AN EXAMINATION OF THE CORRELATION BETWEEN SCHOOL LEADERS' RACE/ETHNICITY AND LATINO ACADEMIC ACHIEVEMENT IN CALIFORNIA

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THESIS

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AN EXAMINATION OF THE CORRELATION BETWEEN SCHOOL LEADERS' RACE/ETHNICITY AND LATINO ACADEMIC ACHIEVEMENT IN CALIFORNIA

A Thesis

by

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Abstract

of

AN EXAMINATION OF THE CORRELATION BETWEEN SCHOOL LEADERS' RACE/ETHNICITY AND LATINO ACADEMIC ACHIEVEMENT IN CALIFORNIA

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With Latinos being California's largest ethnic group, making up approximately 38 percent of the state's total population and 49 percent of the state's K-12 population, it is no surprise that Latinos are projected to become the majority of California's population by 2050. However, Latino students continuously fall well below the academic achievement levels of white and Asian students. A likely consequence of this pattern is that a majority of these students will not be well-prepared for college-level academic work, resulting in a significant percentage of California's future labor force unable to meet the demand for skilled workers. Using data from the Department of Education and Zip Atlas, I conducted a multivariate regression analysis to explain factors that are related to California high schools' Latino academic achievement scores, focusing primarily on teachers and administrators' race/ethnicity. The regression analysis finds that several explanatory variables, including teachers' and administrators' race/ethnicity, a high school's charter status, various student subpopulations (i.e. – percentage of English-language learners, percentage of African American students), parent college education experience, and the Latino population in a high school's zip code have a significant effect on Latino academic achievement. A subsequent qualitative analysis of administrators'

opinions of the quantitative results echo the findings of the regression analysis in that Latino academic achievement is influenced by multiple variables. However, administrators indicate that the variation in students' academic achievement scores go beyond the relationship between school leaders' race/ethnicity and academic achievement. They suggest that reducing the academic achievement gap between Latinos and their white and Asian counterparts must be addressed by increasing school and community support and expectations, in conjunction with the time and resources available to leaders to sufficiently address Latino students' academic challenges as a subgroup and individually.

This report provides additional information supporting the complexity in finding a single solution to the multifaceted issue of maintaining and improving Latino academic achievement.

_______________________________, Committee Chair
Robert W. Wassmer, Ph.D.

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Date

DEDICATION

To Pano

You’re one in a million, rak.

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I would like to thank Professor Robert Wassmer and Professor Mary Kirlin for their patience, as well as their guidance and support throughout this project. Your encouragement and challenges allowed me to remain steadfast and keep my eye on the prize.

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INTRODUCTION

Disparities in academic achievement between California's Latino student population and their white and Asian counterparts continue despite the efforts of administrators and policymakers to eliminate this phenomenon. In the 2009-2010 school year, Latino tenth grade students had a 73 percent passing rate for the California High School Exit Exam (CAHSEE) English-Language Arts test in comparison to a 91 percent passing rate for white tenth grade and Asian tenth grade students (California Department of Education [CDE], 2010c). For the CAHSEE's mathematics test in the same school year, Latino tenth grade students had a 74 percent passing rate compared to a 91 percent passing rate for white students and a 95 percent passing rate for Asian tenth grade students (CDE, 2010c).[1] During the 2008-2009 school year, the dropout rate for California Latino high school students in grades nine through twelve was 7.0 percent, compared to 2.5 percent and 3.7 percent for Asian and white high school students respectively (CDE, 2010d). [2] Statistics have also shown that the Latino student population has consistently scored lower than white and Asian students on the Academic Performance Index (API), which is used to measure schools' and student groups' performance levels based on statewide standardized-testing results (California P-16 Council, 2008; Rogosa, 2003). Low passing rates on the CAHSEE, high dropout rates, and low academic achievement scores for Latino students in California's public

[1] The CAHSEE passing rates shown are for combined test administration, which includes tests administered in February, March, and May 2010.
[2] Dropout rates mentioned are adjusted one-year dropout rates for grades 9-12 and do not take into consideration reenrolled dropouts.

education system have contributed to the growing concern with the educational outcomes of Latinos, and have increased the number of theories regarding the various factors that affect Latino students' academic achievement

The California Department of Education (CDE) considers providing the public with equal access to a high quality academic environment a primary commitment of California's public education system (CDE, 2009b; California P-16 Council, 2008). In addition, the CDE maintains that the state's public education system is structured to promote and support the academic achievement of students and finds it to be the state's responsibility for ensuring quality education and "provide a world-class education for all students, from early childhood to adulthood" in order to prepare individuals to "live, work, and thrive in a highly connected world" (CDE, 2009b; CDE, 2011b). The federal government's 2001 No Child Left Behind Act (NCLB) placed additional responsibility on the state, as well as administrators and educators by adding accountability measures, such as mandated standardized tests to better evaluate academic performance and ensure sufficient annual yearly progress (AYP) for individual institutions and population subgroups (U. S. Department of Education, 2004).

Recently, the CDE has begun focusing on improving academic achievement for struggling student groups, such as Latinos, by providing the support and resources necessary to foster positive teaching and learning environments in order to enhance students' ability to reach California's academic standards (CDE, 2010e). Although improved accountability measures, such as standardized testing and API scores, are in place to assist administrators in identifying low scoring schools and student groups, the academic achievement gap between Latino students and white and Asian students continues to exist. Granted the academic achievement gap has been reduced by teacher and student support strategies and learning resources, but completely *eliminating* the academic achievement gap remains a difficult task as there appears to be factors outside teachers' and administrators' control that affect student achievement and cannot be influenced by macro-level changes in education policy. Nevertheless, in order to continue reducing the academic achievement gap between Latinos and their white and Asian counterparts, it is necessary to further the understanding of the factors that affect student achievement to determine if Latino students' low academic achievement levels are correlated to factors within administrators' control. Deducing such relationships will allow decision-makers to better identify and tailor improvement strategies.

School Leaders' Race/Ethnicity as a Factor Correlated to Academic Achievement

Existing literature suggests that there are numerous factors that affect academic achievement, such as school characteristics (i.e. – class size, percentage of credentialed teachers), student characteristics (i.e. – percentage of English-language-learners, percentage of students belonging racial/ethnic subgroups), and social inputs (i.e. – parents' education). In recognizing that students' academic achievement scores may be affected by multiple inputs, administrators and policymakers must consider multifaceted solutions. When developing academic achievement improvement strategies, it is important for administrators and policymakers to be aware that some inputs may be beyond their control, leading to additional difficulties when attempting to address the academic achievement gap.

Teacher characteristics, particularly race, have been found to play a role in students' academic performance (Dee, 2004). For example, students receiving instruction from teachers of the same race have been found to score higher than students receiving instruction from teachers not of the same race (Dee, 2004). Teachers tend to perceive students of races other than their own differently, which can affect classroom environments. Dee (2005) found that race has a large effect on teachers' perceptions of students, and as a result can adversely affect teachers' attentiveness to particular student groups, increasing the academic achievement gap. Teachers of the same race as a student may be more likely to understand that student's background, culture, and specific challenges, while teachers of a different race are likely to be more unaware or inattentive. Furthermore, the degree to which a teacher understands and/or relates to students' demographics and characteristics can also impact how teachers interact with students, as well as whether teachers have high or low expectations for students' performance (Baron Tom, & Cooper, 1985, as cited in Ferguson, 2003, p. 461). In turn, students' learning environments can be adversely affected leading to low academic achievement. Such teacher effects will be elaborated on in the subsequent literature review.

In the 2009-2010 academic year, California's public education system employed 299,666 certificated teachers. The majority of teachers, approximately 69.2 percent, were white, while only 17.4 percent were Latino (CDE, 2010b). Conversely, approximately 49 percent of K-12 students are Latino (Pew Hispanic Center, 2011), while 27 percent are white (CDE, 2010b). In addition to the disproportionate representation of Latino teachers, there is also a low representation of Latinos amongst public school administrators. In the

2009-2010 academic year, California employed 24,727 administrators, 65 percent of which were white and 20 percent of which were Latino (CDE, 2010b). School administrators include superintendents and principals who are responsible for tasks such as managing individual institutions and districts, adhering to local, state, and federal regulations, developing curriculum, and overseeing the professional development of teachers, all while ensuring the improvement of academic achievement scores (American Association of School Administrators, 2011; EdSource, 2011) Although school administrators do not regularly interact with students to the same extent as teachers, school administrators can affect a school's effectiveness and academic achievement as their decisions assist in shaping students' learning environments (Andrews & Soder, 1987; Hallinger, Bickman, & Davis, 1996). Therefore, one may hypothesize that the low representation of Latinos among public education administrators in California is contributing to Latino students' low academic achievement levels because administrators of other race/ethnic backgrounds may choose to focus on other academic concerns, or are not as informed of Latino students' challenges and the possible future ramifications of an inattentiveness to Latino academic achievement.

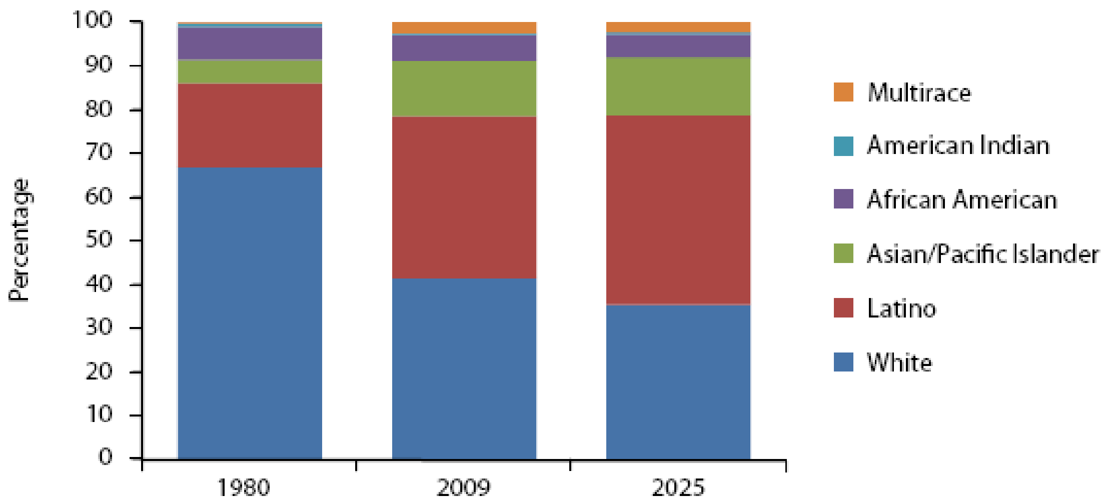
Research Question

Further research is necessary to determine how leadership demographics contribute to Latino's low achievement. As such, this thesis seeks to answer the following research question: Does the race of teachers and administrators affect Latino academic achievement? The remainder of this chapter provides information on California's growing Latino population, the disparities between Latino students' academic achievement and their white and Asian counterparts, the racial distribution of teachers and administrators, as well as some of the difficulties associated with addressing the concerns of the public education system's efficiency and effectiveness. I conclude this first chapter with paragraph descriptions of what is in each of the remaining chapters of this thesis.

California's Latino Population to Grow Rapidly

A recent phenomenon in California's education system is the significant increase in student enrollment because of normal population growth, as well as increasing immigration, as California is a primary destination for immigrants (Johnson, 2011b). According to the 2010 United States Census, the Latino population in California is over 14 million, which is approximately 38 percent of the state's total population (Ennis, Rios-Vargas, & Albert, 2011). It is projected that by 2016, Latinos will become the largest ethnic group (Johnson, 2011a). Researchers forecast that Latinos will become the majority of California's population by 2050 (Johnson, 2008).

Figure 1: California's Ethnic Composition in 1980, 2009, and 2025 (Projected)



(Sources: 1980 Census; 2009 American Community Survey; California Department of Finance projections as cited in Johnson, 2011a)

Although the projected Latino population figures are striking, it is possible that the growth estimates are understated as the statistics are likely excluding a portion of the undocumented immigrant population. The United States Department of Homeland Security estimates that over two million undocumented immigrants reside in California, of which the majority are from Latin America (Hoefer, Rytina, & Baker, 2011; Johnson, 2010). However, this is only an estimate as undocumented immigrants may be reluctant to complete census information requests due to fear of legal ramifications (U.S. Census Bureau, 2009). This increases the difficulty in obtaining an accurate count of undocumented immigrants and their countries of origin in order to estimate Latino population growth. The Pew Hispanic Center found that at least one in ten students enrolled in grades K-12 in five states, Arizona, California, Colorado, Nevada, and Texas, have parents who are undocumented immigrants, which may be particularly alarming to administrators and educators as the Latino population may be growing at a faster rate than anticipated (Passel & Cohn, 2009).

With the rapid growth of the Latino population, this ethnic group has become the largest student population in the state's public education system, representing 49 percent of all K-12 students (Pew Hispanic Center, 2011). Thus, academic achievement discussions must focus on the Latino student population, as the state is not only accountable for providing quality education to *all* student groups, but should pay particular attention to the achievement levels of the student group that will represent the majority of the state's population and workforce in the near future.

Quality Education and Latino Students

As previously mentioned the CDE states that the primary function of California's public education system is to provide students with equal access to *quality* education. Although quality education is difficult to define, according to a recent school finance lawsuit, *Robles-Wong, et al. v. State of California*, the receipt of quality education may be defined as students' ability to become proficient and meet the state's academic standards and program requirements (California School Boards Association, 2010; California School Finance, 2010). Plaintiffs in this case argue that the right to quality education ensured by the California Constitution is not being provided as the resources necessary to meet academic achievement requirements are not being provided in all academic institutions (California School Boards Association, 2010; California School Finance, 2010).

While Latino students have access to California's K-12 public school system as do all other student groups, disparities in academic achievement between Latino students and their white and Asian counterparts support the theory that simply providing students with access does not guarantee that students will attain high academic achievement levels and reach federal and state benchmarks. An example of the degree to which Latino students are not receiving quality education is shown in the CDE's base API year statistics, in which Latino high school students consistently score lower than white and Asian students. There are slight improvements to Latinos' base API scores in each year. However, white and Asian students consistently have notably higher API scores than Latino students.

Table 1: Base API Score Comparisons for 9-12 Grade Students in 2008, 2009, and 2010

Student Group	2008 Base API Score	2009 Base API Score	2010 Base API Score
Asian	829	843	857
Latino	638	653	673
White	776	790	801

(Source: CDE, DataQuest, 2010b)

California Standards Tests (CST) measure whether students are acquiring the specific skill levels for each grade as defined by California. CSTs taken by high school students are part of California's Standardized Testing and Reporting program (STAR), and include standards-based testing for English Language Arts for grades nine through eleven, and math courses, such as algebra and algebra II, for grades nine through eleven (GreatSchools, 2011). CST results are used in calculating the API (Education Data

Partnership, 2011b). 2010 CST English Language Arts and Math scores for secondary Latino and white students illustrate the notable academic achievement gap.

Table 2: 2010 California Standards Test (CST) scores

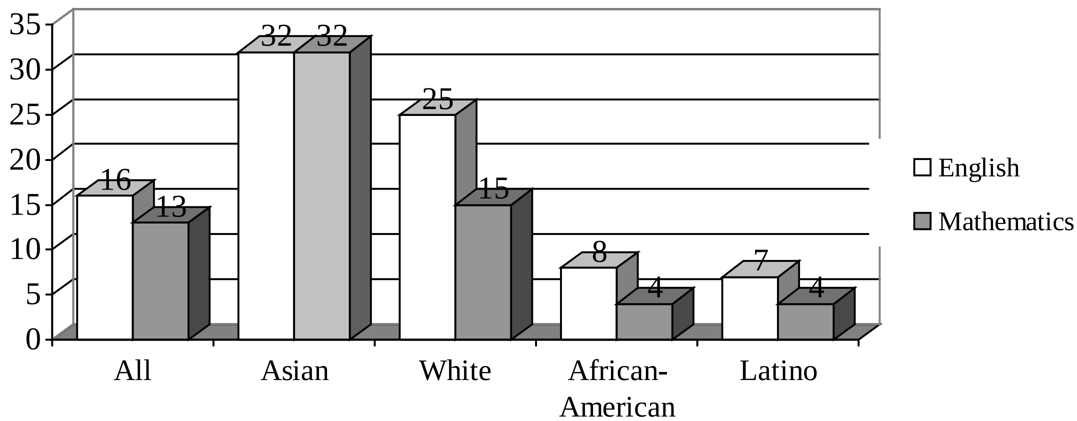
	Grade	Latino Students Scoring Proficient and Advanced	White Students Scoring Proficient and Advanced	Achievement Gap between Latino and White Students (percent)
English Language Arts	11	30%	58%	28%
Math	Algebra I EOC[3]	21%	42%	21%
	Algebra II EOC	20%	37%	17%

(Sources: CDE, 2011a; The Education Trust-West, 2010)

[3] End of course (EOC) examinations test students on what they have learned in a course immediately following completion as opposed to waiting to test students on what they have learned in several courses over a particular time period (Somerville, Levitt, & Yi, 2002).

California has also implemented a voluntary program, the Early Assessment Program (EAP), which measures eleventh graders' preparation for college-level English and math courses. In 2009, Latino students scored the lowest.

Figure 2: Percentage of Students by Ethnicity that are "Ready for College" according to California's Early Assessment Program (EAP), 2009 English and Math Exams



(Sources: California State University, 2009; The Education Trust-West, 2010)

Latino students' pattern of low scores on the various measures of achievement (API, CST, and EAP) can be expected to continue in future generations unless administrators and educators implement more effective strategies.

A consequence of Latinos pattern of low academic achievement is that a majority of Latino students will not be properly equipped for college-level academic work, limiting career options. This workforce skill gap may lead to a significant percentage of the state's labor force unable to meet the future needs of California's employers seeking to hire skilled workers. It is estimated that by 2050 California will need 41 percent of its workers to have completed a college education (Reed, 2008). Researchers estimate that 39 percent of working-age individuals will need to have completed a college education in 2020, but college-educated workers will only increase from 28 percent in 2000 to 33 percent in 2020 (Reed, 2008). In 2006, Latinos were 29 percent of the working age population, and this is expected to increase to 40 percent by 2020 (Reed, 2008). Thus, improving the academic achievement of Latino students is a key to meeting the economic demand for skilled workers, as well as fueling California's growing economy and keeping California competitive nationally and globally.

Racial Distribution of Teachers and Administrators

As previously noted, the majority of the student population in California's public school system is comprised of Latinos (48 percent), while the majority of teachers and administrators are white.

Table 3: Percentage of Teachers in California by Race and School Year

Race	2007-2008	2008-2009	2009-2010
Latino	16.1%	16.6%	17.4%
White	70.7%	70.1%	69.2%

(Source: CDE DataQuest, 2010b; Education Data Partnership, 2011a)

Table 4: Percentage of Administrators in California by Race and School Year

Race	2007-2008	2008-2009	2009-2010
Latino	17.7%	17.9%	20.0%
White	68.0%	67.0%	65.0%

(Source: CDE DataQuest, 2010b)

Although in recent years there have been slight increases in the percentage of Latino teachers and administrators, these increases do not evenly balance the numbers or keep pace with the large percentage of Latino students enrolled in the state's public school system. The disparity between Latino students and Latino teachers and administrators is further magnified when examining the Los Angeles Unified School

District (LAUSD), which is a district with one of the highest Latino populations. During the 2009-2010 school year, 73.5 percent of LAUSD students were Latino, while only 8.9 percent of students were white (CDE, 2010b). Similar to the statewide statistics, in LAUSD although the percentage of Latino teachers and administrators is slowly increasing, the percentage of Latino students still greatly exceeds the percentage of Latino teachers and administrators.

Table 5: Percentage of Teachers in Los Angeles Unified School District by Race and School Year

Race	2007-2008	2008-2009	2009-2010
Latino	30.6%	31.1%	31.8%
White	44.2%	43.3%	43.2%

(Source: CDE DataQuest, 2010b)

Table 6: Percentage of Administrators in Los Angeles Unified School District by Race and School Year

Race	2007-2008	2008-2009	2009-2010
Latino	30.2%	30.7%	34.3%
White	43.3%	41.0%	39.9%

(Source: CDE DataQuest, 2010b)

The Impact of Low Achievement Among Latino Students

Impacts on Latinos

Unemployment rates are notably lower for college graduates compared to rates for individuals who have only graduated from high school (Johnson, 2009). If undereducated low-skilled Latino students do not end up unemployed, they will likely receive low-income earnings as academic achievement is related to earnings and socioeconomic status (Grogger & Trejo, 2002). Wages for unskilled, undereducated workers are lower than wages for skilled, educated workers (Reed & Cheng, 2003). Furthermore, if Latinos continue to be unskilled with low levels of education, the wage disparity between Latinos and their white and Asian counterparts will persist as academic achievement is correlated to socioeconomic status (Sirin, 2005). Consequently, a cycle of low earnings and low academic achievement for future generations of Latinos will be created, resulting in a lower quality of life for this ethnic group.

Public Impacts

Fellow students may also be adversely affected if attending schools with a significant population of low performing Latino students where the school cannot sustain the state’s requirements in student achievement growth as consistently underperforming schools are subject to state sanctions. Sanctions include intensive state monitoring, interventions, and corrective measures (CDE, 2006). If improvement methods do not yield results, the state can change the school into a charter school or have the school closed and students transferred to other schools (CDE, 2006). It is also assumed that many California schools will be unable to meet the NCLB requirement of 100 percent proficiency by 2014 likely due to the persisting academic achievement gap. The ongoing achievement gap and the likelihood of failing to meet the NCLB 2014 proficiency requirement implies that California’s public school system will face federal sanctions, placing added strain on administrators and educators, which may further adversely affect students’ learning environments (Larsen, Lipscomb, & Jaquet, 2011).

Continuous low academic achievement by Latino students can also adversely affect other students’ academic achievement as peer ability has been found to influence academic achievement (Hanushek, Kain, Markman, & Rivkin, 2003). In addition, if the supply of low-skilled workers exceeds the demand for low-skilled workers, there will be less job opportunities for this population and more individuals will require public assistance, increasing the financial burden on the state's budget (Reed, 2008).

Thesis Overview

In Chapter 2, I review existing academic literature focusing on the relationship between teachers' and administrators' race/ethnicity and academic achievement. The studies use similar race/ethnicity categories as this thesis, but use several different measurements for academic achievement, such as API, standardized math and reading test scores, and course grades. The literature review provides support that a relationship exists between school leaders' race/ethnicity and academic achievement, and highlights that limited research has been conducted on how school leaders' race/ethnicity specifically affects Latino students.

In Chapter 3, I introduce the regression model and provide information on the sample used, the data sources, the dependent variable and included explanatory and interaction variables, the relevant descriptive statistics, the bivariate correlation coefficients, and the predicted relationships between Latino academic achievement and the included explanatory variables. Lastly, I include details on the methodology for the qualitative analysis.

In Chapter 4, I present and examine the results of the regression analysis and the evidence of multicollinearity or heteroskedasticity. In this chapter, I also highlight the statistically significant relationships, comparing them to the expected results and offering possible justifications for any inconsistencies, as well as outline the results of the qualitative analysis.

In the final chapter, Chapter 5, I conclude the study with a summary and an added evaluation of the results. I also discuss the implications of these findings as related to possible strategies school leaders may use in order to improve Latino academic achievement in California. Limitations of the study and suggestions for further research are also included.

Chapter 2

LITERATURE REVIEW

This chapter reviews research that mainly focuses on the relationship between teachers' race/ethnicity, administrators' race/ethnicity, students' race/ethnicity, and how the interaction of all these variables at a school site may exert an independent influence on academic achievement. The first section of the review describes regression-based studies using teachers' race as the main explanatory variable in determining students' academic achievement. Regression analysis assists researchers in identifying and measuring relationship between causal (explanatory) variables and a specific dependent variable. In other words, results of a regression analysis can assist researchers in predicting associations, as well as the degree to which certain factors impact a particular variable (Babbie, 2007, p. 456). The second section discusses studies on how race influences teachers' perceptions of students, which can influence teachers' interactions and as a result students' learning environments and consequential academic achievement. With the present study seeking to examine the relationship between teachers' race and academic achievement, it also examines how administrators' race influences students' academic achievement, based on variations in school level API scores, specific to my chosen student population, California Latino high school students. As a result, this chapter also provides summaries of research concerning the role of administrators and how race and other characteristics and behaviors of these leaders can influence academic achievement.

Categories used to define teachers' race were similar for the included regression-based studies using race as an independent variable, with the current study emulating these general race classifications (i.e. – white, African American, Asian, Latino, etc.). Studies dealing with academic performance frequently measured achievement through standardized test results. The present study also measures academic achievement using standardized test results, but utilizes a more comprehensive measurement that includes the results of multiple standardized tests, California's API scores, which some of the included studies also use. Teacher credentials, socioeconomic status, parental education level, class size, and peer traits have been identified in the research as factors linked to academic achievement, which are also used in my regression model. It is important to note that there has been limited research on the effect of teachers' race on *Latino* academic achievement. Consequently, the literature review includes research on the academic achievement of other student groups.

In addition, literature examining other major school and student factors that are related to Latino student success are reviewed in the third section. Some of these factors extend beyond the direct influence of teachers and administrators (i.e. – student socioeconomic status), while other factors may be directly influenced by education policy and strategies formulated by teachers and administrators (i.e. - teacher/administrator credentials and education requirements). Recognizing these different categories allows for a better understanding of the relationships between various inputs and academic performance. These additional factors provide further basis for the regression analysis performed for this thesis.

The sections of the subsequent literature review follow three categories: (1) teacher/administrator race and academic performance, (2) other teacher factors that influence academic performance and (3) school factors that influence academic performance. Studies included in the first section focus on the investigation of the degree to which teachers' and administrators' race/ethnicity impacts students' academic achievement. While the main focus of my research is on the relationship between teachers' and administrators' race on Latino high school students' academic performance, the factors described in the second and third sections are also included in my regression model as previous research indicates that these factors are needed to understand what other explanatory variables to hold constant in order to isolate the variables for teachers' and administrators' race, and discern the impact of these variables on academic achievement from the impact of other independent variables. Including what other variables likely influence academic achievement scores increases the quality of the regression by creating a more robust theoretical framework that better explains the variance in the dependent variable.

Prior to a review of previous literature, the chapter provides a brief discussion on how teachers' can influence academic achievement, or teacher effects, in order to offer information on the types of teacher-student interactions that can result from demographic differences and similarities. Furthermore, it is important to note that the following review discusses aspects of previous studies that are pertinent to the chosen subject matter and does not include information on all the explanatory variables included in each study.

Teacher Effects

To provide a structure to reference how race is related to academic achievement, previous research has identified two categories of manners in which race can influence academic achievement: “active” and “passive” teacher effects. “Active” teacher effects are outcomes of unintentional preconceived notions towards different student groups’ performance and behavior, which are a result of previous experiences with students of the same racial group (Dee, 2005). “Active” teacher effects can lead towards changes in how teachers interact with certain student groups in the classroom affecting these students’ levels of motivation and in turn how and what these students learn. On the other hand, teachers can influence academic achievement indirectly. “Passive” teacher effects include “role model” effects and “stereotype threat” effects (Dee, 2005). These “passive” effects are purely a result of the instructor’s race, gender, culture, and other demographic characteristics as opposed to direct interactions with students. More specifically, the “role model” effect is a teacher of similar demographics to a student increasing that pupil’s academic motivation and expectations. Conversely, the “stereotype threat” can be associated with student-teacher relationships and results from various student subgroups being aware of society’s negative stereotypes associated with one’s group (e.g. – gender stereotypes, racial stereotypes) (Steele, 1997; Steele & Aronson, 1995). A “stereotype threat” is a negative passive effect in which students feel uneasiness or hesitation around teachers of a different race due to assumptions and stereotypes related to their student group (i.e. – teachers doubting students’ abilities) (Dee, 2005). This can adversely affect how students believe they should relate to a classroom setting and in turn harm their learning and consequently their academic achievement (Dee, 2005).

I. Teachers' and Administrators' Race/Ethnicity and the Influences on Academic Performance

Teachers' Race

Ehrenberg, Goldhaber, & Brewer (1995) argue that there is very little connection between teachers' race and academic achievement. Using data from the National Education Longitudinal Study of 1988 (NELS:88), researchers examined gains scores in math, reading, history, and science for white, black, and Latino students between the 8^{th} and 10^{th} grade, and teacher race, using white male teachers as the base comparison. Similar to the present study, researchers focused on Latino students. Researchers reported that for Latino female students, a teachers' race did not significantly influence students' gain scores, with the exception of black and white female teachers being correlated to slightly higher science scores (90% confidence level and 95% confidence level respectively)[4]. For Latino male students, a teachers' race also did not significantly influence students' gain scores. However, black male teachers and white female teachers are correlated to lower reading scores for Latino males, while white female teachers are associated with higher history scores (all at the 90% confidence level). Interestingly, the study did not find statistically significant increases for Latino students when taught by Latino teachers. In addition, the study provides support for the theory that teachers

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[4] Confidence level measures are used to illustrate the probability of the independent variable having an effect on the dependent variable. For example, when stating that regression results are statistically significant at 95%, this signifies that 95% of the time one can expect that the independent variable will have the particular effect noted on the dependent variable. Typically, researchers associate confidence levels of 90%, 95%, and 99% with statistically significant results.

evaluate[5] same-race students more positively as Latino teachers provided Latino math students with significantly higher evaluations compared to white male teachers.

Conversely, Johnson, Crosnoe, & Elder, Jr. (2001) suggest that the demographic makeup of a school's teaching staff can have an effect on how students engage in the classroom, as well as the extent to which students feel a connection to the school. Such feelings may be a result of students being more comfortable and identifying more with individuals of similar demographics and/or cultural background (Johnson et al, 2001). Thus, if the racial composition of teachers affects students' classroom engagement, students may be more active in a learning environment when taught by same-race teachers and academic achievement scores may increase. Ehrenber & Brewer (1995) note a positive correlation between teachers' race and academic achievement. Upon revisiting the 1966 Coleman Report and conducting a study on elementary and high school synthetic gain scores for black and white students, researchers conclude the existence of a relationship between the racial distribution of teachers and academic performance. It was determined that for both elementary and high school data, increasing the number of black teachers is related to lower white student gain scores. Results also yielded a positive relationship between higher numbers of black teachers and black student gain scores; however, this was only at the high school level and researchers note that other assumptions may be influencing this relationship.

[5] Teacher evaluations were based on survey questions regarding the following: the likelihood of a student attending college, if the student should receive academic honors, how the student relates to other, students' work ethic, and if the teacher interacted with the student outside of class (Ehrenberg et al, 1995).

To further address the question of whether teachers' race influence achievement, researchers developed various simulations that estimated changes in student gain scores based on changes in teacher race. Researchers expanded their study and also examined changes in student gain scores based on changes in teachers' verbal ability. One simulation focuses on increasing the percentage of black teachers by 10 while holding the mean values of teacher experience, verbal aptitude, and attainment of a master's degree constant. This simulation produced results that illustrate for this sample increasing the percentage of black elementary school teachers reduces the gain scores for white students as well as black students. However, at the high school level results show that increasing the percentage of black teachers lowers the scores of white students, but *increases* scores for black students (Ehrenber & Brewer, 1995).

Researchers also include two simulations for increasing the verbal ability of black and white teachers. Results indicate that improving black elementary school teachers' verbal scores will increase white and black elementary students' scores. When increasing verbal scores for white elementary school teachers, results indicate that white elementary students' scores will increase, but there is no noticeable effect on black elementary school students. Moreover, results show that improving verbal scores for black and white high school teachers does not significantly influence high school students' scores (Ehrenber & Brewer, 1995). This sample consists of only black and white students and uses older data making it difficult to generalize this relationship to today's public school population.

Dee (2004) found similar results to Ehrenberg and Brewer (1995) in regards to the relationship between teachers' race and academic achievement in a study using

Tennessee's Project STAR[6] to determine whether students scored better on standardized tests when taught by teachers of the same race. The STAR project was a four-year study that began with approximately 6,000 kindergarten students from 79 schools in the 1985-1986 academic year and continued through the third grade. This experiment randomly matched students with teachers over the course of four years, but only included black and white students as there were limited observations for other student race/ethnic subgroups. The study used math and reading scores on yearly standardized tests as the academic achievement measurement.

Dee (2004) found that white male and female students, as well as black male and female students performed better on both math and reading tests when assigned to teachers of the same race. On math tests, assignment to same-race teachers increased scores by 3 to 5 percentage points. Similarly, assignment to same-race teachers increased reading scores for white and black male students and black female students by 3 to 6 percentage points. Although results yielded a positive increase to white female students' reading scores, the results were not statistically significant. Researchers tested additional controls for class size, and teacher and peer factors to determine if these variables changed the relationship between teachers' race and academic achievement. Notably, students with lower socioeconomic status showed large academic achievement gains. An earlier experimental study by Hanushek (1992) supports these findings. Analyses of student and school data, as well as reading and vocabulary test scores from 1,920 black students from 1971-1975, yielded results illustrating a negative relationship between a

[6] STAR is an acronym for Student Teacher Achievement Ratio

dummy variable for white teachers and the reading and vocabulary scores of black students (coefficients of -.071 and -.076 respectively). This suggests that black students perform better when taught by black teachers. Although these studies' results indicate a relationship between teachers' race and academic achievement, the sample populations excluded the Latino student population, and consisted of early year primary school students as opposed to high school students.

While Aksoy and Link (2000) include Latino students in their research, the researchers do not separate Latinos as an individual student population due to a minimal number being included in their sample of 2,756 students from NELS:88. Researchers conducted analyses on three models: a model using the 1988 base mathematics score, as well as two follow up scores for 1990 and 1992, a model using the 1988 base score, and the 1990 follow up score, and a model using the 1988 base score and the 1992 follow up score. The base comparison for the teacher variable is white male math teachers. In the all race analysis,[7] statistically significant results for all three models yield that students receiving instruction from a black math teacher have scores ranging from 2.78 to 7.28 points lower than students receiving instruction from a white male teacher. Conversely, students receiving instruction from a Latino math teacher were found to have lower math scores in models two and three (0.35 to 1.36 points lower, respectively), but these results were not statistically significant. However, in model one, using base scores and both follow up scores, statistically significant results indicate that students receiving

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[7] The "all race" sample includes white, black, Latino, and Asian students. Racial subgroups could not be separated due to the small sample sizes for each race. However, researchers were able to separate white students as they constituted a majority of the student sample. As a result, researchers conducted a subsequent analysis focusing on white students, but not other student subgroups.

instruction from a Latino math teacher have higher math scores (6.80 points). These results support the theory that teachers' race influences academic achievement. Moreover, the results suggest that minority teachers can both positively or negatively influence academic achievement.

If being taught by a minority teacher affects students' academic achievement, could the percentage of minority teachers at an institution be related to academic achievement scores? Wieher (2000) assesses this possibility using data from school districts and schools in Texas during the 1996-1997 school year. When examining the effects of a minority teacher shortfall, or the difference between the percentage of Latino students and the percentage of Latino teachers, on the passing rate for the reading section of the Texas Assessment of Academic Skills (TAAS), researchers discovered that if the percentage of Latino teachers decreases by 10 percent, Latino passing rates fall by 1.09 percent at the district level and 1.28 percent for region IV schools (significant at the 95% confidence level and the 99% confidence level respectively). Thus, Latino students performance decreases when the number of Latino teachers decreases.

With some studies assessing the direct relationship between teachers' race and academic achievement scores, there are also studies that examine teachers' perceptions of students and how this can indirectly affect academic achievement. Ferguson (2003) proposes that these studies provide evidence that teachers' perceptions and expectations of students can influence teachers' behavior and in turn affect students' classroom confidence and behavior creating a learning environment where low achieving student groups continue to underperform. A meta-analysis conducted by Baron, et al (1985) (as cited in Ferguson, 2003, p. 463) found that teachers' expectations for black and white students differ, with studies yielding statistically significant results with teachers favoring white students over other student groups. Although Ferguson (2003) reviews studies conducted in experimental settings and it is difficult to conclude whether teachers would adhere to stereotypes in classroom settings, the research supports that stereotypes exist when forming opinions of students.

Ferguson (2003) also suggests that the underestimation of students' potential also influences teachers' perceptions and can lead to setting low academic achievement goals. Consequently, this can provide less incentive for teachers to assist students deemed as low potential, affecting what students learn and sustaining the academic achievement gap. Jussim, Eccles, and Madon's (1996) study supports the theory that current teacher perceptions can affect students' performance in the future. Researchers collected teachers' opinions on Michigan sixth graders in October of the 1982-1983 academic year and assessed whether the opinions affected math grades and math scores on the Michigan Educational Assessment Program in May of the 1982-1983 academic year. Results yielded that teachers' perceptions do influence grades and scores, and the impact is greater on black students than on white students.

Dee (2005) expands on his 2004 study by examining a larger, representative national sample population of public and private school students. Dee (2005) uses teacher surveys from the NELS:88 to determine whether being taught by a teacher with a similar background influences teachers' opinions of a student's academic performance as this can affect students' learning environments. Opinion variables included whether a teacher found the student disruptive, inattentive, or did not complete homework regularly. When instructing students of a different race, teachers were 36 percent more likely to view students as disruptive, 33 percent more likely to view students as inattentive and 22 percent more likely to view students as not completing homework regularly. It is important to note that 89 percent of Latino students included in this study were with a teacher of a different race. The study collectively reports results for black and Latino students and suggests that teachers of a different racial background are more likely to view these student populations negatively in all three categories (at a .95% confidence level for being perceived as disruptive and not completing homework regularly and a 99% confidence level for being perceived as inattentive).

Administrators' Race

As schools are becoming more diverse, researchers are not solely examining how teachers' race influences academic achievement, but also how administrators (i.e. – principals) influence academic achievement. Sanchez, Thorton, & Usinger (2008) report diversity amongst school leaders is slower than the pace of diversity in the student population. This is a possible consequence of a shortage in the supply of educated minorities that graduate high school. The National Center for Education Statistics' (NCES) annual report, *The Condition of Education,* indicates that although dropout rates are declining for all student subgroups, dropout rate for minorities still remain higher than dropout rates for whites (Planty, Hussar, Snyder, Provasnik, Kena, & Dinkes, 2008). Students that do not complete a high school education do not continue onto higher education, and thus do not obtain the education, skills, and knowledge base to eventually become contenders for school leadership positions. Consequently, the educational attainment gaps in students results in a shortage in the amount of minority principals and a shortage in the amount of positive, same-race examples for minority students.

According to Cistone & Stevenson (2000, as cited in Sanchez et al., 2008), school leadership is an important element in creating and sustaining a constructive learning environment where students can excel. Although principals do not provide guidance and leadership to students in general, these individuals are role models that can motivate and encourage students of similar demographic backgrounds to further their education and become successful (Tillman, 2004). In a qualitative analysis of six white principals, of which 3 were men and 3 were women, Gardiner and Enomoto (2006) discovered that multicultural leadership preparation (e.g. – supporting all student groups, ensuring educational equity) was limited. However, researchers found a general empathy towards students, particularly immigrants, with some administrators recognizing that it is difficult to be proactive in learning about different cultures, and to teach students if their background is unknown. Others administrators recognized that their position is responsible for guiding teachers and eliminating stereotypes and low expectations of certain student groups. Conversely, all principals appeared to rely on teachers to address barriers with English-language learners and immigrants. Researchers found that diversity issues were not a primary focus for all principals, and found that some prefer to be impartial by not focusing on race, but treating all students the same (Gardiner & Enomoto, 2006). However, this perspective is questionable in regards to inclusiveness and equality as it ignores the academic challenges associated with particular student groups.

When looking at regression-based studies concerning school administrators, the studies do not use administrators' race as an independent variable. However, a number of studies have examined whether principals make a difference in school effectiveness. Hallinger et al. (1996) measure school effectiveness with elementary school students' reading scores on Tennessee's Basic Skills First Test and use three models to determine if principals directly or indirectly influence academic achievement. Principals can influence school mission, parent involvement, and teacher expectations. By including these and other mediating variables, Hallinger et al. (1996) concluded that the statistically significant results suggest that principals *indirectly* affect academic achievement. However, the results yield no statistically significant *direct* effects on reading achievement.

With Hallinger et al. (1996) yielding inconclusive results regarding whether principals directly affect academic achievement, Witziers, Bosker, & Kruger (2003) conducted a meta-analysis to scrutinize previous studies using the direct effects model and to determine to the degree to which principals can directly affect academic achievement. In examining 37 studies conducted from 1986 to1996 that had clear measurements of educational leadership (i.e. - list of leadership behaviors) and academic achievement (i.e. – reading score, math score, or combined scores), researchers found that, although small, principals have a significant and positive effect on academic achievement. Results yield positive relationships (at a 90% confidence level) between academic achievement and the following leadership behaviors: defining and communicating a school's mission, supervision and evaluation, monitoring, and visibility. Conversely, results indicate a significant, albeit small, relationship between academic achievement and school improvement variable. Furthermore, researchers determined that studies examining primary school students more frequently illustrated principals' influence on students' academic achievement as opposed to studies focusing on secondary school students' academic achievement. This study's sample is comprised solely of public high schools in order to focus on, and contribute to, the research surrounding high school principals' influence on academic achievement.

Administrators' perspectives and actions shape a school's learning environment, and influence performance levels and teacher-student relationships. Research suggests that administrators do influence academic achievement, and administrators' level of awareness regarding the relationship between diversity and academic achievement, as well as the attentiveness to the academic challenges particular student groups face may be related to the administrator's race.

II. Other Teacher Factors that Influence Academic Performance

This subsection reviews the findings that have implications for other teacher inputs, such as teacher credentials and teacher academic achievement, and their influence on academic achievement.

Teacher Credentials and Academic Achievement

Powers (2003) examines academic achievement for elementary schools in California's two largest school districts: Los Angeles Unified and San Diego Unified, and analyzes base data for API scores from the 1998-1999 school year and compared the data to 2000-2001 base API scores within and across the two districts. For Los Angeles Unified schools in the 2000-2001 school year, results indicate a statistically significant and negative relationship between the percentage of teachers holding emergency credentials and API scores. Regression results estimate that as emergency credentialed teachers increase by one percent, API scores decrease on average by 1.63 percent. Conversely, in the 2000-2001 school year, results for San Diego Unified schools yield a positive correlation between the percentage of emergency credentialed teachers and API scores. Although not a statistically significant relationship, these results raise questions regarding the manner in which emergency credentialed teachers influence academic achievement and suggest the possibility that in some cases a positive relationship may exist.

Clotfelter, Ladd, and Vigdor (2007) also assess the influence of teachers with emergency licenses on academic achievement but also include lateral licenses[8]. In a longitudinal study of North Carolina third through fifth grade students from the 1995-1996 school year to the 2003-2004 school year, researchers discovered that teachers with lateral licenses have statistically significant, negative effects on academic achievement.

[8] Researchers examined teachers with regular licenses, lateral licenses and emergency/provisional licenses. Regular licenses include Standard Professional 1 (SP1) Professional Educator's License and Standard Professional 2 (SP2) Professional Educator's License (North Carolina Department of Public Instruction, 2011a). Lateral licenses are considered an "alternate" route to teaching for qualified individuals outside the public education system. Allows individuals who have a bachelor's degree in the area they are assigned to teach to obtain a teaching position and begin teaching immediately. Lateral licensed teachers must be affiliated with a college or university and obtain an educator's license while they teach (Clotfelter et al., 2007; North Carolina Department of Public Instruction, 2011b). Emergency/provisional/temporary licenses bypass a state's licensing requirements and are issued mostly to address teaching needs in high need subject areas, bilingual education, or urban/high need geographic areas. Theses licenses are typically only available at the request of an employer (Teachers Support Network Company, 2007).

Results also illustrate negative effects for emergency licensed teachers on academic achievement. Goe (2002) also notes a negative relationship between emergency permit teachers and API scores. Results show that a one percent increase in the percent of emergency permit teachers is associated with a .62 percent decrease in API scores. A regression study by Slovacek, Kunnan, and Kim (2002) found that a one percent increase in the percentage of teachers with full credentials results in a 1.06 percent increase in California schools' API scores and a 1.415 percent increase in California charter schools' API scores suggesting that full credentialed teachers have a positive influence on both charter and non-charter schools' API scores.

Conversely, Goldhaber and Brewer (2000) suggest that emergency credentialed teachers do not have an adverse effect on students' academic achievement. The researchers examine standardized math and science test scores of 12^{th} grade public school students with teachers holding probationary, emergency, and private licenses, or no certification, and compare these scores to the standardized math and science test scores of 12^{th} grade public school students with teachers holding standard certifications. The most interesting finding is that students taught by emergency certified teachers do not underperform in comparison to students taught by teachers with standard certifications, while holding all other variables constant. The coefficient for emergency certification for both math and science is positive (.58 and .84 respectively) (Goldhaber & Brewer, 2000). However, it is difficult to determine the statistical significance of the results, as the tables included in the study do not identify statistically significant results. Nevertheless, Goldhaber and Brewer's (2000) study questions whether standard credential requirements are necessary to improve academic achievement.

Darling-Hammond, Holtzman, Gatlin, and Heilig (2005) conducted a longitudinal study examining the effects of Houston elementary school teachers' certification status on students' test scores. Researchers used student-level data for the following academic achievement tests focusing on reading and mathematics: the Texas Learning Index (TLI), the SAT-9, and a Spanish language test know as Aprenda. When comparing uncertified or "non-standard" certified[9] teachers with certified teachers, researchers discovered that teachers without standard certification were more likely to be instructing African-American students, Latino students, and students with a low socioeconomic status. However, results on the relationship between teacher certification and academic achievement are mixed. Uncertified teachers had significantly negative effects on five of the six achievement tests. However, alternatively certified teachers, emergency/temporarily certified teachers, and certified out-of-field teachers were found to have significantly negative effects on some test scores, while significantly positive effects on others. Although certified teachers were found to have a greater positive relationship in increase students' test scores, uncertified and alternatively certified teachers also having positive effects on students' test scores raises a question similar to Goldhaber and Brewer's (2000) study: are standard credential requirements necessary to improve academic achievement?

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[9] "Non-standard" certification includes: alternative certification (some state requirements for certification are still pending completion), emergency/temporary certification, certified out-of-field (individuals emergency permit certified teaching out of their field of certification, and individuals with temporary permits teaching outside of their field of preparation), certified, no test (individuals who have completed preparations, but have not passed the state test).

Teachers Education and Experience and Academic Achievement

One would expect that more highly educated teachers possess greater skills and are well-prepared to teach, which would lead to better classroom practices to foster learning and in turn increase student achievement scores. Conventional wisdom maintains this expectation with the opinion that teachers with degrees in the primary subject taught, as well as those teachers who have obtained master's degree are likely to be more effective in the classroom and able to increase students' academic achievement. However, many of the numerous studies that examine these relationship have found inconclusive results, some of which are further discussed below.

Goldhaber and Brewer (1996) found that the relationship between teachers possessing master's degrees and students' academic achievement in math, science, English, or history is insignificant when using data from NELS:88. Researchers also discovered a statistically insignificant relationship between teachers' years of experience and students' academic achievement in all four subject areas. However, researchers examined whether a teacher with a degree in the subject taught had an impact on students' achievement scores, during which they discovered that a bachelor's in math and science, as well as a master's in math have a significant and positive relationship to math scores.

Rivkin, Hanushek, and Kain (2005) examine how teacher education and experience influence Texas elementary school and middle school students' reading and math scores. Researchers discovered that these teacher characteristics explain a minimal amount of the variance in students' scores. However, results do indicate that teachers with less experience (0-3 years) have a negative affect on students' reading and math scores. Furthermore, results do not provide evidence that teachers with a master's degree are more effective than teacher's who do not possess a master's degree. Rivkin et al.,'s (2005) study found that teachers' education and experience do not explain the variance in academic achievement.

Wenglinsky's (2000) study of eighth graders' math and science scores from the 1996 National Assessment of Educational Progress (NAEP) data found similar results. Wenglinsky (2000) examined three teacher inputs: education level, years of experience, and whether a teacher majored or minored in the subject taught. Comparable to Rivkin et al., (2005), results did not yield a relationship between education levels and academic achievement or years of experience and academic achievement. However, results indicated that academic achievement is related to whether a teacher majored or minored in the subject taught in both math and science. Although the effect was modest in comparison to other school and classroom practice inputs, Wenglinsky (2000) notes that students taught by a teacher that majored or minored in the subject taught are further in their learning by approximately 40 percent of a grade level[10].

Darling-Hammond's (2000) analysis examines 4th and 8th grade math scores and 4th grade reading scores in multiple years as reported in NAEP data. Similar to previous research, teachers who are considered "well-qualified" and prepared, or those with degrees in the field taught and full certification, have a positive and statistically significant relationship to academic achievement in reading and math (coefficients

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[10] Percent of a grade level is defined as the percentage a student's score will increase when a certain factor is present (Wenglinsky, 2000).

ranging from .61 to .80 at the 99.9% confidence level). Teachers with less than a minor in the field taught, or those considered as “less-qualified” teachers had a negative and statistically significant relationship to academic achievement in all categories aside from one year of eight grade math scores (coefficients ranging from -.33 to -.56 at the 90% confidence level). However, similar to previous studies, teachers’ education level (i.e. – percentage of teachers with master’s degree) does not have a significant correlation to academic achievement. Although results yield a positive relationship, further examination is necessary to determine whether a genuine and statistically significant relationship between these two variables exists.

Based on the research and conflicting information concerning the relationship between teachers’ education and experience and academic achievement, it is possible that student and school inputs better explain the variances in students’ academic achievement.

III. School and Student Factors that Influence Academic Performance

This subsection reviews the findings of studies that have implications for school factors that influence academic performance. Some factors associated with school characteristics (i.e. – school calendars and charter status) are within teachers’ and administrators’ control, and school leaders may make changes in these areas to improve students’ academic achievement. However, other factors exist that cannot be influenced by teachers and administrators (i.e. – the number of students belonging to certain race/ethnic subgroups present in schools/classrooms). Some may interpret policy changes in these areas, such as mandating the number of certain student subgroups in schools, as discriminatory and limiting students in their access to a quality education.

Variations in School Calendars and Academic Achievement

Comparisons between traditional and year-round school calendars[11] have surfaced in order to address whether the different approaches to schooling have an affect on academic achievement. Powers' (2003) study addresses the relationships between variations in school calendars and academic achievement. Results of the study indicate that traditional schools perform better than schools with variations on year-round calendars in both Los Angeles Unified and San Diego Unified. However, it is important to note that there is a skewed number of schools in San Diego operating on a year-round calendar, as there are only two. Although Powers' study provides preliminary evidence that school calendars *may* affect API scores, further reviews of studies with larger populations of year-round schools is necessary.

McMillen (2001) assesses academic achievement differences between traditional and year-round school calendar students in North Carolina by examining end-of-grade scores for reading and math for the 1997 school year and the 1998 school year. The study includes test scores and various student-level characteristics for 345,000 students in grades 4-8 from 1,470 schools as provided by the North Carolina Department of Public Testing. McMillen (2001) standardizes the test scores between grade-levels, as students' test scores are naturally expected to increase as grade-level increases due to achievement of higher learning levels. Using a hierarchical linear model to better control for differences in variation of school-level and student-level factors, the results indicate that,

[11] Traditional calendars are defined as educational calendars with an extended summer vacation. Year-round calendars are defined as school calendars where summer break months are evenly distributed throughout the year (Education Week, 2004).

while holding all student-level factors constant, there is no statistically significant difference in either reading or math scores based on the type of school calendar. The conflicting results of the two studies justify the need for further inquiries regarding the relationships between traditional and year-round school calendars and academic achievement.

Charter School Status and Academic Achievement

Additional studies examining school characteristics address such topics as whether the type of school (i.e. - charter or non-charter school) significantly affects academic achievement. Charter schools differ from traditional public schools in that charter schools have a high level of autonomy, are exempt from state and local regulations, and are able to utilize resources differently than required in public schools, all while still receiving public funding. Furthermore, although charter schools are open to all students in a particular jurisdiction, parents must *choose* to enroll children in a charter school. Many have advocated that charter schools are beneficial because they have more independence than traditional public schools as they are subject to fewer state and local regulations, and may be more innovative in their curriculum and support services as they have greater independence in resource allocation, hiring practices, and class sizes (Bettinger, 2005; Bifulco & Ladd, 2006).

Slovacek et al., (2002) compare the academic achievement of California charter and non-charter schools. Researchers focus on high-poverty schools where 50% or more of students were eligible to receive free or reduced cost lunches. Researchers analyzed 1999, 2000, and 2001 API data for charter and non-charter schools while controlling for the percentages of English language learners, students participating in a free/reduced price lunch program, teacher credentials, and enrollment. Comparisons of mean API scores for the three years show that non-charter school students are performing better than charter school students. However, when examining API growth comparisons for charter schools and non-charter schools whose low-socioeconomic student populations are 50 percent or greater show that charter schools have a higher API percent improvement from 1999 to 2001. This suggests that charter schools may better assist disadvantaged students in regards to academic achievement.

The study includes a regression analysis for all California schools and another regression analysis solely for California charter schools. Factors affecting academic achievement were similar for both, with the percent of students participating in a lunch program, the percent of English language learners, and enrollment size having statistically significant negative relationships with API scores. However, socioeconomic status (as controlled by the number of students participating in lunch programs) for charter schools did not negatively affect 2001 API scores to the extent it did for all California schools. This also lends support to the claim that charter schools are better assisting low-socioeconomic status students.

Witte, Weimer, Shober, and Schlomer (2007) also support the argument that charter schools have a positive impact on students' academic achievement scores. Researchers use student-level data provided by the Milwaukee Public School District focusing on standardized test scores for grades 3-10, in reading, language arts, and math from the 1998-1999 school year to the 2001-2002 school year. The results indicate that attending a charter school positively influences test scores in most of the included grade levels, having a greater positive affect on Latino and white students.

Bifulco and Ladd (2006) also conducted a study that seeks to determine if students enrolled in charter schools have greater achievement gains than students in public schools. The researchers analyze student-level data for both students enrolled in charter schools and traditional public schools in North Carolina using data collected by the North Carolina Education Research Data Center from the North Carolina Department of Public Instruction. The study examines five third grade cohorts from 1996 to 2000, following each cohort until the completion of eighth grade or the 2001-2002 academic-year, whichever occurs first. The results of this study indicate that charter schools have a statistically significant negative effect on both math and reading test scores, Moreover, students attending charter schools make smaller average gains in math and reading test scores than students attending public schools.

Bettinger (2005) suggests that charter schools do not have strong effects on academic achievement. Bettinger (2005) examines Michigan charter schools that opened during the 1996-1997 academic year and assesses the impact of charter schools on successive cohorts of fourth grade students based on data collected by the Michigan Department of Education. The cohort comparison of “pre-charter” test scores and “post-charter” test scores utilizes a difference-in-difference estimation. The estimation attempts to identify if the charter school is the influence on the academic achievement scores, or if the scores are simply a result of trends in the academic levels of students entering charter schools (e.g. - students entering a charter school are already performing poorly or performing well). Although statistically insignificant, Bettinger's (2005) results suggest that charter schools do not increase students' academic achievement in comparison to traditional public schools (Bettinger, 2005) and that other variables may have a greater influence on academic achievement.

With these studies offering some conflicting results, additional examination of the relationship between charter status and academic achievement may be warranted in order to determine if the positive effects of charter schools carry statistical significance consistently in studies and how these schools affect specific student subgroups.

Students Populations and Academic Achievement

Baker, Keller-Wolff, and Wolf-Wendel (2000) examine race and ethnicity in aggregate and disaggregate classifications to determine if there is a relationship between race and math and reading performance measures. The study randomly samples 14,596 eighth grade students from stratified samples used in NELS '88. Researchers use two sets of regression analyses to compare academic achievement differences. The first analysis compares such differences among the five aggregate groups in math and reading while controlling for socioeconomic status and language proficiency. Researchers note that the performance differences to be statistically significant (at the 99% confidence level), with Asian and white students outperforming the other groups, and observe the socioeconomic affects as strong and positive. In regards to math performance, the regression results indicate significant performance percentage decreases in scores for blacks (6.78), and Latinos (3.85). Similar effects resulted in reading performance with a 3.86 percent performance decrease for black students, and a 2.01 percent performance decrease for

Latinos. This suggests that schools may need to focus on specific ethnic groups as opposed to aggregating race classifications and treating students as a combined population solely based on socioeconomic status or grade level characteristics. The evidence provides a rationale for tailoring academic interventions according to race and ethnicity.

Bali and Alvarez (2004) also provide additional evidence on the relationship between race and academic achievement. This study seeks to explain at what point during early elementary education do minority-white test score gaps occur, and the possible reasons behind the phenomenon. Researchers collected reading and math test scores for a student cohort from first through fourth grade from 1999 to 2002. The sample student population in the study is from 22 elementary schools in the Pasadena Unified School District, and the multivariate analysis controls for various school and family variables (Bali & Alvarez, 2004). After a preliminary review of the data illustrating the differences between Latino students and white students in reading and math from first to fourth grade, researchers suggest a possibility of a narrowing gap in achievement between these ethnic groups as grade level increases. In first grade math scores, Latino students averaged 11 points lower than white students and were over 13 points lower in reading scores. However, Latino students reduced the gap in math scores compared to white students by the fourth grade by approximately three points and slightly reduced the reading score gap by less than one point. In the first grade, Latino students scored, on average, approximately 13 points lower than white students in reading, and by the fourth grade Latino students have slightly reduced the gap by less than one point. When conducting multivariate analyses of the reading and math score gaps between Latinos and whites, results indicate that Latinos' gaps in reading do not significantly change between the first and fourth grades. Conversely, in regards to math scores, by the fourth grade Latino students' gap has increased. Subsequently, Bali and Alvarez (2004) examine the effects of language acquisition, and socioeconomic status on Latino academic achievement in regards to reading scores in order to suggest possible causes for test score gaps. The results yield negative and statistically significant relationships between and Latino students' fourth grade reading scores and if the student is an English-language-learner (coefficient = -14.49; at the 99.9% confidence level), and has low socioeconomic status (coefficient = -11.75; at the 99% confidence level). In showing that achievement gaps exist between different ethnic groups, researchers suggest additional assessments of academic achievement disparities in order to better understand the particular circumstances that lead to lower scores.

Results from a regression analysis conducted by Powers (2003) for the Los Angeles Unified and San Diego Unified school districts also suggests that student socioeconomic background variables, such as percentage of students qualifying for reduced-price or free lunches and percentage of English-learners, are related to academic achievement. In Power's (2003) study, results indicate a negative and statistically significant correlation between these socioeconomic variables and academic achievement. More specifically, during 1999 in Los Angeles Unified, a one percent increase in students participating in reduced price or free lunches and in the percentage of English-language-learners results in a decrease of 3.15 percent and .043 percent in base

API scores respectively. In 2001, the results are similar with a one percent increase in such factors resulting in decrease of 2.52 percent and .30 percent in base API scores respectively. Furthermore, during 1999 in San Diego Unified, a one percent increase in students participating in reduced price or free lunches and in the percentage of English-language-learners results in 2.52 and .30 percent corresponding decreases in base API scores. In 2001, the magnitude of the effects remains the same for the socioeconomically disadvantaged measure, while a one percent increase in English language learners results in a higher percent reduction in API scores (1.06 percent). It is necessary for further examination of the achievement gaps of ethnic groups and assess each subgroup separately in order to determine what factors are positively and negatively influencing student achievement scores and at what point during a student's education do such gaps occur (Bali & Alvarez, 2004).

Goe (2002) examines various variables affecting student API scores by using data from 6,387 California schools for the 1999-2000 school year. The regression analysis indicates that multiple factors negatively correlate with API scores, such as percentage of students qualifying for free/reduced price lunches, the percentage of Latino students, and the percentage of parents without a high school diploma. The results of the study indicate a one percent increase in students qualifying for free/reduced price lunches is associated with a 1.47 percent decrease in base API scores. Similar decreases in API scores result from a one percent increase in the percent of Latino students, which is associated with a .91 percent decrease in base API scores, as well as a one percent increase in the percentage of parents without a high school diploma, which results in a 1.18 percent decrease in base API scores. Conversely, a positive correlation exists between the percentage of parents that attended graduate school and API scores, where a one percent increase in the percentage of parents that attended graduate school is associated with a 2.01 percent increase in base API scores.

Results from Weiher (2000) illustrate a statistically significant positive relationship between Latino students' passing rate on Texas' state reading exam and the percentage of white students passing the exam. When the percentage of white students' passing increases by 10 percent, Latino students' passing rate increases by 3.97 percent at the district level and 2.86 at the school level for a sample of 540 school districts and 668 schools. Interestingly, an increase in students with low socioeconomic status positively affects Latino students' at the school level. Weiher (2000) suggests that this may be due to students not feeling competitive pressure from privileged student groups. Additionally, at the school level an increase in the percentage of white students positively affects Latino students' passing rates, while an increase in the percentage of Latino students demonstrates no effect on Latino students' passing rates.

Slovacek et al. (2002) indicate that for both predicting API scores for all California schools and for solely California charter schools as the percentages of English-language-learners increases, a school's API score decreases. More specifically, a ten percent increase in the percentage of English-language-learners results in a 5.6 percent decrease in base API scores. The same relationship is true with the percentage of students participating in lunch programs as results indicate that a ten percent increase in the percentage of students participating in reduced price or free lunch programs is associated with a 26.5 percent decrease in base API scores.

Goodman and Young's (2006) results indicate that school districts with higher enrollment numbers of socioeconomically disadvantaged students are associated with lower API scores than schools districts with low populations of socioeconomically disadvantaged students. Such results suggest that increases in English-language-learner and low socioeconomic student populations negatively affect schools' API scores. Perhaps improvement programs and resources must focus on these particular student groups, as these populations appear to face greater academic struggles than other students do and in turn, more negatively influence school API scores.

IV. Conclusion

Previous literature provides support that teachers' race/ethnicity, administrators' race/ethnicity, and students' race/ethnicity can influence academic achievement. Studies indicate that teachers can influence academic achievement through direct interaction with students or indirectly through passive effects that are the result of various demographic characteristics, while administrators directly influence school effectiveness and in turn indirectly influence student achievement as the majority of their direct interaction in an academic environment is with teachers as opposed to students.

However, there are some inconsistencies in whether a strong relationship between teachers' and administrators' race/ethnicity and academic achievement exists. The majority of the studies reviewed found some correlation between teachers' race and academic achievement, while one study suggests there is really no connection. However, there is evidence suggesting that students being taught by a teacher of the same race have higher achievement scores. This may be a result of race affecting school leaders' perceptions of students and altering teachers' classrooms practices and interactions with students, or administrators' guidelines regarding the school's curriculum or strategy in increasing the achievement of particular student subgroups.

In order to provide additional control variables to assist in explaining how teacher and administrators' race can influence academic achievement, previous research examines whether "well-prepared" teachers or those with credentials or advanced degrees will increase academic achievement scores. However, inconsistencies exist in these results as well as with results for the relationship between emergency credentialed teachers and academic achievement not always being negative. This is similar for teacher education levels. In some instances, there is no significant difference in the scores of students taught by teachers with master's degrees and those taught by teachers without advanced degrees.

Previous research also yields counterintuitive results for school factors, such as charter status and year-round calendars. These factors, along with teacher factors, such as credentials, education, and race require additional research as there is great inconsistencies in the results. Nevertheless, student populations are slightly more in line with conventional wisdom with results indicating that traditionally low achieving student populations negatively affect schools academic achievement scores and the performance levels of other students. For example, factors, such as socioeconomic status, parents' education level, and the presence of minorities and English-language learners are found to be related to low achievement scores.

Concerns with the previous research include that an overwhelming majority of the research regarding the relationship between teachers' and administrators' race/ethnicity and academic achievement was not conducted recently. Moreover, there is not a large amount of evidence in the existing literature that allows for this study to assume that teachers' and administrators' race/ethnicity are *directly* related to academic achievement as much of the existing literature deals with indirect teacher and administrator effects on academic achievement. Additionally, although a majority of the studies in the review offer controls for Latino students, the studies do not specifically address research questions pertaining to Latino students. When discussing academic achievement issues, particularly in California, it is imperative to focus on the Latino population as this is the majority of the student population and will soon be the majority of the residents in the state. The factors found to have inconsistent results in other states and in previous research may have greater significance in California as the state is more racially diverse than other areas in the nation. In examining Latino students in California, where limited research has been conducted on how teachers' and administrators' race/ethnicity is related specifically to Latino academic achievement, I seek to provide additional insight on this topic, which can have influence on the recruitment of school leaders, as well as education policy decisions in the future.

Chapter 3

METHODOLOGY

The following chapter describes the regression model that is the foundation for the analysis focusing on the relationship between teachers' and administrators' race/ethnicity and California Latino high school students' academic achievement, as well as the data selected for the dependent and independent variables. The existing literature suggests relationships between several teacher inputs and school inputs and the variances in academic achievement scores. This chapter illustrates the expected relationships between the dependent variable and the various explanatory variables. Section I provides a brief description of regression analysis, Section II presents the regression model used for the analysis, and Section III provides information on the data and measurements used in the regression analysis. In addition to the quantitative regression analysis, this study conducts a supplemental qualitative analysis of administrators' opinions of the regression results to determine if administrators agree with the results, believe school leaders' race/ethnicity influences Latino high school students' academic achievement, and can offer solutions that can assist in improving Latino academic achievement levels. Phone interviews with four administrators provided the data for the qualitative methodological approach. Section IV offers further discussion on this methodology.

I. Regression Analysis

Regression analysis is a statistical method used to analyze data in order to determine the degree that relationships exist between the dependent variable and a given independent variable, holding the influence of other causal independent variables constant (Babbie, 2007, p. 456). However, it is important to mention that regression analysis cannot prove causality, but can only investigate whether a significant correlation exists between the dependent and explanatory variables, and the magnitude of each relationship (Studenmund, 2006, p. 7).

The purpose of this thesis is to explain changes in Latino high school students' academic achievement, as measured by high school-level API scores, and as a function of teachers' and administrators' race/ethnicity while holding various student, school, and social factors constant. I use a common regression model, Ordinary Least Squares (OLS), for my multivariate regression analysis as this model is effective in minimizing residuals, or the differences between the predicted value of the theoretical model and the actual value. The minimization of the residuals assists with the theoretical basis for the regression equation, as it is preferred that the estimated regression equation be as near as possible to the observed data (Studenmund, 2006, p. 36-37). The regression analysis will assist in determining if relationships exist between various independent variables and Latino high school students' academic achievement scores, but not conclude whether the independent variables *cause* increases or decreases to the scores.

II. Regression Model

In order to interpret the results of the regression analysis, it is necessary to explain the how the study will measure the dependent variable, Latino academic achievement, as well as the various explanatory variables used in the model.

Measuring the Dependent Variable of Academic Achievement: The API

In California, students in grades 2 through 12 undergo standardized testing in order to determine academic achievement for each school overall, as well as disaggregate student subgroups, such as ethnic groups. The API is the primary method for measuring academic performance and monitoring progress across school years, making it useful in determining various factors that have significant relationships with academic performance. Enacted under the Public Schools Accountability Act of 1999, the API is a method used to hold schools, educators, and the public education system as a whole accountable for maintaining high academic achievement levels, and is responsible for continuing to improve the academic achievement scores of students that are below average.

Policy guidelines under the Public Schools Accountability Act of 1999 also established a specific scoring method for API scores to illustrate academic students' performance and growth. API scores may be calculated for a specific school or school district, as well as various "numerically significant" subgroups within a school. Such subgroups must have 100 or more students with "valid" test scores, or compose 15 percent of the school's tested population with at least 50 students (Education Data Partnership, 2011b). The number of "valid" test scores at a school includes students who are continuously enrolled since October, and students who are not exempted from testing by parents or through participation in special education programs.

The API does not follow individual student achievement, but compares schools or districts across years within a cycle. The API scoring system follows a two-year cycle and provides a “base” score, indicating students’ performance on tests from the previous spring, and a “growth” score, indicating students’ performance on the current year’s spring tests (CDE, 2010a). The CDE calculates a school’s API by converting scores on various statewide assessment tests into comparable points on the API scale and averaging the numbers for all students and tests (CDE, 2010a). API scores range from 200 to 1,000 and calculations use results from various Standardized Testing and Reporting (STAR) tests and the California High School Exit Exam (CAHSEE) as illustrated in Table 7 below. The STAR tests used in calculating the API include the following: the California Standards Tests (CSTs), which examine students’ skill level in English-language arts, mathematics, science, and history/social science, the California Modified Assessment (CMA), which assesses students with disabilities that prevent them from attaining the proper grade-level proficiency in terms of knowledge for each subject as defined by the California Content Standards[12], and the California Alternative Performance Assessment (CAPA) [13], which examines students with cognitive disabilities who cannot participate in the CST or CMA (CDE, 2010a; Education Data Partnership, 2011b).

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[12] These standards define the achievement levels, including knowledge, concepts, and skills, students should obtain in each grade (California State Board of Education, 2011).

[13] The CAPA and CMA measure the achievement of students in English-language arts, mathematics, and science. The 2009 Base API includes the CMA in English-language arts for grades 3-8, math for grades 3-7, and science for grades 5 and 8, as well as the CAPA in English-language arts, math, and science for grades 5, 8, and 10 (CDE, 2010a).

Table 7: Results Used in Calculating the 2009-2010 API

Standardized Testing and Reporting (STAR) Program

California Standards Tests (CSTs)

- California English–language arts Standards Test (CST in ELA)
  Grades two through eleven, including a writing assessment in grade seven
- California Mathematics Standards Test (CST in mathematics)
  Grades two through seven and grades eight through eleven for the following course-specific tests:
  - General mathematics (grades eight and nine only)
  - Algebra I
  - Geometry
  - Algebra II
  - Integrated mathematics 1, 2, or 3
  - High School Summative Mathematics Test

  Students in grade seven may take the Algebra I test if they completed an Algebra I course.
- California History–social science Standards Test (CST in HSS)
  Grade eight
  Grade eleven (U.S. history)
  Grades nine through eleven (world history)
- California Science Standards Test (CST in science)
  Grades five, eight, and ten and grades nine through eleven for the following course-specific tests:
  - Biology/life sciences
  - Earth science
  - Chemistry
  - Physics
  - Integrated/coordinated science 1, 2, 3, or 4

California Modified Assessment (CMA)

- English–language arts
  Grades three through eight
- Mathematics
  Grades three through seven
- Science
  Grades five and eight

Table 7 (Continued): Results Used in Calculating the 2009-2010 API

California Alternate Performance Assessment (CAPA)

- English–language arts and mathematics
  Grades two through eleven
- Science
  Grades five, eight and ten

California High School Exit Examination (CAHSEE)

CAHSEE (administered in February, March, and May [make-ups])

- English–language arts, including a writing assessment, and mathematics
  Grade ten, also grade eleven or twelve CAHSEE results are included in the API if the student passed the CAHSEE anytime during the school year.

(Source: CDE, 2010a)

In calculating the API, individual student test scores in each subject are assigned to one of the five designated performance bands (i.e. – advanced, proficient, basic, below basic, and far below basic). Subsequently, performance level weighting factors (Table 8) are applied to the percentages of students in each performance band within each subject. These numbers are then added to produce a value for the subject area (i.e. – English-language arts, mathematics, and science) (Education Data Partnership, 2011b).

Table 8: Test Score and Performance Level Weighting Factors

CST, CMA, or CAPA Performance Level	CAHSEE Score	Performance Level Weighting Factor Assigned
Advanced	Pass	1000
Proficient	N/A	875
Basic	N/A	700
Below Basic	N/A	500
Far Below Basic	No Pass	200

(Source: CDE, 2010a)

Following the initial calculation using the test score and performance level weighting factors, each subject area and test are given a specific weight, or test weight (Table 9). The California State Board of Education (SBE) designates individual test weights based on what best mirrors the curriculum priorities in the public education system (Education Data Partnership, 2011c). These fixed weights are the same for all schools and subgroups, as well as the base and growth API scores within a reporting cycle (CDE, 2010a).

Table 9: 2009-2010 API Individual Test Weights, Grades 9-12

Content Area	2009–10 API Test Weights
CST/CAPA in ELA, Grades 9–11	0.30
CST/CAPA in Mathematics, Grades 9–11	0.20
CST in Science, Grades 9–11	0.22
CST/CAPA in Life Science, Grade 10	0.10
CST in History–Social Science, Grades 9–11	0.23
CAHSEE ELA, Grades 10–12	0.30
CAHSEE Mathematics, Grades 10–12	0.30
Assignment of 200, CST in Mathematics, Grades 9–11	0.10
Assignment of 200, CST in Science, Grades 9–11	0.05

(Source: CDE, 2010a)

Lastly, a Scale Calibration Factor (SCF)[14], a numerical constant associated with each grade span, is added to the weighted average of the scores. The sum of the weighted

[14] The SCF differs annually and may be a positive or negative number. This figure provides consistency in the API scale across reporting cycles and is a necessary adjustment so API scores do not vary across years as a result of new factors, such as other standardized test results, being added to the calculation (CDE, 2010a).

average of the scores and the SCF produce one final score for each school, which represents the institution's API score (CDE, 2010a).

Table 10: 2009-2010 API Scale Calibration Factors

Grade Levels	SCF
Grades 9-11 Students with Disabilities Only	8.91
Grades 9-11 Students with No Disabilities	16.93

(Source: CDE, 2010a)

The SBE established an API score of 800 as the statewide performance target, and considers schools near or above this score as having excellent overall academic achievement.

While the API score is an accountability system for schools, school districts, and the state to monitor academic performance and yearly improvements in order to close achievement gaps, it is also a strategy that seeks to increase academic performance of students by incentivizing schools with monetary rewards and distinguished public awards if an institution meets the yearly academic growth goals. Conversely, API scores also determine which schools must go through interventions or receive sanctions under the state's Immediate Intervention/Underperforming Schools Program (II/USP) (CDE, 2006). The looming possibilities of these sanctions and interventions seek to incentivize teachers, administrators, and students alike in improving academic performance.

Former State Superintendent of Public Instruction, Jack O' Connell, views the state accountability system, which includes the API, as the measurements necessary for California "to develop, implement, and sustain a specific, ambitious plan that holds the State of California accountable for creating the conditions necessary for closing the achievement gap" (California P-16 Council, 2008). Such conditions are becoming increasingly important as the NCLB legislation enacted in 2001 requires that *all* students, 100 percent of all enrolled students in K-12 public education, are proficient in math and English by the end of the 2013-2014 academic year (Larsen, 2009). According to the U.S. Department of Education's Report Card, California's average test scores in 2009 for math and reading were at record highs (National Center for Education Statistics, 2011). However, concern exists regarding the ability for some schools to continue achieving the AYP requirements in order to reach the 100 percent goal. Only 51 percent of California public schools reached the state's AYP goals in 2009 (CDE, 2009b). So the question remains, are the resources and other methods of support that are being provided by California's public education system fostering increased learning for struggling student populations, such as Latinos, as these student populations can adversely affect a school's AYP, and hinder California's ability to reach the NCLB goal of 100 percent of enrolled students being proficient in math and English by 2014? This is a difficult question to answer and effective strategies are necessary as California's academic achievement gap leads to the state constantly facing significant pressure to improve each institution's overall API scores. Furthermore, as the Latino population continues to grow, the state faces added demands to improve the API scores for this numerically significant subgroup that will become the majority of California's workforce in the near future.

The regression model uses 2009 Latino base API scores for California high schools as the dependent variable. The 2009 base scores are calculated using results from statewide testing in the spring of 2009.

Explanatory Variables

Previous research identifies the explanatory variables used as control variables in this study as major factors thought to and sometimes found to have significant relationships to student achievement. The main explanatory variables are the percentages of teachers and administrators at each school within the identified race/ethnicity categories: African American, American Indian, Asian, Filipino, Latino, and Pacific Islander. The study uses the percentages of white teachers and administrators at each school site as base comparisons. Other explanatory variables are divided into five input categories: teacher inputs, administrator inputs, high school inputs, student inputs, and social inputs. The teacher/administrator input categories include variables associated with race, as well as variables dealing with educational attainment and qualifications, such as percentage of teachers/administrators with a master's degree, and the percentage of teachers that possess full credentials and emergency credentials.

The category concerning school factors includes dummy variables[15] for whether the school is or is not a charter school, and whether or not the school follows a year-round calendar. For the student factors category, the included explanatory variables are the percentages of students at each school site that are included in traditionally used race/ethnicity categories, the percentage of students participating in free/reduced price lunch programs, the percentage of students in gifted and talented education programs, as well as the percentage of English-learner students and students with disabilities. Lastly, an aggregate measure of parent education is included. The variable is the sum of the

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[15] Dummy variables only have values of one or zero. Each of these designations represents a different condition (Studenmund, 2006, p. 69).

percentage of parents with some college education, the percentage of parents that are college graduates, and the percentage of parents with graduate school experience, and measures what happens to high schools' Latino API scores when parents go from no college experience to any college experience. Disaggregate measures of parent education groups (i.e. – not high school graduate, high school graduate, etc.) were originally included when collecting data in order to assess the specific effects of parent education levels on Latino high school student achievement. However, the analysis excludes the individual variable categories in order to prevent endogenous results.

Functional Regression Model

The analysis expresses the potential link between the identified factors and California high schools' 2009 base Latino API scores in the following functional form:

Latino High School Student Achievement = f (teacher inputs, administrator inputs, high school inputs, student inputs, other control variables)

where (expected effects indicated in parentheses):

Teacher Inputs = f [% African American teachers (-), % American Indian teachers (-), % Asian teachers (+), % Filipino teachers (-), % Latino teachers (+), % Pacific Islander teachers (-), percentage of teachers with a master's degree (?), % of teachers with full credentials (+), % of teachers with emergency credentials (-)]

Administrator Inputs = f [% African American administrators (-), % American Indian administrators (-), % Asian administrators (+),

% Filipino administrators (-), % Latino administrators (+), % Pacific Islander administrators (-), percentage of administrators with a master's degree (?)]

High School Inputs = f [charter status (?), year round status (?)]

Student Inputs = f [% African American students (-), % American Indian students (-), % Asian students (+), % Filipino students (-), % Latino students (+), % Pacific Islander students (-), % English-Language Learners (-), % Students with Disabilities (-), % Students in Gifted and Talented Education Programs (+), % Students in free/reduced price lunch programs (-)]

Social Inputs = f [% of Population within school's zip code that is Latino (-), % of parents with some college education or higher (+)]

Anticipated Direction of Effects

Hypotheses regarding the specific contributing factors within the broad general causes that may have an effect on Latino high school student achievement were developed before conducting the regression portion of the analysis. The expected direction of these effects is indicated in parentheses in the above functional equation, where a "+" sign signifies a positive anticipated effect, a "-"sign signifies a negative anticipated effect, and a "?" sign signifies that the anticipated effect of the explanatory variable on the dependent variable is unknown. Information provided by previous studies noted in the literature review provides evidence to support the prediction directions. The following subsections provide detailed descriptions of the variable categories and justifications for the inclusion of specific explanatory variables.

Teacher/Administrator Inputs

This section combines teacher and administrator inputs in this section as the included variables for each school staff are similar. Although there are inconsistencies in the previous research regarding whether a relationship exists between teachers' and administrators' race and academic achievement, some of the studies noted in the previous literature review provide a foundation for the anticipated effects. One study found no statistically significant relationship between teachers' race and academic achievement (Ehrenberg et al., 1995), while other studies conclude that such a relationship does exist (Johnson et al., 2001) and that students excel when taught by same-race teachers (Dee, 2004; Ehrenberg & Brewer, 1995; Hanushek, 1992; Wieher, 2000).

As this study focuses on Latino student achievement, it is not only important to be attentive to how teachers/administrators of other races influence Latino academic achievement, but how Latino teachers/administrators in particular affect Latino academic achievement. In regards to Latino teachers, one study reviewed found that students receiving instruction from a Latino teacher have higher scores in math (Aksoy & Link, 2000). Wieher (2000) found that if the percentage of Latino teachers decreases so will the achievement scores of Latino students. Latino students interacting with a greater percentage of Latino teachers/administrators may have higher academic motivation and personal academic expectations as these students are observing individuals with similar backgrounds in positive positions ("role model" effect). Latino teachers may also have a better understanding of the cultural and academic challenges Latino students face and in turn create a positive learning environment and tailor teaching strategies towards this student group to assist in improving these students' academic skills. As a result of these studies and assumptions, the regression model anticipates that Latino teachers and administrators will have positive effects on Latino academic achievement.

Results also suggest that students taught by African American teachers have lower achievement scores (Aksoy & Link, 2000; Ehrenberg & Brewer, 1995). The regression model follows suit anticipating that black teachers will have the same effect on Latino students because these individuals are of a different race. As a result, these student/teacher interactions may be challenging due to the different cultural backgrounds. Moreover, teachers of a different race may generally not be aware of the academic obstacles experienced by Latino students. As a result, the regression model assumes that other minority teachers and administrators will also have negative effects on Latino academic achievement, with the exception of Asian teachers and administrators. This race/ethnic group historically has high academic performance and such successful academic backgrounds coupled with a culture that emphasizes learning may translate into a positive educational influence on Latino students.

Additionally, the regression model assumes that as the number of emergency credentialed teachers increases, the academic achievement of Latino students will decrease as the majority of the previous literature reviewed suggests that emergency licensed teachers have a negative impact on academic achievement (Clotfelter et al., 2007; Darling-Hammond, et al., 2005; Goe, 2002; Powers, 2003). Emergency licenses bypass states' licensing requirements and states issue such licenses to address teaching shortages in certain subject areas or urban geographic areas. As a result, these individuals have not experienced rigorous teaching preparation in implementing curriculum, classroom management, and teaching content in an effective manner to prepare students for tests and future grade levels. Rather, they experienced expedited training, and districts typically assign these teachers to classes they are not qualified to teach (Roth & Swail, 2000). Conversely, the anticipated direction of the full credentialed teacher explanatory variable is positive (Slovacek et al., 2002). The higher the number of teachers that have successfully completed a full-credential program, the more likely schools will have higher API scores due to more satisfactory curriculums and teachers that are able to better assist students in achieving learning objectives.

Conventional wisdom suggests that with increased education comes greater skill and preparation. This belief assumes that teachers need a certain level of preparation in a particular subject area to effectively instruct. Therefore, initially the model hypothesized that the variable for the percentage of teachers with a master’s degree will have a positive effect on academic achievement. However, previous research suggests that a significant relationship between teachers possessing master’s degrees and academic achievement does not exist (Darling-Hammond, 2000; Goldhaber & Brewer, 1996; Rivkin et al., 2005; Wenglinsky, 2000). Thus, the regression model was altered and the anticipated effect for this variable is unknown in relation to Latino student achievement in California.

The anticipated directions of administrator inputs mirror the anticipated directions of teacher inputs as the regression-based studies reviewed concerning schools administrators do not use administrators’ race as an explanatory variable. The regression model assumes that administrators’ race will influence student achievement similar to teachers' race as many teachers become administrators, and individuals are likely to carry their perceptions, expectations, and interactions towards certain student groups with them throughout their careers. This theory also applies to the variables included in the input categories associated with educational attainment.

High School Inputs

The factors included under the broad category of high school inputs describe specific school characteristics (i.e. – school calendar type and charter status). The anticipated effects of both these variables are unknown. The dummy variable for school calendar type is coded 1 if the high school is year-round and coded 0 otherwise. Since the included literature provided inconclusive information, one may rationalize and hypothesize that if the high school is year-round, students will experience less of a decrease in achievement scores as these schools eliminate the three-month summer break that may disrupt material retention and provide students with a more consistent academic schedule. Conversely, non-year-round high schools may also have a positive effect on academic achievement as it may be beneficial for Latino students to have a longer vacation period during the academic year. Such a break period may allow students to return to an educational setting more rejuvenated, leading to higher attentiveness and higher test scores.

The dummy variable for charter status is coded 1 if the high school is a charter school and coded 0 if otherwise. The literature reviewed provided questionable evidence to support one anticipated direction versus another as two of the studies found that charter schools have a positive effect on academic achievement (Slovacek et al., 2002; Witte et al., 2007), and one study found that charter schools have a negative effect on academic achievement (Bifulco & Ladd, 2006). As a result of the inconsistencies in the results, the anticipated effect is unknown. However, conventional wisdom may suggest that because charter schools have greater independence compared to traditional public schools as these institutions are exempt from certain regulatory requirement, and are able to delegate resources differently than other schools. As a result, charter schools may be more original in their curriculum and teaching practices, possibly creating more effective teaching strategies and learning environments.

Student Inputs

The student inputs category describes high school student populations, including variables concerning race/ethnicity subgroups, socioeconomic status as defined by students participating in free/reduced price lunch programs, as well as other student population groups, such as English-language learners, students with disabilities, and students in Gifted and Talented Education programs.

The study examines similar race/ethnicity categories as those included under teacher and administrator inputs (African American, American Indian, Asian, Filipino, Latino, and Pacific Islander). Based on the findings of previous literature (Baker et al., 2000; Weiher, 2000), the regression model hypothesizes that Latinos attending high schools with high populations of Asian students will obtain higher achievement levels. Associating with a high percentage of students that historically have high academic achievement scores can increase desegregated learning and create a more challenging academic environment in which Latino students may strive to better themselves to attain academic success similar to their peers. Furthermore, Latinos attending high school with a high percentage of fellow Latino students may perform better on the standardized tests included in calculating API scores due to a more comfortable classroom learning environment in which Latino students are not outcasts and interact with individuals with similar cultural and demographic backgrounds. Thus, the regression model predicts a positive correlation to academic achievement for the percentage of Latino student variable.

Conversely, the model hypothesizes that percentages of African American, American Indian, Filipino, and Pacific Islander students will have negative effects on Latino academic achievement scores as these race/ethnic groups are historically low academic performers and may adversely affect Latino students' learning environments. Minority students that are part of student populations that have traditionally low achievement levels may internalize these stereotypes, have low expectations of themselves, be disinterested in academia, and not perform to their capacity. This may also undermine the academic success of other student groups due to negative peer influence. Similarly, the literature reviewed suggests that variables associated with lower socioeconomic status generally have a negative relationship with academic achievement (Goe, 2002; Goodman & Young, 2006). The regression model hypothesizes that the percentage of students participating in free/reduced price lunch programs, typically students of low socioeconomic status, will have a similar relationship to Latino academic achievement. Low socioeconomic status suggests there are fewer resources available to nourish a student's education (Cheng, 2001). More specifically, this negative correlation may be due to the fact that students of low socioeconomic status have less academic support from parents, particularly in regards to the promotion of attaining high achievement levels, and in the provision of the necessary learning tools and a supportive environment outside of the classroom.

Previous literature provides support for the theory that the percentage of English-language learners will have a negative correlation with the dependent variable (Powers, 2003; Slovacek et al., 2002). Students who are not proficient in the English language will likely score lower on standardized tests due to possible decreased ability to understand the academic material as teaching is conducted primarily in English and these students may struggle when receiving instruction from traditional English-learning schools. In addition, these students may experience difficulties in understanding the questions on standardized tests, regardless of whether or not the material is understood. These students may also inhibit the learning of students who are proficient in English as teachers may be inclined to slow down or simplify classroom exercises and lessons to ensure that all students understand the material. A similar hypothesis is present in predicting the effects of the percentage of students with disabilities variable.

Social Inputs

The final explanatory category includes two external social indicators, the percentage of Latinos living within the high school’s zip code, and the percentage of parents that have college education experience. These are used as proxy variables that capture neighborhood and home characteristics that may influence academic achievement, but are not directly measured in this study. More specifically, these variables serve as proxies for social factors, such as family income, students' learning environments within the home, as well as social interactions. The percentage of Latinos living within the high school's zip code is expected to have a negative effect on Latino academic achievement as minority populations, such as Latinos are generally associated with low income and low education levels. As a result, this population may not be equipped with the resources necessary to assist Latino students academically. The model assumes that the parent education variable is crucial to Latino academic achievement as parents provide early learning experiences, the foundation for students' academic readiness, and the resources to maintain education levels when outside of school (Cheng, 2001). For parents that have graduated from high school and/or continued on with higher education, it is likely that these individuals encourage their children to perform well in school and believe education is important (Goe, 2002).

This model assumes that these social factors are adequate substitutes for the theoretically desired, but missing, variables as these variables effects should correspond similarly to the movements that would occur in the instance the missing variables were included. The regression model hypothesizes that the variable for the percentage of Latinos within a high school's zip code will negatively influence Latino academic achievement, while the variable for the percentage of parents that have college education will have a positive influence on Latino academic achievement.

Interaction Effects

With the presence of numerous explanatory variables in this analysis, there is the opportunity to hypothesize several interactive effects to determine if the influence of one factor on academic achievement is modified by another factor. While a standard regression analysis examines the relationship between each factor to academic achievement holding all other factors constant, this assumes that there are no interactions between these variables, but rather that the effect of one explanatory variable is the same at all levels of the other explanatory variables. For example, the effect of the percentage of Latino teachers at a school is the same regardless of the charter status of a school. However, it is possible that the percentage of Latino teachers at a school interacts with charter status and creates a different relationship to academic achievement dependent on whether the school is or is not a charter.

While it is possible to test all possible interaction combinations that can be created with the included explanatory variables, it is more practical to identify likely interactions based on previous literature and conventional theories. The interactive effects tested in this analysis include Latino teachers/administrators as one of the multiples. The study examines six interactive effects described by the following hypotheses:

- The percentage of Latino teachers and the percentage of Latino administrators will have a greater effect on academic achievement the greater the percentage of Latino students at a school. Latino teachers and administrators at schools with large Latino student populations may feel that they can serve as role models for those students with similar cultural backgrounds, and focus on assisting these students in excelling academically by reducing the likelihood of discrimination within the classroom. As a result, these school leaders may be more attentive to this student group's academic challenges, as well as behaviors that influence students (i.e. – classroom interactions, curriculum presentation, etc.). Thus, this study examines the interactive effect of the percentage of Latino teachers/administrators and the percentage of Latino students on Latino academic achievement.

- Latino teachers will have a greater impact on Latino academic achievement as the number of emergency credentialed teachers increases. The higher the number of teachers that have not participated in rigorous teaching programs, do not have educational coursework, or have fully developed the skills traditionally defined as necessary to create an effective learning environment, the more likely academic achievement will be influenced by teachers' race. If teachers cannot influence and improve students' academic achievement through their qualifications, race and the corresponding "active" and "passive" teacher effects may begin to play a larger role. The study will examine the interactive effect of Latino teachers and the percentage of emergency credentialed teachers on Latino academic achievement.
- The study tests the interaction variables for the percentage of Latino teachers and the percentage of English-language learners, and the percentage of Latino administrators and the percentage of English-language learners on Latino academic achievement hypothesizing that the percentage of Latino teachers and the percentage of Latino administrators will have a greater impact on Latino academic achievement in school where there are a greater number of English-language learners. Since the majority of English-language learners in

California are Latino (approximately 85 percent), as the percentage of English-language learners increases, the more likely Latino teachers and Latino administrators will impact academic achievement as students will seek to identify with leaders that have similar demographic characteristics and can serve as role models (Jepsen & de Alth, 2005).

- Latino student achievement will decrease as the percentage of the population in the high school's zip code that is Latino increases. The greater the percentage of Latinos, the greater the possibility that students will be surrounded by individuals with low socioeconomic backgrounds, low education levels, and a high population of Latinos that do not speak English as a primary language, thus likely not having academic support at home or within their peer groups.

III. Regression Data

This section provides sample and data information. Included tables list the variables used in the regression analysis and illustrate the anticipated direction for each, as well as the descriptive statistics and the correlation coefficients between each of the variables.

Sample

The sample frame is an important consideration in the research design, as the number of observations included in the sample total affects the strength of the analysis. The data used is from the CDE's collection of API scores, teacher, administrator, and student demographics, and other pertinent information from schools and districts. The CDE is the primary source and directly responsible for consolidating academic achievement statistics in California as the CDE is the state agency that must supply state-required (base and growth academic performance results) and federal-required reports (AYP and Program Improvement results) (CDE, 2010f). The sample population for this analysis is 441 out of 2,449 California public high schools that reported 2009 school-level API base scores for Latino students. Not all institutions have a high percentage of Latino students and therefore are not required to report a Latino API statistic. The current requirements for reporting subgroup API scores is a numerically significant population of either 100+ students enrolled on the first day of testing or, for smaller schools, 50+ students enrolled on the first day of testing who make up a least 15 percent of the total student population. These reporting guidelines may demonstrate limitations in the assessment of the effects of various factors on Latino API scores in California public high schools as not all institutions may have a significant Latino student population.

It is also important to note that while the total number of public high schools in California exceeds two thousand schools, this study focuses on a well-defined sample of northern and central California high schools, which include high schools from the following counties: Alameda, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Inyo, Kern, Kings, Lake, Madera, Marin, Mendocino, Merced, Modoc, Mono, Monterey, Napa, Placer, Sacramento, San Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba. It is also important to note that the population chosen excludes those California public high schools that follow the Alternative Schools Accountability Model (ASAM), those that are formatted for special education, as well as high schools that are a combination of ASAM and special education. A total of 2,008 high schools have been eliminated from this study for the reasons listed above or because the schools and/or high school zip codes are missing data for the included inputs due to information not being reported.

Descriptive Statistics

The following tables contain additional details on the explanatory variables, specifically descriptions and the anticipated effect for each variable (Table 11), the descriptive statistics (rounded to the nearest hundredth), including the mean, standard deviation, maximum and minimum values (Table 12), and the bivariate correlation coefficients between the explanatory variables, which illustrate the strength and direction of the linear relationships (Appendix A, Tables A through E). Correlation values illustrate how two variables change in relation to one another. The correlation matrix provides correlation coefficient values range from -1, a negative relationship where a one variable increases the other decreases, to +1, a positive relationship where as one variable increases the other variable also increases. The closer the correlation coefficient is to 1, the stronger the relationship between the two variables (Studenmund, 2007, p 53). If a correlation coefficient has a value of 0, the relationship between the explanatory variables is random and the two variables are unrelated.

Table 11: Variable Labels, Descriptions, Anticipated Direction of Effects, and Data Sources

Variable Label	Description	Anticipated Direction	Data Source
LATAPI09	2009 California high school's Latino API Scores (Base Score)		CDE 2009 Base API Data
Independent Variables: Teacher Inputs			
AA Teach	Percent of African American teachers	-	CDE, DataQuest, Teacher Data for 2009-10
AI Teach	Percent of American Indian Teachers	-	CDE, DataQuest, Teacher Data for 2009-10
AS Teach	Percent of Asian Teachers	+	CDE, DataQuest, Teacher Data for 2009-10
FI Teach	Percent of Filipino Teachers	-	CDE, DataQuest, Teacher Data for 2009-10
LAT Teach	Percent of Latino Teachers	+	CDE, DataQuest, Teacher Data for 2009-10
PI Teach	Percent of Pacific Islander Teacher	-	CDE, DataQuest, Teacher Data for 2009-10

Table 11 (continued)

Variable Label	Description	Anticipated Direction	Data Source
Teach MA	Percent of teachers possessing a master's degree	?	CDE, DataQuest, Teacher Data for 2009-10
Emerg	Percent of teachers with emergency teaching credentials	–	CDE 2009 Base API Data
Full	Percent of teachers with full teaching credentials	+	CDE 2009 Base API Data
Independent Variables: Administrator Inputs			
AA Admin	Percent of African American Administrators	–	CDE, DataQuest, Administrator Data for 2009-10
AI Admin	Percent of American Indian Administrators	–	CDE, DataQuest, Administrator Data for 2009-10
AS Admin	Percent of Asian Administrators	+	CDE, DataQuest, Administrator Data for 2009-10
FI Admin	Percent of Filipino Administrators	–	CDE, DataQuest, Administrator Data for 2009-10
LAT Admin	Percent of Latino Administrators	+	CDE, DataQuest, Administrator Data for 2009-10
PI Admin	Percent of Pacific Islander Administrators	–	CDE, DataQuest, Administrator Data for 2009-10
Admin MA	Percent of administrators possessing a master's degree	?	CDE, DataQuest, Administrator Data for 2009-10
Independent Variables: High School Inputs			
YRRND	Dummy variable for status as a year round high school (coded 1 = year round; 0 = otherwise)	?	CDE 2009 Base API Data File
CHART	Dummy variable for status as a charter school (coded 1 = charter; 0 = otherwise)	?	CDE 2009 Base API Data File
Independent Variables: Student Inputs			
AA	Percent of African American students	–	CDE 2009 Base API Data File

Table 11 (continued)

Variable Label	Description	Anticipated Direction	Data Source
AI	Percent of American Indian students	–	CDE 2009 Base API Data File
AS	Percent of Asian American students	+	CDE 2009 Base API Data File
FI	Percent of Filipino students	–	CDE 2009 Base API Data File
LAT	Percent of Latino students	+	CDE 2009 Base API Data File
PI	Percent of Pacific Islander students	–	CDE 2009 Base API Data File
ELL	Percent of students English-language learners	–	CDE 2009 Base API Data File
DI	Percent of students with disabilities	–	CDE 2009 Base API Data File
GATE	Percent of students in Gifted and Talented Education programs	+	CDE 2009 Base API Data File
FREE/RED	Percent of students participating in free/reduced price lunch program	–	CDE 2009 Base API Data File
Independent Variables: Social Inputs			
PCNT_LAT	Percent of population that is Latino in high school's zip code	–	Zip Atlas Database
COL_ED	Aggregate measure of the Percent of parents that have any college education	+	CDE 2009 Base API Data File

Table 12: Descriptive Statistics

Variable Label	Mean	Standard Deviation	Minimum Value	Maximum Value
Dependent Variable				
LATAPI09	672.62	61.85	471	893
Independent Variables: Teacher Inputs				
AA Teach	2.82	4.73	0	33
AI Teach	0.63	1.24	0	8
AS Teach	4.28	4.66	0	24
FI Teach	1.46	2.68	0	14
LAT Teach	13.27	9.37	0	62
PI Teach	0.18	0.83	0	14
Teach MA	33.09	12.78	3	82
Emerg	2.60	4.35	0	30
Full	93.84	6.95	46	100
Independent Variables: Administrator Inputs				
AA Admin	8.05	18.46	0	100
AI Admin	0.80	5.48	0	50
AS Admin	2.55	9.88	0	100
FI Admin	1.11	5.58	0	50
LAT Admin	16.08	23.47	0	100
PI Admin	0.16	2.00	0	33
Admin MA	68.10	30.50	0	100
Independent Variables: High School Inputs				
YRRND	0.00	0.07	0	1
CHART	0.08	0.27	0	1
Independent Variables: Student Inputs				
AA	6.97	8.87	0	60
AI	0.81	1.32	0	12
AS	9.27	12.05	0	74
FI	3.11	5.12	0	44
LAT	43.78	23.39	7	100
PI	0.78	1.23	0	8
ELL	16.78	12.75	0	99
DI	8.48	3.01	0	17
GATE	9.73	7.91	0	62
FREE/RED	46.22	23.71	0	100
Independent Variables: Social Inputs				
PCNT_LAT	28.77	19.73	2.76	93.62
COL_ED	52.75	21.61	0	96

IV. Qualitative Analysis of Administrators' Opinions of Regression Findings

This study also includes qualitative analysis on various administrators' opinions on whether they believe race/ethnicity influences Latino high school students' academic achievement, specifically in regards to the results of this study's regression analysis. The goal was to determine whether the factors suggested in the literature review and in the quantitative analysis as being related to Latino students' academic achievement were in fact found to be related to Latino students' academic achievement from the perspectives of high school administrators.

Data

Data for this portion of the analysis relied on phone and in-person interviews. In order to ensure the safety of the participants, the California State University, Sacramento, Public Policy and Administration Department's Human Subjects Review Committee reviewed the research procedures and interview questionnaire. The Committee determined that the research proposal did not pose a risk to the subjects. Participants were informed that they could decline to answer any of the questions. In addition, participants received full disclosure on the nature and purpose of the research, which included informing participants that the results of the research will be made available to the public. However, participants' names and other identifying information would not be publically reported. Participants were also provided with my contact information in the instance there are questions or concerns regarding the study.

Interviewee Selection

I only selected administrators to interview, and excluded interviewing teachers, as administrators assume a greater leadership role in schools in terms of their involvement in developing curriculum, a school's mission, parental involvement in students' education, and teacher/classroom expectations. Due to a limited amount of resources, I was unable to interview administrators from all included high schools or school districts.

A total of 60 Placer, Sacramento, and Yolo county high schools were included in the quantitative analysis. I calculated the mean and standard deviation of the percentage of Latino students for these 60 high schools based on the 2009-10 school year data and sought to interview a total of 9 administrators (three administrators from schools that were at least one standard deviation above the mean, three administrators from schools that were at least one standard deviation below the mean, and three administrators from schools that were near the mean). I requested participation from a total of 33 administrators at the identified high schools via phone and email inviting them to participate in an hour long phone interview regarding factors affecting Latino students' academic achievement. The majority of administrators did not respond or declined to participate. As a result, the analysis includes interview responses from a total of four administrators from the greater Sacramento area.

I worked with administrators to schedule the phone and in-person interviews during times that were convenient to their schedules. The interviews lasted between 35 minutes and 90 minutes, depending on the level of detail administrators wanted to discuss. Although it may appear that a connection would be difficult to establish with administrators as the interview process was the first opportunity to establish a personal connection with these individuals, all of the participants were passionate in discussing education and appeared to enjoy the opportunity to discuss their professional experiences.

Participants’ high school administration experience ranged from six years to sixteen years, including lead and assistant positions. Three of the four administrators identified themselves as Latino, and three of the four administrators identified themselves as female. A total of sixteen open-ended questions were asked, specifically in regards to administrators’ professional opinions of the regression results and what they view as the challenges in maintaining and improving Latino academic achievement levels, as well as the strategies they currently use in their schools. The final interview questions are included in Appendix B.

It is once again important to note a limitation of the qualitative analysis as only four administrators were interviewed. Administrators from different school districts oversee different student populations in their schools, and in turn experience different obstacles in regards to Latino academic achievement, teacher/student relationships, classroom interactions, etc. For example, three of the four administrators interviewed are employed at a high school with a Latino student population of 40 percent and above, while one of the four administrators is employed at a high school with a Latino student population of 14 percent and below. Consequently, the results of these case studies may not be generalized and interpreted as the opinions of all school administrators.

Analysis

I analyzed the qualitative data by using a comparative case study method and inferring common themes found in the interview responses concerning the relationship between Latino academic achievement and the percentage of Latino students, the percentage of Latino teachers and administrators, and the percentage of the population within the school's zip code that are Latino. I categorized and organized this information into an Excel spreadsheet. Subsequently, I examined the information and discussed the opinions and suggestions that were similar and different across administrators' responses. The following chapter includes the results of the regression analysis, as well as the qualitative analysis.

Chapter 4

RESULTS

The following chapter presents and discusses the results of the three basic functional forms used in the OLS regression analysis: linear-linear, log-linear, and log-mixed log. Section I discusses the three functional forms and provides justification as to why one of the functional forms is preferred in the analysis over the others. Table 13 illustrates what explanatory variables have a statistically significant effect on high schools' Latino API scores. Section II describes the processes used to find possible errors in the regression analysis (i.e. – multicollinearity and heteroskedasticity) and the manners in which such errors are remedied. Section III compares the regression results of the chosen functional form and the corrected regression results. In addition, the expected results of the functional regression model noted in Chapter 3 are compared to the actual results of the regression analysis. Possible explanations for any discrepancies are offered. Lastly, Section IV presents the results of the qualitative analysis of high school administrators' reactions to the results, as well as their opinions of the issues surrounding Latino academic achievement.

I. Selecting a Functional Form for the Regression Analysis

Table 13 reports the results of the three OLS functional forms tested and illustrates how the regression findings differ based on the functional form used. The table includes the un-standardized coefficients, standard errors in parentheses, variance inflation factors (VIFs), and the statistical significance of each of the regression coefficients at the 85, 90, 95, and 99 percent confidence levels. Stating that a regression coefficient is statistically significant at the 95 percent confidence level implies that 95 percent of the time one can predict that the explanatory variable has an effect on the dependent variable. The VIFs measure the degree to which a particular explanatory variable is explained by the other explanatory variables included in the equation, making these factors important in identifying the severity of multicollinearity in the regression equation (Studenmund, 2006, p. 258). Section II provides additional details on the usage of VIFs in detecting multicollinearity.

Based on the results of the three OLS regressions, I decided to use the log-mixed log functional form for my analysis. This has the dependent variable, as well as the explanatory variables that do not have any zero or negative values, in log form. Although one approach to choosing a functional form could be to choose the model with the highest R-squared or adjusted R-squared,[16] these statistics cannot be compared across functional forms because variables have been transformed in some of the functional forms and not in others, and as a result this statistic is irrelevant when deciding on the best model (Studenmund, 2006, p. 229). Thus, the number of significant relationships or, more specifically the number of significant relationships in the expected direction, influences which functional form to use. The log-mixed log regression results yielded 12 of the 30 explanatory variables significant at the 85% confidence level[17]. Conversely, the

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[16] R-squared and adjusted R-squared measure the quality of fit of a regression equation, or the proportion of variation in the dependent variable that is explained by the explanatory variables. The difference between R-squared and Adjusted R-squared is that R-squared always increases when a new explanatory variable is added to a model, while the latter increases only if the new variable improves the quality of fit by meaningfully explaining the dependent variable. The highest possible value for both measurements is 1.00 (Studenmund, 2006, p. 53).

[17] The 85 percent confidence level is the lower end of the range for statistically significant results in this analysis.

linear and log-lin forms yielded 10 and 11 of the 30 explanatory variables significant at the 85% confidence level, respectively. In addition to having more significant variables than the other functional forms, the log-mixed log functional form accounts for nonlinear relationships between an explanatory and dependent variable, and furthermore, the regression coefficients directly represent an elasticity (which measures the percentage change in the dependent variable for a one percent change in an explanatory variable and is calculated by multiplying the coefficient term by 100).

Table 13: Regression Results Across Functional Forms

Variable Label	Log–Lin	Log–Mixed Log	Linear	VIFs for Log-Lin	VIFs for Log-Mixed Log	VIFs for Linear
Constant	6.596 (.076)	6.966 (.256)	728.599 (50.671)			
Independent Variables: Teacher Inputs						
AA Teach	-.002* (.001)	-.002 (.001)	-1.254* (.817)	2.987	2.975	2.987
AI Teach	.003 (.003)	.003 (.003)	1.438 (1.964)	1.179	1.177	1.179
AS Teach	-.001 (.001)	-8.068E-4 (.001)	-.861 (.704)	2.154	2.074	2.154
FI Teach	-.002 (.002)	-.002 (.002)	-1.083 (1.075)	1.659	1.655	1.659
LAT Teach	-2.243E-4 (.001)	-1.749E-4 (.001)	-.117 (.386)	2.620	2.420	2.620
PI Teach	.003 (.004)	.003 (.004)	2.245 (2.916)	1.172	1.197	1.172
Teach MA(Ln)	1.333E-4 (.000)	.002 (.009)	.109 (.218)	1.555	1.465	1.555
Emerg	-.001*** (.001)	-.001* (.001)	-.880* (.576)	1.257	1.255	1.257
Full(Ln)	-.001* (.001)	-.077 (.055)	-.621 (.443)	1.901	1.902	1.901
Independent Variables: Administrator Inputs						
AA Admin	-2.005E-4 (.000)	-2.245E-4 (.000)	-.112 (.163)	1.803	1.801	1.803

Table 13 (Continued)

Variable Label	Log–Lin	Log–Mixed Log	Linear	VIFs for Log-Lin	VIFs for Log-Mixed Log	VIFs for Linear
AI Admin	.001 (.001)	4.518E-4 (.000)	.295 (.421)	1.068	1.070	1.068
AS Admin	-2.136E-4 (.000)	-1.779E-4 (.000)	-.131 (.246)	1.187	1.184	1.187
FI Admin	-5.114E-5 (.001)	-7.349E-5 (.001)	-.069 (.416)	1.079	1.080	1.079
LAT Admin	2.755E-4* (.000)	2.979E-4* (.000)	.160 (.118)	1.542	1.516	1.542
PI Admin	-5.620E-4 (.002)	-4.992E-4 (.002)	-.423 (1.142)	1.048	1.053	1.048
Admin MA	-1.259E-4 (.000)	-8.127E-5 (.000)	-.098 (.082)	1.261	1.254	1.261
Independent Variables: High School Inputs						
YRRND	-.038 (.051)	-.033 (.051)	-30.229 (34.145)	1.057	1.057	1.057
CHART	-.020 (.015)	-.022* (.015)	-12.197 (10.168)	1.517	1.504	1.517
Independent Variables: Student Inputs						
AA	-.001** (.001)	-.001*** (.001)	-.739* (.454)	3.254	3.041	3.254
AI	-.008**** (.003)	-.009**** (.003)	-5.637**** (2.006)	1.396	1.350	1.396
AS	2.092E-4 (.000)	-3.110E-4 (.000)	.145 (.312)	2.828	2.694	2.828
FI	-7.455E-5 (.001)	-1.101E-4 (.001)	-.162 (.566)	1.707	1.724	1.707
LAT(Ln)	-5.597E-4 (.000)	-.054**** (.015)	-.420 (.315)	10.880	7.545	10.880
PI	4.462E-4 (.003)	.001 (.003)	.159 (2.305)	1.613	1.589	1.613
ELL	-.002**** (.000)	-.002**** (.000)	-1.126**** (.315)	3.232	3.078	3.232

Table 13 (Continued)

Variable Label	Log–Lin	Log–Mixed Log	Linear	VIFs for Log-Lin	VIFs for Log-Mixed Log	VIFs for Linear
DI	-.007**** (.001)	-.007**** (.001)	-5.260**** (.894)	1.446	1.404	1.446
GATE	.001**** (.001)	.001*** (.001)	.910**** (.349)	1.523	1.499	1.523
FREE/RED	.001**** (.000)	.001**** (.000)	.505*** (.211)	4.992	4.897	4.992
Independent Variables: Social Inputs						
PCNT_ LAT(Ln)	4.749E-4 (.000)	.022*** (.009)	.343* (.238)	4.398	3.859	4.398
COL_ED	.002**** (.000)	.002**** (.000)	1.231**** (.256)	6.130	5.867	6.130
R-Squared	.461	.475	.465			
Adjusted R-Squared	.422	.437	.426			
Observations (N)	441	441	441			

Shaded Column: Functional Form Used
Ln Variables = Logged variables (variables that do not have zero or negative values)
* significant at the 85% confidence level, **significant at the 90% confidence level, ***significant at the 95% confidence level, ****significant at the 99% confidence level (All tests are two-tailed t-tests).

II. Errors in Regression Results

The most important phases in regression analysis are specifying a theoretically sound regression model, which includes the careful selection of explanatory variables, indicating the manners in which these variables are measured, as well as choosing the most effective functional form to illustrate the relationship between the independent variables and the dependent variable. Although careful consideration may be taken in order avoid various errors that result from steps involved in specifying a regression equation, certain errors may arise nonetheless as such errors naturally occur with the specific data set. Two common issues, particularly found in cross-sectional data models in which observations are collected from the same time frame (i.e. – 2009 academic school year), but are collected from different units (i.e. – high schools), are multicollinearity and heteroskedasticity. The following discussion addresses whether these issues are present in the regression results, and identifies possible remedies.

Multicollinearity

Multicollinearity is a violation of the Classical Assumption[18] which states that, "no explanatory variable is a perfect linear function of any other explanatory variables" (Studenmund, 2006, p. 245). In the instance that there is a strong linear relationship between two or more explanatory variables, it is extremely difficult to assess the individual variables' effects on the dependent variable because whenever one explanatory variable changes, the other explanatory will tend to change as well. Such strong relationships may result from the specific sample chosen or theoretical errors. For example, research surrounding social science topics that typically include conditional variables such as socioeconomic status, education level, and English-language capabilities, may often experience high multicollinearity as these variables are likely interrelated. Nevertheless, it is important to consider that it is extremely rare to observe a regression equation where correlation between some explanatory variables does not exist. Thus, multicollinearity is expected. However, it is the *degree* to which multicollinearity exists in the equation that is important to note. Although multicollinearity does not adversely affect the regression coefficients by creating bias, it may lead to high standard

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[18] Classical assumptions are a series of basic assumptions that must be met in order for an OLS regression to be considered the "best" estimation technique for an analysis (Studenmund, 2006, p.88).

errors and low t-scores which in turn create difficulties in achieving statistical significance.

Two techniques commonly used in detecting multicollinearity are examining the bivariate correlation coefficients and calculating the VIFs for the explanatory variables. The bivariate correlation coefficients indicate the strength and direction of the relationship between two variables. Instances where correlation coefficients are high in absolute value, typically greater than 0.80, there is an indication of significant multicollinearity (Studenmund, 2006, p. 257). Appendix A (Tables A through E) identifies these values and relationships. As previously mentioned, multicollinearity may also be detected by calculating the VIFs for each explanatory variable (Table 13). This measurement assesses the degree to which *one* explanatory variable may be explained by all other explanatory variables in the equation. A general rule states that VIFs greater than 5 indicate a high degree of multicollinearity (Studenmund, 2006, p. 259). However, this is only one of several rules of thumb as there is no fixed VIF decision rule. For instance, some researchers have found VIF statistics as high as 10 acceptable (Lin, 2006; O'Brien, 2007). Conversely others, like Menard (1995), provide slightly more detail stating that VIFs over 5 should be concerning, while VIFs greater than 10 indicate severe multicollinearity (as cited in O'Brien, 2007).

Results for the log-mixed log regression analysis exhibit bivariate correlation coefficients greater than 0.80 and VIFs greater than 5. Two relationships between student and social inputs have high bivariate correlation coefficients (percentage of Latino students at a high school and percentage of population that is Latino in a high school's zip code; percentage of students participating in free/reduced price lunch programs and percentage of parents with any college education experience). In some instances, a possible solution is to eliminate one of the variables in the relationship as the variable may be measuring the same effects of another variable, or the variable uses some of the same information as another variable. On the contrary, on a theoretical level, one may argue to include both variables in the regression equation as the variables are pertinent to the purpose of the regression analysis: to include and control for as many student, school, and social inputs in order to assess various variables' effects on high schools' 2009 base Latino API scores.

The utilization of the same information is likely the case in regards to the high bivariate correlation coefficient illustrating the nature of the relationship between the percentage of Latino students and the percentage of the population that is Latino in a high school's zip code because some redundant information is used as the percentage of Latinos in a high school's zip code includes the Latino students at the high school. Although the VIFs for percentage of Latino students and percentage of Latinos in the high school's zip code are 7.545 and 3.859 respectively, the bivariate correlation coefficient is only slightly higher than 0.80 (0.835). In addition, both variables are found to be statistically significant, and both are explanatory variables that are theoretically sound and belong in the equation.

Similarly, the strong relationship between the percentage of students participating in free/reduced price lunch programs and the percentage of parents that have any level of college education experience has a bivariate correlation coefficient of -.847, and VIFs of

4.897 and 5.867, respectively. Although the VIFs are greater than 5, theoretically, a strong relationship between these two variables is logical. One may expect that as the number of parents that have any college education increases, the number of students participating in free/reduced price lunches decreases since parents with higher education experience likely earn a sufficient income in order to not enroll their children in low-income lunch programs. In addition, the percentage of students participating in free/reduced price lunch programs and percentage of parents with any college education experience are statistically significant, and theoretically belong in the regression equation.

While some multicollinearity exists among the variables, all variables will remain in the regression model in order to reduce omitted variable bias[19] and because the variables suggesting high multicollinearity are statistically significant.

Heteroskedasticity

The presence of heteroskedasticity also violates one of the Classical Assumptions, which states that "observations of the error term are drawn from a distribution that has a constant variance" (Studenmund, 2006, p. 346). Thus, cross-sectional data sets where inconsistencies exist in the variance of the error term between larger and smaller observations (i.e. – large high schools and small high schools) are prone to heteroskedasticity. Similar to multicollinearity, the consequences of heteroskedasticity do not lead to biasess in the estimated coefficients. Nonethesless, heteroskedasticity

[19] It is important to note that another manner in which to reduce the degree of multicollinearity is to increase the sample size. Because this study focuses on Northern and Central California high schools reporting 2009 API scores for Latino high school students, the study is limited. Future studies may choose to expand statewide or use time-series data.

adversely affects the regression analysis by likely leading to OLS incorrectly estimating the true coefficients, as well as the standard errors[20], which leads to an overestimation of the t-scores making them unreliable when hypothesis testing. For example, if a correlation coefficient's t-score is too high, it increases the likelihood that one will reject a null hypothesis when, in fact, it cannot be rejected. In other words, heteroskedasticity increases the chance of committing Type I errors.

A commonly used method for testing for the presence of heteroskedasticity is the Park Test, in which the residuals (or estimates of the error terms) from the regression are squared, logged, and tested in a subsequent regression. This "second" regression uses the log of the square residuals as the dependent variable and a Z factor, or the log of an explanatory variable (not necessarily a variable in the original regression equation) that appears to vary with variance of the error term. When testing for heteroskedasticity in this analysis, I identified the following variable: total high school enrollment as the Z factor since there is suspect of significant variation in size of high schools within the data set. The interactive scatterplot of the squared residuals separately plotted against the Z factor (Appendix C) illustrates that heteroskedasticity is present. Additionally, the results of the t-test are statistically significant (sig = .000) indicating the possibility that heteroskedasticity is present in the equation and that total high school enrollment and the residuals are related. Furthermore, the results suggest that one may reject the null hypothesis of homoskedasticity as the absolute value of the calculated t-score (3.563 or |-3.563|) is higher the critical t-value (2.576 at a 1% level of confidence for a two-tailed

[20] The standard error of the estimated coefficients is the square root of the estimated variance of the coefficient (Studenmund, 2006, p. 102).

t-test with 440 degrees of freedom). Although the presence of heteroskedasticity does not cause a bias in the coefficient estimates, the standard errors reported within the regression are called into question and can be considered biased. Thus, it was necessary to correct for heteroskedasticity.

In order to correct for heteroskedasticity, I performed a weight estimation procedure, which calculates the coefficients of the linear regression model using Weighted Least Squares (WLS). In WLS, the regression equation is divided by the proportionality factor of Z, which results in an error term that has constant variance (Studenmund, 2006, p. 363). This gives the more accurate observations, or those with less variability, greater weight in establishing the regression coefficients. In addition, the weight estimation procedure examines a range of weight transformations and identifies the one that will provide the data with the "best fit." As a result, greater confidence is placed in the WLS results. Table 14 provides a detailed comparison of the results pre- and post-correction for heteroskedasticity. Section III further discusses the log-mixed log and WLS regression results, and evaluates the expected and actual results.

Table 14: Coefficient and Statistical Significance Comparisons, Pre and Post Correction for Heteroskedasticity

Variable Label	WLS (Post Correction)	Log–Mixed Log (Pre Correction)
Constant	6.988 (.267)	6.966 (.256)
Independent Variables: Teacher Inputs		
AA Teach	-.002** (.001)	-.002 (.001)
AI Teach	.001 (.003)	.003 (.003)
AS Teach	-.002* (.001)	-8.068E-4 (.001)

Table 14 (Continued)		
Variable Label	WLS (Post Correction)	Log–Mixed Log (Pre Correction)
FI Teach	-7.642E-4 (.001)	-.002 (.002)
LAT Teach	.001 (.001)	-1.749E-4 (.001)
PI Teach	.007* (.005)	.003 (.004)
Teach MA(Ln)	-.004 (.008)	.002 (.009)
Emerg	-4.296E-4 (.001)	-.001* (.001)
Full(Ln)	-.069 (.057)	-.077 (.055)
Independent Variables: Administrator Inputs		
AA Admin	-3.017E-4 (.000)	-2.245E-4 (.000)
AI Admin	6.004E-5 (.001)	4.518E-4 (.000)
AS Admin	-1.370E-4 (.000)	-1.779E-4 (.000)
FI Admin	-1.453E-5 (.001)	-7.349E-5 (.001)
LAT Admin	2.850E-4* (.000)	2.979E-4* (.000)
PI Admin	-6.714E-4 (.001)	-4.992E-4 (.002)
Admin MA	-1.265E-4 (.000)	-8.127E-5 (.000)
Independent Variables: High School Inputs		
YRRND	-.041 (.046)	-.033 (.051)
CHART	-.049**** (.016)	-.022* (.015)
Independent Variables: Student Inputs		
AA	-.001** (.001)	-.001*** (.001)
AI	-.011**** (.003)	-.009**** (.003)
AS	-1.516E-4 (.000)	-3.110E-4 (.000)

Table 14 (Continued)		
Variable Label	WLS (Post Correction)	Log–Mixed Log (Pre Correction)
FI	-7.849E-4 (.001)	-1.101E-4 (.001)
LAT(Ln)	-.045**** (.013)	-.054**** (.015)
PI	.002 (.003)	.001 (.003)
ELL	-.002**** (.000)	-.002**** (.000)
DI	-.008**** (.001)	-.007**** (.001)
GATE	.001*** (.000)	.001*** (.001)
FREE/RED	.001** (.000)	.001**** (.000)
Independent Variables: Social Inputs		
PCNT_LAT (Ln)	.012* (.008)	.022*** (.009)
COL_ED	.001**** (.000)	.002**** (.000)
R-Squared	.571	.475
Adjusted R-Squared	.540	.437
Observations (N)	441	441

Ln Variables = Logged variables (variables that do not have zero or negative values). * significant at the 85% confidence level, **significant at the 90% confidence level, ***significant at the 95% confidence level, ****significant at the 99% confidence level (All tests are two-tailed t-tests).

III. Actual vs. Expected Regression Results

The following variables were found to be statistically significant and in the expected direction in both the log-mixed log functional form and the WLS regression: percentage of Latino administrators (+), percentage of African American students (-), percentage of American Indian students (-), percentage of English-language learners (-), percentage of students with disabilities (-), percentage of students in Gifted and Talented

Education programs (+), and percentage of parents that have any college education experience (+). Surprisingly, the results for the log-mixed log functional form and the WLS regression indicate that the percentage of Latino students have significant and negative relationship with high schools' Latino API scores, while the percentage of students participating in free/reduced price lunch programs and the percentage of the population that is Latino in a high school's zip code have significant and positive relationships with high schools' Latino API scores.

The results concerning the percentage of Latino students having a significant and negative relationship with Latino API scores may be due to Latino students learning better when surrounded by a diverse student body, where the different perspectives of students from others race/ethnic subgroups encourage complex thinking. A previous study reviewed indicated that an increase in the population of Latino students decreases API scores (Goe, 2002). Current results suggest that this may also be true for API scores of individual student populations. Conversely, Weiher's (2000) study found that as the number of white students passing an academic achievement exam increases so did the number of Latinos passing the exam, possibly indicating that Latino academic achievement increases when surrounded by students of traditionally high achieving races. Latino students attending schools with greater racial integration may also experience more exposure to English-learning as opposed to frequent interactions with Latino English-language learners in the classroom. Powers (2003) found that increases in the percentage of English-language learners decreases API scores. The log-mixed log and WLS regression results mirror Powers (2003) and suggest that increases in the percentage of English-language learners have a negative relationship with Latino API scores. These results coupled with the negative relationship found between the percentage of Latino students and Latino API scores raises questions of whether there is a negative relationship between *Latino* English-language learners and Latino students API scores. Another explanation of the negative relationship may be that a majority of Latino students have negative attitudes and expectations in regards to academics, which can be a peer effect (unmeasured in this analysis) that discourages other Latino students from attempting to improve on their academic achievement.

In regards to the relationship between the percentage of students participating in free/reduced price lunches and Latino API scores, the expected result would be a negative relationship as opposed to the positive relationship illustrated in the results. Variables associated with low socioeconomic status traditionally have negative relationships with academic achievement. However, these results do not support the idea that low-income peers negatively affect academic achievement. Although possible explanations for this result are unclear, perhaps the peer effect associated with socioeconomic status influences academic achievement during earlier grade levels. Another possible explanation is that Latino students are choosing to establish relationships with fellow students that possess high academic aspirations which may reduce the effect of the percentage of students with low socioeconomic status on academic achievement. Weiher (2000) found a similar result where an increase in students with low socioeconomic status positively affects Latino students, and suggests that Latino students may not feel competitive pressure from privileged student groups. Nevertheless, the relationship between this explanatory variable and Latino API scores is small and warrants cautious interpretation.

Contrary to the negative relationship between the percentage of Latino students and Latino API scores, the percentage of the population that is Latino within a high school's zip code has a significant and positive relationship to Latino API scores. This result suggests that Latinos are more likely to have greater academic achievement when surrounded by more Latino residents in their neighborhoods. While students in highly Latino populated areas may attend high poverty schools with low academic success, perhaps positive racial identity, connection to a group, and participating in community activities foster a sense of belonging and increase students' confidence. Such social factors may serve as "buffers" against negative neighborhood effects. Moreover, large Latino communities may be able to influence schools/school districts to be more attentive to the academic achievement of Latino students in the area.

Previous literature provides conflicting results on charter status and its effects on academic achievement. As a result, the expected direction of the charter status variable was unknown. However, the log-mixed log and WLS regression results for this study yield a significant and negative relationship between charter status and Latino API scores. This result is of interest as charter schools sometimes receive praise for their autonomy and ability to delegate public funding and resources as their administration finds appropriate. With nearly 1000 charter schools and a growing population of Latinos, charter schools possibly having a negative impact on Latino academic achievement should raise concern for California's public education system (EdSource, 2011).

Variables only found to be statistically significant in the WLS regression include the percentage of African American teachers (-), the percentage of Asian teachers (-), and the percentage of Pacific Islander teachers (+). While the percentage of African American teachers had the expected negative effect on Latino API scores, the percentage of Asian teachers and the percentage of Pacific Islander teachers differed from the expected direction. The percentage of Asian teachers may have a negative effect on Latino API scores due to the identified “active” and “passive” teacher effects found in previous literature (Dee, 2005). One explanation may be that because Asians are traditionally a well-educated student subgroup, these teachers may hold unintentional, preconceived perceptions towards Latino students’ performance and behavior as Latino students are traditionally associated with low academic achievement. Teachers may hold these beliefs based on previous experiences or simply Latino students’ reputation. Such beliefs can affect how teachers interact with these students and influence how and what they learn in the classroom. Conversely, the significant and negative relationship may be a result of a “stereotype” threat in which Latino students feel uncomfortable or tentative around Asian teachers due to the academic stereotypes associated with Latinos, and believe that because Asian teachers traditionally have successful academic backgrounds, these individuals may possess negative opinions of them as they are members of a race/ethnicity subgroup that does not traditionally emphasize academic success (Dee, 2005; Steele, 1997; Steele & Aronson, 1995). The positive correlation between Pacific Islander teachers and Latino API scores is contrary to the expected direction, which was based on previous research suggesting that African American teachers having a negative effect on academic achievement, leading to the anticipation that other minority teachers (aside from Asians) would also have a negative effect on academic achievement (Aston & Link, 2000; Ehrenberg & Brewer, 1995). This result warrants additional exploration into the relationship.

Results also yielded a negative relationship between the percentage of emergency credentialed teachers and Latino API scores in both the log-mixed log and WLS regressions, falling in line with previous research (Clotfelter et al., 2007; Darling-Hammond et al., 2005; Goe, 2002; Powers, 2003;). However, the relationship was only statistically significant in the log-mixed log regression. Lastly, the interaction variables tested in this analysis, which included Latino teachers/administrators as one of the multiples, did not yield statistically significant results in either the log-mixed log or WLS regressions.

Section IV: Qualitative Results

The high school administrator interviews revealed several themes and factors that school leaders find imperative in maintaining and improving Latino students', as well as all students', academic achievement. The interview questions are organized into three factors that were found to be related to Latino academic achievement in the quantitative analysis: (1) the racial/ethnic composition of a high school's leaders, (2) the racial/ethnic composition of the high school's student population, and (3) the racial/ethnic composition of the high school's neighborhood. I discuss the various responses for each of the three factors, as well as the various strategies used and challenges expressed by administrators in advancing Latino academic achievement levels.

Racial/Ethnic Composition of High School Leaders

A majority of the participating administrators believe that it is beneficial to minority students' academic achievement if a school site that has a larger percentage of minorities as students also has a minority principal or vice principal. Three of the four respondents noted that having a minority administrator is not necessarily a *critical* factor to ensuring minority students' academic achievement, but do find it beneficial because although school administrators can serve as a role model to all students, those administrators that are minorities can better serve as a role model to specifically to minority student subgroups by giving students concrete examples of what is possible for minorities academically and vocationally. Furthermore, these administrators indicated that minority administrators may be better able to relate and communicate with minority students and parents as they understand their culture, struggles, and possibly even their language. Interestingly, the only non-Latino administrator interviewed disagreed stating that "good leadership does not see color," and indicated that there is no particular benefit in having a minority administrator at a school that has a large percentage of minority students if the administrator values education and supports all students.

Administrators provided similar responses when asked whether they found it beneficial for minority students' academic outcomes if a school site that has a larger percentage of minorities as students also has a larger percentage of minority teachers. Three of the four administrators indicated that it could possibly be more beneficial for schools with high minority student populations to have a higher percentage of minority teachers. Two of these three administrators specifically stated that it is similar to administrators’ race/ethnicity in that teachers can serve as role models and can increase minority students’ trust and comfort levels in an academic environment. All four administrators’ responses indicated a general consensus in that all teachers can raise students’ academic achievement if the school values education for all students, and encourages effective communication with all students regarding what skills and activities are necessary to be academically successful, and offers support and access to all students.

Consistent across three of the four interviews was the suggestion that teachers’ and administrators’ race/ethnicity can sometimes affect all students, not solely minority students, in a negative way if allowed by the culture of a school. Biased mindsets created by previous experiences and societal stereotypes can affect the manner in which school leaders work and interact with particular student subgroups. An institution’s culture can magnify these negative perspectives. One administrator suggested that a school can reduce such biases through constant efforts by school leaders to eliminate race identification on campus, shifting the focus more towards all students being successful, rather than classifying students by race/ethnicity or ability. However, while this suggestion may assist in reducing negative stereotypes associated with race in some instances, implementing this strategy may also limit students’ individuality at school.

When answering the question specifically dealing with the regression analysis’ findings of a negative correlation between both the percentages of African American teachers and Asian American teachers and Latino students’ API scores, three of the four administrators commented on this as an interesting finding. The majority of participants attested this finding to conflicting cultural stereotypes that adversely affect classroom instruction and teachers' expectations of students. One administrator implied that this may be a misunderstanding in how certain students learn and suggested that administrators should try and assist teachers in adjusting their instructional techniques for different students as to provide rigorous and quality instruction to all students while ensuring that all students understand the material. Another administrator indicated that the negative correlation may be a result of African American and Asian American teachers being preoccupied with their own struggles in a dominant white teaching community being minorities themselves, and as a result may not have the resources to assist members of other minority subcultures, particularly students.

The regression analysis also yielded a positive correlation between the percentage of Latino administrators at a high school, and Latino students' API scores. The majority of participants indicated that this may be result of Latino administrators feeling more obligated to reach out to Latino students and doing more to ensure the success of this student population. Interestingly, two of the three Latino administrators responded to this question by detailing the institutional changes they made upon becoming administrators at their respective schools in order to increase the support provided to and expectations of Latino students. These administrators are both Latino and serve a large Latino student population, which may lend support to the viewpoint that school leaders are more aware of students' challenges and are more likely to consider improvement strategies a priority for student populations if those students are of similar race/ethnic background as them.

Racial/Ethnic Composition of High School Students

When asking participants about their thoughts on how Latino students score on their API if Latinos are the majority or minority at a high school, all four administrators indicated that it is not the racial/ethnic composition of the high school's students that affects Latino academic achievement, but rather the expectations, support, and quality of instruction provided to the students. Administrators discussed effective teaching and leadership as a manner in which to provide each student with the opportunity to aspire to reach successful achievement levels.

In regards to the regression results that indicate a negative relationship between the percentage of Latino students and Latino API scores, two administrators contradicted these findings with experiences at their own high schools. These administrators stated that as their Latino student population increased so did their Latino academic achievement scores. One administrator suggested that schools that have a negative relationship between the percentage of Latino students and Latino API scores may not be making the Latino student population a priority or not tailoring teaching and support strategies to specifically address the needs of Latino students. In addition, schools may be trying to focus on raising all subgroup scores simultaneously, but "in trying to hit all the targets at once, you will fail more so than if you address them one by one."

Another administrator provided an example where two high schools existed within a school district, one that had a student population that was 95 percent white and another that had a student population that was 75 percent Latino. The expectation at the predominantly white school was to prepare *all* students to go to college regardless of race/ethnicity, ability, etc. Conversely, most students at the predominantly Latino school did not attend higher education as this school was in a farming community and was comprised of students and parents who accepted certain outcomes as the norm. An executive decision was made to “balance out the schools” and a significant portion of the Latino student population from the predominantly Latino school was transferred to the predominantly white school. The expectation for students at the predominantly white school did not change as a result of the student population increasing in the percentage of minority students. Instead, administrators and teachers continued to have the same expectations, which was to prepare all students to attend college. Unfortunately, Latinos and other students at the previously predominantly Latino school continued to not attend college in high percentages. The administrator stated that administrators, teachers, parents, and students should “respect the culture, but [not] accept the culture.” From this, the administrator alluded that individuals must recognize stereotypes associated with cultures, acknowledge the positive aspects, but have an obligation as a school leader and or a community member to have a mindset that all students are able to learn at high levels and in turn provide the support programs necessary to foster a quality learning environment for all students. Thus, it is suggested that high expectations and effective support systems within a student’s academic environment can overcome the stereotypes of a culture.

Racial/Ethnic Composition of High School Neighborhoods

The majority of participating administrators agree that the racial/ethnic composition of a high school’s neighborhood influences the school’s overall API scores, as well as minority groups' API scores. However, administrators indicated that it is not necessarily a direct effect of the racial/ethnic composition that can influence schools' scores, but rather the expectations of the community, which may stem from environmental factors (i.e. - socioeconomic status, crime rate, etc.) or cultural beliefs pertaining to career choices and responsibilities. Unfortunately, communities exist that have low expectations for particular student subgroups, and may not anticipate that these students will continue on to higher education. Administrators argued that school leaders can overcome these low expectations, along with other limitations (i.e. – socioeconomic status, parent education, etc.), by providing all students with the same opportunities, support programs, and quality instruction that in turn give students access to choices. According to the participating administrators, these strategies, coupled with clear boundaries on campus, can provide a safe learning environment that will lead to all students being college-ready.

When informing administrators that the statistical analysis yielded a positive relationship between the percentage of the population in a high school's zip code that are Latino and the high school's Latino API scores, the majority of administrators continued to state that it is not a direct effect of the racial/ethnic composition of the neighborhood, but rather the community's expectations and support systems for students that affect academic achievement. Effective support systems can provide students with a sense of belonging, which can increase students' academic success. Interestingly, one administrator stated that this was a surprising finding that requires more examination as different generations of Latinos have different attitudes towards education. In this administrator's experience, first generation Latino families were found to be more actively engaged in their children's education as they are seeking the "American dream", whereas second and third generation Latino students and families may begin to feel a sense of entitlement.

Similar to the inference observed when examining administrators' responses to questions surrounding the racial/ethnic composition of high school students, a general implication provided by administrators in responding to whether the racial/ethnic composition of a high school's neighborhood affects academic achievement is that there is an indirect relationship. Certain community expectations can be the result of racial/ethnic composition. For example, more minorities tend to be of low-socioeconomic status, and Latino immigrants may not have high levels of education. Regardless of these factors, if a community has high expectations for their students and the quality of education schools should provide, and is supportive of the school and the students, then students will be successful. However, administrators indicated that both the community and the school leaders must share this belief system and strive for success in providing students with various options after high school.

Strategies and Challenges

Each of the participating administrators indicated that they have not experienced Latino parents expressing a desire for the school to hire more Latino teachers or Latino administrators. The administrator employed at the school with a Latino population of less than 14 percent stated that is not a significant Latino population within the community to express these types of concerns and thus far have not. The other administrators, that have schools with Latino student populations of 40 percent and above, expressed that Latino parents want to have their children's educational needs satisfied, not necessarily by Latino educators, but by *quality* educators. One administrator did indicate that Latino leadership can provide a sense of trust with Latino parents and students as there are assumptions that members of a similar ethnic background may better understand cultural barriers and personal challenges, but stated that it is still ultimately about teacher *quality*.

Along with quality teachers, participating administrators identified the following strategies as necessary in order to maintain and increase Latino academic achievement:

- Ensure that teachers are supportive and accessible to students, both inside and outside the classroom
- Ensure that there is constant dialogue between school leaders and students regarding the school's expectations and individual student's needs
- Hire bilingual staff to assist with English-language learning students and in creating increased comfort for Latino students
- Encourage diversification in teaching strategies, as this can increase engagement between teachers and students, and ensure that students are understanding the curriculum
- Ensure that teachers are not only preparing students for standardized testing, but also increase the focus on teaching students life skills and preparing them for higher education by assisting them in visualizing themselves in college environments

- Ensure that teachers and administrators establish a sense of caring and trust with students as education is beyond the classroom. Personal relationships with school leaders can show students support. Having supportive role models can increase students' motivation to succeed in the classroom.

Although most, if not all, of these strategies are implemented on a daily basis at the participating administrators' high schools, there are significant challenges that hinder their school's ability to sustain and raise Latino students' achievement scores. The main challenge identified by the majority of administrators was a lack of resources, both in regards to money and time. Funding for education has been reduced along with the number of days administrators have for staff development, which can limit administrators' ability to strategize with their staff on how to better assist students in general, as well as specific student subgroups. Moreover, administrators noted that there are fewer instructional days in the school year, which reduces the number of days teachers have to educate students on relevant material for their grade level. One administrator related these concerns back to the NCLB requirement that all students must be proficient by 2014, a task that is becoming more difficult for some schools as a result of the lack of resources and time available to educate students.

Administrators also had various suggestions regarding education policy changes that they believe can assist in increasing Latino academic achievement. One administrator stated that state mandates are misguided and that schools and school districts should be allowed to conduct independent research on education strategies that have yielded positive results in previous research. With education policies and strategies being macro level and possibly being based on research results in other states or other student populations that cannot be generalized across all Latino populations, the administrator suggested that states should mandate the target of achievement, but districts should have discretion on what strategies and policies are implemented, provided that there is an ample amount of research supporting the actions.

Another administrator suggested that there is an unrealistic view of the teaching profession. According to this administrator, teachers are expected to conduct a significant amount of lesson planning, grading, and tutoring on their own, unpaid time, which sometimes leads to frustrations and can decrease the quality of teachers' interactions with students. They suggested that the education system reexamine teachers' salaries and expected on-campus work hours in order to provide them with ample paid planning and student review time. This can increase the time teachers spend interacting with students to review learning expectations, providing support, establishing personal connections with students, and reviewing their teaching performance to make any necessary adjustments to ensure that all students understand the material.

Revisiting the allocation of funding to schools was also recommended by one administrator in regards funding provided to schools specifically for field trips. According to this administrator, there is currently no portion of the budget allocated to provide schools with the resources needed to conduct field trip activities. However, if schools had the ability to take Latino students to colleges, teachers and administrators can assist these students in visualizing themselves beyond high school and beyond their cultural stereotypes, as well as help them discover that there are opportunities for them beyond their individual communities and traditional cultural expectations.

The final suggestion was that the education system stop categorizing individuals by race and ethnicity as this approach just leads to negative awareness for students. According to one administrator, the education system should assist students in academics first and foremost, and with cultural identification afterward because the current system of identifying students in student subgroup categories does not allow students to visualize themselves beyond the stereotypes that are associated with their subgroup categories.

Summary

The interview portion of the research allowed me to investigate administrators' perspectives on how teachers', administrators', students' and communities' racial/ethnic composition are related to Latino academic achievement, as well as academic achievement in general. The differences and similarities between the administrators' responses allowed me to understand how high school leaders view the relationship between race and academic achievement and the common viewpoints that may exist across the population of administrators. In addition, I was able to gather information on the strategies and challenges administrators face daily in ensuring that their students receive quality education.

When examining administrators' responses to questions surrounding the racial/ethnic composition of high school leaders, three general beliefs were observed: (1) having minority teachers and administrators is not critical at a school with a majority of minority students, but it can assist in establishing relationship with minority students and can create a more comfortable learning environment, (2) conflicting cultural stereotypes can adversely affect classroom instruction and student interaction, (3) cultural subgroups may have a tendency to assist students from similar racial/ethnic backgrounds.

A general implication found in administrators' responses to questions surrounding the racial/ethnic composition of high school students is that the racial/ethnic composition of the student population does not affect academic achievement directly, but it is more the expectations, level of support, and quality of instruction provided to students that affects students' ability to overcome cultural stereotypes and obtain high levels of academic achievement. A similar implication was found in administrators' responses to the questions surrounding the racial/ethnic composition of a high school's neighborhood. Administrators suggested that the racial/ethnic composition of a high school's neighborhood has an indirect relationship to student achievement. Although certain communities' expectations can be the result of racial/ethnic composition, or more specifically the cultures associated with these subgroups, communities possessing high expectations for their students and a school's quality of education will have more successful minority students. However, administrators indicated that both the community and the school leaders must share this belief system and strive for success in providing *all* students with options after high school.

In the final chapter, the results of the quantitative and qualitative analyses are revisited and are used to draw conclusions on the correlation between race and Latino academic achievement. In addition, I discuss the limitations of the study and provide suggestions for further research.

Chapter 5

CONCLUSION

As stated in previous chapters, the purpose of this research is to address the question of whether teachers' and administrators' race/ethnicity affects Latino students' academic achievement. In order to determine whether a relationship existed between teachers' and administrators' race/ethnicity, as well as other high school, student, and social inputs, and Latino academic achievement in Northern and Central California high schools, I conducted quantitative and qualitative analyses. In this final chapter, I revisit the major findings of the analyses, and evaluate the results and discuss the implications of these findings. The chapter concludes with the limitations of the study and suggested improvements to the model and future research, along with a few closing comments.

Revisiting the Statistically Significant Results

When drawing conclusions regarding the relationships between the explanatory variables and high schools' Latino API scores, one may conclude that either a unit or percentage change in the explanatory variable results in a unit of percentage change in the dependent variable. I converted the regression coefficients into elasticities in order to more easily compare the variables by addressing the magnitude of the effect of each statistically significant explanatory variable on high schools' Latino API scores. More specifically, the percentage value change in high schools' Latino API scores for a one percent change in the explanatory variable, when holding all other factors constant.

Two statistically significant explanatory variables from the WLS log mixed-log regression were able to be expressed in log form, which allows for these variables' regression coefficients to be interpreted as elasticities directly. Thus, a one percent increase in the percentage of Latino students will decrease Latino API scores by .045 percent. Conversely, a one percent increase in the percentage of the Latino population in a high school's zip code will increase Latino API scores by .012 percent.

As noted in Table 14, only some of the variables included in the WLS log mixed-log regression were expressed in log form. For the variables not expressed in log form, I conducted conversion calculations to obtain elasticity values.[21] For teacher and administrator factors the elasticities indicate the following: one percent increases in African American and Asian teachers will result in .006 percent and .009 percent decreases high schools' Latino API scores, respectively, and one percent increases in Pacific Islander teachers will increase high schools' Latino API scores by .001 percent. Latino administrators also had a positive relationship, but with a slightly high elasticity value. A one percent increase in Latino administrators is expected to increase scores by .005 percent.

The majority of the student inputs had a negative relationship with high schools' Latino API scores, while the only social input not in log form had a positive relationship. More specifically, one percent increases in the percentage of African American students, American Indian students, English-language learners, and students with disabilities are expected to result in corresponding decreases of .007 percent, .009 percent, .034 percent, and .068 percent in scores. Conversely, one percent increases in the percentage of students in Gifted and Talented Education programs and students participating in

[21] Conversion calculations take the regression coefficient for each explanatory variable and multiply it by the variable's mean.

free/reduced price lunch programs are predicted to increase Latino API scores by .010 percent and .046 percent, respectively. Lastly, a one percent increase in the percentage of parents with college education experience is expected to increase Latino API scores by .053 percent.

The majority of the significant variables were consistent with the anticipated direction of the coefficients except for the following five variables: percentage of Asian teachers, percentage of Pacific Islander teachers, percentage of Latino students, percentage of students participating in free/reduced price lunch programs, and the percentage of the Latino population in the high school's zip code.

The qualitative analysis allowed me to further examine the relationship between race and Latino academic achievement through administrators' perspectives. Two important inferences were gathered from the interview process. The first is that the racial/ethnic composition of teachers and administrators at a school is not critical to maintaining and improving Latino students' academic achievement. According to participating administrators, the more critical factors that increase not only Latino students' academic achievement, but all students' academic achievement, are a school ensuring high academic expectations, an abundant amount of support systems available on campus so attempts to reach high academic expectations have the necessary support, and quality classroom instruction. The second conclusion is that communities are also responsible for driving high academic expectations, providing support to students, and insisting on quality instruction for their students. Participating administrators made certain to convey that communities play as essential of a role as school leaders and staff in maintaining and improving academic achievement levels by insisting that these three factors are present at a school site. Thus, all individuals involved in a student's life can affect students' academic achievement.

Evaluating the Results

The study's design examined various teacher, administrator, high school, student, and social factors that may be significantly correlated to Latino academic performance. While the significant findings may increase discussions of Latino students' successes and failures in California's public education system, the results are disappointing as not all of them align with the expected directions. Furthermore, with the regression coefficients measuring the percent change in Latino API scores, for a one-percent change in the explanatory variable, while holding all other explanatory variables constant, the results show that changes in any *one* of the explanatory variables will not lead to large changes in Latino API scores. One may infer that these results suggest that it is a combination of multiple factors that lead to large changes in Latino academic achievement levels rather than solely one factor.

Although not all the inputs dealing with teacher and administrator race/ethnicity were found significant (only three of the six teacher inputs, and one of the six administrator inputs), the results suggest that there is a plausible relationship between school leaders' race/ethnicity and Latino academic achievement. From the current study, one can also gather that school, student, and social factors also have an effect on Latino academic achievement. In the majority of instances, these other inputs have more statistically significant relationships with and have a greater impact on Latino API scores than teachers' and administrators' race/ethnicity. For example, the four teacher and administrator inputs that were found to be statistically significant had regression coefficients ranging from .007 to -.002. Conversely, the statistically significant regression coefficients for high school, student, and social inputs ranged from .012 to -.049.

Three rationalizations may be given to explain why the teacher and administrator race/ethnicity inputs have significant, but relatively small, effects on the academic achievement of Latino high school students in Northern and Central California. One, as suggested by administrators in the qualitative interview process, is that Northern and Central California high schools may have a great success in implementing strategies that reduce the effect of conflicting cultural stereotypes that can adversely affect classroom instruction and ensure that high expectations and support systems are in place, along with high quality instruction for *all* students, including Latinos, which reduce the challenges associated with heterogeneous groups and improve academic achievement. Northern and Central California schools may also have a less "challenging" Latino student population in regards to the percentages of students that are English-language learners or students who internalize cultural stereotypes compared to areas such as Southern California where more homogeneous and first generation Latino student populations exist.

A third explanation is that teachers and administrators do not interact nearly as much with students as fellow students do, which is why some of the student inputs dealing with race were found to have stronger relationships with Latino academic achievement. Latino academic achievement may be more dependent on the extent racial/ethnic integration exists within the student population at the school, rather than the racial/ethnic composition of school leadership. A manner in which to further study the correlation between students and academic achievement would be to examine student populations beyond simple population percentages (i.e. – percentages of students that are of a particular race, English-language learners, students that have disabilities, etc.) and focus more on students' direct peer groups and degree of interactions with various student subgroups. For example, do Latino students have higher academic achievement scores if their peer group consists more of students from a particular race/ethnicity or socioeconomic status? Or, is there an effect on Latino student achievement if Latino students participate in athletics or clubs?

Nevertheless, it is important to recognize the various factors the study found to have statistically significant relationships to Latino API scores at confidence levels between 85 and 99 percent. Previous studies also support the notion that multiple inputs influence academic performance, which increases the complexity surrounding the development of strategies to ensure academic success and in turn makes it difficult to resolve the issue of the academic achievement gap. Consequently, policymakers, administrators, and teachers must consider multi-faceted solutions in order to create greater academic success for the Latino student population.

Limitations of the Study

The study has several limitations, both in the quantitative and qualitative analyses. First, the API scores studied were from Northern and Central California high schools and cannot be generalized to Latino student populations in other areas, such as Southern California or other states and countries. Expanding the sample to include Southern

California high schools or strictly focusing on Southern California high schools may provide added value to literature examining Latino academic achievement in California as this area has a large number of Latino students and likely more high schools that are required to report Latino API scores.

The qualitative analysis only included participation from four administrators out of the 33 who I asked to participate in the study. Possible explanations for low participation may be that race and ethnicity as related to academic achievement is a sensitive subject and individuals feel uncomfortable candidly discussing race relations, or individuals had time constraints as a result of professional and personal priorities. Of the four participating administrators, three are Latino, three are females, and three are administrators at high schools with Latino populations greater than 40 percent (the other administrator is employed at a school with a Latino population of 14 percent). Not only is the sample size for the qualitative analysis small overall, but so are the sample sizes for non-Latinos administrators, male administrators, and administrators employed at high schools with Latino populations that are at least one standard deviation below the mean and from schools that are near the mean of the Latino students for the 60 high schools from Placer, Sacramento, and Yolo counties included in the quantitative analysis.

There is also a high degree of multicollinearity among some of the variables. I have concluded that this can be attested to the relatively small sample size of Northern and Central California high schools reporting 2009 base API scores for Latino students. It was necessary to exclude 2,008 high schools from the sample population due to not all Northern and Central California high schools having a large enough population of Latino students to report Latino API scores, information on certain inputs missing for some high schools, and the study excluding ASAM, special education, and ASAM/special education high schools. As a result, only 441 high schools were included in the quantitative analysis. Future studies focusing on specific areas, such as Northern and Central California should utilize individual Latino students' scores on standardized tests as the dependent variable, as opposed to high schools' Latino API scores to ensure that there are no sample size limitations.

Lastly, aside from the simple presence of particular peer subgroups at a high school, the effects of Latino students' peers are not included in this study. The data examined did not provide additional peer variables that could have assisted in explaining the academic achievement of Latino students. Several studies have identified peer effects as a possible explanation of the variation in students' academic achievement (Hanushek et al., 2003; Zimmer & Toma, 2000; Zimmerman, 2003). Including additional variables that center on the interactions of Latino students and other student subpopulations, including students with various academic achievement levels, students involved in clubs and organizations, students involved in athletics, etc., may provide further understanding into the factors that affect Latino academic achievement in Northern and Central California.

Future Research

While this study provides information on the factors related to Latino academic achievement in California, my analysis did not capture all factors that might explain differences in Latino high school students' academic achievement. As previously mentioned I recommend that future research on Latino academic achievement veer away from Latino API scores at the high school level and instead mirror studies that have examined individual student scores. While school-level data analyses provide information relative to areas of concern regarding academic achievement by identifying the positive and negative effects of various school characteristics, studying the relationship between race/ethnicity and academic achievement using student-level data may better assist researchers in evaluating educational strategies.

Furthermore, future studies may choose to examine student level data in specific counties or school districts to pinpoint research to more specific geographic areas and communities as opposed to state-wide data. Future analysis of Latino academic achievement at the student level should also include additional factors, such as curriculum inputs, teaching strategies, and school support and guidance participation experienced by each student in order to improve the model. Analyses should also use longitudinal data as observing one-year of academic achievement data does not provide a comprehensive snapshot in order to thoroughly understand relationships and detect trends.

Closing Comments

Although Latino academic achievement scores have shown improvements over the course of recent years, this student population is still not achieving at the same levels as white and Asian students in California. Various factors have been shown to be related to Latino academic achievement levels both in this and other previous research, which illustrates the complexity in finding a single solution to a multifaceted problem. The qualitative analysis suggests that in order to continue improving Latino academic achievement levels, while also closing the achievement gap, strategies must be implemented on individual school and student levels as opposed to macro level, system-wide (i.e. – state, county, city, district) changes. However, with the resource limitations stemming from budgetary constraints and the continuously growing Latino student population in California, school leaders are finding it difficult to allocate the time and resources necessary to sufficiently address Latino students' academic challenges as a subgroup and individually. Thus, the issues of adequate school funding and availability of resources must be addressed before effective solutions to eliminating the academic achievement gap may be realized in their entirety.

APPENDIX A

Bivariate Correlations

Bivariate Correlations

Due to the large size of the Bivariate Correlations, the table is divided into five tables (A, B, C, D, and E). In all the following tables, the first two left columns remain the same. However, different variables are shown in the top row.

Table A

		AA_Admin	AA_Teach	AI_Admin	AI_Teach	AS_Admin	AS_Teach	CHART
AA_Admin	Pearson Correlation	1	.615**	-.064	-.057	-.043	.234**	.026
	Sig. (2-tailed)		.000	.182	.229	.364	.000	.580
	N	441	441	441	441	441	441	441
AA_Teach	Pearson Correlation	.615**	1	-.067	-.010	-.060	.279**	.031
	Sig. (2-tailed)	.000		.161	.827	.212	.000	.518
	N	441	441	441	441	441	441	441
AI_Admin	Pearson Correlation	-.064	-.067	1	.098*	-.038	-.054	.034
	Sig. (2-tailed)	.182	.161		.039	.430	.256	.479
	N	441	441	441	441	441	441	441
AI_Teach	Pearson Correlation	-.057	-.010	.098*	1	.126**	.021	.007
	Sig. (2-tailed)	.229	.827	.039		.008	.659	.885
	N	441	441	441	441	441	441	441
AS_Admin	Pearson Correlation	-.043	-.060	-.038	.126**	1	.187**	.113*
	Sig. (2-tailed)	.364	.212	.430	.008		.000	.018
	N	441	441	441	441	441	441	441
AS_Teach	Pearson Correlation	.234**	.279**	-.054	.021	.187**	1	.100*
	Sig. (2-tailed)	.000	.000	.256	.659	.000		.036
	N	441	441	441	441	441	441	441

(Table A Continued)		Emerg	FI_Admin	FI_Teach	Full	LAT_Admin	LAT_Teach	LATAPI09
AA_Admin	Pearson Correlation	-.012	.024	.262**	-.196**	-.155**	-.067	-.183**
	Sig. (2-tailed)	.800	.622	.000	.000	.001	.162	.000
	N	441	441	441	441	441	441	441
AA_Teach	Pearson Correlation	.085	.032	.321**	-.300**	-.073	-.044	-.293**
	Sig. (2-tailed)	.073	.503	.000	.000	.125	.353	.000
	N	441	441	441	441	441	441	441
AI_Admin	Pearson Correlation	-.003	-.029	-.059	.067	-.093	-.006	.055
	Sig. (2-tailed)	.953	.543	.214	.162	.051	.893	.246
	N	441	441	441	441	441	441	441
AI_Teach	Pearson Correlation	.077	-.031	-.025	.058	-.048	-.074	-.037
	Sig. (2-tailed)	.106	.517	.607	.228	.311	.118	.444
	N	441	441	441	441	441	441	441
AS_Admin	Pearson Correlation	.070	.012	-.012	-.006	-.052	-.066	-.054
	Sig. (2-tailed)	.143	.801	.798	.892	.277	.170	.255
	N	441	441	441	441	441	441	441
AS_Teach	Pearson Correlation	.061	.084	.245**	-.209**	.052	.012	-.155**
	Sig. (2-tailed)	.201	.079	.000	.000	.278	.803	.001
	N	441	441	441	441	441	441	441

(Table A Continued)		FREE/RED	DI	ELL	GATE	AA	AI	AS
AA_Admin	Pearson Correlation	.111*	-.013	.056	.061	.521**	-.055	.167**
	Sig. (2-tailed)	.020	.792	.243	.200	.000	.253	.000
	N	441	441	441	441	441	441	441
AA_Teach	Pearson Correlation	.211**	.026	.136**	-.047	.726**	-.121*	.155**
	Sig. (2-tailed)	.000	.591	.004	.329	.000	.011	.001
	N	441	441	441	441	441	441	441
AI_Admin	Pearson Correlation	-.051	-.008	-.033	.007	-.076	.142**	.002
	Sig. (2-tailed)	.281	.862	.487	.891	.109	.003	.965
	N	441	441	441	441	441	441	441
AI_Teach	Pearson Correlation	.023	.041	-.040	-.008	.013	.247**	.064
	Sig. (2-tailed)	.636	.391	.404	.869	.783	.000	.178
	N	441	441	441	441	441	441	441
AS_Admin	Pearson Correlation	-.056	.064	.010	.100*	-.023	-.012	.158**
	Sig. (2-tailed)	.237	.178	.830	.036	.623	.804	.001
	N	441	441	441	441	441	441	441
AS_Teach	Pearson Correlation	.059	-.018	.186**	.160**	.280**	-.184**	.565**
	Sig. (2-tailed)	.214	.704	.000	.001	.000	.000	.000
	N	441	441	441	441	441	441	441

(Table A Continued)		FI	LAT	PI	PI_Admin	PI_Teach	AdminMA	PCNTLAT
AA_Admin	Pearson Correlation	.160**	-.067	.273**	-.035	.059	-.030	-.082
	Sig. (2-tailed)	.001	.162	.000	.468	.216	.528	.086
	N	441	441	441	441	441	441	441
AA_Teach	Pearson Correlation	.154**	.003	.367**	-.035	.210**	-.088	-.074
	Sig. (2-tailed)	.001	.953	.000	.462	.000	.065	.120
	N	441	441	441	441	441	441	441
AI_Admin	Pearson Correlation	-.047	-.051	-.078	-.012	-.032	.017	-.031
	Sig. (2-tailed)	.328	.285	.104	.809	.509	.727	.510
	N	441	441	441	441	441	441	441
AI_Teach	Pearson Correlation	.065	-.044	.030	.015	-.055	.004	-.077
	Sig. (2-tailed)	.174	.356	.525	.758	.252	.929	.106
	N	441	441	441	441	441	441	441
AS_Admin	Pearson Correlation	.084	-.022	.100*	-.020	.010	.017	.001
	Sig. (2-tailed)	.080	.650	.035	.668	.841	.718	.985
	N	441	441	441	441	441	441	441
AS_Teach	Pearson Correlation	.231**	-.042	.275**	-.026	.074	-.050	-.100*
	Sig. (2-tailed)	.000	.373	.000	.591	.120	.294	.035
	N	441	441	441	441	441	441	441

(Table A Continued)		TeachMA	COL_ED	YRRND
AA_Admin	Pearson Correlation	-.001	-.105*	-.029
	Sig. (2-tailed)	.980	.028	.537
	N	441	441	441
AA_Teach	Pearson Correlation	-.005	-.220**	-.026
	Sig. (2-tailed)	.915	.000	.586
	N	441	441	441
AI_Admin	Pearson Correlation	.048	.060	-.010
	Sig. (2-tailed)	.315	.210	.837
	N	441	441	441
AI_Teach	Pearson Correlation	.047	-.066	-.034
	Sig. (2-tailed)	.326	.168	.472
	N	441	441	441
AS_Admin	Pearson Correlation	.056	-.033	-.017
	Sig. (2-tailed)	.241	.483	.715
	N	441	441	441
AS_Teach	Pearson Correlation	.288**	-.122*	-.019
	Sig. (2-tailed)	.000	.010	.698
	N	441	441	441

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table B

		AA_Admin	AA_Teach	AI_Admin	AI_Teach	AS_Admin	AS_Teach	CHART
CHART	Pearson Correlation	.026	.031	.034	.007	.113*	.100*	1
	Sig. (2-tailed)	.580	.518	.479	.885	.018	.036	
	N	441	441	441	441	441	441	441
Emerg	Pearson Correlation	-.012	.085	-.003	.077	.070	.061	.006
	Sig. (2-tailed)	.800	.073	.953	.106	.143	.201	.907
	N	441	441	441	441	441	441	441
FI_Admin	Pearson Correlation	.024	.032	-.029	-.031	.012	.084	.015
	Sig. (2-tailed)	.622	.503	.543	.517	.801	.079	.750
	N	441	441	441	441	441	441	441
FI_Teach	Pearson Correlation	.262**	.321**	-.059	-.025	-.012	.245**	.024
	Sig. (2-tailed)	.000	.000	.214	.607	.798	.000	.612
	N	441	441	441	441	441	441	441
Full	Pearson Correlation	-.196**	-.300**	.067	.058	-.006	-.209**	-.274**
	Sig. (2-tailed)	.000	.000	.162	.228	.892	.000	.000
	N	441	441	441	441	441	441	441
LAT_Admin	Pearson Correlation	-.155**	-.073	-.093	-.048	-.052	.052	.050
	Sig. (2-tailed)	.001	.125	.051	.311	.277	.278	.296
	N	441	441	441	441	441	441	441
LAT_Teach	Pearson Correlation	-.067	-.044	-.006	-.074	-.066	.012	.064
	Sig. (2-tailed)	.162	.353	.893	.118	.170	.803	.180
	N	441	441	441	441	441	441	441
LATAPI09	Pearson Correlation	-.183**	-.293**	.055	-.037	-.054	-.155**	-.124**
	Sig. (2-tailed)	.000	.000	.246	.444	.255	.001	.009
	N	441	441	441	441	441	441	441

(Table B Continued)		Emerg	FI_Admin	FI_Teach	Full	LAT_Admin	LAT_Teach	LATAPI09
CHART	Pearson Correlation	.006	.015	.024	-.274**	.050	.064	-.124**
	Sig. (2-tailed)	.907	.750	.612	.000	.296	.180	.009
	N	441	441	441	441	441	441	441
Emerg	Pearson Correlation	1	-.031	.027	-.316**	.118*	.176**	-.148**
	Sig. (2-tailed)		.511	.569	.000	.013	.000	.002
	N	441	441	441	441	441	441	441
FI_Admin	Pearson Correlation	-.031	1	.138**	-.026	-.049	-.046	.003
	Sig. (2-tailed)	.511		.004	.583	.300	.337	.951
	N	441	441	441	441	441	441	441
FI_Teach	Pearson Correlation	.027	.138**	1	-.274**	.080	.107*	-.177**
	Sig. (2-tailed)	.569	.004		.000	.092	.025	.000
	N	441	441	441	441	441	441	441
Full	Pearson Correlation	-.316**	-.026	-.274**	1	-.233**	-.398**	.264**
	Sig. (2-tailed)	.000	.583	.000		.000	.000	.000
	N	441	441	441	441	441	441	441
LAT_Admin	Pearson Correlation	.118*	-.049	.080	-.233**	1	.518**	-.077
	Sig. (2-tailed)	.013	.300	.092	.000		.000	.107
	N	441	441	441	441	441	441	441
LAT_Teach	Pearson Correlation	.176**	-.046	.107*	-.398**	.518**	1	-.179**
	Sig. (2-tailed)	.000	.337	.025	.000	.000		.000
	N	441	441	441	441	441	441	441
LATAPI09	Pearson Correlation	-.148**	.003	-.177**	.264**	-.077	-.179**	1
	Sig. (2-tailed)	.002	.951	.000	.000	.107	.000	
	N	441	441	441	441	441	441	441

(Table B Continued)		FREE/RED	DI	ELL	GATE	AA	AI	AS
CHART	Pearson Correlation	.084	-.282**	.112*	-.283**	.154**	.126**	-.130**
	Sig. (2-tailed)	.078	.000	.019	.000	.001	.008	.006
	N	441	441	441	441	441	441	441
Emerg	Pearson Correlation	.089	.025	.105*	-.118*	.121*	-.038	.010
	Sig. (2-tailed)	.063	.604	.027	.013	.011	.423	.830
	N	441	441	441	441	441	441	441
FI_Admin	Pearson Correlation	-.061	.016	-.037	-.007	.058	-.014	.119*
	Sig. (2-tailed)	.198	.737	.435	.877	.221	.762	.012
	N	441	441	441	441	441	441	441
FI_Teach	Pearson Correlation	.061	-.016	.154**	-.009	.244**	-.112*	.181**
	Sig. (2-tailed)	.203	.738	.001	.843	.000	.019	.000
	N	441	441	441	441	441	441	441
Full	Pearson Correlation	-.341**	.131**	-.405**	.281**	-.315**	.167**	.042
	Sig. (2-tailed)	.000	.006	.000	.000	.000	.000	.379
	N	441	441	441	441	441	441	441
LAT_Admin	Pearson Correlation	.287**	-.177**	.353**	-.136**	-.133**	-.120*	-.108*
	Sig. (2-tailed)	.000	.000	.000	.004	.005	.012	.024
	N	441	441	441	441	441	441	441
LAT_Teach	Pearson Correlation	.512**	-.252**	.486**	-.187**	-.092	-.144**	-.159**
	Sig. (2-tailed)	.000	.000	.000	.000	.054	.002	.001
	N	441	441	441	441	441	441	441
LATAPI09	Pearson Correlation	-.427**	-.247**	-.466**	.256**	-.283**	.007	.085
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.883	.076
	N	441	441	441	441	441	441	441

(Table B Continued)		FI	LAT	PI	PI_Admin	PI_Teach	AdminMA	PCNTLAT
CHART	Pearson Correlation	-.085	.104*	.045	-.023	-.063	.006	.026
	Sig. (2-tailed)	.076	.029	.344	.626	.183	.893	.593
	N	441	441	441	441	441	441	441
Emerg	Pearson Correlation	-.003	.062	.128**	.044	.113*	-.087	.024
	Sig. (2-tailed)	.957	.191	.007	.359	.018	.069	.611
	N	441	441	441	441	441	441	441
FI_Admin	Pearson Correlation	.193**	-.095*	.151**	-.016	.031	.081	-.065
	Sig. (2-tailed)	.000	.046	.001	.740	.515	.091	.173
	N	441	441	441	441	441	441	441
FI_Teach	Pearson Correlation	.492**	.061	.191**	-.043	.171**	-.026	.067
	Sig. (2-tailed)	.000	.200	.000	.363	.000	.591	.160
	N	441	441	441	441	441	441	441
Full	Pearson Correlation	-.078	-.324**	-.084	-.010	-.122*	-.025	-.227**
	Sig. (2-tailed)	.101	.000	.078	.832	.011	.596	.000
	N	441	441	441	441	441	441	441
LAT_Admin	Pearson Correlation	-.060	.458**	-.095*	.070	.022	.040	.472**
	Sig. (2-tailed)	.211	.000	.045	.141	.639	.397	.000
	N	441	441	441	441	441	441	441
LAT_Teach	Pearson Correlation	-.026	.660**	-.136**	.067	-.046	.006	.685**
	Sig. (2-tailed)	.587	.000	.004	.158	.334	.901	.000
	N	441	441	441	441	441	441	441
LATAPI09	Pearson Correlation	.008	-.362**	-.182**	.008	-.065	.024	-.185**
	Sig. (2-tailed)	.859	.000	.000	.864	.175	.611	.000
	N	441	441	441	441	441	441	441

(Table B Continued)		TeachMA	COL_ED	YRRND
CHART	Pearson Correlation	.127**	-.135**	.105*
	Sig. (2-tailed)	.008	.005	.027
	N	441	441	441
Emerg	Pearson Correlation	-.104*	-.137**	.115*
	Sig. (2-tailed)	.029	.004	.016
	N	441	441	441
FI_Admin	Pearson Correlation	.062	.071	-.013
	Sig. (2-tailed)	.193	.139	.778
	N	441	441	441
FI_Teach	Pearson Correlation	.007	-.144**	-.012
	Sig. (2-tailed)	.885	.003	.806
	N	441	441	441
Full	Pearson Correlation	.074	.398**	-.062
	Sig. (2-tailed)	.123	.000	.196
	N	441	441	441
LAT_Admin	Pearson Correlation	-.069	-.328**	.001
	Sig. (2-tailed)	.146	.000	.980
	N	441	441	441
LAT_Teach	Pearson Correlation	-.140**	-.519**	-.027
	Sig. (2-tailed)	.003	.000	.569
	N	441	441	441
LATAPI09	Pearson Correlation	.028	.537**	-.011
	Sig. (2-tailed)	.555	.000	.826
	N	441	441	441

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table C

		AA_Admin	AA_Teach	AI_Admin	AI_Teach	AS_Admin	AS_Teach	CHART
FREE/RED	Pearson Correlation	.111*	.211**	-.051	.023	-.056	.059	.084
	Sig. (2-tailed)	.020	.000	.281	.636	.237	.214	.078
	N	441	441	441	441	441	441	441
DI	Pearson Correlation	-.013	.026	-.008	.041	.064	-.018	-.282**
	Sig. (2-tailed)	.792	.591	.862	.391	.178	.704	.000
	N	441	441	441	441	441	441	441
ELL	Pearson Correlation	.056	.136**	-.033	-.040	.010	.186**	.112*
	Sig. (2-tailed)	.243	.004	.487	.404	.830	.000	.019
	N	441	441	441	441	441	441	441
GATE	Pearson Correlation	.061	-.047	.007	-.008	.100*	.160**	-.283**
	Sig. (2-tailed)	.200	.329	.891	.869	.036	.001	.000
	N	441	441	441	441	441	441	441
AA	Pearson Correlation	.521**	.726**	-.076	.013	-.023	.280**	.154**
	Sig. (2-tailed)	.000	.000	.109	.783	.623	.000	.001
	N	441	441	441	441	441	441	441
AI	Pearson Correlation	-.055	-.121*	.142**	.247**	-.012	-.184**	.126**
	Sig. (2-tailed)	.253	.011	.003	.000	.804	.000	.008
	N	441	441	441	441	441	441	441
AS	Pearson Correlation	.167**	.155**	.002	.064	.158**	.565**	-.130**
	Sig. (2-tailed)	.000	.001	.965	.178	.001	.000	.006
	N	441	441	441	441	441	441	441
FI	Pearson Correlation	.160**	.154**	-.047	.065	.084	.231**	-.085
	Sig. (2-tailed)	.001	.001	.328	.174	.080	.000	.076
	N	441	441	441	441	441	441	441

(Table C Continued)		Emerg	FI_Admin	FI_Teach	Full	LAT_Admin	LAT_Teach	LATAPI09
FREE/RED	Pearson Correlation	.089	-.061	.061	-.341**	.287**	.512**	-.427**
	Sig. (2-tailed)	.063	.198	.203	.000	.000	.000	.000
	N	441	441	441	441	441	441	441
DI	Pearson Correlation	.025	.016	-.016	.131**	-.177**	-.252**	-.247**
	Sig. (2-tailed)	.604	.737	.738	.006	.000	.000	.000
	N	441	441	441	441	441	441	441
ELL	Pearson Correlation	.105*	-.037	.154**	-.405**	.353**	.486**	-.466**
	Sig. (2-tailed)	.027	.435	.001	.000	.000	.000	.000
	N	441	441	441	441	441	441	441
GATE	Pearson Correlation	-.118*	-.007	-.009	.281**	-.136**	-.187**	.256**
	Sig. (2-tailed)	.013	.877	.843	.000	.004	.000	.000
	N	441	441	441	441	441	441	441
AA	Pearson Correlation	.121*	.058	.244**	-.315**	-.133**	-.092	-.283**
	Sig. (2-tailed)	.011	.221	.000	.000	.005	.054	.000
	N	441	441	441	441	441	441	441
AI	Pearson Correlation	-.038	-.014	-.112*	.167**	-.120*	-.144**	.007
	Sig. (2-tailed)	.423	.762	.019	.000	.012	.002	.883
	N	441	441	441	441	441	441	441
AS	Pearson Correlation	.010	.119*	.181**	.042	-.108*	-.159**	.085
	Sig. (2-tailed)	.830	.012	.000	.379	.024	.001	.076
	N	441	441	441	441	441	441	441
FI	Pearson Correlation	-.003	.193**	.492**	-.078	-.060	-.026	.008
	Sig. (2-tailed)	.957	.000	.000	.101	.211	.587	.859
	N	441	441	441	441	441	441	441

(Table C Continued)		FREE/RED	DI	ELL	GATE	AA	AI	AS
FREE/RED	Pearson Correlation	1	-.041	.700**	-.280**	.183**	-.048	-.117*
	Sig. (2-tailed)		.391	.000	.000	.000	.315	.014
	N	441	441	441	441	441	441	441
DI	Pearson Correlation	-.041	1	.003	.099*	.148**	-.007	.030
	Sig. (2-tailed)	.391		.943	.038	.002	.889	.529
	N	441	441	441	441	441	441	441
ELL	Pearson Correlation	.700**	.003	1	-.226**	.034	-.238**	-.051
	Sig. (2-tailed)	.000	.943		.000	.474	.000	.287
	N	441	441	441	441	441	441	441
GATE	Pearson Correlation	-.280**	.099*	-.226**	1	-.101*	.000	.383**
	Sig. (2-tailed)	.000	.038	.000		.034	.995	.000
	N	441	441	441	441	441	441	441
AA	Pearson Correlation	.183**	.148**	.034	-.101*	1	-.074	.152**
	Sig. (2-tailed)	.000	.002	.474	.034		.121	.001
	N	441	441	441	441	441	441	441
AI	Pearson Correlation	-.048	-.007	-.238**	.000	-.074	1	-.128**
	Sig. (2-tailed)	.315	.889	.000	.995	.121		.007
	N	441	441	441	441	441	441	441
AS	Pearson Correlation	-.117*	.030	-.051	.383**	.152**	-.128**	1
	Sig. (2-tailed)	.014	.529	.287	.000	.001	.007	
	N	441	441	441	441	441	441	441
FI	Pearson Correlation	-.161**	.037	-.082	.101*	.194**	-.108*	.282**
	Sig. (2-tailed)	.001	.441	.086	.033	.000	.024	.000
	N	441	441	441	441	441	441	441

(Table C Continued)		FI	LAT	PI	PI_Admin	PI_Teach	AdminMA	PCNTLAT
FREE/RED	Pearson Correlation	-.161**	.724**	-.022	.068	.044	-.106*	.591**
	Sig. (2-tailed)	.001	.000	.644	.157	.353	.027	.000
	N	441	441	441	441	441	441	441
DI	Pearson Correlation	.037	-.185**	.195**	-.034	.026	.031	-.237**
	Sig. (2-tailed)	.441	.000	.000	.478	.593	.515	.000
	N	441	441	441	441	441	441	441
ELL	Pearson Correlation	-.082	.707**	.093	.056	.086	-.064	.521**
	Sig. (2-tailed)	.086	.000	.050	.240	.072	.177	.000
	N	441	441	441	441	441	441	441
GATE	Pearson Correlation	.101*	-.289**	-.062	.060	-.015	-.012	-.218**
	Sig. (2-tailed)	.033	.000	.197	.207	.761	.794	.000
	N	441	441	441	441	441	441	441
AA	Pearson Correlation	.194**	-.153**	.396**	-.034	.106*	-.110*	-.205**
	Sig. (2-tailed)	.000	.001	.000	.473	.026	.021	.000
	N	441	441	441	441	441	441	441
AI	Pearson Correlation	-.108*	-.186**	-.101*	-.017	-.052	-.071	-.178**
	Sig. (2-tailed)	.024	.000	.033	.723	.276	.135	.000
	N	441	441	441	441	441	441	441
AS	Pearson Correlation	.282**	-.400**	.212**	-.048	-.047	-.098*	-.297**
	Sig. (2-tailed)	.000	.000	.000	.314	.323	.040	.000
	N	441	441	441	441	441	441	441
FI	Pearson Correlation	1	-.197**	.335**	-.044	.021	.055	-.115*
	Sig. (2-tailed)		.000	.000	.362	.664	.247	.016
	N	441	441	441	441	441	441	441

(Table C Continued)		TeachMA	COL_ED	YRRND
FREE/RED	Pearson Correlation	-.219**	-.847**	-.011
	Sig. (2-tailed)	.000	.000	.824
	N	441	441	441
DI	Pearson Correlation	.061	.036	-.078
	Sig. (2-tailed)	.203	.450	.101
	N	441	441	441
ELL	Pearson Correlation	-.075	-.718**	-.041
	Sig. (2-tailed)	.116	.000	.388
	N	441	441	441
GATE	Pearson Correlation	.104*	.312**	-.036
	Sig. (2-tailed)	.029	.000	.449
	N	441	441	441
AA	Pearson Correlation	.061	-.140**	.004
	Sig. (2-tailed)	.198	.003	.933
	N	441	441	441
AI	Pearson Correlation	-.052	.097*	-.016
	Sig. (2-tailed)	.275	.043	.739
	N	441	441	441
AS	Pearson Correlation	.063	.150**	-.041
	Sig. (2-tailed)	.184	.002	.393
	N	441	441	441
FI	Pearson Correlation	.117*	.146**	-.028
	Sig. (2-tailed)	.014	.002	.562
	N	441	441	441

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table D

		AA_Admin	AA_Teach	AI_Admin	AI_Teach	AS_Admin	AS_Teach	CHART
LAT	Pearson Correlation	-.067	.003	-.051	-.044	-.022	-.042	.104*
	Sig. (2-tailed)	.162	.953	.285	.356	.650	.373	.029
	N	441	441	441	441	441	441	441
PI	Pearson Correlation	.273**	.367**	-.078	.030	.100*	.275**	.045
	Sig. (2-tailed)	.000	.000	.104	.525	.035	.000	.344
	N	441	441	441	441	441	441	441
PI_Admin	Pearson Correlation	-.035	-.035	-.012	.015	-.020	-.026	-.023
	Sig. (2-tailed)	.468	.462	.809	.758	.668	.591	.626
	N	441	441	441	441	441	441	441
PI_Teach	Pearson Correlation	.059	.210**	-.032	-.055	.010	.074	-.063
	Sig. (2-tailed)	.216	.000	.509	.252	.841	.120	.183
	N	441	441	441	441	441	441	441
AdminMA	Pearson Correlation	-.030	-.088	.017	.004	.017	-.050	.006
	Sig. (2-tailed)	.528	.065	.727	.929	.718	.294	.893
	N	441	441	441	441	441	441	441
PCNT_LAT	Pearson Correlation	-.082	-.074	-.031	-.077	.001	-.100*	.026
	Sig. (2-tailed)	.086	.120	.510	.106	.985	.035	.593
	N	441	441	441	441	441	441	441
TeachMA	Pearson Correlation	-.001	-.005	.048	.047	.056	.288**	.127**
	Sig. (2-tailed)	.980	.915	.315	.326	.241	.000	.008
	N	441	441	441	441	441	441	441
COL_ED	Pearson Correlation	-.105*	-.220**	.060	-.066	-.033	-.122*	-.135**
	Sig. (2-tailed)	.028	.000	.210	.168	.483	.010	.005
	N	441	441	441	441	441	441	441

(Table D Continued)		Emerg	FI_Admin	FI_Teach	Full	LAT_Admin	LAT_Teach	LATAPI09
LAT	Pearson Correlation	.062	-.095*	.061	-.324**	.458**	.660**	-.362**
	Sig. (2-tailed)	.191	.046	.200	.000	.000	.000	.000
	N	441	441	441	441	441	441	441
PI	Pearson Correlation	.128**	.151**	.191**	-.084	-.095*	-.136**	-.182**
	Sig. (2-tailed)	.007	.001	.000	.078	.045	.004	.000
	N	441	441	441	441	441	441	441
PI_Admin	Pearson Correlation	.044	-.016	-.043	-.010	.070	.067	.008
	Sig. (2-tailed)	.359	.740	.363	.832	.141	.158	.864
	N	441	441	441	441	441	441	441
PI_Teach	Pearson Correlation	.113*	.031	.171**	-.122*	.022	-.046	-.065
	Sig. (2-tailed)	.018	.515	.000	.011	.639	.334	.175
	N	441	441	441	441	441	441	441
AdminMA	Pearson Correlation	-.087	.081	-.026	-.025	.040	.006	.024
	Sig. (2-tailed)	.069	.091	.591	.596	.397	.901	.611
	N	441	441	441	441	441	441	441
PCNT_LAT	Pearson Correlation	.024	-.065	.067	-.227**	.472**	.685**	-.185**
	Sig. (2-tailed)	.611	.173	.160	.000	.000	.000	.000
	N	441	441	441	441	441	441	441
TeachMA	Pearson Correlation	-.104*	.062	.007	.074	-.069	-.140**	.028
	Sig. (2-tailed)	.029	.193	.885	.123	.146	.003	.555
	N	441	441	441	441	441	441	441
COL_ED	Pearson Correlation	-.137**	.071	-.144**	.398**	-.328**	-.519**	.537**
	Sig. (2-tailed)	.004	.139	.003	.000	.000	.000	.000
	N	441	441	441	441	441	441	441

(Table D Continued)		FREE/RED	DI	ELL	GATE	AA	AI	AS
LAT	Pearson Correlation	.724**	-.185**	.707**	-.289**	-.153**	-.186**	-.400**
	Sig. (2-tailed)	.000	.000	.000	.000	.001	.000	.000
	N	441	441	441	441	441	441	441
PI	Pearson Correlation	-.022	.195**	.093	-.062	.396**	-.101*	.212**
	Sig. (2-tailed)	.644	.000	.050	.197	.000	.033	.000
	N	441	441	441	441	441	441	441
PI_Admin	Pearson Correlation	.068	-.034	.056	.060	-.034	-.017	-.048
	Sig. (2-tailed)	.157	.478	.240	.207	.473	.723	.314
	N	441	441	441	441	441	441	441
PI_Teach	Pearson Correlation	.044	.026	.086	-.015	.106*	-.052	-.047
	Sig. (2-tailed)	.353	.593	.072	.761	.026	.276	.323
	N	441	441	441	441	441	441	441
AdminMA	Pearson Correlation	-.106*	.031	-.064	-.012	-.110*	-.071	-.098*
	Sig. (2-tailed)	.027	.515	.177	.794	.021	.135	.040
	N	441	441	441	441	441	441	441
PCNT_LAT	Pearson Correlation	.591**	-.237**	.521**	-.218**	-.205**	-.178**	-.297**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000
	N	441	441	441	441	441	441	441
TeachMA	Pearson Correlation	-.219**	.061	-.075	.104*	.061	-.052	.063
	Sig. (2-tailed)	.000	.203	.116	.029	.198	.275	.184
	N	441	441	441	441	441	441	441
COL_ED	Pearson Correlation	-.847**	.036	-.718**	.312**	-.140**	.097*	.150**
	Sig. (2-tailed)	.000	.450	.000	.000	.003	.043	.002
	N	441	441	441	441	441	441	441

(Table D Continued)		FI	LAT	PI	PI_Admin	PI_Teach	AdminMA	PCNTLAT
LAT	Pearson Correlation	-.197**	1	-.147**	.080	.059	.028	.835**
	Sig. (2-tailed)	.000		.002	.094	.215	.561	.000
	N	441	441	441	441	441	441	441
PI	Pearson Correlation	.335**	-.147**	1	-.050	.167**	-.012	-.188**
	Sig. (2-tailed)	.000	.002		.291	.000	.804	.000
	N	441	441	441	441	441	441	441
PI_Admin	Pearson Correlation	-.044	.080	-.050	1	-.017	-.034	.075
	Sig. (2-tailed)	.362	.094	.291		.720	.480	.114
	N	441	441	441	441	441	441	441
PI_Teach	Pearson Correlation	.021	.059	.167**	-.017	1	-.023	.007
	Sig. (2-tailed)	.664	.215	.000	.720		.629	.882
	N	441	441	441	441	441	441	441
AdminMA	Pearson Correlation	.055	.028	-.012	-.034	-.023	1	-.001
	Sig. (2-tailed)	.247	.561	.804	.480	.629		.991
	N	441	441	441	441	441	441	441
PCNT_LAT	Pearson Correlation	-.115*	.835**	-.188**	.075	.007	-.001	1
	Sig. (2-tailed)	.016	.000	.000	.114	.882	.991	
	N	441	441	441	441	441	441	441
TeachMA	Pearson Correlation	.117*	-.096*	.195**	-.080	-.061	.337**	-.152**
	Sig. (2-tailed)	.014	.045	.000	.095	.202	.000	.001
	N	441	441	441	441	441	441	441
COL_ED	Pearson Correlation	.146**	-.792**	-.008	-.011	-.071	.101*	-.612**
	Sig. (2-tailed)	.002	.000	.863	.813	.138	.035	.000
	N	441	441	441	441	441	441	441

(Table D Continued)		TeachMA	COL_ED	YRRND
LAT	Pearson Correlation	-.096*	-.792**	-.021
	Sig. (2-tailed)	.045	.000	.659
	N	441	441	441
PI	Pearson Correlation	.195**	-.008	.012
	Sig. (2-tailed)	.000	.863	.802
	N	441	441	441
PI_Admin	Pearson Correlation	-.080	-.011	-.005
	Sig. (2-tailed)	.095	.813	.911
	N	441	441	441
PI_Teach	Pearson Correlation	-.061	-.071	-.015
	Sig. (2-tailed)	.202	.138	.760
	N	441	441	441
AdminMA	Pearson Correlation	.337**	.101*	-.059
	Sig. (2-tailed)	.000	.035	.217
	N	441	441	441
PCNT_LAT	Pearson Correlation	-.152**	-.612**	-.026
	Sig. (2-tailed)	.001	.000	.581
	N	441	441	441
TeachMA	Pearson Correlation	1	.175**	-.037
	Sig. (2-tailed)		.000	.432
	N	441	441	441
COL_ED	Pearson Correlation	.175**	1	-.001
	Sig. (2-tailed)	.000		.987
	N	441	441	441

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table E

		AA_Admin	AA_Teach	AI_Admin	AI_Teach	AS_Admin	AS_Teach	CHART
YRRND	Pearson Correlation	-.029	-.026	-.010	-.034	-.017	-.019	.105*
	Sig. (2-tailed)	.537	.586	.837	.472	.715	.698	.027
	N	441	441	441	441	441	441	441

(Table E Continued)		Emerg	FI_Admin	FI_Teach	Full	LAT_Admin	LAT_Teach	LATAPI09
YRRND	Pearson Correlation	.115*	-.013	-.012	-.062	.001	-.027	-.011
	Sig. (2-tailed)	.016	.778	.806	.196	.980	.569	.826
	N	441	441	441	441	441	441	441

(Table E Continued)		FREE/RED	DI	ELL	GATE	AA	AI	AS
YRRND	Pearson Correlation	-.011	-.078	-.041	-.036	.004	-.016	-.041
	Sig. (2-tailed)	.824	.101	.388	.449	.933	.739	.393
	N	441	441	441	441	441	441	441

(Table E Continued)		FI	LAT	PI	PI_Admin	PI_Teach	AdminMA	PCNTLAT
YRRND	Pearson Correlation	-.028	-.021	.012	-.005	-.015	-.059	-.026
	Sig. (2-tailed)	.562	.659	.802	.911	.760	.217	.581
	N	441	441	441	441	441	441	441

(Table E Continued)		TeachMA	COL_ED	YRRND
YRRND	Pearson Correlation	-.037	-.001	1
	Sig. (2-tailed)	.432	.987	
	N	441	441	441

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

APPENDIX B

Interview Questionnaire

Interview Questionnaire

1.) How long have you been a high school administrator?

2.) Approximately what percentage of your school's *students* would classify themselves as Latino? African American? Asian American?

3.) Approximately what percentage of your school's *teachers* would classify themselves as Latino? African American? Asian American?

4.) Approximately what percentage of your school's *administrators* would classify themselves as Latino? African American? Asian American?

5.) In your professional opinion, do you believe it is beneficial to minority students' academic outcomes if a school site that has a larger percentage of minorities as students also has a minority principal or vice principal? If yes, why? If no, why not?

6.) In your professional opinion, do you believe it is beneficial to minority students' academic outcomes if a school site that has a larger percentage of minorities as students also has a larger percentage of minority teachers? If yes, why? If no, why not?

7.) Based on previous and current observations and experiences, in your professional opinion do you find that teachers' and/or administrators' race/ethnicity affects Latino students differently than students of other races/ethnicities? If yes, are Latino students affected more or less so than other students? How and why? If no, why not?

8.) In a statistical examination I undertook of Northern and Central California high schools' Latino API scores, where I controlled for many other causal factors, I found a negative correlation between both the percentages of African American teachers and Asian American teachers at a school site, and Latino students' average API scores at the school site. As a high school administrator, what is your professional reaction to these findings? Based on your professional experiences, can you offer any causal explanations of why I found this?

9.) In my study, I also found a positive correlation between both the percentage of Latino administrators at a school site, and Latino students' average API scores at the school site. As a high school administrator, what is your professional reaction to these findings? Based on your professional experiences, can you offer any causal explanations of why I found this?

10.) In your professional role as a high school administrator, what are your thoughts on how Latinos, on average, at a specific school site, score on their API if Latinos are the minority at the school site? What about if Latinos are in the majority? Can you offer any specifics on why there may be a relationship between Latino students' academic performance, on average at a school site, and how much they are represented at the school site?

11.) In my study, I found a negative relationship between the percentage of Latino students and Latino API scores at a school site. Based on your professional experiences, any ideas on what may be causing this?

12.) In your professional opinion, could the racial/ethnic composition of the neighborhood that a school site is in have an influence on the school site's overall API score and minority groups' API scores? If yes, how so and why? If no, why not?

13.) My study's results indicate a positive relationship between the percentage of the population in the high school's zip code that are Latino and Latino API scores. Based on your professional experiences, do you have any ideas on what may be causing this?

14.) What is your professional experience with Latino parents and their desire to have their children taught by a Latino teacher? In your role as a high school administrator, have you seen or heard Latino parents express a desire to hire a Latino administrator for their school?

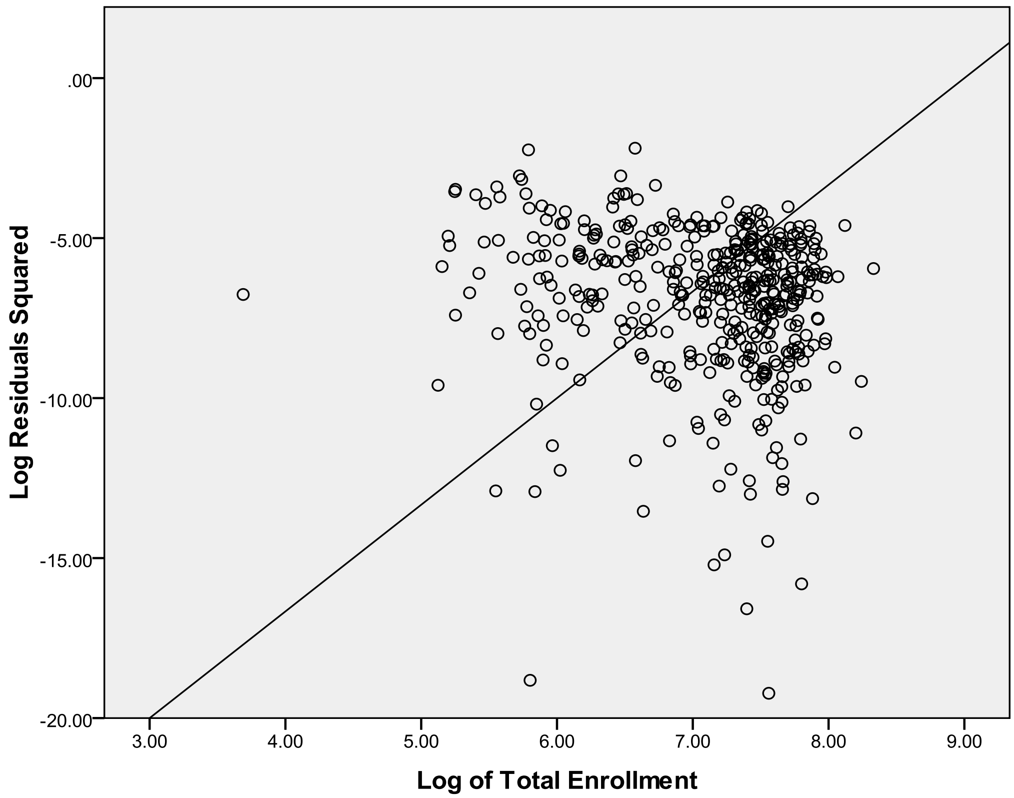
15.) In your professional role, what are the main challenges you face in maintaining and increasing Latino students' academic achievement? What are the strategies currently in place to improve academic achievement for this student population? What, if any, education policies prevent your current strategies from having a greater impact?

16.) Do you have any education policy changes that you would like to see implemented that you believe would better assist in improving Latino students' academic achievement?

APPENDIX C

Interactive Scatterplot – Test for Heteroskedasticity

Interactive Scatterplot – Test for Heteroskedasticity



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