(0.168)
Parent Education	0.789***	0.795***
	(0.224)	(0.224)
Grade Retention	-6.165***	-6.166***
	(0.925)	(0.928)
Teacher Morale	1.030	0.961
	(0.663)	(0.659)
Urban School	1.622	1.895
	(1.159)	(1.166)
School Population	-1.304***	-1.201***
	(0.288)	(0.289)
	n = 846	n = 843
	F = 27.29	F = 23.10
	Adj. R^2 = 0.22	Adj. R^2 = 0.22

* p<0.1
**p < 0.05
*** p < 0.01

Latino Students

Although the work of previous scholars would indicate that increased administrator autonomy would lead to improved student outcomes, results from these tests show that autonomy by itself has no significant impact on student outcomes. The interaction term is not associated with significant improvement in student Math scores; however, the interaction term between administrator autonomy and Latino English teacher, shows the largest effect of any factor on student reading performance, and it is statistically significant (Table 4.9). Although having a Latino English teacher has no impact on Reading scores for Hispanic students (Table 4.3), the effect is both positive and significant when the school administrator has a high level of autonomy.

It is worth noting that Reading scores for Latino students seem to be impacted by more school and classroom factors than Math scores. This stands to reason, not only because the content of an English class may vary quite a bit based on school and teacher – provided that the school and/or teacher has a level of influence over the curriculum – but also because it would be most directly impacted by English language skills. Again, we see that a student's ESL status is significantly associated with lower performance in Reading. All of the other student control factors (income, parent education, previous retention) and school environment factors (Teacher morale, school population) move in the expected direction.

Table 4.9: Latino Student Outcomes - Reading

Variable	**Model 1**	**Model 2**
Administrator Autonomy	-0.755	-1.205
	(1.124)	(1.131)
Latino English Teacher	---	-15.561***
		(4.982)
AdminAutonomy*LatEngTeacher	---	9.049***
		(3.164)
Teacher Credential	-6.290***	-6.494***
	(1.923)	(1.939)
Teacher Experience	0.093*	0.090*
	(0.052)	(0.052)
Income	0.801***	0.838***
	(0.249)	(0.250)
Parent Education	1.611***	1.689***
	(0.291)	(0.291)
ESL	-3.390***	-3.417***
	(1.121)	(1.124)
Grade Retention	-8.050***	-8.050***
	(1.445)	(1.448)
Teacher Morale	1.515**	1.438*
	(0.778)	(0.775)
Urban School	1.091	1.490
	(1.322)	(1.312)
School Population	-1.551***	-1.404***
	(0.377)	(0.377)
	n = 936	n = 923
	F = 28.01	F = 24.10
	Adj. R^2 = 0.22	Adj. R^2 = 0.23

* p<0.1
**p < 0.05
*** p < 0.01

Table 4.10: Latino Student Outcomes - Math

Variable	**Model 1**	**Model 2**
Administrator Autonomy	0.454	0.209
	(0.916)	(0.949)
Latino Math Teacher	---	-6.554*
		(3.624)
AdminAutonomy*LatMathTeacher	---	2.283
		(2.218)
Teacher Credential	-3.067**	-3.210**
	(1.564)	(1.585)
Teacher Experience	0.136***	0.115***
	(0.044)	(0.044)
Income	0.827***	0.829***
	(0.207)	(0.206)
Parent Education	1.209***	1.243***
	(0.241)	(0.242)
ESL	-1.571*	-1.730*
	(0.929)	(0.931)
Grade Retention	-6.245***	-6.401***
	(1.169)	(1.169)
Teacher Morale	0.957	1.034
	(0.636)	(1.092)
Urban School	1.881*	1.814*
	(1.091)	(1.092)
School Population	-0.986***	-0.811**
	(0.315)	(0.319)
	n = 959	n = 948
	F = 24.05	F = 20.76
	Adj. R^2 = 0.19	Adj. R^2 = 0.20

* p<0.1
**p < 0.05
*** p < 0.01

The results actually show that descriptive representation and administrator autonomy have little to no impact on student performance – and that the impact could go in either direction. When controlling for student and school-level factors – things that may be common to black and Latino student but that stem from issues outside of the classroom – descriptive representation seems to have no statistically significant impact in the most cases and a negative impact for black Math students. The results of the first two hypotheses indicate that descriptive representation and administrator autonomy, when considered alone, are not sufficient to produce better scores for black and Latino students.

While tests of the two theories guiding this analysis (descriptive representation leads to improved student outcomes and administrator autonomy also leads to improved student outcomes) show mixed results, the interaction term, particularly for Reading results of Latino students indicates that descriptive representation, when coupled with bureaucratic discretion, can have a positive and significant impact on student academic performance.

CHAPTER 5 – CONCLUSION: IMPLICATIONS OF FINDINGS AND AREAS FOR CONTINUED RESEARCH

This work began with the goal of addressing some major questions about the academic performance of black and Latino students. Although minority teachers still make up less than a quarter of the teaching force, their numbers have increased at a faster rate than those of minority students. Why has the achievement gap persisted - even worsened - during a time when the number of Black and Latino teachers has increased? Despite the findings of many education and policy scholars, the answer may be that the gap has persisted because minority students do not necessarily perform better with teachers who share their race. This is not to say that the influences that black and Latino teachers have over black and Latino students (stereotype-blocking, culturally responsive pedagogy, the ability to be a role-model, etc.) are somehow invalid. In fact, many of the factors associated with teacher ability and student performance are not measured by standardized test scores. In an age of increased school accountability, however, student performance – as measured by state assessments – is a major focus point of school leaders around the country. It is clear that shared race is not enough to help teachers produce better student results.

Despite some of the other factors that may positively influence black and Latino students, same-race teachers face too many additional challenges in reaching these students. The expected barriers (poverty, native language, school environment, previous academic record, etc.) are the primary indicators of student success in nearly every case. These factors are indeed challenging to teachers of minority students; however, the

question remains: Is there a situation in which same-race teacher effects *could* overcome the negative impact of being in a low-income school? It would seem that there are policies and practices that keep same-race teachers from having the impact that we would expect to see.

One possibility is that the loss of school and school leader autonomy has kept teachers from doing much beyond exactly what is explicitly outlined by state-mandates and scripted curricula. While this study has not shown that administrator autonomy is sufficient to improve student outcomes, it has produced some interesting findings when considering the interaction between autonomy and teacher race. Results for the interaction term were not statistically significant in three of the four cases; however, the interaction term is significantly and substantively positive in the case of Reading scores for Latino students. This finding alone is quite compelling, given the added difficulty of a high concentration of English Language Learners among Latino students.

This result, along with the fact that the interaction term produces a positive coefficient for two of the other three cases (Latino students in Math and African-American students in Reading), indicates that future studies should examine the impact that same-race teachers can have when there is a high level of school autonomy. When considered alone, neither teacher race nor administrator autonomy makes a difference in student outcomes. The fact that teacher race interacted with administrator autonomy does show a positive (and significant) impact on reading performance of Latino students does indicate that there may be something to the idea that same-race teachers could be more effective when they are paired with autonomous administrators. Graphs of means comparisons,

though most are not statistically significant, show that high levels of administrator autonomy reverse the direction of same-race teacher impact (from negative to positive). These graphs are shown in Figures 5.1 – 5.4 below.

Figure 5.1

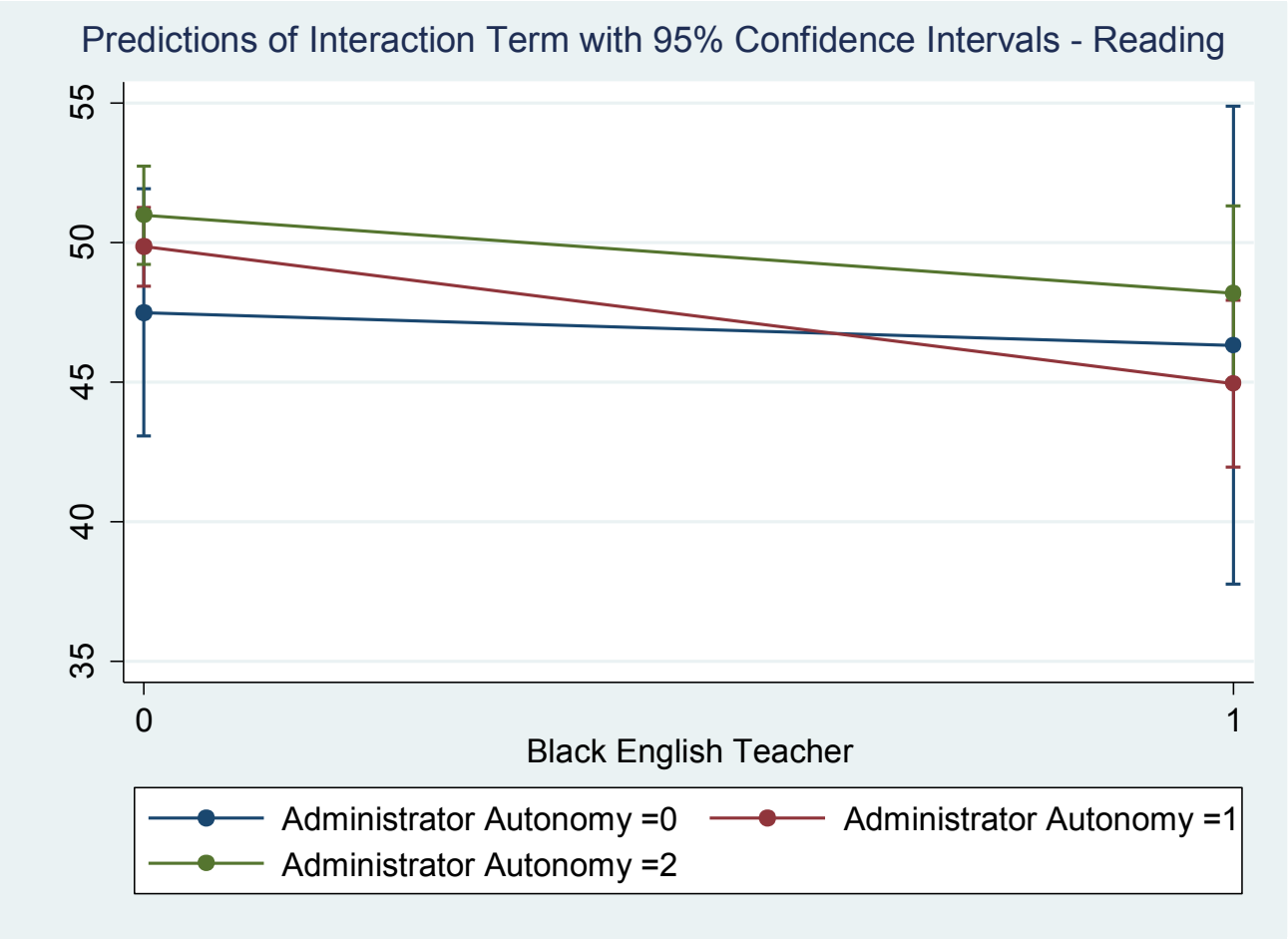

Predictions of Interaction Term with 95% Confidence Intervals - Reading
55
50
45
40
35
0
1
Black English Teacher
Administrator Autonomy =0
Administrator Autonomy =1
Administrator Autonomy =2

Figure 5.2

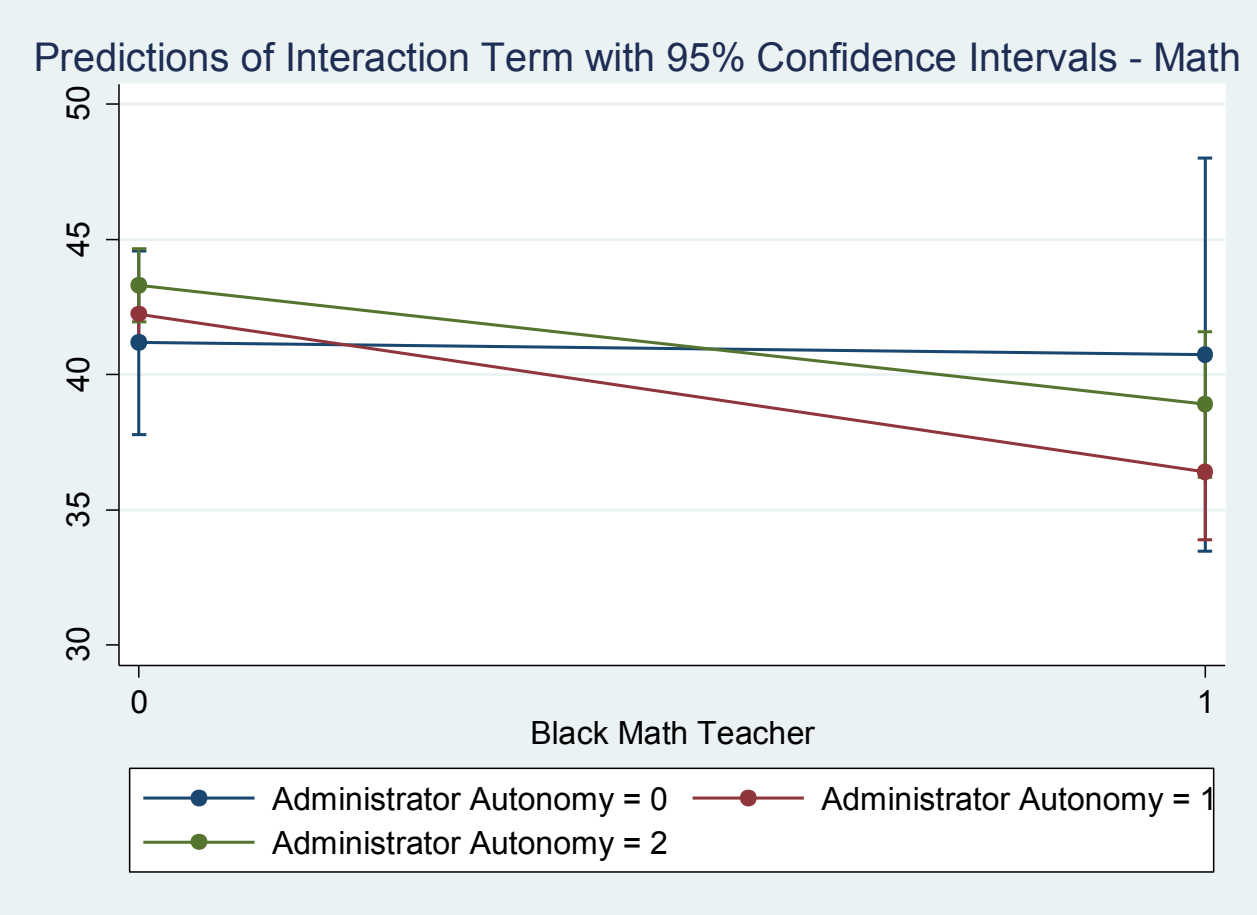

Predictions of Interaction Term with 95% Confidence Intervals - Math
50
45
40
35
30
0
1
Black Math Teacher
Administrator Autonomy = 0
Administrator Autonomy = 1
Administrator Autonomy = 2

Figure 5.3

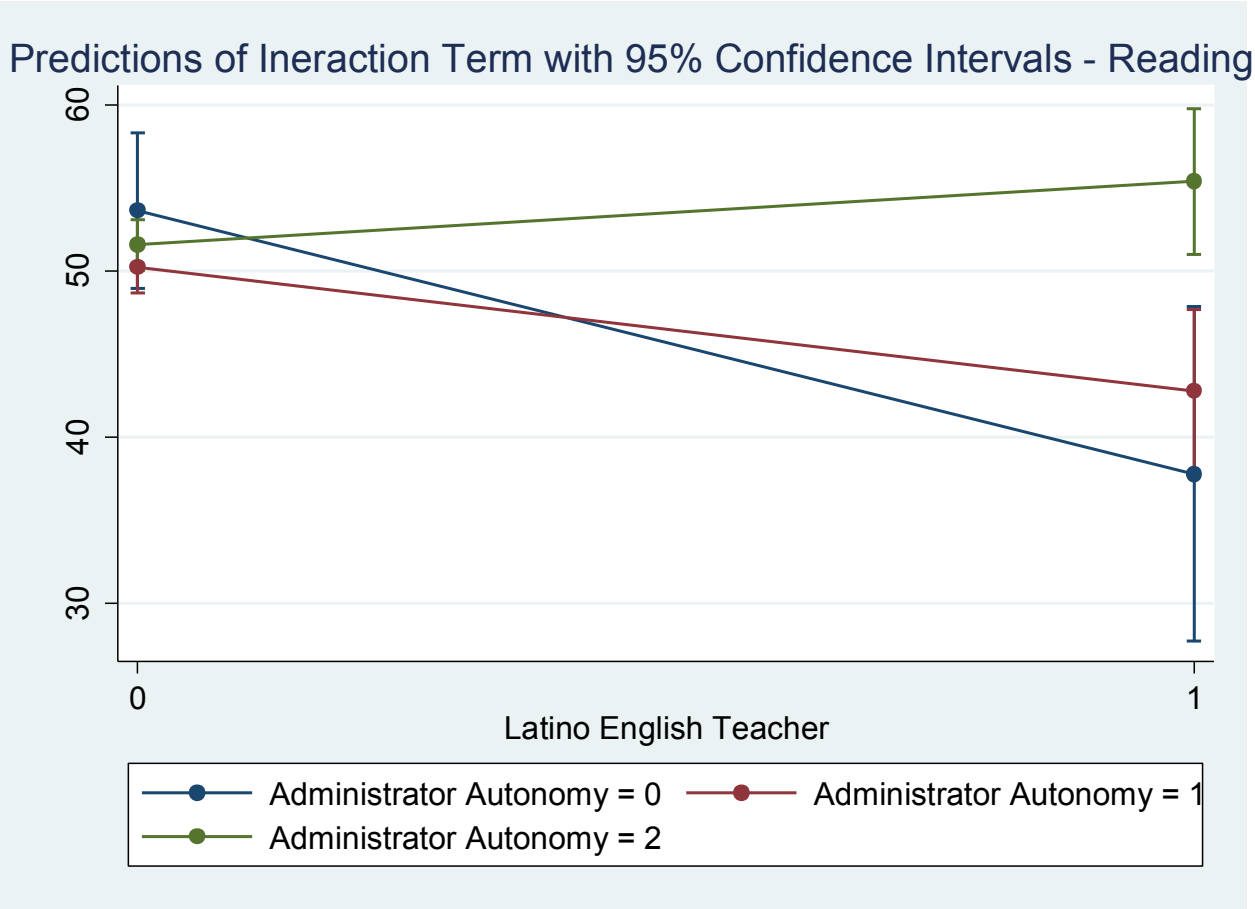
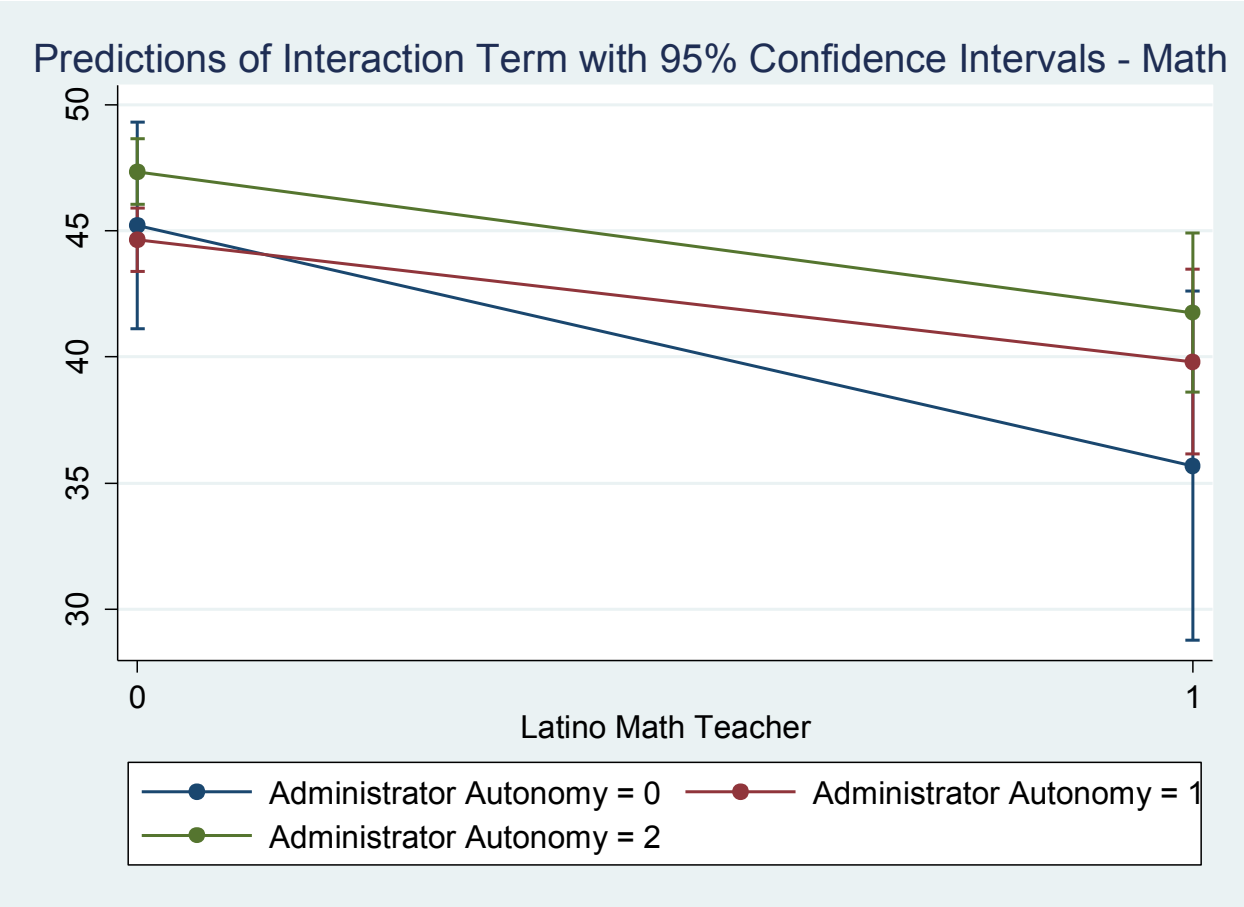

Predictions of Ineraction Term with 95% Confidence Intervals - Reading
60
50
40
30
0
1
Latino English Teacher
Administrator Autonomy = 0
Administrator Autonomy = 1
Administrator Autonomy = 2

Figure 5.4


Predictions of Interaction Term with 95% Confidence Intervals - Math
50
45
40
35
30
0
1
Latino Math Teacher
Administrator Autonomy = 0
Administrator Autonomy = 1
Administrator Autonomy = 2

Policy Recommendations

As policy discussions about the best way to educate struggling students continue at all levels of government, the present analysis offers some additional insight into the academic performance of non-Asian minority students, using the most recent available data. I have interacted teacher race with administrator autonomy to strengthen the argument that discretion is a key lever in improving representation in the bureaucracy. In addition to the academic debates on this issue, there are some very real world implications to continued research on the impact of teacher race and administrator autonomy on student outcomes. The results offered in the previous chapter indicate that teachers sharing the race of their students may not be the best way to produce higher test scores. This has bearing on the types of programs and policies that school districts should pursue as they are considering how to improve the performance of their black and Latino students. The purpose of this work is not to somehow suggest that school leaders shouldn't actively seek out teachers and staff member who look like the students with whom they work. To the contrary, I believe the literature is clear: same-race teachers can have a positive impact on their students. Translating that impact into higher test scores, however, would require some important policy changes.

1.) **Non-classroom factors must be addressed.** While teacher variables were shown to have little impact on student performance, it is clear that factors coming from outside of the classroom consistently affect student performance. Factors that stem from the home (parent education, household income, etc.) should certainly be addressed through adult education programs and job training. It is also important to note that school-wide poverty is negatively

associated with student test scores. As policy makers continue to address the issue of how to help schools in low-income neighborhoods, it may also be helpful to invest more resources into magnet and vanguard public schools, which have been known to have more economic diversity than traditional neighborhood schools. In addition to providing resources to the schools, bureaucrats and elected officials should establish methods of educating parents about the options that they have in sending their children to different schools. It is quite possible that minority students with a number of school options end up working their way through a feeder pattern, simply because their parents didn't know what other options were open to them. Standard school zoning practices have led to concentrated populations of low-income students, often resulting in lower student performance.

2.) **School culture matters.** In nearly every model, teacher morale is positively – and significantly – associated with higher student scores. As mentioned before, school leadership plays a major role in shaping teacher attitude. Principals often make decisions about classroom structure, professional development, and even teacher promotion/advancement. School districts should pursue policies that allow school administrators to provide opportunities for development and advancement. Some research indicates that shared decision-making is associated with a more positive school environment (White 1992, Heck and Hallinger 2009). With more research, policy makers could certainly implement practices that will build morale among educators at all levels.

3.) **High-quality, autonomous leadership is beneficial**. While the results of the models testing the third hypothesis were mixed (several showing no relationship between the interaction of administrator autonomy and teacher race), the interaction term is certainly something that should be noted. For Latino students, high administrator independence along with same-race teachers is associated with greatly improved Reading scores. Policy makers should encourage autonomous school leaders, particularly those with a strong track record of building positive culture, to consider student demographics when recruiting teachers. While race should not be a factor in making hiring decisions, concerted efforts to recruit highly qualified teachers who look like the student population could go a long way. More research into this interaction could provide insight to state policy makers as they consider how extensive their accountability and oversight programs should be. It could also provide autonomous leaders of schools that cater to high populations of Latino students with guidance on what decisions they should make about staffing.

The purpose of this work is to complement the existing literature on bureaucratic representation and to perhaps offer some additional insight into the troubling academic outcomes of non-Asian minority students. Although the majority of studies that analyze the impact of representative bureaucracy in education look at group-wide trends, rather than individual outcomes, I have used individual-level data to show that teacher race does not positively impact student achievement. In most cases, it does not make a significant difference, and for African-American and Latino Math students, shared race is associated

with lower performance. In the future, more should be done to examine the impact of having a shared race teacher *over time*. What would it look like for students to have a series of teachers who are members of the same race? Additionally, it is possible that other outcome variables would tell a different story. While a student may not perform better on a given standardized test if they are taught by a same-race teacher, that student may be more likely to enter and graduate from college or less likely to drop out. These issues are worth exploring.

Continued research into the best conditions for producing higher student results will both refine existing theories about how to operate the educational system and inform the policy decisions that are made at all levels of government.

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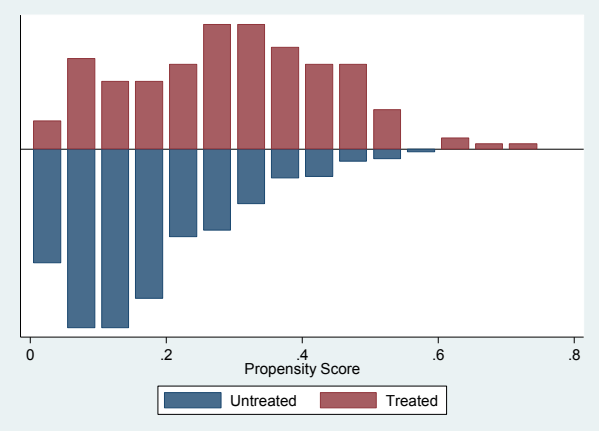
APPENDIX A

Propensity Score Matching for Classroom Descriptive Representation

Table A.1: Association of Covariates with Treatment (Black English Teacher)

Variable	**Coefficient**	**%bias**
Teacher Credential	-0.751**	0.000
	(0.321)	
Teacher Experience	0.018***	1.500
	(0.005)	
Morale	-0.285***	6.400
	(0.069)	
Income	-0.075***	13.800
	(0.022)	
Parent Education	0.059**	8.000
	(0.029)	
Retention	0.062	0.000
	(0.118)	
Urban School	0.004	-12.300
	(0.108)	
School Population	0.139***	13.200
	(0.030)	
n = 843		
F = 26.27		
Adj. R^2 = 0.20		

Figure A.1: Balance of Treated and Untreated Groups

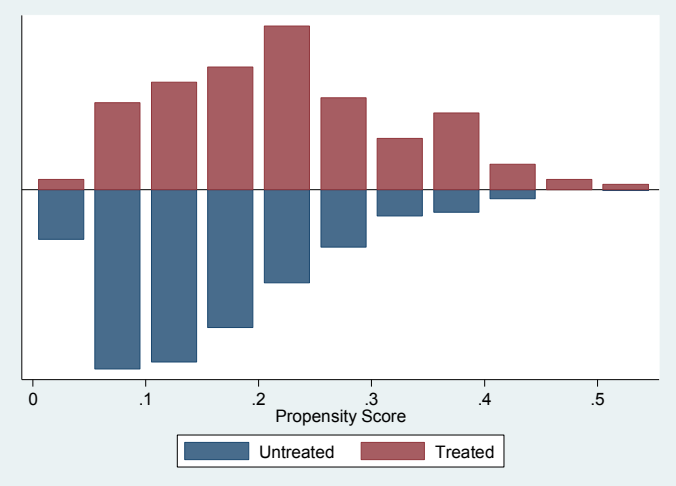


Impact of Black English teacher after p-score matching: **-0.275 (SE: 1.1952)**

Table A.2: Association of Covariates with Treatment (Black Math Teacher)

Variable	**Coefficient**	**%bias**
Teacher Credential	-0.199	-3.700
	(0.306)	
Teacher Experience	-0.004	-0.800
	(0.004)	
Morale	-0.226***	5.100
	(0.066)	
Income	-0.033	-6.000
	(0.022)	
Parent Education	0.038	8.400
	(0.029)	
Retention	0.069	-1.500
	(0.117)	
School Population	0.139**	-1.000
	(0.030)	
n = 864		
F = 27.68		
Adj. R^2 = .20		

Figure A.2: Balance of Treated and Untreated Groups

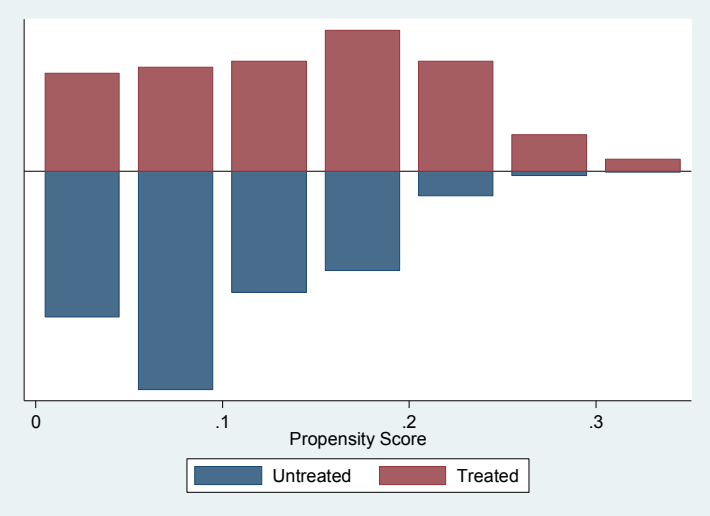


Impact of Black Math teacher after p-score matching: **-1.090 (SE: 1.362)**

Table A.3: Association of Covariates with Treatment (Latino English Teacher)

Variable	**Coefficient**	**%bias**
Teacher Credential	0.301*	-6.600
	(0.180)	
Teacher Experience	-0.018***	-3.400
	(0.006)	
Morale	0.029	-15.600
	(0.067)	
Income	-0.014	-3.100
	(0.025)	
Parent Education	0.045	-14.400
	(0.029)	
Retention	-0.070	-10.900
	(0.157)	
School Population	0.154***	4.300
	(0.032)	
n = 963		
F = 25.54		
Adj. R^2 = 0.20		

Figure A.3: Balance of Treated and Untreated Groups

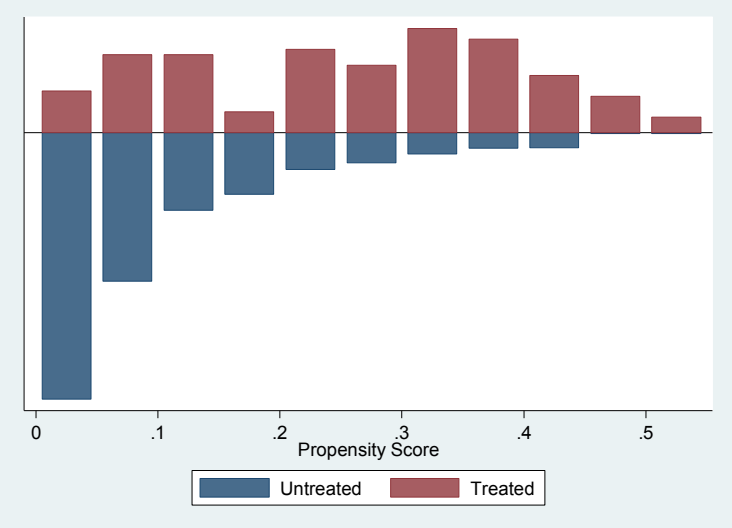


Impact of Latino English Teacher after p-score matching: **2.700 (SE: 2.324)**

Table A.4: Association of Covariates with Treatment (Latino Math Teacher)

Variable	**Coefficient**	**%bias**
Teacher Credential	-1.020***	-13.000
	(0.292)	
Teacher Experience	-0.037***	7.900
	(0.006)	
Morale	-0.005	22.600
	(0.065)	
Income	0.003	16.000
	(0.025)	
Parent Education	-0.047	9.400
	(0.030)	
Retention	-0.292*	2.100
	(0.152)	
School Population	0.256***	1.200
	(0.356	
n = 939		
F = 28.97		
Adj. R^2 = 0.22		

Figure A.4: Balance of Treated and Untreated Groups



Impact of Latino Math Teacher after p-score matching: **-0.014 (SE: 1.085)**

APPENDIX B

Checks for Robustness: For the following models, I used the multilevel mixed-effects method to determine the impact of descriptive representation on student outcomes (Hyp 1). As shown below, results are mixed. While there seems to be a positive and significant impact of shared teacher race at schools with the lowest number of students on free and reduced lunch (low-poverty schools) for African-American students in Reading, same-race teachers seem to have the opposite effect in the second and third quartile of schools for both black and Latino students. As expected, at high poverty schools, shared teacher race has no impact. These puzzling results are likely the result of small samples or lack of variance in the dependent variable.

African-American Students: Reading

Table B.1: School Poverty Quartile 1

Variable	Coefficient
Black English Teacher	-11.314***
	(3.407)
Teacher Credential	-2.961
	(5.131)
Teacher Experience	-0.031
	(0.103)
Income	0.119
	(0.544)
Parent Education	2.007***
	(0.710)
Retention	-7.973**
	(3.460)
Morale	2.501*
	(1.380)
Urban School	2.758
	(2.283)
n =	222
F =	5.90
Adj. R^2 =	0.15

Table B.2: School Poverty Quartile 2

Variable	Coefficient
Black English Teacher	11.563***
	(3.244)
Teacher Credential	1.779
	(3.447)
Teacher Experience	0.014
	(0.107)
Income	1.086***
	(0.393)
Parent Education	1.546***
	(0.550)
Retention	-8.524***
	(2.321)
Morale	1.173
	(1.230)
Urban School	2.702
	(2.033)
n = 224	
F = 8.88	
Adj. R^2 = 0.22	

Table B.3: School Poverty Quartile 3

Variable	**Coefficient**
Black English Teacher	-2.015
	(2.265)
Teacher Credential	10.143**
	(4.615)
Teacher Experience	0.197**
	(0.076)
Income	0.628*
	(0.372)
Parent Education	0.218
	(0.467)
Retention	-9.675***
	(1.764)
Morale	2.490**
	(1.217)
Urban School	2.092
	(1.726)
n = 309	
F = 8.64	
Adj. R^2 = 0.17	

Table B.4: School Poverty Quartile 4

Variable	**Coefficient**
Black English Teacher	0.067
	(3.549)
Teacher Credential	-3.412
	(8.502)
Teacher Experience	-0.133
	(0.134)
Income	0.715
	(0.605)
Parent Education	-0.421
	(0.932)
Retention	-7.260**
	(3.442)
Morale	-2.195
	(2.589)
Urban School	7.836**
	(3.807)
n = 82	
F = 1.83	
Adj. R^2 = 0.08	

African-American Students: Math

Table B.5: School Poverty Quartile 1

Variable	Coefficient
Black Math Teacher	-4.612
	(2.940)
Teacher Credential	-5.867*
	(3.225)
Teacher Experience	-0.089
	(0.087)
Income	0.928**
	(0.400)
Parent Education	1.715***
	(0.542)
Retention	-9.908***
	(2.574)
Morale	0.834
	(1.081)
Urban School	2.199
	(1.767)
n = 236	
F = 8.80	
Adj. R^2 = 0.21	

Table B.6: School Poverty Quartile 2

Variable	Coefficient
Black Math Teacher	-0.832
	(2.877)
Teacher Credential	8.856**
	(4.152)
Teacher Experience	-0.072
	(0.073)
Income	1.246***
	(0.320)
Parent Education	0.770*
	(0.445)
Retention	-6.261***
	(1.886)
Morale	0.566
	(1.026)
Urban School	3.227*
	(1.782)
n = 224	
F = 7.38	
Adj. R^2 = 0.19	

Table B.7: School Poverty Quartile 3

Variable	**Coefficient**
Black Math Teacher	-4.411**
	(1.724)
Teacher Credential	-3.957
	(5.369)
Teacher Experience	0.073
	(0.059)
Income	0.542*
	(0.293)
Parent Education	0.423
	(0.363)
Retention	-6.414***
	(1.410)
Morale	2.387**
	(0.927)
Urban School	1.262
	(1.385)
n = 307	
F = 6.72	
Adj. R^2 = 0.13	

Table B.8: School Poverty Quartile 4

Variable	**Coefficient**
Black Math Teacher	-0.934
	(2.234)
Teacher Credential	-7.274
	(6.434)
Teacher Experience	-0.068
	(0.104)
Income	0.491
	(0.424)
Parent Education	0.808
	(0.656)
Retention	0.397
	(2.232)
Morale	-0.173
	(1.627)
Urban School	-3.353
	(2.315)
n = 97	
F = 1.00	
Adj. R^2 = 0.00	

Latino Students: Reading

Table B.9: School Poverty Quartile 1

Variable	Coefficient
Latino English Teacher	2.012
	(4.757)
Teacher Credential	-11.376**
	(5.544)
Teacher Experience	-0.018
	(0.110)
Income	0.306
	(0.585
Parent Education	2.055***
	(0.661)
ESL	-2.525
	(2.646)
Retention	-12.881**
	(4.976)
Morale	2.524
	(1.647)
Urban School	-1.356
	(2.527)
n = 192	
F = 3.44	
Adj. R^2 = 0.10	

Table B.10: School Poverty Quartile 2

Variable	Coefficient
Latino English Teacher	-7.967
	(4.981)
Teacher Credential	-2.692
	(3.651)
Teacher Experience	-0.123
	(0.122)
Income	1.449**
	(0.583)
Parent Education	1.480**
	(0.686)
ESL	-4.911*
	(2.630)
Retention	-9.211***
	(3.227)
Morale	3.934***
	(1.473)
Urban School	5.621**
	(2.752)
n = 189	
F = 7.64	
Adj. R^2 = 0.24	

Table B.11: School Poverty Quartile 3

Variable	**Coefficient**
Latino English Teacher	-3.274
	(4.382)
Teacher Credential	-9.469***
	(3.509)
Teacher Experience	0.184*
	(0.095)
Income	0.990**
	(0.479)
Parent Education	1.593***
	(0.547)
ESL	-6.848***
	(2.087)
Retention	-6.770***
	(2.452)
Morale	0.100
	(1.275)
Urban School	.381
	(2.088)
n = 290	
F = 7.05	
Adj. R^2 = 0.16	

Table B.12: School Poverty Quartile 4

Variable	**Coefficient**
Latino English Teacher	-2.767
	(4.319)
Teacher Credential	-11.223**
	(4.415)
Teacher Experience	0.110
	(0.111)
Income	0.572
	(0.543)
Parent Education	1.710**
	(0.698)
ESL	-0.123
	(2.435)
Retention	-6.568**
	(3.130)
Morale	-0.916
	(1.275)
Urban School	0.642
	(2.391)
n = 168	
F = 2.44	
Adj. R^2 = 0.07	

Latino Students: Math

Table B.13: School Poverty Quartile 1

Variable	Coefficient
Latino Math Teacher	-4.016
	(4.749)
Teacher Credential	-0.701
	(3.816)
Teacher Experience	0.164*
	(0.987)
Income	0.633
	(0.515)
Parent Education	1.453***
	(0.539)
ESL	-0.091
	(2.209)
Retention	-17.896***
	(4.575)
Morale	1.653
	(1.331)
Urban School	-0.945
	(2.057)
n = 204	
F = 4.60	
Adj. R^2 = 0.14	

Table B.14: School Poverty Quartile 2

Variable	Coefficient
Latino Math Teacher	1.594
	(3.924)
Teacher Credential	-0.759
	(4.325)
Teacher Experience	0.193*
	(0.104)
Income	1.542***
	(0.505)
Parent Education	1.001*
	(0.574)
ESL	-2.251
	(2.130)
Retention	-7.245***
	(2.694)
Morale	2.225*
	(1.277)
Urban School	5.368**
	(2.259)
n = 189	
F = 6.85	
Adj. R^2 = 0.22	

Table B.15: School Poverty Quartile 3

Variable	**Coefficient**
Latino Math Teacher	-5.504*
	(3.160)
Teacher Credential	-7.483***
	(2.497)
Teacher Experience	0.142*
	(0.074)
Income	0.723**
	(0.367)
Parent Education	1.109***
	(0.424)
ESL	-5.065***
	(1.612)
Retention	-3.577*
	(1.893)
Morale	0.502
	(0.892)
Urban School	3.358**
	(1.614)
n = 310	
F = 6.60	
Adj. R^2 = 0.14	

Table B.16: School Poverty Quartile 4

Variable	**Coefficient**
Latino Math Teacher	-3.151
	(2.698)
Teacher Credential	-2.567
	(2.762)
Teacher Experience	0.022
	(0.103)
Income	0.945**
	(0.459)
Parent Education	0.199
	(0.618)
ESL	2.722
	(2.163)
Retention	-2.928
	(2.564)
Morale	-0.709
	(1.244)
Urban School	-0.788
	(2.150)
n = 169	
F = 1.28	
Adj. R^2 = 0.01	