AN EXAMINATION OF THE RELATIONSHIP BETWEEN TEACHER

CHARACTERISTICS AND STUDENT OUTCOMES IN

SOUTHEASTERN URBAN HIGH SCHOOLS

Except where reference is made to the work of others, the work described in this dissertation is my own or was done in the collaboration with my advisory committee. This dissertation does not include proprietary or classified information.

_____

Nora Gerdes Stevens

Certificate of Approval:

_____	_____
Anthony Guarino Associate Professor Educational Foundations, Leadership and Technology	James E. Witte, Chair Associate Professor Educational Foundations, Leadership and Technology
_____	_____
Maria Martinez Witte Associate Professor Educational Foundations, Leadership and Technology	Joe F. Pittman Interim Dean Graduate School

AN EXAMINATION OF THE RELATIONSHIP BETWEEN TEACHER CHARACTERISTICS AND STUDENT OUTCOMES IN SOUTHEASTERN URBAN HIGH SCHOOLS

Nora Gerdes Stevens

A Dissertation

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Doctor of Education

Auburn, Alabama
December 15, 2006

AN EXAMINATION OF THE RELATIONSHIP BETWEEN TEACHER CHARACTERISTICS AND STUDENT OUTCOMES IN SOUTHEASTERN URBAN HIGH SCHOOLS

Nora Gerdes Stevens

_____
Signature of Author

_____
Date of Graduation

VITA

Nora Gerdes Stevens, daughter of Kendall and Karen Gerdes, was born June 14, 1972, in Ellsworth, Maine. She graduated from Whitman College in Walla Walla, Washington, with a Bachelor of Arts in Biology in 1994. She worked as a customer service representative at Labor Ready, a day-labor service, for three years, meeting an unusual cross-section of humanity. She received a Master of Science in Biology from California Polytechnic State University in San Luis Obispo, California in 2001. She entered Auburn University in January 2002. While attending Auburn she taught Vertebrate Biodiversity and various biology labs, taught MCAT and DAT preparation courses for Kaplan, facilitated problem-based-learning sections for the Pharmacy School, and received a Certificate in the Preparing Future Faculty program from the Biggio Center for Teaching and Learning. Between 2004 and 2006, she worked as an adjunct biology instructor at Columbus State University. She is married to Sam Stevens, a marriage and family therapist. She and her husband will be settling in Portland, Oregon, her husband's city of origin.

DISSERTATION ABSTRACT

AN EXAMINATION OF THE RELATIONSHIP BETWEEN TEACHER CHARACTERISTICS AND STUDENT OUTCOMES IN SOUTHEASTERN URBAN HIGH SCHOOLS

Nora Gerdes Stevens

Doctor of Education, December 15, 2006
(M.S., California Polytechnic State University, 2001)
(B.A., Whitman College, 1994)

176 typed pages

Directed by James E. Witte

The social and economic penalties of not graduating from high school are numerous, such as limited access to high-paying work and concomitant poverty. However, across the nation, the graduation rate is only about 70% and even lower among minorities and students of low socioeconomic status (Orfield, Losen, Wald, & Swanson, 2004). The purpose of this study was to investigate the relationship of the characteristics of teachers in Atlanta, Georgia's urban high schools to student outcomes, that is, graduation and dropout rates. The study also examined persistence, i.e., the number of freshmen as compared to the number seniors or graduates four years later, as an alternative to graduation rate.

The data was obtained from Georgia's School Report Cards for school years 2003-2004 and 2004-2005. Correlations, t-tests, and regressions were mainly used to examine the data. Graduation rate increased significantly between 2004 and 2005. Dropout rate did not change. Persistence has increased as compared with calculations in 2001 (Orfield et al., 2004).

Teachers are vital to the increase in graduation rate and persistence. Together, all the predictor variables explained over 70% of graduation rate, over 50% of dropout rate, and over 50% of persistence. Few teacher characteristics showed unique contributions, meaning that the impact of teachers cannot be narrowed down to one or two variables. In multiple regressions, the strongest unique contributor for all outcome variables was the enrollment of students in poverty, negatively for graduation rate and persistence and positively for dropout rate.

The most surprising result was the impact of school size on graduation rate. Simple statistics suggested a positive relationship: larger schools have higher graduation rates, but multiple regressions showed school size had a unique negative effect. When the factors concomitant with larger schools were removed, i.e., better facilities, more teachers, more course offerings, the impact of larger schools on graduation rates was negative.

ACKNOWLEDGEMENTS

Special recognition to my major professor and chair of my dissertation committee, Dr. James Witte whose patience, guidance, and encouragement have facilitated the development and completion of my dissertation. I wish to acknowledge and express my sincere gratitude to my committee members, Dr. Maria Martinez Witte and Dr. Anthony Guarino, for their continued support throughout my graduate studies. I also appreciated the insight and assistance of my Outside Reader, Dr. Sheri Brock. I would like to thank my family, my friends (especially Christina), and fellow colleagues for their support and encouragement. Finally, Sam, I couldn't have made it without you.

Style manual or journal used: Publication Manual of the American Psychological Association, 5th Edition.

Computer software used: SPSS 11.5, Windows XP, Microsoft Word and Excel 2002

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

The No Child Left Behind Act of 2001 required that 100% of teachers of core classes be highly qualified teachers by the 2006/2007 school year but not one state had achieved the goal by spring 2006 (Feller, 2006). A large part of the problem is a dearth of quality teachers at schools populated by a large percentage of low-income or minority students, those schools most often found in urban centers. Nationally, the teachers of the highest quality tend to be attracted to schools with high-achieving students, leaving less able teachers at low-achieving schools. Low-achieving schools are often populated by more economically disadvantaged, minority, and learning disabled students, exactly the students who need the expertise of highly skilled teachers (Ingersoll, 2001; Lankford, Loeb, & Wyckoff, 2002). There is also evidence that students tend to learn more from teachers of their own race, and there is a national disparity between the number of minority students and the number of minority teachers (Dee, 2003; Hanushek, Kain, O'Brien, & Rivkin, 2005). Urban schools are frequently populated by minority students and low-quality, Caucasian teachers (Fine, 1986). Atlanta, Georgia, is an urban center that has a majority population of African Americans, many with the affluence to demand quality public education for their children (Dewan & Goodman, 2006).

There is also strong evidence that the impact of teacher credentials differs across secondary subjects, with math and science requiring more training than the humanities for teacher effectiveness (Darling-Hammond, Berry, & Thoreson, 2001; Goldhaber & Brewer, 2000, 2001). In the 2006 State of the Union Address, President George W. Bush called for increased spending to improve the quality of science education in the United States (Bush, 2006). American students are falling far short of the science and technology standards needed to maintain the technological international prowess of the United States (Lemonick, 2006). This problem is exacerbated by the lack of highly qualified teachers in math and science (National Commission on Mathematics and Science Teaching for the 21st Century, 2000). Teachers of math and science are more likely to drop out of the teaching workforce than teachers of other subjects, particularly from urban schools, because of the availability of higher-paying corporate or industry jobs (Ingersoll, 2000, 2001; Rumberger, 1987).

Purpose of the Study

The purpose of this study was to investigate the relationship of the characteristics of teachers in Atlanta's urban high schools to student outcomes, that is, graduation and dropout rates. The social and economic penalties of not graduating from high school are numerous, such as limited access to high-paying work and concomitant poverty. However, across the nation, the graduation rate is only about 70%, and even lower among minorities and students of low socioeconomic status (Orfield, Losen, Wald, & Swanson, 2004). The No Child Left Behind Act is calling for 100% highly qualified teachers so that an adequate education is available for everyone (No Child Left Behind Act, 2002).

Teachers vary in quality of teaching (Darling-Hammond, 2000). This study investigates the relationship of teacher characteristics to high school graduation and dropout rates. In addition to gauging this success by the graduation rates reported by high schools, it also examined persistence rate, that is, the number of freshmen as compared to the number of seniors or graduates four years later. No similar investigation has been undertaken in a majority African-American urban center which may show a different pattern than majority Caucasian urban centers. Using the data available from the Georgia School Report Cards of 2003-2004 and 2004-2005, this study examined information about the number of highly qualified teachers and teacher demographics in Atlanta region high schools with respect to the demographics of the students and how these characteristics affect high school graduation and dropout rate and persistence.

Research Questions

The following questions were answered by this study:

1. What is the relationship, if any, of teacher characteristics and student graduation rate?
2. What is the relationship, if any, of teacher characteristics and student dropout rate?
3. What is the relationship, if any, of teacher characteristics and student persistence?

Background of the Problem

The No Child Left Behind Act (NCLB) called for 100% highly qualified teachers in core subjects, or the plan to achieve 100%, by the 2006/2007 school year (No Child Left Behind Act, 2002). According to NCLB, a highly qualified teacher is one who has a bachelor's degree, a state license, and proven competency in every subject they teach

(State of Georgia, 2003b). The question is if these requirements and data on other teacher characteristics collected by public schools are sufficient to determine effective teachers. In order to determine if these teacher qualifications are sufficient, the next step is to determine if highly qualified teachers actually produce students who pass the standardized exams and graduate from high school.

Assumptions

1. All data were recorded and reported accurately.
2. Percent of students accepting free or reduced lunches is a good proxy for socioeconomic status of a school and all students eligible for free or reduced lunches have signed up for them.
3. All students were under equal conditions when taking the standardized exams.
4. The standardized exams given to high school students in Georgia are accurate indicators of teacher impact.

Limitations and Delimitations

The study encompassed public high schools from Atlanta City School System, Cobb County School System, DeKalb County School System, and Fulton County School System. All of these counties lie partially within the boundaries of Interstate 285, the freeway that surrounds Atlanta. This study did not include data from private, alternative or charter high schools.

Only public high schools in the Atlanta, Georgia, region were used. Results may not apply to public high schools in other regions of the country. Also, only urban high

schools were analyzed. Results may not be applicable to rural or suburban high schools. Results may not be applicable to private or charter high schools.

Only standardized state exam results were used as the outcome variable. Exams set by individual teachers may be more indicative of learning of students, especially those that do poorly in standardized testing conditions. Standardized tests have a time limit that may penalize some students who do poorly under time pressure or simply need more time. These examinations were developed on a state level in Georgia and outcomes may not be applicable to standardized exams developed by other states.

Study data was obtained from publicly available, quantitative data from the Georgia Department of Education website (Georgia Department of Education, 2005). Only publicly available data were used. Private, confidential data not used by this study may offer more detail or change the results. Also, only quantitative data were available; qualitative data not used by this study may provide more detail or change the results.

These data represent schools during the initial phases of concurrence with the dictates of the No Child Left Behind Act. Schools at a different phase in concurrence or schools with different local or monetary restrictions may act differently and, therefore, show different student outcomes.

Quantitative data about students, teachers, and schools were available only on the school level. Data on individuals may have provided more detail or changed the results.

The data does not include the source of teacher training. This study does not control for the quality of instruction received by teachers when they were being trained.

Definition of Terms

The following definitions are furnished to provide, as nearly as possible, clear and concise meanings of terms as used in this study.

1. Drop-out rate. Students are defined as dropouts if they leave school for one of the following reasons: Marriage, Expelled, Financial Hardship/Job, Incarcerated/Under Jurisdiction of Juvenile or Criminal Justice Authority, Low Grades/School Failure, Military, Adult Education/Postsecondary, Pregnant/Parent, Removed for Lack of Attendance, Serious Illness/Accident, and Unknown. The dropout rate is then calculated by dividing the number of students with a dropout code by the number of students in the school (State of Georgia, 2003b).
2. Graduation rate. According to the State of Georgia website, a graduate is defined as "a student who leaves high school with a regular diploma (this does not include Certificates of Attendance or Special Education diplomas) in the standard time (i.e., 4 years)…. The graduation rate reflects the percentage of students who entered ninth grade in a given year and were in the graduating class four years later" (State of Georgia, 2003b). The graduation rate is then calculated based on this percentage and the number of dropouts during the four years. Students must pass all four subject Georgia High School Graduation Tests plus the Georgia High School Writing Test in order to graduate (State of Georgia, 2003b).
3. Highly qualified teachers. "To be deemed highly qualified, teachers must have: 1) a bachelor's degree, 2) full state certification or licensure, and 3) prove that they know each subject that they teach. NCLB requires states to 1) measure the extent to which

all students have highly qualified teachers, particularly minority and disadvantaged students, 2) adopt goals and plans to ensure all teachers are highly qualified and, 3) publicly report plans and progress in meeting teacher quality goals. Teachers (in middle and high school) must prove that they know the subject they teach with: 1) a major in the subject they teach, 2) credits equivalent to a major in the subject, 3) passage of a state-developed test, 4) High, Objective, Uniform State Standard of Evaluation (HOUSSE) that is for current teachers only, 5) an advanced certification from the state, or 6) a graduate degree. NCLB allows states to develop an additional way for current teachers to demonstrate subject-matter competency and meet highly qualified teacher requirements. Proof may consist of a combination of teaching experience, professional development, and knowledge in the subject garnered over time in the profession" (State of Georgia, 2003b, p. 6).

4. Persistence. The ratio of senior enrollment in 2004 to freshman enrollment in 2000 was termed Persistence to Senior Year (Orfield et al., 2004). The ratio of graduates in 2004 to freshman enrollment in 2000 was termed Persistence to Graduation (Losen, 2005). Data were available for 2001 to 2005 as well but school restructuring made the data meaningless as many senior enrollments were higher than freshman enrollments or freshman enrollments in 2000 were zero.
5. Student subgroups. In addition to reporting total number of students, Georgia schools are required to report enrollment, graduation rate, dropout rate, and passing rates on exams in student subgroups (State of Georgia, 2003b). Not all subgroups have been included in the analyses conducted in the current study.

a. Asian or Pacific Islander. A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.
b. Black/African-American. A person having origins in any of the black racial groups of Africa.
c. Hispanic. A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.
d. Native American/Alaskan. A person having origins in any of the original peoples of North America who maintains cultural identification through tribal affiliation or community recognition.
e. White/Caucasian. A person having origins in any of the original peoples of Europe, North Africa, or the Middle East and who has no Hispanic origin.
f. Multi-racial. A person having parents of different races.
g. Male. Self-reported.
h. Female. Self-reported.
i. Student with Disabilities. A student or youth from three through 21 years of age is considered to have a disability under the IDEA if the student or youth meets one or more of the categories of eligibility consistent with State Board Rule 160-4-7-.02. Categories of eligibility include: autism, deaf/blind, deaf/hard of hearing, emotional and behavioral disorder, mild intellectual disability, moderate intellectual disability, severe intellectual disability,

orthopedic impairment, other health impairment, significant developmental delay, specific learning disability, speech-language impairment, traumatic brain injury, and visual impairment. Such students are eligible to receive special education services.

j. Students without disabilities. A student who does not meet any category of eligibility to receive special education services.

k. Limited English proficiency. A student who has limited English proficiency. An LEP student usually has a primary language other than English.

l. Economically disadvantaged. A student eligible for free or reduced price meal program.

m. Not economically disadvantaged. A student not eligible for free or reduced price meal program.

n. Migrant. A student who has been enrolled in the Migrant Education Program (MEP) for any time during the year. A child/youth is eligible to receive Migrant Education Program services if: 1) she/he is between three and 21 years of age; 2) parent, guardian, or other immediate family member is a migratory agricultural worker or fisher; and 3) moved within the last 36 months from one school district to another to enable the migrant worker to obtain temporary or seasonal employment in an agricultural or fishing activity.

6. Student-to-teacher ratio. “Number of students enrolled in a school system for every one teacher position, including instructional specialists, special education teachers

and vocational education teachers, as well as regular classroom teachers…The number of positions is reported as a decimal number designating the certified positions at that location, with partial numbers representing part-time positions, while the number of personnel is an actual head count of full-time and part-time certified employees." (State of Georgia, 2003a).

7. Urban high schools. Atlanta's urban schools were determined to include public, comprehensive high schools from Atlanta City School System, Cobb County School System, DeKalb County School System, Fulton County School System and Gwinnett County School System. All of these school systems and counties lie partially within the boundaries of Interstate 285, the freeway that surrounds Atlanta's city center.

Organization of the Study

Chapter I introduces the purpose of the study, presents the research questions, expands on the background of the problem, lists the assumptions and limitations of the study and defines relevant terms. Chapter II is a review of literature about teacher characteristics that may impact student test scores, graduation rates, dropout rates, and persistence. Chapter III reports the source of the data and statistical procedures used in its analysis. The findings of the study are reported in Chapter IV. Chapter V discusses the study's findings including discovery findings, conclusions, and recommendations for future research.

CHAPTER II

LITERATURE REVIEW

Purpose of the Study

The purpose of this study was to investigate the relationship of the characteristics of teachers in Atlanta's urban high schools to student outcomes, that is, graduation and dropout rates. The social and economic penalties of not graduating from high school are numerous, such as limited access to high-paying work and concomitant poverty. However, across the nation, the graduation rate is only about 70%, and even lower among minorities and students of low socioeconomic status (Orfield et al., 2004). The No Child Left Behind Act is calling for 100% highly qualified teachers so that an adequate education is available for everyone (No Child Left Behind Act, 2002). Teachers vary in quality of teaching (Darling-Hammond, 2000). This study investigates the relationship of teacher characteristics to high school graduation and dropout. In addition to gauging this success by the graduation rates reported by high schools, it will also examine persistence rate, that is, the number of freshmen as compared to the number seniors or graduates four years later.

Research Questions

The following questions were answered by this study:

1. What is the relationship, if any, of teacher characteristics and student graduation rate?
2. What is the relationship, if any, of teacher characteristics and student dropout rate?
3. What is the relationship, if any, of teacher characteristics and student persistence?

History of American Secondary Education

Public high schools have existed in the United States since the late 1800's. The Department of Education was formed in 1867 to aid states in establishing their school systems and to gather data on the outcome of that process (Barker, 2005). Within only a short time, it became clear that there needed to be a standardized core curriculum in high schools. In 1893, the Committee of Ten, an influential panel of educators, reported that all high school students should receive a strong liberal-arts education. Ever since, there has been disagreement whether high schools should focus on preparing students for college with liberal-arts emphasis or focus on technical skills students can use for immediate employment (Bloch, 1996; C. E. Finn, Jr., 2005b). Both pathways appear valid but unlikely to serve all students equally well. As the demographic of high school students has changed from Caucasian, affluent males to virtually all persons between ages 14 and 18, the needs of the secondary student body have changed as well. Unfortunately, several learned committees since the Committee of Ten have each determined that their generation of students is not as smart as previous generations. In 1918, the Commission on the Reorganization of Secondary Education disagreed with the ideas of the Committee of Ten in its final report, *Cardinal Principles of Secondary Education*.

> First, it assumed that most new high-school students were less intelligent than previous generations of students. Second, it claimed that since these new students lacked the intellectual ability, aspirations, and financial means to attend college, it was counterproductive to demand that they follow a college-preparatory program…Proponents believed that requiring all students to follow the same academic course of study increased educational inequality (Mirel, 2005, pp. 16-17).

In the 1920's, high schools tended to balance the ideals of both the Committee of Ten and the Commission on the Reorganization of Secondary Education, offering both strong academic programs and vocational classes. The Great Depression, however, collapsed the youth labor market and many students were forced to go back to school. In response to this huge increase in students, over 2.3 million between 1930 and 1940,

> education leaders once again argued that the intellectual abilities of the new high school entrants were weaker than those of previous groups of students; and these new students needed access to less-demanding courses (Mirel, 2005, p. 18).

These educational trends influenced administrators toward offering simpler life-skills classes in order to retain low-performing students in school long enough to graduate. It is widely recognized that persons without a high school diploma are at a severe social and economic disadvantage, particularly now as manufacturing jobs are being out-sourced to other countries (Barton, 2005a; Orfield et al., 2004; U.S. Department of Education, 2003). However, lowering course requirements also means students who do go on to college are entering without the required skills (C. E. Finn, Jr.,

2006a, 2006b) and some students are dropping out of high school because of boredom (Gordon, 2004).

> In a survey of high-school students released by the National Governors Association in July 2005, more than a third of respondents said their school had not done a good job of challenging them academically or preparing them for college; almost two-thirds said they would work harder if the courses were more demanding or interesting (C. E. Finn, Jr., 2006b, p. 32).

The No Child Left Behind Act of 2001 (NCLB) was a concerted effort toward the liberal arts model of high school. Some researchers believe that a good liberal arts curriculum should include the job skills advocated by pragmatists (Donlevy, 2000; Mirel, 2005). There is also evidence that students will step up to the challenge of harder classes (C. E. Finn, Jr., 2006b). However, not all schools have the teacher pool or resources to offer more difficult classes. Many of these schools are urban, high-poverty high schools. However, one cannot make the assumption that urban or inner-city schools are low-performing schools. Morris (2004) investigated two elementary schools, one in Atlanta, that took the stigma of the inner-city, high minority school and used it as an incentive to excel. However, many urban schools are failing, particularly high schools (Gardner & Miranda, 2001; Gill & Reynolds, 1999; Lankford et al., 2002; Orfield et al., 2004; U.S. Department of Education, 2003).

Teacher Characteristics that Affect Student Success

High quality teachers do make a difference. In an investigation of teachers in Texas, Hanushek and colleagues (2005) found that a good teacher can improve the test

score of any student significantly over a mediocre teacher. McGee (2004) found that high-poverty schools in Illinois that were successful at closing the test score gap had good teachers as part of the equation.

In another study of paired teacher-student data from Texas, Rivkin, Hanushek and Kain (2005) examined teacher and school effects using the data from 3000 school districts and over half a million students in grades three through six. They found that teacher quality ranked high in its effect on student achievement, even when teachers were distributed randomly across schools. In comparison, class size and school resources had a small, mixed effect. Because of the primacy of teacher quality, it is vital to have a strong understanding of teacher assessment for policy decisions (Rivkin et al., 2005).

The Georgia Department of Education gathers data on teachers, and provides that data to the public. For each school, the number of male and female teachers and the number of teachers of each race are tallied. The average salaries of teachers, as opposed to support staff or administrators, are provided as well as the ratio of students to teachers for the whole school. Years of experience are broken down into ten-year increments and the number of teachers in each increment is provided as well as the average year's experience of all teachers in the school. There is also a section that enumerates the degrees held by teachers, from the four-year bachelor's degree to the seven-year doctoral degree. Finally, in accordance with the requirements of NCLB, there is a tally of the number of teachers in each subject area and how many of them are highly qualified (State of Georgia, 2003a, 2005a). The theoretical impact of each of these characteristics in regard to student achievement is explored below.

Gender

There is very limited evidence that teacher gender makes a difference to student achievement. The studies are usually with elementary school students who have the same teacher for most of the day. Dee (2005) found that having a teacher of the same gender improved mathematics and science scores in both boys and girls. Dee (2005) further attributed a component of the lag in boys' scores during middle school to the predominance of female teachers. He also pointed out that having a female science teacher helped girls develop a long-term interest in science. In contrast, Ehrenberg, Goldhaber, and Brewer (1995) found that student learning, for the most part, was not affected by the gender of the teacher though teachers tend to rate students of their same race and gender more highly than other students. Overall, gender effects were small in the study.

Race

There is some evidence that students learn better from teachers of their own race (Dee, 2005; Hanushek et al., 2005) While the reasons for this benefit are unclear, a randomized experiment in Tennessee demonstrated that elementary children scored three to five percentile points higher on standardized math and reading tests when taught by a teacher of their own race (Dee, 2003, 2004). Moreover, the effect was cumulative: students with same race teachers for four years scored about eight percentile points higher than children who had teachers of a different race or whose teachers' races changed. This result was sustained when the positive effects of smaller classes and other demographic factors were eliminated. Hanushek and colleagues (2005) come to a similar

conclusion using data about teachers and student achievement in Texas, though they noted that a high quality teacher of any race affects more learning with students than a poor quality one. Dee (2004) cautions that these results are some of the first of their kind and may not hold true in the upper grades nor have any long-term impact. One possibility may be that teachers are more generous with students of their own race. He also noted that African-American kids doing poorly with Caucasian teachers may be a reflection of the low quality Caucasian teachers being employed by predominantly African-American schools. A contrary finding from Ehrenberg, Goldhaber, and Brewer (1995) demonstrated that student learning, for the most part, was not affected by the race or ethnicity of the teacher though teachers tend to rate students of their same race and gender more highly than other students.

Part of the disconnect between Caucasian teachers and minority students in high-minority schools is because the teachers simply do not experience the same lives as the students. Students in one study were living in violent neighborhoods with little access to health care, while teachers often drove in from suburban homes (Fine, 1986). Morris (2004) commented that African-American elementary school teachers more often live in the same neighborhood as their students and thus are more likely to know students' parents and make community connections. Parents of low-income students are often from sparse educational backgrounds and are intimidated to come to their children's schools. When parents know the teachers from other contexts, like church, much of the fear can be moderated. Because of the trust teachers are then given by parents, teachers are more effective at teaching.

Nationally, as of 2000, African-American students make up about 17% of all students while there are only 7% African-American teachers for all grades (Dee, 2003). If the evidence of African-American children learning more from African-American teachers is valid, the paucity of African-American teachers is a major problem, particularly in urban schools with predominantly African-American student populations. The lack of African-American teachers may be contributing to the African-American-Caucasian test score gap investigated by many researchers (Card & Rothstein, 2006; Fryer & Levitt, 2004; Jencks & Phillips, 1998; Ludwig, 2003; Vigdor, 2006). Such statements seem to suggest a call for resegregation. Unfortunately, many schools are already very segregated (Card & Rothstein, 2006; Echenique & Fryer, 2005).

Salary

In Georgia, as in most public school systems, teacher salary is determined by a combination of the teacher's level of education and years of experience. The increments for each, additional education and additional years, are tightly controlled by salary schedules set through negotiations between the teachers' union and the state (Georgia Department of Education, 2005; Krei, 1998). Many teachers and their supporters claim that teachers make much less money than the requirements of their jobs merit (Vedder, 2003). Podgursky (2006), however, points out that teachers earn an amount similar to other jobs that require a college degree, such as registered nurses and police.

The following section reviews the literature on how teacher salary impacts teachers' effect on students and their achievement, how salaries vary and how it affects schools, and how salary relates to teacher turnover and retention.

Effect on Student Test Scores, Graduation and Dropout Rates. This current study addresses how teacher characteristics affect student achievement. In the literature, there is little evidence that teacher quality and salary are correlated. Rumberger and Palardy (2005) comment that higher teacher salaries are associated with lower drop out rates but not higher achievement. Jacob and Lefgren's (2006) research showed no relationship between teacher pay and performance. There was no discernable change in teacher effectiveness through increases in salary (Hanushek et al., 2005).

Teacher salaries have not climbed as quickly as some other fields. One hypothesis for the lag in teacher salaries is that it reflects a decline in teacher quality. Lakdawalla (2002b), using an analysis of the labor market, proposes that the success of our schools has actually led to lower quality teachers. Students who might otherwise become teachers are choosing to enter other professions. Partly, this may be due to industries and technology constantly pushing the envelope of innovation which increases the price of skilled labor. However, the productivity of teachers, particularly elementary teachers, has not increased because all children start at zero with math and reading skills. This is slightly less true of secondary teachers. High quality teachers become more expensive as the price of skilled labor increases. Spending per student has increased greatly. School systems respond by using their limited monies to hire more teachers to staff smaller classes but those teachers are of lower quality. Ironically, this means that the quality of teachers decreases across the board even as the quality of the students produced by the system increases. Unfortunately, there is little evidence that smaller classes produce better student outcomes (Lakdawalla, 2002a, 2002b).

There is evidence that more money can make a difference to student test scores but the money must be used properly. Simply throwing more money at the problem without changing the current situation will not make a difference (Papke, 2005). There is also evidence that disadvantaged students simply cost more money to educate than other students. This additional amount is significantly more than is currently calculated in Title I considerations (Duncombe & Yinger, 2005). The amount allocated to schools by the Title I provisions is a relatively small proportion of the total money available to the school (Sunderman & Mickelsen, 2000). These monies are typically supplemented by efforts of the individual states.

Variations in Salary and How Schools Are Affected. One of the problems is the level of salary available to a particular school or district. Low-status schools receive fewer applications from teachers so they have fewer options for hires (Hanushek et al., 2005; Krei, 1998). Loeb, Darling-Hammond, and Luczak (2005) examined the salary range in California public schools. They found a salary ratio of nearly three-to-one between the highest and lowest paying districts across the state, even when the salaries were adjusted for local county labor markets. Clearly, even if those districts have the same amount of money to spend per student, some students cost more to educate (Duncombe & Yinger, 2005). Also, Kozol (1991) pointed out that schools with deteriorating facilities spend more on heating, cooling, and repairs than newer school buildings. As states are legally charged with providing equitable education to their citizens (Hardy, 2006), some schools clearly need more to come up to equity.

The study *A Nation at Risk* predicted a need for qualified teachers as the nation moved toward smaller classes and the number of students rose (National Commission on Excellence in Education, 1983). A few researchers do not consider that there is a national qualified teacher shortage. Podgursky (2006) points out that over 90% of public school teachers had a certification in the area that they were teaching as reported in a 1999-2000 survey.

> If a single-salary schedule for a school district yields a large surplus of qualified applicants for elementary education, social studies, and physical education, but no qualified applicants in physics or speech pathology, is teachers' pay in this district adequate? By suppressing performance or field-based pay differentials, these schedules may be driving teachers out of the profession (Podgursky, 2006, p. 32).

To address this localized paucity, some policymakers have tried to raise salaries.

McGee (2004) found that the mixture of elements for closing the achievement gap at high-performing high-poverty schools was variable by school. However, quality leadership, committed teachers and involved parents were always part of the mix. Other factors like school or class size or even alignment with state standards were not necessarily characteristics of successful schools. However, successful schools spent significantly more on instruction than failing schools (McGee, 2004).

> We have significantly increased per-pupil spending, hired an army of additional teachers, and greatly increased the formal training those teachers have received. In short, we have focused considerable energy on increasing the resources available for education. But we have not improved the motivation of

> administrators and educators to use those resources effectively. Attending to resources without attending to motivation is like filling a race car with fuel and then putting an infant behind the wheel. You just won't go anywhere (Greene, 2005, p. 25).

One of the problems in assisting schools and school systems towards academic adequacy is the lack of a measurable definition of adequate. "Remember the warning of the French political commentator, George Bernanos: 'The worst, the most corrupting of lies, are problems poorly stated'" (C. E. Finn, Jr., 2006b, p. 29). Most states' constitutions contain a requirement to maintain an adequate public education system for the states' children. Increasingly, education reformers have been suing states over adequacy issues but without a measurable definition of adequate, their suits are rarely successful (Imber, 2004). The Center for Educational Equity has called for a governmental study to determine how much money would be needed to provide adequate education (Hardy, 2006).

> Some reformers believe that insisting on equity in the way a state funds its schools is the best way to ensure adequacy as well. They reason that since people who live in wealthy areas will always have the political power to procure adequate funding for their own schools, equitably funded schools will all be adequate. If this reasoning is correct, then courts need not get involved in evaluating adequacy claims as long as they take seriously their obligation to enforce the equity provisions of their state constitutions. Unfortunately, however, in some states this approach might tempt the legislature to provide a level of

> funding that is inadequate in all schools in the state. And, unfortunately, some states are already moving in this direction (Imber, 2004, p. 47).

As the nation becomes more concerned about having qualified teachers to aid student achievement, salary seems to be an important bargaining chip. Teachers, particularly in math and science, have higher-paying career alternatives outside of public school systems. In order to draw these people into teaching, and retain them, their salaries must be competitive (Warner, 2004).

Teacher Turnover and Retention. As more attention is placed on teacher quality, there is also a concern about teacher quantity. Student enrollments are increasing so the nation will need more teachers. The study *A Nation at Risk* predicted a desperate need for qualified teachers as the nation moved toward smaller classes and the number of students rose (National Commission on Excellence in Education, 1983). Many studies, however, are showing that the teacher shortage is more due to lack of retention of teachers than loss due to retirement as was anticipated (Colgan, 2004; Ingersoll, 2001). The teachers who do stay in the profession tend to move away from high-poverty, high-minority schools, leaving shortages there (Ingersoll, 2001; Loeb et al., 2005).

Teacher turn-over is often examined in the context of teachers leaving the teaching profession altogether. For example, over 1200 teachers left the Charlotte-Mecklenburg school system in 2003 with an estimated cost of $14.2 million to replace them (Charlotte Advocates for Education, 2004). The estimated percentage of teachers in their first three to five years who leave teaching altogether each year nationwide is 30 to 50 percent (Ballinger, 2000). Another study found no evidence of a relationship between

teaching wage and decision to leave teaching altogether. Decisions to change schools or careers are more driven by proportion of minority children in a school than salary (Scafidi, Sjoquist, & Stinebrickner, 2005).

Other studies examine the movement of teachers within the profession. Data are more often available to examine teacher movement between districts (Gritz & Theobald, 1996; Mont & Rees, 1996; Theobald, 1990; Theobald & Gritz, 1996). While salaries may differ more between districts than within them, most teacher movements occur within districts (Scafidi et al., 2005). Only a few studies have examined movements of teachers between individual schools (Hanushek, Kain, & Rivkin, 2004; Lankford et al., 2002; Scafidi et al., 2005). Scafidi, Sjoquist, and Stinebrickner (2005) examined the movements of teachers in their first five years of teaching in Georgia schools. They determined that novice Caucasian teachers tend to move away from schools with a large proportion of minorities, whether to other teaching positions or to other careers. These movements may even result in a decrease in salary. In the context of teacher turnover, teacher salary does not correlate with student test scores, rates of student poverty, or school racial composition.

Studies of other cities corroborate this finding. During the 2000-2001 school year, the national teacher turnover rate was 15.7%. An Association of Community Organizations for Reform Now study of urban Chicago Public Schools had a 25% turnover for the same time period. The percentage is even more shocking for first-year teachers at high-poverty schools nationally: 39% (*Here one year*, 2002).

Naturally, teacher movements may be prompted by unobserved characteristics associated with schools with high proportions of minorities. However, a one standard deviation increase in the proportion of African-American students increases the probability of a non-African-American teacher leaving by about 20% of the annual exit rate or about 30% of all teachers in their first five years. Other studies of teacher movement have suggested that teachers leave high-poverty and low-achieving schools preferentially (Ingersoll, 2001; Loeb et al., 2005) but Scafidi et al. (2005) find that the effects of a high proportion of African-American students swamps the effects of high-poverty or low-achieving schools. These findings are corroborated in a study of Texas elementary school teachers (Hanushek et al., 2004). In fact, when the race element is controlled, schools with a higher proportion of students on free or reduced lunches actually have greater holding power for novice teachers than affluent schools. The authors suggest that teachers may take less desirable positions simply to gain access to the school district, expecting to move later (Scafidi et al., 2005). Turnover has also been found to be variable by field. For instance, the rate of turnover in math and science teachers is high, possibly because they have the lure of high-paying jobs in industry as an alternative to teaching (Rumberger, 1987).

Interestingly, teachers who move between schools are of all ability levels, not just the most talented. There is also no evidence that the most effective teachers are drawn from around the district by the offer of higher salary and urban districts do not seem to lose teachers to suburban districts (Hanushek et al., 2005). Krei (1998) found that

inexperienced, low-quality, and unsatisfactory teachers are being disproportionately placed in schools with large proportions of low-income students.

> School officials are not likely to openly acknowledge that such practices exist and that they contribute to inequitable conditions. In fairness, these practices are so pervasive, long-standing, and accepted that it may be understandable that they are taken for granted and rarely questioned. Furthermore, candid information on this issue would necessitate the admission that this is a type of hierarchy of desirability among schools in a district, something school officials might hesitate to confirm on the record (Krei, 1998, p. 78).

These schools often have the least money, fewest resources, and most students in need of additional attention, so it seems that the best teachers, not the worst, should be working there. High-poverty schools seem to show the highest rates of turnover but the same is not true of large or urban public schools. Teacher salaries are usually tightly controlled by experience and education schedules negotiated by teacher unions so one of the few ways schools and districts have to reward senior teachers is the ability to change schools. Because of this system, good, experienced teachers tend to leave less desirable schools (Krei, 1998).

Novice African-American teachers are much less likely to leave predominantly African-American schools. This suggests that there are unobserved variables that impact the comfort of non-African-American teachers in predominantly African-American schools, like the distance they must travel to work (Scafidi et al., 2005). Since there are not enough African-American teachers to sufficiently staff these schools (Dee, 2004), it is

assumed that high minority schools are left with lower quality non-African-American teachers, since better ones who do want to leave change schools within their first five years of teaching (Scafidi et al., 2005).

Merit pay has been a topic of great discussion for some twenty years. Twenty-nine states initiated some sort of merit pay system by the mid 1980's but almost all of them have since been abandoned or significantly altered (Dee & Keys, 2005b). Also, Murname and Olsen (1990) found, in a long term study, that a $1,000 increase in salary kept teachers in that district an average of two to three years longer. Proponents of merit pay argue that the programs were not extensive enough nor allowed sufficient time to show their benefit. Critics argue that the programs failed because of the fundamental difficulty of effectively determining and rewarding good teaching.

Some cities, like Los Angeles and Houston, have attempted to lure teachers into those less desirable schools with promises of additional pay. The plan was more successful in Houston, partly because the incentives offered were a significant compensation (Krei, 1998).

Interestingly, schools with many combinations of characteristics are successful. The common factor seems to be the people. When the people involved in a school have drive and vision, they are more likely to make a difference (Towns, Cole-Henderson, & Serpell, 2001). Unfortunately, finding those people with vision and gathering them together to bring a school to success is not simple. Just dispersing more money to failing schools will not help, if there is not a leader available to use the money wisely (Podgursky, 2006).

> In a study of three urban districts, principals and district officials expressed their doubts that incentive pay alone would be effective in attracting and retaining teachers to high-poverty schools…. In one southeastern metropolitan district, officials stated that good relationships with teacher education programs, improved preservice training for work with low-income students, and an effort to send extra resources into high-poverty schools had increased the district's teacher labor pool and decreased teacher transfer away from low-income schools (Krei, 1998, p. 86).

Teachers need to learn how to deal with the problems of students in poverty. Chicago Public Schools started the Grow Your Own initiative, a program that provides new teachers with mentoring and peer support. This has been helping but more is needed to bring teachers into high-poverty schools and keep them there for the long-term (*Here one year*, 2002). Programs that provide support for teachers, like mentoring programs for new teachers and staff-initiated professional development options for more experienced teachers can help decrease teacher turnover, creating a more stable environment (Black, 2004; Lee, Dedrick, & Smith, 1991; Ma & MacMillan, 1999).

Assessing Teachers

Effectively assessing teacher quality is a complex problem (Kupermintz, 2003). A large part of the problem is the lack of a definition of what makes a good teacher. Teachers with very different styles and training can be equally effective. One consideration of NCLB appears to be a means to assess teachers. It seems to be common sense that student test scores should reflect the quality of the instruction they are receiving. "Differences in student learning determines—by definition—teacher

effectiveness: a teacher whose students achieve larger gains is the 'effective teacher'" (Kupermintz, 2003, p. 289). However, the actual outcomes of teacher assessments based on students' achievement have been less straight forward.

As standardized exams come with higher and higher stakes, like merit pay or school sanctions, teachers are pushed toward behaviors, good and bad, that will increase scores. If the exam has been well-aligned with the curriculum and the teacher brings her teaching into closer alignment with the curriculum, those behaviors may also bring about the desired increase in real student achievement. However, aligning the curriculum with the exam can become a narrowing of the curriculum when the teacher only instructs on topics relevant to the exam and deemphasizes less relevant topics. By this means often even good teachers are pushed away from less tangible, shorter-term gains like motivation and behavior in order to show greater gains on the final examinations. Depending on how and which topics are emphasized and deemphasized, this narrowing of the curriculum can have a large negative impact on student achievement, as demonstrated by their performance in later situations like college classes (Koretz, 2002).

One qualitative study (Booher-Jennings, 2005) demonstrated that the resources of the entire elementary school went into helping the bubble kids, those who were close to passing but needed more help to pass. Teachers, counselors, and aids all focused on helping these children pass the exam, to the neglect of other students. Students who were not considered able to pass the exam, even with much personal attention, were often referred for testing for special education. Being in special education took the children out of the pool of students who were included in accountability measures, thus boosting the

percentage of students in a teacher's class who did or could pass the exam. Students who were passing the exams already were also neglected and expected to do individual seatwork while the teacher was helping the bubble kids (Booher-Jennings, 2005).

In the worst cases of altered teacher behavior, teachers can be tempted to cheat. Chicago Public Schools called in statisticians to ferret out the cheating by examining test scores within classes (Jacob & Levitt, 2003). The researchers detected egregious cheating in 4-5% of elementary school teachers in their sample.

> As incentives for high test scores increase, unscrupulous teachers may be more likely to engage in a range of illicit activities, including changing student responses on answer sheets, providing correct answers to students, or obtaining copies of an exam illegitimately prior to the test date and teaching students using knowledge of the precise exam questions (Jacob & Levitt, 2003, p. 3).

Naturally, the penalties were harsh and several teachers were fired. Cheating went down for the following several years but the administration realized that they needed to change the incentive system so teachers would not feel forced to cheat in order to survive (Levitt & Dubner, 2005).

Basing teacher evaluations solely on the standardized test scores of their students' forces teachers into the painful position of using methods that may not help all students, simply to increase the number of students passing the exam. Booher-Jennings (2005) set out to examine why there was a change in teachers' behavior under the accountability standards put in place by NCLB when other educational reforms had been met with apathy.

> I show how the equating of "good teaching" with high test scores by the institutional environment and the district shapes teachers' professional identities. Also, I describe how the district endangers relational trust between teachers by putting them into competition with one another (Booher-Jennings, 2005, p. 233).

One reason for the change in teacher behavior may be that scores for classes and their affiliated teachers were posted for all school employees to see. Teachers began to compete with each other, rather than cooperating, and were resentful of teachers of lower quality who were receiving higher test scores by what they considered immoral strategies (Booher-Jennings, 2005). One alternative is to lump scores for the entire school. However, while there are the benefits of encouraging teachers to work together, there are the drawbacks of a lack of reason to work hard individually, it does not remove poor teachers, and does not create incentives for good teachers to enter and remain in teaching (Hanushek et al., 2005).

The simplest method for determining teacher accountability might seem to be one number: the students' test score. However, there are many variables to consider: the amount of education students bring with them to class, the support for learning in their home environments, and the fact that individual classes do not uniquely serve individual classes (math skills are learned in science classes, for instance). According to Ballou (2002), the idea of measuring the value added by a teacher is an intriguing one but one that will never be answered by test scores. Unfortunately, many of the statistical techniques that would allow for removal of unexplained variation from student characteristics are too convoluted for anyone but advanced statisticians to understand.

While assessing accountability is valuable, teacher value-added should not be based upon test scores alone.

The current emphasis on accountability requires the assessment of teachers. If it is assumed that the standardized exams do measure student achievement and that teachers impact that achievement, it seems logical that teachers can be assessed by examining their students' test scores. However, students have much more in their lives than just school. Their home environments are just one source of great variation. Additionally, students rarely have the same teacher for more than one year and yet knowledge and skills are cumulative. To test the impact of a single teacher, the test much be sufficiently narrow to only test the things she has, or should have, taught. As this would require unique exams for all subjects and levels, it is unlikely that such a strategy will be adopted. Koretz (2002) calls for more diverse assessment of teachers, including direct observation. Since exams are given once in most cases, there are also the influences of the testing day and year that are outside the control of the teacher, like staffing changes and cohort effects (Kane & Staiger, 2002).

Other methods of evaluating teachers have been put forth. Milanowski (2004) describes the initial results from three years of evaluation of teachers using an assessment system developed for the Cincinnati Public School system. He finds the system to be an effective means of evaluating teachers since it shows high correlations with student outcome measures like standardized test results but can be used for teachers whose students are not being tested on standardized subjects. The main drawback is the assessment system requires many resources, particularly in terms of faculty release-time

for observations, and therefore may not be feasible for schools with very limited resources (Milanowski, 2004). However, this is a good indication that there are effective alternatives to simple correlations with student test scores for teacher assessment.

Kupermintz (2003) assessed the Tennessee Value Added Assessment System (TVAAS) for its validity regarding teacher effects. He determined that more extensive research on the validity of the system for ranking or scoring teachers should be undertaken before using its assessment to determine the fate of teachers. Koretz (2002) agrees that there needs to be active research to determine an appropriate means of evaluating teachers for accountability at least partially independent of their student test scores.

> There is a simple idea behind value-based assessment: schools and teachers should be evaluated based on student progress…. However, successful implementation of this concept is far from simple. It is much harder to measure achievement gains than is commonly supposed….Those who look to value-added assessment as the solution to the problem of educational accountability are likely to be disappointed. There are too many uncertainties and inequities to rely on such measures for high-stakes personnel decisions (Ballou, 2002, p. 15).

Dee and Keys (2005a) examined the Career Ladder Evaluation System used, and subsequently abandoned, in Tennessee. In the system, teachers could sign on for evaluations every five years that would move them higher in salary and rank. The salary hikes were generous as teachers achieved higher levels. The program probably failed because it was too easy to progress from level to level, particularly from the probationary

level to level I, and because there was no evidence that teachers in levels II and III were any more effective than level I teachers. In the end, the researchers concluded that the Ladder System had some benefits that could be used in subsequent attempts at merit pay systems but there needs to be a stronger means of differentiating outstanding teachers from merely competent ones (Dee & Keys, 2005a). It appears that traditional methods for teaching math and science are simply not effective for all students. Teachers need training in new methods that will be effective for all of the students in their diverse classes. When given reformed instruction in mathematics, students, particularly minority students who were struggling before, can improve on standardized exams (Manswell Butty, 2001). Manswell Butty also found that the positive attitude of the teacher had a strong impact on the attitude of the student. A well-trained, experienced teacher who is confident of her method is more likely to have a positive attitude.

Ratio of Students to Teachers

Research investigating the ratio of students to teachers uses class size as its measure rather than the ratio of all students in the school to all classroom teachers (Ehrenberg, Brewer, Gamoran, & Wilms, 2001; Hanushek, 2003). Most schools have special education teachers, physical education teachers, and other specialists with whom not all students interact. However, student-to-teacher ratio is the unit of data nearest to class size that is collected by the Georgia Department of Education and made available to the public.

Most studies about class size have been conducted in elementary schools where children are with the same teacher and class most of each day (Krueger & Whitmore,

2000; Varble, 1990). The research on the benefits of class size have had mixed results. Studies of class size in high schools, both nationally and internationally, have shown little impact of class size on student achievement (Hanushek, 2003). Another study found that in schools or districts that decrease their class sizes, if teachers have not been trained to handle smaller classes well, they often use the same techniques they had used in the larger class, resulting in no benefit to the students (Slavin, 1990).

However, class size does affect teachers. When they have fewer students to accommodate, they like those students more, feel they have more time for planning and grading, and generally feel they do a better job (Glass, Cahen, Smith, & Filby, 1982). Teachers who like their students and are less stressed are less likely to leave their positions, either to go to other schools or to leave the profession entirely. Teachers probably also convey their contentment to their students, aiding the students' motivation for learning (J. D. Finn & Achilles, 1990).

Naturally, larger schools will have more teachers to accommodate the greater number of students. A few studies have questioned the achievement impact of school size. There is very limited research on the impact of school size on student outcomes in high schools. Work on elementary schools is not generalizable to high schools because of the difference in academic layout. However, there is either contrary (Fowler & Walberg, 1991; Luyten, 1994) or limited supporting evidence that medium sized schools have more positive effect on students' scores on standardized exams (Speilhofer, Benton, & Schagen, 2004). One study of Caucasian males between 1920 and 1966, when there was a general movement toward consolidating small schools into large ones, showed strong

evidence that people from small schools earned more per year of additional schooling than people from large schools. People from lower socioeconomic status had more economic benefit than other subgroups from attending a small school, though the trend held even when parental income was controlled (Berry, 2004).

In 2003, the Gates Foundation initiated a five-year, $31 million project to found 168 alternative schools (Hendrie, 2003). The eventual goal of the national project is to break up the large, particularly urban, schools into smaller neighborhood schools that offer more personal attention. The Georgia chapter of the Communities in Schools nonprofit group received the largest grant. The plan is to increase the number of alternative schools in Georgia from two to 25 in the next three years (Hendrie, 2003).

Years of Experience

It may be a given that a teacher in her first year of teaching is not the most effective teacher (Hanushek et al., 2005). Regardless of the quality of their training, first-year teachers are usually struggling to adapt to a new situation with problems they have only encountered before in a textbook. The benefits of experience level off at about five years but there is a significant difference in effectiveness between teachers in their first year and those with five years of experience (Darling-Hammond, 2000). Another study found that the benefits of experience level out after two to five years (Kane, Rockoff, & Staiger, 2006). Teachers with one or fewer years of experience have students with reading and math scores one-tenth of a standard deviation lower than a teacher with five years experience (Clotfeller, Ladd, & Vigdor, 2005).

Naturally, with teachers retiring and increasing numbers of students, there is no way to avoid a certain number of new teachers in any given year. However, African-Americans and Hispanics have greater odds of having a teacher in her first year of teaching, which translates to multiple years of smaller achievement on exams (Hanushek et al., 2005). Clotfeller, Ladd, and Vigdor (2005) determined that novice teachers in North Carolina school districts are disproportionately found in schools and classrooms with more minority students. They attribute this pattern to two pressures on school administrators: parents and senior teachers. Involved parents have the ability to pressure their school administrators for the highest quality teachers. Lower quality teachers are relegated to less desirable schools where parents do not have as strong a voice. There is also pressure on administrators from senior teachers. Since salary schedules prevent increased salaries, senior teachers are rewarded with a choice of working location within the district (Krei, 1998). As accountability measures become more prevalent, this pattern will likely be reinforced as senior teachers move toward higher-achieving schools and classrooms (Clotfeller, Ladd, & Vigdor, 2004; Clotfeller et al., 2005).

Certification

The research on teacher certification falls into two categories: initial teacher certification and years of education or additional degrees. In Georgia, all teachers must hold a teaching certificate but that may be from either a traditional teaching certification program or an emergency or alternative program (Georgia Professional Standards Commission, 2006). The education data collected on teachers includes their degree level from four-year bachelors to seven-year doctorate.

Teacher Certification. There is great variation in the quality of teachers, even those who are highly qualified according to NCLB (Hanushek et al., 2005). Some researchers are questioning the value of teacher certification (Goldhaber & Brewer, 2000; Hoxby & Leigh, 2005). For instance, Kane and colleagues (2006) found that the type of certification—traditional, alternative, or from Teach for America—makes much less difference to a teacher's quality than years of experience. They also found that uncertified and alternately certified teachers tend to be clustered in low performing schools, making the research on the value of certification more necessary. In an examination of teacher credentials and student characteristics drawn from the National Education Longitudinal Study of 1988 (NELS:88) data (National Center for Educational Statistics), Goldhaber and Brewer (2000) found that poor students in the 10th and 12th grades are more likely to have math and science teachers with probationary or emergency certification than their more affluent peers. They also found that students who perform poorly on 10th grade math exams are more likely to have a 12th grade math teacher without a certification in math. Since this is the time when most high schools give their graduation exams, these students who have the most need are left with teachers who have the least experience. Math and science teachers with standard certification, as opposed to alternative or emergency certification, are more likely to be Caucasian and to teach in schools with fewer students of low socioeconomic status (Goldhaber & Brewer, 2000).

In 2000, Goldhaber and Brewer, using the data from NELS, found that teachers with an emergency certification had students with test scores in math and science that were just as high as teachers with a standard certification. While both groups produced

students that had higher test scores than teachers with probationary or private school certification or without any certification, the researchers suggested that policy makers should question the value of certification programs and regulations. Since there has been a teacher shortage, some states are creating programs to pull new teachers from industry. These people generally have limited pedagogical training. They also noted that students' math scores increased with the number of math courses that their teachers had taken. Using this reasoning, they decided that the value of teacher certification programs was questionable (Goldhaber & Brewer, 2000).

This study was critiqued by Darling-Hammond, Berry, and Thoreson (2001) who expressed concern that Goldhaber and Brewer should claim that teacher certification had little bearing on students' achievement. Using quotations from the original work, reanalysis of the data, and a different set of references, they refuted the claims of Goldhaber and Brewer. They noted that Goldhaber and Brewer themselves found that students did better with credentialed teachers but chose to focus their interpretation on the type of credentialing, thus skewing the sense of the study. They critiqued the small sample of the teachers with temporary or emergency credentials, noting that the effect of 24 science teachers and 34 math teachers were subject to large sampling error in their correlational analysis. Darling-Hammond et al. (2001) also examined the type of people who were receiving emergency credentials and determined that the majority of them were teachers from other states who were completing the specific requirements of a new state. Emergency credentials are typically valid for only a year or two. These people were not, therefore, without pedagogical training and could even be experienced teachers in their

own right. Darling-Hammond et al. (2001) also noted that students' scores increased when their teachers were trained both in the content areas and in education (Darling-Hammond et al., 2001). As stated by Monk (1994), "a good grasp of one's subject area is a necessary but not a sufficient condition for effective teaching" (p. 142). Darling-Hammond and colleagues also noted that because emergency credentials are only available for one to two years and teachers often are required to have probationary credentials for up to three years when they first enter teaching, part of the analysis that was ignored was the confounding one of experience. If teachers with emergency credentials really are coming from other states with prior experience, they will naturally have a more positive impact on their students than probationary teachers or those lacking certification simply because of their experience.

Another confounding effect was the lack of information provided by the survey in which content area teachers held their credential. Thus, teachers teaching in math might not hold a credential in that subject and were therefore considered uncredentialed when in fact they held a credential in science. Darling-Hammond et al. (2001) also noted that about 45% of the teachers surveyed commented that they were teaching in that class for the first time (Darling-Hammond et al., 2001). As schools ask teachers to cover more fields, some teachers will be asked to teach outside of field, especially in small schools (Feller, 2006). While this is contrary to the requirements of NCLB, smaller schools may find themselves lacking alternatives for financial reasons. Darling-Hammond et al. noted that teachers with fewer than three years experience are more likely to be teaching within their own fields. There were several ways to interpret this finding. More stringent rules

may keep teachers within their subject areas. Less experienced teachers are less likely to have post-baccalaureate education degrees so may have less pedagogical preparation to handle unfamiliar material. Their critique was supported by a quote from Levin (1980) about the value of certification as an objective means of evaluating teachers.

Goldhaber and Brewer (2001) were given the opportunity to rebut the critique of Darling-Hammond, Berry, and Thoreson. In the same issue of *Education Evaluation and Policy Analysis*, they defend their interpretation of the results of the NELS analysis. They argued that their statements were not as forceful as Darling-Hammond et al. portray and refuted their critique. Mostly, they argued that there are few studies like their own so comparisons on equal footing are not possible. They end by noting that the NELS survey was conducted during a time when the labor market for teachers was slack. As need for teachers grows, states may need to hire more teachers on emergency credentials simply to fill classroom requirements. These teachers may appear quite different from those sampled in the NELS survey and are worth studying. The risk, however, of increasing the stringency of certification requirements, however, is that people who might have become good teachers will not enter the field (Goldhaber & Brewer, 2001).

Many states require certified teachers to take a standardized exam in order to become licensed (Angrist & Guryan, 2003). Unlike the licensing exams for doctors and lawyers, licensing requirements vary by state and even within state. Goldhaber and Brewer (2000) examined the credentialing examination process. Since each state provides its own requirements, level comparisons were difficult but they examined credentialing exams, for instance. Thirty-six states have an exit exam for new teachers; the average

pass rate for this exam is about 85%. The entrance exam for teacher credentialing programs, used by 27 states, is slightly better at 78%. Part of this high rate of passing is due to states setting a low bar for passing. Goldhaber and Brewer questioned whether these exams weed out ineffective teachers. They commented that many states are increasing the difficulty of exams and stringency of credentialing requirements.

Angrist and Guryan (2003) found that state-mandated testing for teachers increases teacher wages but not teacher quality. Similar to doctors and dentists, teachers who have taken licensing exams can demand higher wages but show no evidence of increase in quality. Teachers who have taken exams do not come from better colleges nor are they more likely to be teaching the subject in which they majored or minored. The researchers commented that most skilled workers in private sector are not required to take a licensing exam but they admit that the public employee does not face market competition. They comment that there is some concern that licensing exams, even if they set a baseline achievement standard, will scare off some teacher applicants, particularly minorities. There is evidence that such tests are not a barrier to African-Americans but are to Hispanics (Angrist & Guryan, 2003).

Additional Degrees. The relative amount of schooling of teachers has declined over the last century. In 1900, teachers had an average of seven more years of schooling than people in other skilled trades. In the 1990's, teachers had about two and a half years more schooling than other skilled trades and the gap is shrinking. The disparity is even greater when male and female teachers' education levels are compared (Lakdawalla, 2002a, 2002b).

There have been several studies regarding the value of rewarding teachers for attaining higher degrees (C. E. Finn, Jr., 2005a; Lakdawalla, 2002b). Hanushek and colleagues (2005) studied how teacher quality influenced student achievement on standardized exams in Texas. They found that quality teachers are very valuable but that quality is not correlated with certificate level. Current salary schedules that increase teacher salary with respect to the certificate held, as well as number of year's experience, were not good indicators of the quality of a teacher and should be reconsidered.

Kane et al. (2006) compared teachers in grades three through eight with their own previous performance over the course of six years. "There are large and persistent differences in teacher effectiveness. This evidence suggests that classroom performance during the first two years, rather than certification status, is a more reliable indicator of a teacher's future effectiveness" (Kane et al., 2006, p. 1). Because high quality can be seen within the first two years of teaching, schools desiring high quality teachers would do well to retain teachers who are assessed highly during those first two years rather than relying upon quality assumptions associated certification, education, or even experience. The researchers also found evidence that students do better in National Board for Professional Teaching Standards (NBPTS) certified teachers' classrooms. This mid-career certification looks at evidence of quality after a year or more of experience (Kane et al., 2006).

Highly Qualified Teachers. One of the main requirements of NCLB was highly qualified teachers for all students, in all schools, for all subjects. The term highly qualified teacher is more a minimum qualification as it requires teachers to hold a bachelors degree, a

teaching certificate in the state, and proven competency in all the subjects she would be teaching that year (State of Georgia, 2003b). All states were required to have 100% highly qualified teachers or be able to describe how they were getting to 100% compliance by school year 2006-2007 (Feller, 2006). Not one state was able to comply with the requirement and nine states plus the District of Columbia and Puerto Rico are even facing loss of federal aid because they made too little effort in that direction. States with many rural schools often have the most difficulty because small schools require teachers to handle several subjects and have difficulty finding people with sufficient credentials in all subjects. The largest concern is the rate of turnover in teachers and the lack of qualified teachers for low income and urban students (Feller, 2006). Because of turnover and state licensing variability, it may be impossible to attain 100% teachers certified in their primary subject: 90% may have to suffice (Podgursky, 2006).

Student Outcomes

The main data collected in accordance with NCLB requirements to assess student outcomes are passing rates on standardized exams, graduation rate, and dropout rate.

Standardized Exams

There is disagreement over the value of standardized testing (Dee & Jacob, 2006; Hoxby, 2005; Jacob, 2003; Koretz & Deibert, 1996; Newell, 2002, November; Perkins-Gough, 2005; Popham, 1999; Riffert, 2005; Rothstein, 2004; Zhao, 2006). The poor comparative performance of American students on international examinations clearly demonstrates that our educational system needs reform. Standardized tests seem an ideal

way to ensure that all students are meeting a national minimum proficiency (C. E. Finn, Jr., 2006b). They also allow transparency of the actions of schools and teachers so good ones can be rewarded and poor ones can be corrected (McAdams, 2002). From a distance, standardized tests are a good solution to finding and removing problems in our school systems. However, the results of testing have brought about some unexpected consequences.

The use of standardized tests requires two major assumptions: that student scores measure achievement and that holding teachers responsible for those scores will improve teacher performance (Koretz, 2002). Unfortunately, there is strong evidence from numerous studies that neither assumption can be accepted (Ballou, 2002; Ediger, 2000; Koretz & Deibert, 1996; Kupermintz, 2003; Odden, 2004; Popham, 1999). Student scores can be artificially inflated by teacher behaviors and teachers are often pushed into behaviors that are counterproductive to increasing student achievement, as noted earlier in this review (Booher-Jennings, 2005; Jacob, 2002).

The first problem of artificial inflation of scores is a difficulty for many standardized examinations (Jacob & Levitt, 2003; Koretz & Barron, 1998). Ideally, standardized tests ask questions about a certain subsection of a domain of knowledge, thus demonstrating proficiency in the domain if the student passes the exam. Unfortunately, the limitations of time, money, and research rarely allow for examinations that appropriately encompass a subject area. For one, there is often argument about the boundaries of the domain and what content and skills should demonstrate proficiency. The tendency currently is to compromise with very broad, simple questions. Second,

there is the problem that fill-in-the-bubble exams have difficulty testing other desirable skills like creativeness, problem-solving, or deep understanding (Koretz, 2002). It is also questionable if the items tested demonstrate skills that can be transferred to other domains (Haertl, 1999). More often the exams are filled with items that require basic recall or, in the case of mathematics, simple calculations. Third, standardized tests are expected to test every student but cannot be too long. The ability to demonstrate the capacities of all students from highly excelled to remedial cannot be covered in one exam. That would require many more questions than are feasible in a given testing period and would frustrate all test-takers with the questions that were ill-matched to their level. The result of these limitations is exams that test only basic proficiency, the lowest common denominator. Beyond that are the difficulties in maintaining sufficiently equivalent testing situations that tests given at different times can be compared. There are many factors beyond the control of the school that truly equivalent testing is basically impossible (Koretz, 2002).

The problem with score inflation arises from several factors related to standardized examinations. The first is simply familiarity: as a teacher or school gets to know the format and question type for their particular exam, they become very adept at helping the students to answer questions better. Only gains in later years can be trusted as true indicators of student learning improvements (Koretz, 2002). There is also evidence that the gains made on new tests are not transferable to equivalent tests (Linn, Graue, & Sanders, 1990). Again this may be due to familiarity issues but throws great doubt upon the comparability of tests and whether test scores actually demonstrate proficiency in the

domain tested (Haertl, 1999). Since each state is using its own exams, national comparisons of student achievement are almost impossible.

One of the main difficulties in assessing standardized tests is most of the money to do so comes from the testing agencies themselves (Haertl, 1999). Their researchers have practical and even economic reasons to find supportive evidence rather than criticism. The critical studies must be financed by independent means. This is exacerbated by the tendency to use a checklist as means to assess the quality of tests rather than constructing validity arguments. A checklist is much less likely to notice the assumptions that link the items on the checklist and actually contributes to the tendency to search only for supportive evidence. Also, no one wants to uncover the evidence that may eventually face him in court when the testing company must defend its tests (Haertl, 1999).

The intense focus on the outcome of standardized examinations is having some deleterious effects. For instance, Texas was initially lauded for its incredible gains in test scores, decreasing the gap in test scores between Caucasian students and minorities, and decreasing dropout rates. However, upon closer examination, it was demonstrated that many minority students were disappearing from the system altogether and the number of students referred to special education, and thereby exempt from the testing, nearly doubled from 1994 to 1998 (Haney, 2000). Georgia intends to track each student individually so students no longer disappear and graduation and dropout rates can be counted directly instead of calculated (State of Georgia, 2005b).

Since minorities make up the largest proportion of the low socioeconomic status cohort, there is often the sense that African-Americans do not do as well on standardized exams and are more likely to drop out of high school (Haertl, 1999). When socioeconomic status is removed from the equation, African-American students tend to do better on standardized tests (Portes & Wilson, 1976) and dropout rates are lower than Caucasian students (Myers & Ellman, 1983). There is also the problem of test scores being inappropriately used.

> Consumers of test score reports often seem to interpret them as if test scores were a direct reflection of the quality of schooling. In fact, I am sure we would all agree that how much students know is a complex function of many factors, only some of which are within a school's control (Haertl, 1999, p. 8).

When scores are not corrected for parental education, differences in income, and school quality, among other factors, the test-score gap between Caucasians and minorities begins to sound like something that will always exist and might be due to the students themselves rather than their environments or the tests or the schools (Haertl, 1999).

Graduation Rate

NCLB recognizes that assessing schools and students on standardized tests alone is not sufficient to understanding the condition of schools. NCLB asks that states include graduation rate into their annual reports but allows states much leeway in choosing a second indicator of Adequate Yearly Progress (Orfield et al., 2004). Most Georgia schools have chosen to use graduation rate as the second indicator (State of Georgia, 2003b). While NCLB does include provision for accountability for graduation rates, the

provision is not seriously enforced whereas the test score requirements are stringently enforced. The goal of attaining high rates of passing on standardized exams encourages schools to push out low-achieving students. Also, states are allowed to choose to give an Adequate Yearly Progress score (AYP) to schools that show any improvement at all, even if some subgroups have declining graduation rates or test scores. This exacerbates schools' incentive to push out underachieving students (Orfield et al., 2004).

However, graduation rate is variable depending on the data and method used to calculate it and NCLB has not laid down clear guidelines. Barton found graduation rate is either around 90% across the nation or around 70% depending on how it is calculated (Barton, 2005a, 2005b). The Urban Institute used the Cumulative Promotion Index (CPI) to calculate the holding power of schools. The CPI compares freshman enrollment with senior enrollment four years later. When graduation rates were examined using the CPI, all states fell into Needs Improvement status, assuming a minimum graduation rate of 66% for all subgroups (Orfield et al., 2004).

Currently, most states claim a graduation rate on the order of 75% (Orfield et al., 2004). However, when all students are included, accounting for those who dropped out at any time before graduation and those who are incarcerated, the rate drops significantly. When using estimates based on enrollment data as of 2001, the percent of students who enter ninth grade who subsequently graduate with a regular diploma in twelfth grade drops to 68%. In 2001, Georgia claimed 61.8% of students were graduating. The CPI calculation was 55.5%, thus ranking Georgia 48th of 51 states plus the District of Columbus. That rate was even lower for minorities. Nationally, Caucasian students

averaged 74.9% graduation rate while African-American students only averaged 50.2%. When the data were disaggregated by gender, African-American male students have only a 42.8% graduation rate nationwide (Orfield et al., 2004).

Graduation rate in Georgia is determined by a proxy calculation that uses the percent of students entering ninth grade and exiting in four years with a regular diploma, removing any students who officially drop out (State of Georgia, 2003b). The number of freshmen far outnumbers the number of seniors. For instance, Centennial High School in Fulton County, Georgia, had 621 freshmen enrolled in Fall 2004 but only 462 seniors. Assuming that the size of the school remains relatively constant, only 74% of students are remaining in school by twelfth grade. The section on year 2005 High School Completers revealed that there were 417 total completers, 403 of those with regular graduation diplomas. When compared with the number of freshmen in 2000, only 64.8% of students are graduating with the regular diplomas as by NCLB, yet the school claims 90.8% graduation rate for all students in the school (State of Georgia, 2005a). If the 589 ninth-graders in Fall 2001 who should have graduated in 2005 are used in these calculations, the regular diploma graduation rate becomes 68.4% (State of Georgia, 2003a). There needs to be a change in the way graduation rate is calculated if Georgia is ever going to get an accurate count of how many students are actually receiving high school diplomas.

Dropout Rate

As the inverse of graduation rate, dropout rate is quite variable depending on how it is calculated. This section will examine how dropout is calculated, who and how many

students are dropping out, the consequences of dropping out, and some solutions researchers and practitioners have suggested or tried.

Calculating Dropout. Depending on how graduation rate is calculated, this is a decent second indicator. One of the risks of placing all assessment on one criterion is that other important aspects of schools will be lost. For instance, the pressure to have a high percentage of students passing the standardized exams encourages schools to remove low performers (McDill, Natriello, & Pallas, 1985; Rumberger & Palardy, 2005). Therefore it is important to check dropout rate as well as passing rate on standardized exams. Depending on how dropout rate is calculated, not all students who leave school before graduation will be documented. For instance, Rumberger and Palardy (2005) noted that schools often do not follow students who transfer out of their schools. Some of those students do finally graduate but some actually drop out (Fine, 1986).

Students drop out for many reasons but some common ones are: have to take care of older or younger family members, didn't like school, or hung out with others who were not interested in school (Civic Enterprises, 2006). The possibilities offered for formal dropout in Georgia include: Marriage, Expelled, Financial Hardship/Job, Incarcerated/Under Jurisdiction of Juvenile or Criminal Justice Authority, Low Grades/School Failure, Military, Adult Education/Postsecondary, Pregnant/Parent, Removed for Lack of Attendance, Serious Illness/Accident, and Unknown (State of Georgia, 2003b).

As noted by Rumberger and Palardy (2005), test scores are a preferred measure of school effectiveness because they are a direct measure of student learning. However,

schools that are striving for high rates of exam passing may neglect to consider the unintentional consequences of such striving. For instance, schools that push for higher exam scores may push less able students out, either directly or indirectly. Remediation is costly. Without examining dropout rate alongside exam scores, loss of students from the system may be missed (Rumberger & Palardy, 2005). Since the social and financial ramifications of dropout are great (Kaufman, Alt, & Chapman, 2004), it is highly important to keep all students in view.

Who Drops Out and How Many. J. D. Finn (2006), using the data in the National Education Longitudinal Study of 1988 (NELS:88), identified students who were at risk of educational failure due to status risk factors. These factors were the socioeconomic status of the student's home, as determined by reports of parents' education, occupations, and household income, and of the school the student attended, as determined by the percentage of students eligible for reduced or free school lunches. Of the more than 10,000 students followed over 12 years, approximately a third fell into the "at-risk" category. As compared with students not at risk, these students were disproportionately minorities, did not speak English at home, attended public rural or urban schools, and were not living with both biological parents.

J. D. Finn (2006) categorized students into successful completers of high school, marginal completers, and noncompleters. Successful completers, comprising 21% of the at-risk group, graduated from high school on time and had acceptable grades. Marginal completers, 52% of the group, also graduated from high school but with non-passing

grades and lower test scores. Noncompleters, 27% of the group, left high school without graduating.

J. D. Finn (2006) noted that one important revelation of the analysis is the diversity of outcomes for student with status risk factors. Many go on to graduate from four-year colleges and have consistent, good-paying employment in their adult lives. Others, particularly those who show little engagement in school and do not complete high school, are at great risk of inconsistent employment and low income. They are also less likely to attend postsecondary education as a means to improving their employment situations.

An examination of dropout rates in the United States from 1972 through 2001 shows that progress was made in increasing high school completion during the 1970's and 1980's but has since stagnated. One analysis breaks dropout and completion rates into categories: event dropout rate and status dropout rate (Kaufman et al., 2004).

Event dropout rates examine dropout rates over a short timeframe, like one school year, allowing for investigation of the impact of events like changes in economic conditions or educational policy (Kaufman et al., 2004). In 2001, five percent of students who had been in high school as of October 2000 had left school without a diploma as of October 2001. This percentage has stayed approximately the same since 1987. This adds up to between 300,000 and 500,000 students each year. Students from families in the lowest 20% income bracket are more than six times more likely to drop out than students of the 20% of the income distribution (Kaufman et al., 2004).

Status dropout rates examine the total number of persons between ages 16 and 24 who are out of school and lack a high school diploma, regardless of when or if they dropped out of school (Kaufman et al., 2004). This allows for a broader picture of the educational status of the nation or a particular population. Status dropout rate tends to be higher than event dropout rate simply because it includes all persons in the age range, even if they never attended high school in the United States, like immigrants. In October 2001, 3.8 million 16- through 24-year-olds were considered status dropouts. This constitutes approximately 10.7% of all 16- through 24-year-olds in the United States and has remained consistent since 1990. Hispanics consistently have the highest dropout rates (27.0% in 2001) though Hispanics born in the United States have lower rates of dropout than their immigrant counterparts. In 2001, Caucasians' status dropout rate, 7.3%, remained below that of African-Americans, 10.9%, but the gap has narrowed since 1972. Asians/Pacific Islanders showed the lowest dropout rates at 3.6% (Kaufman et al., 2004).

While the National Center for Education Statistics quotes an 85.7% graduation rate (Swanson, 2003), meaning 14.3% have dropped out, other sources question the figures. For instance, the Manhattan Institute points out that students who get a GED are not included in dropout data, nor are students who have been jailed (Vail, 2004). Considering that the number of African American men in their 30's who are in jail, 22%, nearly doubles the number who are in college, 12% (Western, Schiraldi, & Ziedenberg, 2003), their lack in the dropout statistics is very deceptive. Also, dropout reporting varies by state. Some states only report students who file paperwork to drop out officially, like Georgia, or only those who drop out in 12th grade. Also, students who claim to transfer

between schools but never arrive at their new institution are often lost to the count (Vail, 2004).

The dropout rate is perpetually higher among minorities, particularly African-Americans, Hispanics, and Native Americans. Since these students are often from low socioeconomic status schools and backgrounds, they have often attended the worst high schools, too (Orfield et al., 2004). Students who do graduate go on to college 70% of the time but even then 58% of those require remedial math and reading courses sometime during their college careers (Vail, 2004).

A longitudinal study (NELS:88, National Center for Educational Statistics) by the National Center for Educational Statistics found that there was a 43% reduction in the percent of sophomores who dropped out between 1982 and 1992. There was no significant difference between dropout rates for males and females, though both decreased during the ten-year period. Dropout rates decreased for all racial and ethnic groups but remained the highest for Hispanics over African-Americans and Caucasians and Asians. In 1982 and 1992, the reasons for leaving school were dominated by "didn't like school" and "poor grades or failing". Females often also dropped because they were married or pregnant. Marriage, however, decreased in importance from 35% to 20% between 1982 and 1992 (McMillen, Kaufman, Germino Hausken, & Bradby, 1993).

The more in-depth analysis of the data from High School and Beyond (National Center for Educational Statistics) was published in 1987. It analyzed data regarding many individual characteristics of dropouts, including race, socioeconomic status, parent education and socioeconomic status, local economic conditions, school characteristics,

and events that might have influenced students decision to drop out of school (Barro & Kolstad, 1987). A qualitative study of dropouts in an inner-city New York high school also noted firmly that many students are discharged from school, either because they are too difficult to handle or have too many absences. These students are also included in the dropout numbers, even though the decision to leave school was made by the school, not themselves. Of the cohort studied, only 33% of the ninth-grade class ultimately graduated from any high school. Nearly half of those 1221 students were discharged (Fine, 1986).

Consequences of Dropping Out. Many students and their parents are unaware that in most states they are legally allowed to attend public school until age 21. When students are pushed out of high school, they are often directed toward graduate equivalency degree (GED) or adult education programs. However, there is evidence that students with a GED instead of a regular high school diploma are about as well employed as high school dropouts, unless they go back for postsecondary education, which only about 2% do (Chaplin, 2002; Orfield et al., 2004).

J. D. Finn (2006) compared postsecondary education and employment among at-risk students who had completed high school, marginal completers, and noncompleters. Students who do not complete high school are at greatest risk for unemployment during their adult lives. High school noncompleters completed fewer postsecondary credits than high school completers or even marginal completers, were less likely to be employed during the year 2000, and showed less consistent employment over a three-year time period. Interestingly, students who completed a postsecondary program of study showed nonsignificant differences in employment consistency. Clearly, simply graduating from

high school makes a great difference in students' chances. Even marginal completers were five times more likely than noncompleters to attend postsecondary education. They also earned more postsecondary credits and were more likely to complete the program. When postsecondary education was removed from the analysis, the groups differed regarding current employment, consistency of employment, and income. However, postsecondary education seems to be the greatest determiner of adult income and employment differences among at-risk students (J. D. Finn, 2006).

An examination of the lives of dropouts after leaving school in 1980 included in the High School and Beyond longitudinal study (HS&B, National Center for Educational Statistics) revealed that by 1982 many dropouts (27%) were unemployed or dissatisfied with their work and looking for work. The ones who were working had low-skilled jobs. Most of the dropouts regretted leaving school. The data collected confirmed earlier studies (Rumberger, 1981) that found students of low socioeconomic status, poor academic performance, and non-academic program were more likely to drop out. On a perhaps related note, more kids from urban schools drop out than those from suburban or rural schools (Barro & Kolstad, 1987).

As discussed above, the consequences of dropping out, such as limited access to high-paying work and concomitant poverty, are numerous and detrimental both to the individual and to society. Since students from low socioeconomic status are more likely to drop out than their affluent peers, they also are likely to pass poverty and the tendency to drop out on to their own children, especially if they started having those children in their teen years. Susan Sclafani, assistant secretary for Adult and Vocational Education,

said if the states are serious about increasing the rates of graduation, the law allowing drop out at 16 or 17 must be rescinded (U.S. Department of Education, 2004; Vail, 2004).

Solutions to the Dropout Problem. Alternative schools are being created as another option for students who are failing conventional schools (Lange, 1998). For failing students, many states offer school choice. They can choose to attend an alternative school in lieu of the conventional school. Alternative schools usually fall into one of three categories or a mix of types: Type I schools act as magnet schools and often focus around a particular subject or theme; Type II schools focus on behavior modification for students who are on the edge of expulsion; and Type III schools focus on remediation or rehabilitation. Assessment of the effectiveness of alternative schools is still being developed. A survey of Minnesota alternative school teachers and directors documented the characteristics of alternative schools in that state as a prerequisite to evaluation. Some teachers wished for more standardized testing to complement the greater use of small groups and community involvement. Teachers also felt that the alternative school environment was much closer to ideal than a conventional school. Many special education students are also attracted to alternative schools and it seems to be working well for them (Lange, 1998).

Students who do graduate go on to college 70% of the time but even then 58% of those require remedial math and reading courses sometime during their college careers (Vail, 2004). Employers are beginning to question whether a high school diploma means students actually have the basic skills. The concerns of businesses often translate to increased public and governmental attention. NCLB is an outcome of this concern. The

Gates Foundation has made a grant of $31 million dollars over five years to establish more small high schools and more schools with a specific focus (Hendrie, 2003). Comprehensive, large high schools are losing many students to dropout. Several school districts in Minnesota, Colorado, New York, and California have begun the process of reform. While they are still in the process of change, results are muddled but teachers and administrators are hopeful (Vail, 2004).

The Calculation of Adequate Yearly Progress

The goal of each school under NCLB is to achieve Adequate Yearly Progress. This can mean different things in different states but generally means a demonstration of improvement in test scores and graduation rate over the previous year. Theoretically, all subgroups should also be showing improvement but schools are allowed to exempt subgroups under certain conditions (Orfield et al., 2004). In Georgia, schools must meet standards in three areas: test participation, academic performance, and a second indicator, which is graduation rate for many high schools. If schools fail to make AYP for two consecutive years, the school receives a score of Needs Improvement which entitles students and parents to leave the school. If the school remains in Needs Improvement status for five years, it must restructure in order to improve (Georgia Department of Education, 2004).

While one of the main goals of NCLB is transparency of methods and statistics, the methods used to find AYP are much less than clear. Hoxby (2005) offers several suggestions for making the picture clearer, suggestions that can be implemented immediately. The suggestion of the most immediate relevance to this study is creating a

linear forecast of a school's performance using regression. Since a regression offers confidence levels, a school could tell its community high, likely, and low forecasts of its progress toward 100% proficiency. This is the same method used by businesses, something that is apparently a goal of accountability standards in NCLB. Using regression would also allow more equal comparisons of progress by subgroups like minorities and economically disadvantaged students. Currently, the failure of one subgroup can cause the loss of AYP for the entire school because of the subgroup threshold. This way would also allow groups who are not passing the exams to demonstrate their progress, allowing all groups to contribute to AYP (Hoxby, 2005). Such a change might help alleviate the teacher defensive focus on the bubble kids just to get certain levels of passing scores (Booher-Jennings, 2005). Since schools are not allowed AYP if less than 95% of students take the exams, Hoxby (2005) suggested simply recording the minimum score for all children not taking the exam. This method would account for all students and would encourage schools to allow all students to take the exams, since they are likely to increase from the minimum score. This method would sidestep any arbitrary thresholds of student participation and allow all students to contribute to schools' progress.

> Fortunately, reasonable administrative action can correct deficiencies in the way in which AYP is measured and reported today. AYP can be refined simply by paying closer attention to the operational definitions of key words in the law. We need to benchmark state definitions of proficiency, measure progress by forecasting how well each school is moving toward the 2014 goal, publicize

> adequacy by means of simple figures that show where each school stands, encourage schools to test every child by assigning minimum scores to those who are not tested, and hold schools accountable for only that portion of the year the child spent in the school (Hoxby, 2005, p. 51).

These changes would go far in helping keep schools on the track of educating all students and striving for 100% graduation in addition to higher test scores.

Summary

The literature about teacher effects on students is extensive. Teacher quality is a difficult trait to assess. It is not consistently correlated with gender, race, certificate level, education, salary, or even experience beyond the first few years. Currently, teachers are paid according to their experience and education though some researchers argue that teacher salary should driven more by market forces than salary schedules (Ballou & Podgursky, 1997; C. E. Finn, Jr., 2005a; Podgursky, 2005). Assessing teachers more thoroughly requires time and money, commodities that are notoriously in short supply in public schools. One option is to assess teachers by their students' success at standardized examinations. Not only is there poor correlation between teacher quality and test scores because students bring so many other variables into the process but also teachers have enacted strange behaviors, like cheating, to increase test scores to the detriment of quality schooling.

The No Child Left Behind Act has set out to improve the quality of education for America's children. The goal of 100% certified teachers in classrooms has proved difficult to attain. Partly, this is due to high teacher dissatisfaction and frustration. More

training is needed to help teachers deal with the diversity they will encounter in today's schools. The other major goal of NCLB, 100% graduation is also facing difficulties since the dropout rate is so high. More accurate calculation of graduation and dropout rates will help to understand the problem and its extent. With some alterations, NCLB may help improve schooling in America.

CHAPTER III

METHODS

Purpose of the Study

The purpose of this study was to investigate the relationship of the characteristics of teachers in Atlanta's urban high schools to student outcomes, that is, graduation and dropout rates. The social and economic penalties of not graduating from high school are numerous, such as limited access to high-paying work and concomitant poverty. However, across the nation, the graduation rate is only about 70%, and even lower among minorities and students of low socioeconomic status (Orfield et al., 2004). This study investigated the relationship of teacher characteristics to high school graduation and dropout. In addition to gauging this success by the graduation rates reported by high schools, it also examined persistence rate, that is, the number of freshmen as compared to the number seniors or graduates four years later.

Research Questions

The following questions were addressed by this study:

1. What is the relationship, if any, of teacher characteristics (certificate/degree level, years of experience, race, gender, full-time, student to teacher ratio, highly qualified teachers) and student graduation rate?

2. What is the relationship, if any, of teacher characteristics and student dropout rate?
3. What is the relationship, if any, of teacher characteristics and student persistence rate?

Data Source and Variables

The data were compiled from the 2003-2004 and 2004-2005 School Report Cards available at the Georgia Department of Education website (State of Georgia, 2003a, 2005a). Only comprehensive high schools in and around Atlanta were used, including schools from Atlanta City Schools, Cobb County Schools, DeKalb County Schools, Fulton County Schools, and Gwinnett County Schools. Alternative and magnet schools were not included.

Data collected included: graduation rate, dropout rate, total school enrollment, enrollment by subgroup (race, free/reduced lunch, students with disabilities), and teacher characteristics. Teacher characteristics included average teacher salary, number of full- and part-time teachers, number of male and female teachers, race distribution of teachers, distribution of teachers' college degrees, years of experience, number of highly qualified teachers, and student-to-teacher ratio (see sample page in Table 1).

The outcome variables were graduation rate and dropout rate in 2004 and 2005. Also, since the calculation of graduation and dropout rate is poorly defined, the third outcome variable was persistence, the ratio of freshmen in 2000 to seniors or graduates in 2004 (Losen, 2005; Orfield et al., 2004). Twenty of the 63 schools had persistence rates over 100% from 2001 to 2005, suggesting reshuffling of students between schools within the district, making the variable meaningless for that range of years.

Table 1

Sample Personnel Data Page from Washington High School (Atlanta City School District) 2004-2005 Report Card

	Administrators	Support Personnel	PK-12 Teachers
Positions			
Number	6.60	8.60	85.34
Average Annual Salary	$82,840.54	$62,639.24	$50,310.68
Average Contract Days	221.82	197.91	190.16
Average Daily Salary	$373.46	$316.51	$264.56
Personnel			
Full-time	6	8	85
Part-time	1	1	1
Gender			
Male	2	3	31
Female	5	6	55
Certificate Level			
4 Yr Bachelor's	0	0	29
5 Yr Master's	3	6	45
6 Yr Specialist's	3	2	8
7 Yr Doctoral	1	1	3
Other *	0	0	1
Race / Ethnicity			
Black	7	9	78
White	0	0	8
Hispanic	0	0	0
Asian	0	0	0
Native American	0	0	0
Multiracial	0	0	0
Years Experience			
< 1	0	0	12
1-10	2	4	45
11-20	0	4	13
21-30	2	0	9
> 30	3	1	7
Average	24.43	12.44	10.24

*Includes One- and Two-Year Vocational Certificates
Source: 2004-2005 State of Georgia K-12 Report Card,
http://reportcard2005.gaosa.org/k12/persfiscal.aspx?TestType=pers&ID=761:4568

Students are influenced by their peers as well as their teachers so the independent variables included both. While correlations were examined between all possible variables, ten independent variables were formed from the original dataset for regression analysis. The final 4 dependent and 10 independent variables used in regression analyses were (see Table 2):

Dependent variables:

1. Graduation rate
2. Dropout rate
3. Persistence to senior year
4. Persistence to graduation

Independent variables:

1. School size was the total number of students in the school that year.
2. Enrollment of students was represented by the percentage of students on free or reduced lunch.
3. The ratio of part-time teachers to full-time teachers.
4. The ratio of male teachers to female teachers.
5. The ratio of African-American teachers to Caucasian teachers.
6. The ratio of teachers with only bachelor's degrees to teachers with higher degrees.
7. The ratio of teachers in their first year of teaching to more than one year teaching.
8. The average years of experience of all teachers in a school.
9. The ratio of students to teachers.
10. The percent of core subject teachers who were highly qualified teachers.

Table 2

Raw Data Collected and Eventual Variables Used in Analyses

Original Variables Collected	Final Variables Used in Analyses
Graduation rate	Graduation rate
Dropout rate	Dropout rate
Freshman enrollment in 2000 Senior enrollment in 2004	Persistence to senior year = 2000 freshman enrollment : 2004 senior enrollment
Freshman enrollment in 2000 Number graduating in 2004	Persistence to graduation = 2000 freshman enrollment : 2004 number graduating
School size = Total school enrollment	School size
African-American enrollment Caucasian enrollment Hispanic enrollment Enrollment of students on free or reduced lunch Enrollment of students with disabilities	Enrollment of students on free or reduced lunch
Total number of teachers Average teacher salary	
Number of full- and part-time teachers	Part-time : Full-time teachers
Number of male and female teachers	Male : Female teachers
Number of African-American teachers Number of Caucasian teachers Number of Hispanic teachers	African-American : Caucasian teachers
Number of teachers with Bachelors degrees Number of teachers with Masters degrees Number of teachers with Specialist and Doctoral degrees	Bachelors : Graduate degrees

Table 2 continued

Raw Data Collected and Eventual Variables Used in Analyses

Original Variables Collected	Final Variables Used in Analyses
Number of teachers with less than one year of experience Number of teachers with 1-10 years of experience Number of teachers with 11-20 years of experience Number of teachers with 21-30 years of experience Number of teachers with over 30 years of experience	Number of teachers with under one year : Over one year of experience
Average years experience	Average years experience
Student-to-teacher ratio	Student-to-teacher ratio
Number teachers of core subjects Number of highly qualified teachers of core subjects according to NCLB	Percent of highly qualified teachers of core subjects according to NCLB

It was decided to use enrollment of students on free or reduced lunch to represent school enrollment. The enrollment of students on free or reduced lunch is a commonly used proxy for determining the socioeconomic status of schools (J. D. Finn, 2006). All student enrollment groups were highly correlated with each other, except students with disabilities, but the percent of students on free and reduced lunch explained more variation in regressions than percent enrollment of African-Americans or Caucasians, the two largest enrollment race subgroups (Graduation rate 2005: African-American enrollment, $R^2 = 0.658$, Caucasian enrollment, $R^2 = 0.616$, Free/Reduced Lunch enrollment, $R^2 = 0.850$). The literature is divided as to whether the proportion of African-American students or students in poverty has more impact on student outcomes in

America's high schools (Caldas & Bankston, 1997; Dee, 2003; Howard, 2001; Scafidi et al., 2005).

Some subgroups have been omitted, for instance, Asian and Native American student enrollment percentages. These were omitted because their numbers were so small. Of the 63 high schools used in this study, only 11 schools had Asian enrollments over 10% and only 20 had Asian enrollments over 5%. Native American enrollment never reached over 1% in any of the schools examined and was usually non-existent. The same pattern was seen in the races of teachers so only African-American, Caucasian and Hispanic teachers were investigated. Migrant and Limited English Proficient student enrollments were similarly small and thus not examined in this study.

Data Analysis

Data were treated similarly for all three research questions. For a better understanding of the data, scatter plots of relationships between predictor and outcome variables. Also, z-scores were generated in order to identify outliers. There was no theoretical basis for removal of outliers, so analyses were run with and without outliers to determine if the outliers had a strong effect on outcomes (Tabachnick & Fidell, 2001). Correlations were also conducted without outliers. Bivariate correlations were examined between all variables in each respective year. All variables were compared between years using paired t-tests.

Finally, multiple regressions were conducted using the final predictor variables on each of the dependent variables. Regressions were conducted on each of the dependent variables: graduation rate, dropout rate, and persistence for each year. The ten

independent or predictor variables were: the percent enrollment of students on free or reduced lunch, school size, the ratio of part-time teachers to full-time teachers, the ratio of male teachers to female teachers, the ratio of teachers with only bachelors degrees to teachers with higher degrees, the ratio of African-American teachers to Caucasian teachers, the ratio of teachers in their first year of teaching to those who had taught more than one year, the average years of experience of all teachers in a school, the ratio of students to teachers, the percent of core subject teachers who were highly qualified teachers. Because of the presence of outliers, 16 multiple regressions were conducted (see Table 3).

Summary

Using data originating from the Georgia Department of Education School Report Cards for Atlanta, Georgia, area schools, ten final independent variables were created to succinctly characterize schools and teachers. Subsequently, correlations and regressions were used to assess the impact of the predictor variables on graduation rate, dropout rate and persistence. As there were outliers in both dependent and independent variables but there was no theoretical reason to remove them from the analyses, regressions and correlations were examined both with and without outliers. In addition, the differences of variables between years and intercorrelations between predictor variables were examined.

Table 3

Summary of Multiple Regression Analyses

Dependent Variable	Independent Variables	Outliers Removed from:
Graduation rate 2004	All predictors, outliers included	
Graduation rate 2004	All, outliers removed	• male to female teachers bachelors to graduate • African-American to Caucasian teachers • under one year experience highly qualified teachers
Graduation rate 2005	All, outliers included	
Graduation rate 2005	All, outliers removed	• African-American to Caucasian teachers • highly qualified teachers
Graduation rate 2005	All, outliers included	• Graduation rate 2005
Graduation rate 2005	All, outliers removed	• Graduation rate 2005 • African-American to Caucasian teachers • highly qualified teachers
Dropout rate 2004	All, outliers included	
Dropout rate 2004	All, outliers removed	• male to female teachers • bachelors to graduate • African-American to Caucasian teachers • under one year experience highly qualified teachers
Dropout rate 2004	All, outliers included	• Dropout rate 2004

Table 3 continued

Summary of Multiple Regression Analyses

Dependent Variable	Independent Variables	Outliers Removed from:
Dropout rate 2004	All, outliers removed	• Dropout rate 2004 • male to female teachers bachelors to graduate • African-American to Caucasian teachers • under one year experience highly qualified teachers
Dropout rate 2005	All, outliers included	
Dropout rate 2005	All, outliers removed	• African-American to Caucasian teachers • highly qualified teachers
Persistence to senior year, 2000 - 2004	All, outliers included	
Persistence to senior year, 2000-2004	All, outliers removed	• male to female teachers bachelors to graduate • African-American to Caucasian teachers • under one year experience highly qualified teachers
Persistence to graduation, 2000-2004	All, outliers included	
Persistence to graduation, 2000-2004	All, outliers removed	• male to female teachers • bachelors to graduate • African-American to Caucasian teachers • under one year experience • highly qualified teachers

CHAPTER IV

RESULTS

Purpose of the Study

The purpose of this study was to investigate the relationship of the characteristics of teachers in Atlanta's urban high schools to student outcomes, that is, graduation and dropout rates. The social and economic penalties of not graduating from high school are numerous, such as limited access to high-paying work and concomitant poverty. However, across the nation, the graduation rate is only about 70%, and even lower among minorities and students of low socioeconomic status (Orfield et al., 2004). The No Child Left Behind Act is calling for 100% highly qualified teachers so that an adequate education is available for everyone (No Child Left Behind Act, 2002). Teachers vary in quality of teaching (Darling-Hammond, 2000). This study investigated the relationship of teacher characteristics to high school graduation and dropout. In addition to gauging this success by the graduation rates reported by high schools, it also examined persistence rate, that is, the number of freshmen as compared to the number seniors or graduates four years later.

Presentation of Data Analysis and Findings

The characteristics gathered from the Georgia Department of Education Report Cards were: school size, percent of student subgroup enrollment, graduation rate, dropout rate, freshman enrollment in 2000 and senior enrollment in 2004, and teacher characteristics (State of Georgia, 2003a, 2005a). Persistence was created by dividing the number of seniors in 2004 by the number of freshmen in 2000. Persistence to graduation was created by dividing the number of graduates in 2004 by the number of freshmen in 2000. Teacher characteristics included: total number of teachers, average teacher salary, gender of teachers, race of teachers, education level of teachers, years of experience of teachers and average years of experience, student-to-teacher ratio, and the percent of teachers of core subjects who were highly qualified as defined by NCLB.

For preliminary assessment of the data, descriptive statistics were examined. For each outcome variable—graduation rate, dropout rate, and persistence—and all predictor variables, the following statistics were examined: minimum, maximum, mean, and standard deviation.

Bivariate correlations were examined for all raw data. The correlations helped to determine the final set of variables. For instance, because of the strong positive correlation between school size and teacher total (2004, 0.955, $p = 0.000$; 2005, 0.965, $p = 0.000$), only school size was used in further analyses. Also, teacher salary was correlated with both the ratio of bachelors to graduate degrees (2004, -0.453, $p = 0.000$; 2005, -0447, $p = 0.000$) and average years of experience (2004, 0.727, $p = 0.000$; 2005, 0.815, $p = 0.000$). Since salary is usually determined by these two factors (C. E. Finn, Jr.,

2005a; Georgia Department of Education, 2005), education level and years experience variables, but not average salary, were used in further analyses.

The raw data were converted into ten variables for regression analysis. The variables used in the regression analysis were: enrollment of students on free or reduced lunch, school size, the ratio of part-time teachers to full-time teachers, the ratio of male teachers to female teachers, the ratio of teachers with only bachelors degrees to teachers with higher degrees, the ratio of African-American teachers to Caucasian teachers, the ratio of teachers in their first year of teaching to those who had taught more than one year, the average years of experience of all teachers, the ratio of students to teachers, and the percent of core subject teachers who were highly qualified teachers. Some of these variables were not changed from the raw data, as examined above. The others are ratios of orthogonal data. For instance, it is impossible for a teacher to have both less than and more than one year of experience. Thus, the variable of the ratio of teachers with less than one year of experience to those with more than one year shows the ratio of new teachers to more experienced teachers in a school (see Table 2).

Multiple regression analyses were conducted between each of the outcome variables and all of the same-year independent variables. Individual regressions were run for the dependent variables: Graduation Rate 2004, Graduation Rate 2005, Dropout Rate 2004, Dropout Rate 2005, Persistence to Senior Year 2000-2004, and Persistence to Graduation 2000-2004. The independent variables included in each regression were: percent of enrollment of students on free or reduced lunch, school size, the ratio of part-time to full-time teachers, the ratio of male to female teachers, the ratio of teachers with

bachelors degrees to graduate degrees, the ratio of African-American teachers to Caucasian teachers, the ratio of teachers with less than one year of experience to teachers with more than one year of experience, the average years of experience of teachers, the student-to-teacher ratio, and the percent of highly qualified core subject teachers.

Research Questions

What is the relationship, if any, of teacher characteristics and student graduation rate?

Across all schools and districts, mean graduation rate in year 2004 was 73.7% (*SD* = 13.7%), ranging from 32.1% at Therrell High School in Atlanta City School District to 95.3% at Brookwood High School in Gwinnett County School District. Across all schools and districts, mean graduation rate in year 2005 was 76.4% (*SD* = 13.6%), ranging from 41.0% at McNair High School in DeKalb County School District to 95.2% at Brookwood High School in Gwinnett County School District. Graduation rate increased significantly between 2004 and 2005 ($t = 2.617$, $p = .011$). Since this is one of the goals of NCLB, it appears that the requirements and efforts are having the desired effect. While an interpretation of real trends is inappropriate because of the short time-frame encompassed by the data, some differences are supported either by other research or the goals of NCLB (Orfield et al., 2004; U.S. Department of Education, 2003).

The best means to check these numbers, persistence (Orfield et al., 2004), was not viable for both 2004 and 2005 because there was extensive school restructuring before 2005. A comparison with graduation rate in 2001 as calculated using the Cumulative Promotion Index (CPI) does show evidence that graduation rate has been increasing in

Georgia (see Table 4). The restructuring evident from the 2001-2005 time-frame may invalidate the 2000-2004 persistence data as well but all but one school had fewer seniors or graduates than freshmen, suggesting that the calculations were valid.

Table 4

Comparison of the Cumulative Promotion Index (CPI), Graduation Rate and Persistence for Five School Districts in Georgia

	CPI	Graduation Rate		Persistence to Senior Year	Persistence to Graduation
School District	2001	2004	2005	2004	2004
Atlanta City	39.6%	57.8%	72.4%	55.0%	79.1%
Cobb Co.	73.4%	77.5%	81.1%	74.8%	81.4%
DeKalb Co.	50.7%	70.5%	65.0%	54.5%	66.3%
Fulton Co.	61.8%	78.1%	82.7%	66.3%	68.5%
Gwinnett Co.	74.3%	77.1%	79.7%	75.9%	80.3%

Note: Cumulative Promotion Index data gathered from Orfield, et al., 2004.

Correlations. Graduation rate was correlated with dropout rate (2004: -.574, $p = .000$; 2005: -.591, $p = .000$), the percent of students on free or reduced lunch: (2004: -.838, $p = .000$; 2005: -.773, $p = .000$), school size: (2004: .483, $p = .000$; 2005: .437, $p = .000$), the ratio of part-time teachers to full-time teachers (2004: ns; 2005: .268, $p = .037$), the ratio of teachers with bachelor degrees to those with graduate degrees (2004: -.292, $p = .022$; 2005: ns), the ratio of African-American teachers to Caucasian teachers (2004: -.444, $p = .000$; 2005: ns), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: -.289, $p = .024$; 2005: ns), the average years of teacher experience (2004: .353, $p = .005$; 2005: .263, $p = .040$), and the percent of highly qualified core subject teachers (2004: .500, $p = .000$; 2005: .461, $p = .000$) (see Table 5).

Table 5

Significant Correlations Between Graduation Rate and Teacher Characteristics

Outcome variables	Part-time: Full-time teachers	Bachelors: Graduate degree	Male: Female teachers	African-American: Caucasian teachers	Under 1 year : Over 1 year experience	Average years experience	% Highly Qualified Teachers
Graduation rate: 2004 (n = 61)		*-.292*		-.444	*-.289*	.353	.500
Graduation rate: 2005 (n = 61)	*.268*					*.263*	.461

Note: All correlations are significant below the 0.01 level unless otherwise marked. Correlations significant below the 0.05 level are in smaller font and italics.

Outliers. Several of the variables, both independent and dependent, had data points that had z-scores of three or more. Since there were no theoretical bases for removing those data points from the dataset, the regressions were conducted twice: once with outliers included and once with outliers removed. To examine the individual effects of the outliers, correlations with and without outliers were conducted (see Table 6). Differences in regression outcomes are included in regression outcomes (see Tables 7 and 8). Only a few of the correlations showed differences in significance. A list of the outliers and their z-scores can be found in Appendix B.

Regressions. Regressions were conducted separately for graduation rate in 2004 and 2005 and then again with outliers removed (see Tables 7 and 8 and Appendix B).

All variables combined explain 77.1% of the variation in graduation rate in 2004 ($F = 16.845$, $p = .000$). This is largely made up by the percent enrollment of students receiving free or reduced lunch, which uniquely explains 26.2% of the variance. No other

variable contributes significantly to explaining the variance in graduation rate in 2004 (see Table 7).

Table 6

Changes in Significant Correlations of Year 2004 Graduation Rate When Outliers Are Removed from Outcome and Predictor Variables

Significantly correlated variables	Outliers included	Outliers removed
Dropout rate 2004	-0.574**	-0.589**
Persistence to senior year 2000-04	0.752**	0.757**
Persistence to graduation 2000-04	0.438**	0.601**
School size	0.483**	0.454**
African-American percentage of enrollment	-0.609**	-0.596**
Hispanic percentage of enrollment	-0.242	-0.309*
Caucasian percentage of enrollment	0.731**	0.740**
Bachelors: graduate degree	-0.292*	-0.296*
Bachelors: graduate degree (without outliers)	-0.352**	-0.356**
African-American: Caucasian teacher	-0.444**	-0.300*
African-American: Caucasian teacher (without outliers)	-0.315*	-0.315*
Less than one year: over one year experience	-0.289*	-0.211
Less than one year: over one year experience (without outliers)	-0.327*	-0.234
Average years experience	0.353**	0.373**
Percent of Highly Qualified Teachers	0.500**	0.474**
Percent of Highly Qualified Teachers (without outliers)	0.523**	0.483**

Note: ** significant below the 0.01 level; * significant below the 0.05 level

In 2004, there were outliers with z-scores above three in several variables: the ratio of male to female teachers, the ratio of teachers with Bachelors degrees to graduate degrees, the ratio of African-American to Caucasian teachers, the ratio of teachers with less than one year experience to teachers with more than one year experience and the percent of highly qualified core subject teachers (see Appendix B). The regression for graduation rate in 2004 was run again with the outliers removed. Without outliers, the variation explained is 84.5% ($F = 23.414$, $p = .000$). Thirty-two percent of that explanation was due to the percent of enrollment of students on free and reduced lunch. An additional 1.5% of the variation was explained by school size. No other variable provided a significant contribution to explaining the variation (see Table 7).

Graduation rate in 2004 also contained an outlier with a z-score over three (see Appendix B). The regression was conducted with the original predictor variables and then again with the outliers removed from both graduation rate and the predictor variables. In the former case, the variables explained 83.4% of the variance ($F = 24.575$, $p = .000$). The percent of students receiving free and reduced lunch explained 35.5% of the variance uniquely. School size, student-to-teacher ratio, the ratio of teachers with less than one year of experience, and the ratio of African-American to Caucasian teachers all neared significance in explaining portions of the variance ($p < .010$). Together they explain 4.5% of the variance, independent of other variables. In the latter case of a regression with outliers removed from both graduation rate and predictor variables, the variance explained was exactly the same as when outliers were removed only from the predictor variables ($R^2 = 0.845$, $F = 23.414$, $p = .000$) (see Table 7).

Table 7

Significant Predictors of Variation in Year 2004 Graduation Rate from Regression Analyses

	Complete Regression	Without Predictor Outliers†		Without Outcome Outlier	Without All Outliers†	
Significant Predictor Variable	% Free/ Reduced Lunch	% Free/ Reduced Lunch	School Size	% Free/ Reduced Lunch *	% Free/ Reduced Lunch	School Size
R^2	.771	.845		.834	.845	
t	-7.566	-9.484	-2.056	-10.236	-9.484	-2.056
p	.000	.000	.046	.000	.000	.046
Standardized Beta	-.914	-.971	-.178	-1.057	-.971	-.178
Part Correlation	-.512	-.570	-.124	-.596	-.570	-.124
Unique Contribution	.262	.325	.015	.355	0.325	.015

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.

†Variables with outliers in 2004 were: ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year of experience, and percent of highly qualified core subject teachers.

* School size, Student: teacher ratio, Less than one year experience, and African-American: Caucasian teachers all neared significance ($p < 0.010$).

All variables combined explain 72.2% of the variation in graduation rate in 2005 ($F = 12.979$, $p = .000$). The percent of students receiving free and reduced lunch explained 36.1% of the variance uniquely. The ratio of African-American teachers to Caucasian teachers explains 6.1% of the variance in graduation rate in 2005. The ratio of male to female teachers also nears significance ($p = .068$) (see Table 8).

In 2005, there were outliers with z-scores above three in two variables: the ratio of African-American to Caucasian teachers and the percent of highly qualified core

subject teachers (see Appendix B). When these outliers were removed, the full complement of variables explained 75.0% of the variance ($F = 13.814$, $p = .000$). Of that total, 44.9% was explained uniquely by the percent of students receiving free and reduced lunch. An additional 9.7% was uniquely explained by the ratio of African-American teachers to Caucasian teachers (see Table 8).

Table 8

Significant Predictors of Variation in Year 2005 Graduation Rate from Regression Analyses

	Complete Regression*		Without Predictor Outliers‡	
Significant Predictor Variable	% Free/ Reduced Lunch	African-American: Caucasian teachers	% Free/ Reduced Lunch	African-American: Caucasian teachers
R^2	.722		.750	
t	-8.053	3.306	-9.052	4.220
p	0.000	0.002	0.000	0.000
Standardized Beta	-0.975	0.343	-1.038	0.535
Part Correlation	-0.601	0.247	-0.667	0.311
Unique Contribution	0.361	0.061	0.449	0.097

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.
‡Variables with outliers in 2005 were: ratio of African-American to Caucasian teachers and percent of highly qualified core subject teachers.
*Male: Female teachers nears significance ($p = 0.068$)

What is the relationship, if any, of teacher characteristics and student dropout rate?

Across all schools and districts, mean dropout rate in year 2004 was 2.8% (*SD* = 1.7%), ranging from 0% at TriCities High School in Fulton County School District to 8.3% at McNair High School in DeKalb County School District. Across all schools and

districts, mean dropout rate in year 2005 was 2.8% (*SD* = 1.8%), ranging from 0.4% at Douglass and South Atlanta High Schools in Atlanta City School District to 9.8% at Osborne High School in Cobb County School District. Dropout rate did not change significantly between 2004 and 2005 ($t = 0.537$, $p = .593$).

Correlations. Dropout rate was correlated with the percent of students receiving free or reduced lunch (2004: 0.426, $p = 0.001$; 2005: 0.374, $p = 0.003$), the ratio of teachers with bachelor degrees to those with graduate degrees (2004: 0.303, $p = 0.015$; 2005: 0.278, $p = 0.028$), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: -0.298, $p = 0.018$; 2005: 0.252, $p = 0.046$), the average years of teacher experience (2004: ns; 2005: -0.276, $p = 0.029$), and the percent of highly qualified core subject teachers: (2004: -0.249, $p = 0.049$; 2005: ns) (see Table 9).

Table 9

Significant Correlations Between Dropout Rate and Teacher Characteristics

Outcome variables	Part-time: Full-time teachers	Bachelors: Graduate degree	Male: Female teachers	African-American: Caucasian teachers	Under 1 year : Over 1 year experience	Average years experience	% Highly Qualified Teachers
Dropout rate: 2004 (n = 63)		*.305*			*-.298*		*-.249*
Dropout rate: 2005 (n = 63)		*.278*			*.252*	*-.276*	

Note: All correlations are significant below the 0.05 level.

Outliers. Several of the variables, both independent and dependent, had data points that had z-scores of three or more. Since there were no theoretical bases for removing those data points from the dataset, the regressions were conducted twice: once with outliers

included and once with outliers removed. To examine the individual effects of the outliers, correlations with and without outliers were conducted (see Table 10). The differences in regression outcome are reported in Tables 11 and 12. Only a few of the correlations showed differences in significance. A list of the outliers and their z-scores can be found in Appendix B.

Table 10

Changes in Significant Correlations of Dropout Rate in 2005 When Outliers Are Removed from Outcome and Predictor Variables

Significantly correlated variables	Outliers included	Outliers removed
Hispanic percentage of enrollment	.512**	.464**
Hispanic percentage of enrollment (without outliers)	.420**	.269**
Caucasian percentage of enrollment	-.303*	-.311*
Bachelors: graduate degree	.278*	.338**
Less than one year: over one year experience	.252*	.218
Average years experience	-.276*	-.210

Note: ** significant below the 0.01 level; * significant below the 0.05 level

Regressions. Regressions were conducted separately for dropout rate in 2004 and 2005 and then again with outliers removed (see Tables 11 and 12).

All variables combined explain 58.6% of the variation in dropout rate in 2004 ($F = 7.357$, $p = 0.000$). This is largely made up by the positive impact of the percent enrollment of students on free or reduced lunch, which uniquely explains 14.7% of the variance. The ratio of teachers with less than one year of experience to teachers with more than one year experience has a negative impact on the variation in dropout rate,

uniquely explaining 8.0% of the variance. The ratio of African-American teachers to Caucasian teachers also nears significance ($p = 0.095$) (see Table 11).

In 2004, there were outliers with *z*-scores above three in several variables: the ratio of male to female teachers, the ratio of teachers with Bachelors degrees to graduate degrees, the ratio of African-American to Caucasian teachers, the ratio of teachers with less than one year experience to teachers with more than one year experience and the percent of highly qualified core subject teachers (see Appendix B). The regression for dropout rate in 2004 was run again with the outliers removed. Without outliers, the predictor variables explained 63.2% of the variance in dropout rate in 2004 ($F = 7.728$, $p = 0.000$). Again, this is largely made up by the positive impact of the percent enrollment of students on free or reduced lunch, which uniquely explains 21.3% of the variance. The ratio of teachers with less than one year of experience to teachers with more than one year experience has a negative impact on the variation in dropout rate, uniquely explaining 5.7% of the variance. The ratio of African-American teachers to Caucasian teachers without outliers becomes a significant part of the picture, explaining 5.1% of the variation uniquely. The ratio of part-time to full-time teachers nears significance ($p = 0.073$) (see Table 11).

The variance in dropout rate in 2005 was explained 51.1% by all the variables ($F = 5.437$, $p = 0.000$). The percent enrollment of students on free or reduced lunch uniquely explains 26.8% of the variance. The ratio of African-American teachers to Caucasian teachers explains 16.4% of the variance in dropout in 2005. Seven and a half percent of the variance was uniquely explained by the ratio of part-time to full-time teachers. The

ratio of teachers with less than one year of experience to teachers with more than one year experience nears significance ($p = 0.075$) (see Table 12).

Table 11

Significant Predictors of Variation in Year 2004 Dropout Rate from Regression Analyses

	Complete Regression*		Without Predictor Outliers‡**		
Significant Predictor Variable	% Free/ Reduced Lunch	Less than one year exp.	% Free/ Reduced Lunch	Less than one year exp.	African-American: Caucasian teachers
R^2	.586			.632	
t	4.298	-3.171	5.095	-2.643	-2.498
p	.000	.003	.000	.011	.016
Standardized Beta	.676	-.425	.783	-.319	-.293
Part Correlation	.384	-.283	.461	-.239	-.226
Unique Contribution	.147	.080	.213	0.057	.051

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.

†Variables with outliers in 2004 were: ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year of experience, and percent of highly qualified core subject teachers.

* African-American: Caucasian teachers neared significance ($p = 0.095$).

** Part-time: Full-time teachers neared significance ($p = 0.073$).

In 2005, there were outliers with *z*-scores above three in two variables: the ratio of African-American to Caucasian teachers and the percent of highly qualified core subject teachers (see Appendix B). When these outliers were removed, the full complement of variables explained 54.8% of the variance ($F = 5.821$, $p = 0.000$). The percent enrollment of students on free or reduced lunch uniquely explains 33.8% of the variance. The ratio of

African-American teachers to Caucasian teachers explains 16.7% of the variance in dropout in 2005. Seven point one percent of the variance was uniquely explained by the ratio of part-time to full-time teachers. The ratio of teachers with less than one year of experience to teachers with more than one year experience uniquely explains 4.8% of the variance (see Table 12).

Dropout rate in 2005 also contained an outlier with a z-score over three. The regression was conducted with the original predictor variables and then again with the outliers removed from both graduation rate and the predictor variables. In the former case, the variables explained 83.4% of the variance ($F = 5.076$, $p = 0.000$). The percent of students receiving free and reduced lunch explained 26.8% of the variance uniquely. The ratio of African-American teachers to Caucasian teachers and the ratio of part-time to full-time teachers also uniquely explained part of the variance, 18.1% and 4.0% respectively (see Table 12).

In the latter case of a regression with outliers removed from both dropout rate and predictor variables, the variance explained was 53.2% ($F = 5.333$, $p = 0.000$). The percent enrollment of students on free or reduced lunch uniquely explains 35.8% of the variance. The ratio of African-American teachers to Caucasian teachers, outliers removed, explains 17.0% of the variance uniquely. The ratio of teachers with less than one year of experience to teachers with more than one year experience and the ratio of part-time to full-time teachers also uniquely explained part of the variance, 4.5% and 4.0% respectively (see Table 12).

What is the relationship, if any, of teacher characteristics and student persistence rate?

Across all schools and districts, mean persistence to senior year from year 2000 to 2004 was 66.2% (*SD* = 17.2%), ranging from 30% at Cross Keys High School in DeKalb County School District to 99.7% at Walton High School in Cobb County School District. Mean persistence to graduation from year 2000 to 2004 was 74.5% (*SD* = 12.7%), ranging from 43.7% at Cross Keys High School in DeKalb County School District to 100.6% at Harrison High School in Cobb County School District. Persistence was not viable for both 2004 and 2005 because there was extensive school restructuring before

Table 12

Significant Predictors of Variation in Year 2005 Dropout Rate from Regression Analyses

	Complete Regression			Without Predictor Outliers†*			
Significant Predictor Variable	% Free/ Reduced Lunch	African-American: Caucasian	Part-time: Full-time	% Free/ Reduced Lunch	African-American: Caucasian	Part-time: Full-time	Less than one year exp.
R^2		.511			.548		
t	5.346	-4.174	2.816	5.990	-4.212	2.748	2.257
p	0.000	0.000	0.007	0.000	0.000	0.008	0.029
Standardized Beta	0.832	-0.535	0.359	0.899	-0.706	0.349	0.280
Part Correlation	0.518	-0.405	0.273	0.581	-0.409	0.267	0.219
Unique Contribution	0.268	0.164	0.075	.338	0.167	0.071	0.048

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.
‡Variables with outliers in 2005 were: ratio of African-American to Caucasian teachers and percent of highly qualified core subject teachers.
* Less than one year experience nearing significance ($p = .075$).

Table 12 continued

Significant Predictors of Variation in Year 2005 Dropout Rate from Regression Analyses

	Without Outcome Outlier			Without All Outliers†**		
Significant Predictor Variable	% Free/ Reduced Lunch	African-American: Caucasian	Part-time: Full-time	% Free/ Reduced Lunch	African-American: Caucasian	Less than one year exp.
R^2		.499			.532	
t	5.230	-4.300	2.025	5.991	-4.131	2.122
p	.000	.000	.048	.000	.000	.039
Standardized Beta	.842	-.596	.272	.935	-.720	.270
Part Correlation	.518	-.426	.201	.598	-.412	.212
Unique Contribution	.268	.181	.040	.358	.170	.045

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.
‡Variables with outliers in 2005 were: ratio of African-American to Caucasian teachers and percent of highly qualified core subject teachers.
** Part-time: Full-time neared significance ($p = .051$).

2005. A comparison with graduation rate in 2001 as calculated using the Cumulative Promotion Index (CPI) does show evidence that persistence has been increasing in Georgia. The restructuring evident from the 2001-2005 time-frame may invalidate the 2000-2004 persistence data but all but one school, Harrison High School in Cobb County School District, had fewer seniors or graduates than freshmen, suggesting that the calculations were valid (see Table 4).

Correlations. Persistence to senior year was only calculated for students finishing in 2004 so was only correlated with 2004 teacher and student data. Persistence to senior year was

correlated with graduation rate (0.752, $p = 0.000$), dropout rate (-0.421, $p = 0.001$), persistence to graduation (0.788, $p = 0.000$), the percent of students on free or reduced lunch (-0.728, $p = 0.000$), school size (0.521, $p = 0.000$), the ratio of part-time teachers to full-time teachers (0.308, $p = 0.018$), the ratio of African-American teachers to Caucasian teachers (-0.282, $p = 0.030$), and the percent of highly qualified core subject teachers: (0.377, $p = 0.003$) (see Table 13).

Persistence to graduation was only calculated for students finishing in 2004 so was only correlated with 2004 teacher and student data. Persistence to graduation was correlated with graduation rate (0.438, $p = 0.001$), dropout rate (-0.292, $p = 0.025$), the percent of students on free or reduced lunch (-0.503, $p = 0.000$), school size (0.378, $p = 0.003$), and the ratio of part-time teachers to full-time teachers (0.312, $p = 0.016$) (see Table 13).

Table 13

Significant Correlations Between Persistence and Teacher Characteristics

Outcome variables	Part-time: Full-time teachers	Bachelors: Graduate degree	Male: Female teachers	African-American: Caucasian teachers	Under 1 year : Over 1 year experience	Average years experience	% Highly Qualified Teachers
Persistence to Seniors (n = 59)	*.308*			*-.282*			.377
Persistence to Graduation (n = 59)	*.312*						

Note: All correlations are significant below the 0.01 level unless otherwise marked. Correlations significant below the 0.05 level are in smaller font and italics.

Regressions. Persistence is an alternative means of determining how many students are starting school as freshman and how many are remaining or graduating four years later.

The variance in persistence to senior year from 2000 to 2004 was explained 61.8% by all the variables ($F = 7.777$, $p = 0.000$). Only the percent enrollment of students on free or reduced lunch was a significant, unique, negative predictor of variance at 16.8% (see Table 14).

In 2004, there were outliers with z-scores above three in several variables: the ratio of male to female teachers, the ratio of teachers with Bachelors degrees to graduate degrees, the ratio of African-American to Caucasian teachers, the ratio of teachers with less than one year experience to teachers with more than one year experience and the percent of highly qualified core subject teachers (see Appendix B). After outliers were removed, all variables explained 64.2% of the variance in persistence to senior year ($F = 7.349$, $p = 0.000$). The percent enrollment of students on free or reduced lunch uniquely explains 35.8% of the variance, negatively. The ratio of teachers with less than one year of experience to teachers with more than one year experience explains an additional, positive 3.8% of the variance (see Table 14).

The variance in persistence to graduation from 2000 to 2004 was explained 61.8% by all the variables ($F = 7.777$, $p = 0.000$). The negative influence of the percent enrollment of students on free or reduced lunch explained only 9.6% of that variance. The ratio of teachers with less than one year of experience to teachers with more than one year experience explains an additional, positive 5.6% of the variance. Interestingly, distinct from persistence to senior year, variance was also uniquely, positively explained by the ratio of part-time to full-time teachers and student-to-teacher ratio, 4.7% and 4.3%

respectively. The influence of the ratio of African-American to Caucasian teachers also nears significance ($p = 0.075$) (see Table 15).

Table 14

Significant Predictors of Variation in Persistence to Senior Year 2000-2004 from Regression Analyses

	Complete Regression	Without Predictor Outliers†	
Significant Predictor Variable	% Free/ Reduced Lunch	% Free/ Reduced Lunch	Less than one year exp.
R^2	.618	.642	
t	-4.602	-4.115	2.098
p	.000	.000	.042
Standardized Beta	-.724	-.650	.263
Part Correlation	-.410	-.385	.196
Unique Contribution	.168	.148	.038

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch (%FRL), school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.
†Variables with outliers in 2004 were: ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year of experience, and percent of highly qualified core subject teachers.

After outliers were removed from the ratio of male to female teachers, the ratio of teachers with Bachelors degrees to graduate degrees, the ratio of African-American to Caucasian teachers, the ratio of teachers with less than one year experience to teachers with more than one year experience and the percent of highly qualified core subject teachers, all variables explained 63.2% of the variance in persistence to senior year ($F = 7.051$, $p = 0.000$). For the first time, a variable other than free or reduced lunch was the primary influence. The ratio of teachers with less than one year of experience to teachers

with more than one year experience explains an additional, positive 6.5% of the variance. The percent enrollment of students on free or reduced lunch uniquely explains 6.4% of the variance, negatively. Variance was also uniquely, positively explained by student-to-teacher ratio and the ratio of part-time to full-time teachers, 4.5% and 4.2% respectively. Once outliers were removed, the ratio of teachers with bachelor degrees to teachers with graduate degrees became significant, explaining 4.0% of the variance of persistence to graduation (see Table 15).

Table 15

*Significant Predictors of Variation in Persistence to Graduation 2000-2004 from Regression Analyses**

Predictor Variable	% Free/ Reduced Lunch	Less than one year experience	Part-time: Full-time	Student: Teacher Ratio
R^2		.534		
t	-3.146	2.404	2.192	2.098
p	0.003	0.020	0.033	0.041
Standardized Beta	-0.547	0.367	0.268	0.250
Part Correlation	-0.310	0.237	0.216	0.207
Unique Contribution	0.096	0.056	.047	.043

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.

†Variables with outliers in 2004 were: ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year of experience, and percent of highly qualified core subject teachers.

* African-American: Caucasian teachers neared significance ($p = 0.075$).

Table 15 continued

Significant Predictors of Variation in Persistence to Graduation 2000-2004 from Regression Analyses (Outliers Removed)

Predictor Variable	Less than one year experience	% Free/ Reduced Lunch	Student: Teacher Ratio	Part-time: Full-time	Bachelors: Graduate Degree
R^2			.632		
t	2.692	-2.666	2.234	2.157	-2.123
p	0.010	0.011	0.031	0.037	0.040
Standardized Beta	0.342	-0.427	0.267	0.250	-0.271
Part Correlation	0.255	-0.252	0.212	.204	-.201
Unique Contribution	0.065	0.064	.045	.042	.040

Note: All regressions were run with the following independent variables: percent of enrollment of students on free or reduced lunch, school size, ratio of part-time to full-time teachers, ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year, average years of experience of teachers, student-to-teacher ratio, and percent of highly qualified core subject teachers.
†Variables with outliers in 2004 were: ratio of male to female teachers, ratio of teachers with bachelors to graduate degrees, ratio of African-American to Caucasian teachers, ratio of teachers with less than one year of experience to teachers with more than one year of experience, and percent of highly qualified core subject teachers.

Other Relationships and Discovery

Descriptive Statistics. For preliminary assessment of the data, descriptive statistics were examined. For each predictor variable, the following statistics were examined: minimum, maximum mean, and standard deviation (see Tables 16 and 17).

Differences between Years. In an effort to determine if the two years of data could be combined for a larger sample size, *t*-tests were conducted between years. Because there

were many significant differences, years were examined separately in both correlations and regressions (see Table 18).

Table 16

Descriptive Statistics of 63 Atlanta, Georgia Region High Schools for Year 2004

Variables	Minimum	Maximum	Mean	*SD*
Part-time: Full-time teachers	0	0.761	0.179	0.224
Male: Female teachers	0.333	1.026	0.544	0.127
Bachelors: Graduate degree	0.431	1.312	0.744	0.185
African-American: Caucasian teachers	0.008	14.000	1.753	2.9134
Less than one year: Over one year experience	0.010	0.400	0.092	0.080
Average years experience	7.55	16.31	11.891	1.890
Student: Teacher ratio	11	20	15.75	1.769
Highly qualified teachers	0.804	1.000	0.969	0.038
School size	970	3556	1887	600.8
African-American enrollment	0.04	0.99	0.494	0.357
Hispanic enrollment	0	0.49	0.070	0.087
Caucasian enrollment	0	0.90	0.361	0.307
Free/reduced lunch enrollment	0.02	0.73	0.330	0.217
Students with disabilities enrollment	0.05	0.15	0.094	0.022

Table 17

Descriptive Statistics of 63 Atlanta, Georgia Region High Schools for Year 2005

Variables	Minimum	Maximum	Mean	*SD*
Part-time: Full-time teachers	0.000	0.747	0.172	0.234
Male: Female teachers	0.304	0.879	0.553	0.112
Bachelors: Graduate degree	0.371	1.111	0.697	0.157
African-American: Caucasian teachers	0.000	25.000	1.932	3.788
Less than one year: Over one year experience	0.030	0.170	0.083	0.037
Average years experience	8.19	16.93	12.057	1.857
Student: Teacher ratio	14	21	17.24	1.542
Highly qualified teachers	0.825	1.000	0.960	0.045
School size	974	3481	1895	603.8
African-American enrollment	0.04	1.00	0.504	0.353
Hispanic enrollment	0.000	0.54	0.077	0.096
Caucasian enrollment	0.000	0.90	0.343	0.300
Free/reduced lunch enrollment	0.02	0.80	0.364	0.232
Students with disabilities enrollment	0.05	0.17	0.096	0.025

Table 18

T-Test Comparisons of Student and Teacher Characteristics in Years 2004 and 2005

Variable	Mean (*SD*)		Change	*t*	*p*
	2004	2005			
Graduation rate	0.737 (0.137)	0.764 (0.136)	▲	2.617	0.011**
Dropout rate	0.027 (0.017)	0.028 (0.018)	—	0.537	0.593
African-American enrollment	0.494 (0.357)	0.504 (0.353)	▲	3.725	0.000**
Hispanic enrollment	0.070 (0.087)	0.077 (0.096)	▲	4.304	0.000**
Caucasian enrollment	0.361 (0.307)	0.343 (0.300)	▼	5.942	0.000**
Free/reduced lunch enrollment	0.330 (0.217)	0.364 (0.232)	▲	8.076	0.000**
Students with disabilities enrollment	0.094 (0.022)	0.096 (0.025)	—	1.964	0.054
School size	1886.6 (600)	1895.0 (603)	—	0.301	0.764
Part-time: Full-time	0.179 (0.224)	0.172 (0.234)	—	1.324	0.190
Male: Female teachers	0.544 (0.127)	0.553 (0.112)	—	0.810	0.421
Bachelors: Graduate	0.744 (0.186)	0.697 (0.157)	▼	3.324	0.001**
African-American: Caucasian teachers	1.753 (2.913)	1.932 (3.788)	—	0.694	0.490
Less than one year: Over one year experience	0.092 (0.080)	0.083 (0.037)	—	0.977	0.332
Average years experience	11.891 (1.890)	12.057 (1.857)	—	1.349	0.182
Student: teacher ratio	15.75 (1.769)	17.24 (1.542)	▲	9.432	0.000**
Highly qualified teachers	0.960 (0.045)	0.969 (0.038)	▲	2.069	0.043*

Note: ** significant below the 0.01 level; * significant below the 0.05 level

Correlations. The percent of enrollment of students receiving free or reduced lunch was correlated with school size (2004: -0.629, $p = 0.000$; 2005: -0.579, $p = 0.000$), the ratio of part-time to full-time teachers (2004: -0.441, $p = 0.000$; 2005: -0.469, $p = 0.000$), the ratio of African-American to Caucasian teachers (2004: 0.571, $p = 0.000$; 2005: 0.534, $p = 0.000$), the ratio of teachers with less than one year to those with greater than one year experience (2004: 0.305, $p = 0.015$; 2005: 0.224, $p = 0.078$), and the percent of highly qualified core subject teachers (2004: -0.605, $p = 0.000$; 2005: -0.627, $p = 0.000$; see Tables 19 and 20).

School size was correlated with the percent of students on free or reduced lunch (2004: -0.629, $p = 0.000$; 2005: -0.579, $p = 0.000$), the ratio of part-time to full-time teachers (2004: 0.291, $p = 0.021$; 2005: 0.378, $p = 0.002$), the ratio of African-American to Caucasian teachers (2004: -0.387, $p = 0.002$; 2005: ns), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: -0.267, $p = 0.035$; 2005: ns), student-to-teacher ratio (2004: 0.295, $p = 0.019$; 2005: 0.265, $p = 0.036$), and the percent of highly qualified core subject teachers: (2004: 0.360, $p = 0.004$; 2005: 0.452, $p = 0.000$; see Tables 19 and 20).

The ratio of part-time to full-time teachers was correlated with the percent of students on free or reduced lunch (2004: -0.441, $p = 0.000$; 2005: -0.469, $p = 0.000$), school size (2004: 0.291, $p = 0.021$; 2005: 0.378, $p = 0.002$), the ratio of teachers with bachelor degrees to teachers with graduate degrees (2004: 0.287, $p = 0.023$; 2005: 0.320, $p = 0.010$), the ratio of African-American teachers to Caucasian teachers: (2004: -0.307, $p = 0.003$; 2005: -0.311, $p = 0.013$), the ratio of teachers with less than one year

experience to those with greater than one year experience (2004: ns; 2005: -0.256, p = 0.043), and the percent of highly qualified core subject teachers (2004: ns; 2005: 0.279, p = 0.027; see Tables 19 and 20).

The ratio of male teachers to female teachers was correlated with the ratio of teachers with less than one year experience to those with greater than one year experience (2004: 0.271, p = 0.032; 2005: 0.300, p = 0.017), average years of teacher experience (2004: ns; 2005: -0.326, p = 0.009), and the percent of highly qualified core subject teachers (2004: -0.293, p = 0.020; 2005: ns; see Tables 19 and 20).

The ratio of teachers with bachelor degrees to teachers with graduate degrees was correlated with the ratio of part-time to full-time teachers (2004: 0.287, p = 0.023; 2005: 0.320, p = 0.010), and the average years of teacher experience (2004: -0.443, p = 0.000; 2005: -0.434, p = 0.000; see Tables 19 and 20).

The percent of African-American teachers was strongly negatively correlated with the percent of Caucasian teachers (-0.996, p = 0.000, both years; see Figure 1). The ratio of African-American teachers to Caucasian teachers was correlated with the percent of students on free or reduced lunch (2004: 0.571, p = 0.000; 2005: 0.534, p = 0.000), school size (2004: -0.387, p = 0.002; 2005: ns), the ratio of part-time to full-time teachers (2004: -0.370, p = 0.003; 2005: -0.311, p = 0.013), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: 0.502, p = 0.000; 2005: ns), student-to-teacher ratio (2004: ns; 2005: 0.315, p = 0.012), and the percent of highly qualified core subject teachers (2004: -0.579, p = 0.000; 2005: -0.559, p = 0.000; see Tables 19 and 20).

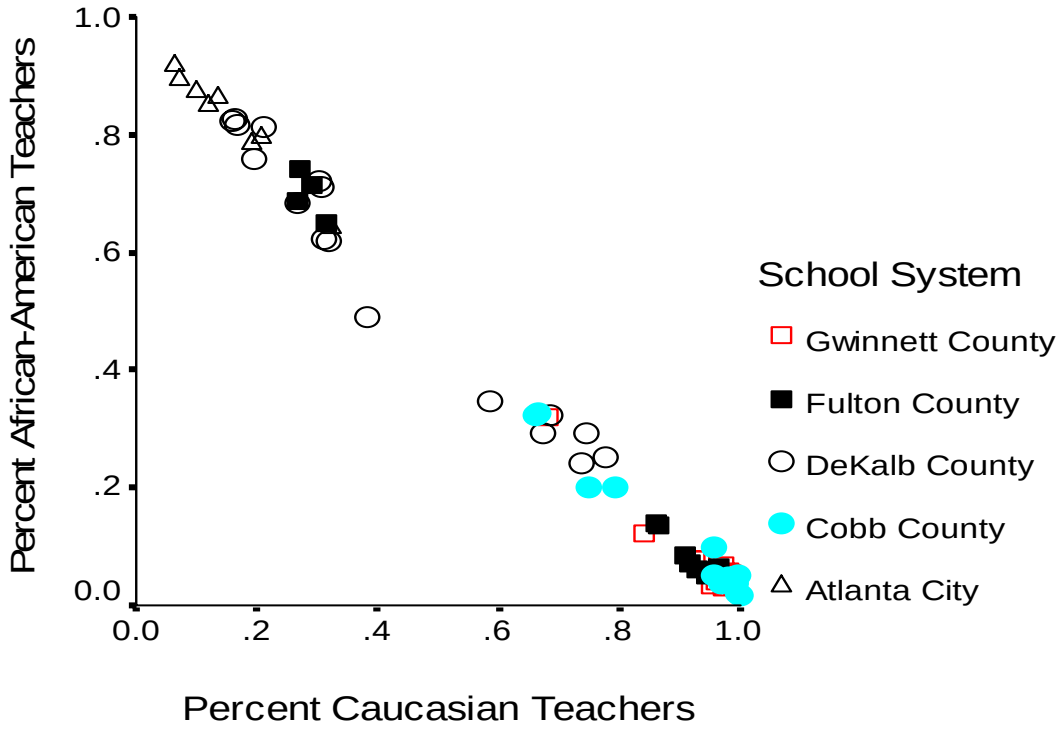

Figure 1. Percent of Caucasian teachers as compared with percent of African-American teachers in school systems around Atlanta in the year 2004.

The ratio of teachers with less than one year experience to those with greater than one year experience was correlated with the percent of students on free or reduced lunch (2004: 0.305, $p = 0.015$; 2005: ns), school size (2004: -0.267, $p = 0.035$; 2005: ns), the ratio of part-time to full-time teachers (2004: ns; 2005: -0.256, $p = 0.043$), the ratio of male teachers to female teachers (2004: 0.271, $p = 0.032$; 2005: 0.300, $p = 0.017$), the ratio of African-American teachers to Caucasian teachers (2004: 0.502, $p = 0.000$; 2005: ns), the average years of teacher experience (2004: -0.487, $p = 0.000$; 2005: -0.470, $p = 0.000$), student-to-teacher ratio (2004: -0.328, $p = 0.009$; 2005: ns), and the percent of

highly qualified core subject teachers (2004: -0.399, $p = 0.001$; 2005: ns; see Tables 19 and 20).

The average years of teacher experience was correlated with the ratio of male teachers to female teachers (2004: ns; 2005: -0.326, $p = 0.009$), the ratio of teachers with bachelor degrees to teachers with graduate degrees (2004: -0.443, $p = 0.000$; 2005: -0.434, $p = 0.000$), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: -0.487, $p = 0.000$; 2005: -0.470, $p = 0.000$), and the percent of highly qualified core subject teachers (2004: 0.295, $p = 0.019$; 2005: ns; see Tables 19 and 20).

The student-to-teacher ratio was correlated with school size (2004: 0.295, $p = 0.019$; 2005: 0.265, $p = 0.036$), the ratio of African-American teachers to Caucasian teachers (2004: ns; 2005: 0.315, $p = 0.012$), and the ratio of teachers with less than one year experience to those with greater than one year experience (2004: -0.328, $p = 0.009$; 2005: ns; see Tables 19 and 20).

The percent of core subject teachers who were highly qualified was correlated with the percent of students on free or reduced lunch (2004: -0.605, $p = 0.000$; 2005: -0.627, $p = 0.000$), school size (2004: 0.360, $p = 0.004$; 2005: 0.452, $p = 0.000$), the ratio of part-time teachers to full-time teachers (2004: ns; 2005: 0.279, $p = 0.027$), the ratio of male teachers to female teachers (2004: -0.293, $p = 0.020$; 2005: ns), the ratio of African-American teachers to Caucasian teachers (2004: -0.579, $p = 0.000$; 2005: -0.559, $p = 0.000$), the ratio of teachers with less than one year experience to those with greater than

one year experience (2004: -0.399, $p = 0.001$; 2005: ns), and the average years of teacher experience (2004: 0.295, $p = 0.019$; 2005: ns; see Tables 19 and 20).

Table 19

Significant Bivariate Correlations between Independent Variables in the Year 2004

	Percent free and reduced lunch	School size	Part-time: Full-time	Male: Female	Bachelor: Graduate	African-American: Caucasian	Less than one year exp.	Average years experience
School size	-0.629 **							
Part-time: Full-time	-0.441 **	0.291 *						
Male: Female								
Bachelor: Graduate			0.287 *					
African-American: Caucasian	0.571 **	-0.387 *	-0.307 *					
Less than one year exp.	0.305 *	-0.267 *	ns	0.271 *		0.502 **		
Average years experience				ns	-0.443 **		-0.487 **	
Student: teacher ratio		0.295 *				ns	-0.328 *	
%HQT	-0.600 **	0.360 **	ns	-0.293 *		-0.579 **	-0.399 **	0.295 *

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

Table 20

Significant Bivariate Correlations between Independent Variables in the Year 2005

	Percent free and reduced lunch	School size	Part-time: Full-time	Male: Female	Bachelor: Graduate	African-American: Caucasian	Less than one year exp.	Average years experience
School size	-0.579 **							
Part-time: Full-time	-0.469 **	0.378 *						
Male: Female								
Bachelor: Graduate			0.320 *					
African-American: Caucasian	0.534 **		-0.311 *					
Less than one year exp.	ns	ns	-0.256 *	0.300 *		ns		
Average years experience		ns		-0.326 *	-0.434 **		-0.470 **	
Student: teacher ratio		0.265 *				0.315 *	ns	
%HQT	-0.756 **	0.452 **	0.279 *	ns		-0.559 **	ns	ns

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

Additional Correlations with Subgroup Enrollments. As may be expected, the enrollment of African-American students was strongly correlated with enrollment of students in other subgroups, either positively or negatively. The percent of African-American enrollment was strongly negatively correlated with Caucasian enrollment (2004: -0.933, *p*

= 0.000; 2005: -0.925, p = 0.000; see Figure 2). Enrollment of African-American students was also negatively correlated with enrollment of Hispanic students (2004: -0.331, p = 0.008; 2005: -0.331, p = 0.008). African-American students and students on free or reduced lunch were strongly positively correlated (2004, 0.811, p = 0.000; 2005, 0.828, p = 0.000), corroborating the impression that impoverished schools are majority African-American schools and vice versa (Hill, Guin, & Celio, 2003). Since there is disagreement in the literature whether the predominant race of the student body or the relative poverty of the student body has more effect on teachers and student outcomes (Howard, 2001; Scafidi et al., 2005), correlations and regressions were examined individually with percent African-American enrollment and percent enrollment of students on free or reduced lunch. In regressions, more of the variation in graduation rate in 2005, for instance, was explained with percent enrollment of students on free or reduced lunch (R^2 = 0.850) as with percent of African-American enrollment (R^2 = 0.658) or Caucasian enrollment (R^2 = 0.616; see Tables 21 through 25).

The percent of enrollment of African-American students was correlated with graduation rate (2004: -0.609, p = 0.000; 2005: -0.564, p = 0.000), school size (2004: -0.629, p = 0.000; 2005: -0.579, p = 0.000), the ratio of part-time to full-time teachers: (2004: -0.400, p = 0.001; 2005: -0.438, p = 0.000), the ratio of African-American to Caucasian teachers (2004: 0.694, p = 0.000; 2005: 0.622, p = 0.000), the ratio of teachers with less than one year experience to those with greater than one year experience (2004: 0.305, p = 0.015; 2005: 0.224, p = 0.078), and the percent of highly qualified core subject teachers (2004: -0.600, p = 0.000; 2005: -0.756, p = 0.000; see Tables 21 through 25).

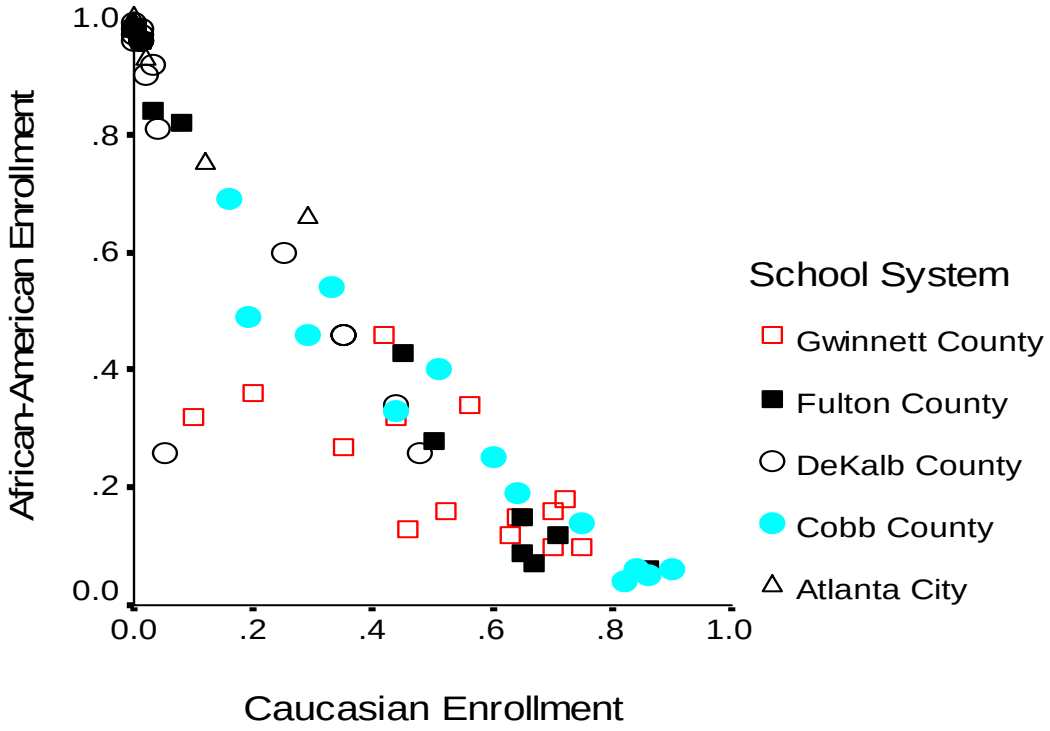

Figure 2. Enrollment of African-American students as compared with enrollment of Caucasian students in Atlanta area high schools in year 2005.

The percent of enrollment of Hispanic students was correlated with dropout rate (2004: 0.327, $p = 0.009$; 2005: 0.512, $p = 0.000$), the percent of African-American enrollment (2004: -0.331, $p = 0.008$; 2005: -0.331, $p = 0.008$), the ratio of African-American teachers to Caucasian teachers (2004: -0.325, $p = 0.009$; 2005: -0.284, $p = 0.024$), student-to-teacher ratio (2004: -0.254, $p = 0.045$; 2005: -0.397, $p = 0.001$), and the percent of highly qualified core subject teachers (2004: ns; 2005: 0.258, $p = 0.041$; see Tables 21 through 25).

Table 21

Significant Correlations between Outcome Variables and School and Enrollment Characteristics

Outcome variables	School size	% African-American enrollment	% Hispanic enrollment	% Caucasian enrollment	% Students on free/reduced lunch	% Students with disabilities
Graduation rate: 2004 (n = 61)	.483	-.609		.731	-.838	
Graduation rate: 2005 (n = 61)	.437	-.564		.710	-.773	
Dropout rate: 2004 (n = 62)			.327	-.324	.426	
Dropout rate: 2005 (n = 62)			.512	*-.303*	.374	
Persistence to Seniors 2000-04 (n = 59)	.521	-.566		.695	-.728	
Persistence to Graduation 2000-04 (n = 59)	.378	-.401		.544	-.503	

Note: All correlations are significant below the 0.01 level unless otherwise marked. Correlations significant below the 0.05 level are in smaller font and italics.

The percent of enrollment of Caucasian students was correlated with graduation rate (2004: 0.731, $p = 0.000$; 2005: 0.710, $p = 0.000$), dropout rate (2004: -0.324, $p = 0.010$; 2005: -0.303, $p = 0.016$), the percent of African-American enrollment (2004: -.933, $p = 0.000$; 2005: -0.925, $p = 0.000$), the percent of students on free or reduced lunch (2004: -0.906, $p = 0.000$; 2005: -0.923, $p = 0.000$), school size (2004: 0.627, $p = 0.000$; 2005: 0.579, $p = 0.000$), the ratio of part-time to full-time teachers (2004: 0.476, $p = 0.000$; 2005: 0.504, $p = 0.000$), the ratio of African-American teachers to Caucasian teachers (2004: -0.607, $p = 0.000$; 2005: -0.542, $p = 0.000$), the ratio of teachers with less

than one year experience to those with greater than one year experience (2004: -0.295, p = 0.019; 2005: ns), and the percent of highly qualified core subject teachers (2004: 0.608, p = 0.000; 2005: 0.691, p = 0.000; see Tables 21 through 25).

The percent enrollment of students with disabilities was only correlated with the ratio of part-time to full-time teachers (2004: 0.381, p = 0.002; 2005: 0.338, p = 0.007) and student-to-teacher ratio (2004: ns; 2005: -0.264, p = 0.037).

Table 22

Significant Correlations between Student Subgroup Enrollments in the Year 2004

	Student enrollment percentages				
	African-American	Hispanic	Caucasian	Free/Reduced Lunch	Students with Disabilities
Hispanic	-0.331*				
Caucasian	-0.933**				
Free/Reduced Lunch	0.811**		-0.906**		
Students with Disabilities					
School size	-0.629**		0.627**	-0.629**	

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

Table 23

Significant Correlations between Student Subgroup Enrollments and Teacher Characteristics in the Year 2004

	Student enrollment percentages				
	African-American	Hispanic	Caucasian	Free/Reduced Lunch	Students with Disabilities
Part-time: Full-time	-0.400**		0.476**	-0.441**	0.381*
Male: Female					
Bachelor: Graduate					
African-American: Caucasian	0.694**	-0.325*	-0.607**	0.571**	
Less than one year exp.	0.305*		-0.295*	0.305*	
Average years experience					
Student: teacher ratio		-0.254*			ns
%HQT	-0.600**	ns	0.608**	-0.600**	

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

Table 24

Significant Correlations between Student Subgroup Enrollments in the Year 2005

	Student enrollment percentages				
	African-American	Hispanic	Caucasian	Free/Reduced Lunch	Students with Disabilities
Hispanic	-0.331*				
Caucasian	-0.925**				
Free/Reduced Lunch	0.828**		-0.923**		
Students with Disabilities					
School size	-0.579**		0.579**	-0.579**	

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

In the process of analyzing the data, it was discovered that school size was correlated with graduation rate. School size was broken into seven categories (0-1000, 1000-1500, 1500-2000, 2000-2500, 2500-3000, 3000+ students). A curve estimation showed that a quadratic relationship existed between school size and graduation rate, explaining over 25% of the variance (2004: $R^2 = 0.275$, $F = 11.38$, $p = 0.000$; 2005: $R^2 = 0.281$, $F = 11.70$, $p = 0.000$; see Figure 3).

Table 25

Significant Correlations between Student Subgroup Enrollments and Teacher Characteristics in the Year 2005

	Student enrollment percentages				
	African-American	Hispanic	Caucasian	Free/Reduced Lunch	Students with Disabilities
Part-time: Full-time	-0.438**		0.504**	-0.469**	0.338*
Male: Female					
Bachelor: Graduate					
African-American: Caucasian	0.622**	-0.284*	-0.542**	0.534**	
Less than one year exp.	ns		ns	ns	
Average years experience					
Student: teacher ratio		-0.397*			-0.264*
%HQT	-0.756**	0.258*	0.691**	-0.756**	

Note: ** significant below the 0.01 level; * significant below the 0.05 level; ns = non-significant but is included to highlight differences between years

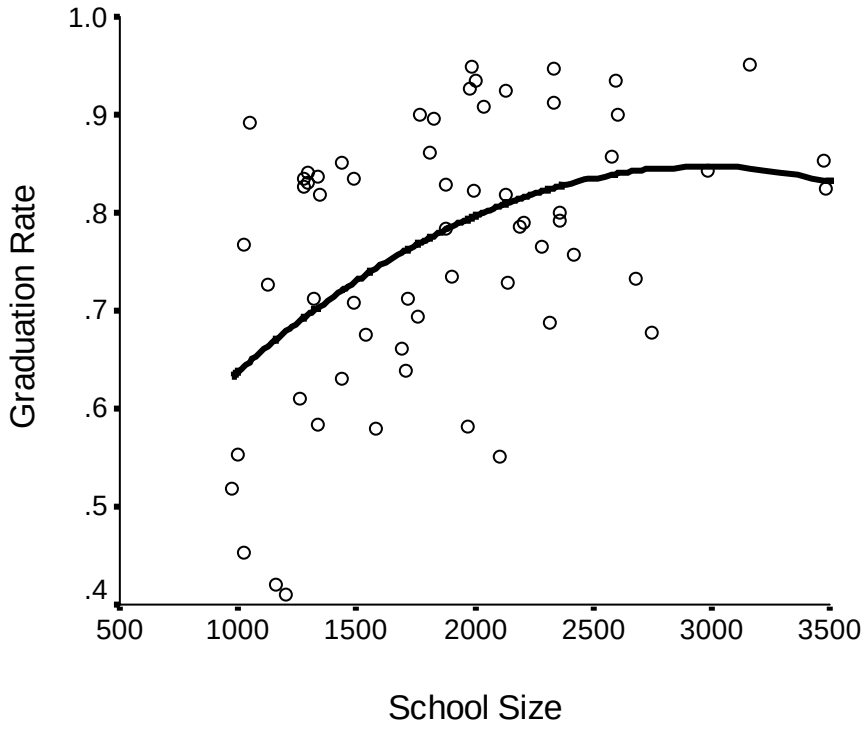

Figure 3. Quadratic relationship between Atlanta area school size and graduation rate in year 2005.

Summary

In summary, there are many intercorrelations between teacher characteristics and student outcomes. Many variables were significantly different between years. The strongest correlations were between the percent enrollment of students on free or reduced lunch and, positively, dropout rate and, negatively, graduation rate and persistence. Of all the teacher characteristics, no correlation strength was greater than .500. The percent of highly qualified teachers was moderately positively correlated with graduation rate both years. The ratio of African-American to Caucasian teachers was moderately negatively correlated with graduation rate only in year 2004. Average years of teacher experience

was moderately positively correlated with graduation rate in year 2004 only. All other correlations were of lesser significance.

In all but one regression, the variable with the greatest explanatory value was the percent enrollment of students on free or reduced lunch. The unique explanatory value of other characteristics varied greatly. School size negatively impacted graduation rate in 2004. The ratio of African-American to Caucasian teachers positively impacted graduation rate in 2005 and negatively impacted dropout rate both years. The proportion of new teachers had a changing impact on dropout and persistence rates, making its interpretation difficult. The ratio of part-time to full-time teachers impacted dropout and persistence rates positively, an apparently contradictory result. Student-to-teacher ratio and the proportion of bachelor's to graduate degrees also had small, unique contributions to persistence. The ratio of male to female teachers and percent of highly qualified teachers did not explain variation uniquely for any outcome variable. The removal of outliers only strengthened associations.

CHAPTER V

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Purpose of the Study

This study investigated the relationship of teacher characteristics to high school graduation and dropout. In addition to gauging this success by the graduation rates reported by high schools, it also examined persistence rate, that is, the number of freshmen as compared to the number seniors or graduates four years later.

Research Questions

The following questions were answered by this study:

1. What is the relationship, if any, of teacher characteristics and student graduation rate?
2. What is the relationship, if any, of teacher characteristics and student dropout rate?
3. What is the relationship, if any, of teacher characteristics and student persistence rate?

Findings from Data Analysis

An examination of the data using descriptive statistics, correlation, multiple regression and scatterplots demonstrated some expected and some unexpected results. There were relationships found both between outcome variables and predictor variables and within the group of predictor variables. The results are organized by the research questions plus a section on the interesting relationships between predictor variables.

Research Questions

What is the relationship, if any, of teacher characteristics and student graduation rate?

As a required second indicator of progress, graduation rate is a statistic of great importance to schools. This study examined how teacher characteristics impacted graduation rate in the high schools around Atlanta, Georgia. In the regression analyses, the influence of teacher characteristics, percent of students on free or reduced lunch, and school size combined to explain 72-85% of the variance in graduation rate (see Table 15). This is impressive considering that the amount of variance explained by the same variables for dropout rate and persistence only reached 63% and 64% respectively (see Tables 16 and 17).

Many of the predictor variables examined were significantly correlated with graduation rate (see Table 10). The percent of students on free or reduced lunch was the most strongly correlated graduation rate at -.838 in the year 2004 and -.773 in the year 2005. As demonstrated in other studies, the pressures of poverty have a strong negative influence on student achievement (Fine, 1986; Orfield et al., 2004). The percent enrollment of students on free or reduced lunch, a proxy for the socioeconomic status of a school (C. E. Finn, Jr., 2006b), outweighed any other factor in explaining variance. In 2004, 26.2% of the variance in graduation rate was uniquely explained by the level of poverty in the school and, in 2005, 35.5% of the variance was uniquely explained (see Table 15). The percent enrollment of students on free or reduced lunch had a negative influence on graduation rate. These numbers suggest that the influence of particular teacher characteristics is small as compared with the effects of students' peers and

environment. The result is not unexpected, however. Other researchers have also found that when students are faced with the challenges of poverty, including homelessness, hunger, violence, and inadequate health care, it is very difficult to focus on school (Fine, 1986; Howard, 2001; Kozol, 1991; Orfield et al., 2004). This result also highlights the need to help schools counteract these problems. While the goal of Title I to assist schools with high proportions of students in poverty is laudable, the monies being disbursed are not sufficient (Duncombe & Yinger, 2005). Schools and teachers need more help, monetary and otherwise, to combat the academic and social ravages caused by poverty, particularly in locations where poverty is concentrated.

The percent of highly qualified teachers and school size were both positively correlated with graduation rate, albeit less strongly than percent enrollment of students on free or reduced lunch (see Tables 10 and 11; Figure 3). These sorts of data support the requirement of 100% highly qualified teachers in classrooms. The percent of highly qualified teachers was not a significant unique predictor in regressions, however. In regressions, once the explanatory value of all the other variables was removed, the remaining unique explanation by school size of graduation rate in 2004 was negative, albeit small: 1.5%. Considering that, in this study, graduation rate was positively correlated with school size, this is a surprising finding. The positive correlation of graduation rate with school size runs counter to the current fad of breaking up large high schools in favor of smaller ones. The negative regression outcome suggests that students may get lost in larger schools when the usually positive influences of larger schools—more teachers, more money, more facilities—are not sufficient. The Gates Foundation

has put millions of dollars toward making smaller high schools but the value of this activity may be more in the better facilities and better paid teachers than the actual size of the school (Gates, 2005; Hendrie, 2003). This outcome also highlights the need for more complex statistical analyses than simple correlations as school size, student characteristics, and teacher characteristics are interrelated.

The average years of experience of teachers in a school were weakly, positively correlated with graduation rate (2004: .353, $p = .005$; 2005: .263, $p = .040$). Perhaps surprisingly, the ratio of teachers with less than one year experience to those with greater experience was only significantly correlated in 2004, not in 2005, and that was a weak, negative correlation (2004: -.289, $p = .024$; 2005: ns). Together, these outcomes suggest that teacher experience is not as important as may have been supposed, at least when it comes to helping students stay in school through graduation.

The ratio of teachers with bachelor's degrees to those with graduate degrees was weakly, negatively correlated with graduation rate only in 2004 (2004: -.292, $p = .022$; 2005: ns). This is another factor, along with year's experience, that determines how much a teacher is paid (Georgia Department of Education, 2005). This weak correlation does suggest that the greater proportion of teachers with graduate degrees does have weak positive influence on graduation rate. As has been argued elsewhere, it is clear that teachers, unlike employees in other careers, are paid not for their talents but for their credentials (Podgursky, 2005). The weak positive benefit of graduate degrees also raises the question of the value of graduate degrees to teacher efficacy. Other studies have similarly found that graduate degrees are not effective in improving teachers' quality

(Dee & Keys, 2005b). In this study, all data were only available from certified personnel so it is impossible to know if the researchers questioning the value of initial teacher certification have been supported by the patterns in Atlanta's schools (Goldhaber & Brewer, 2000). Future studies may re-examine the student outcomes using information on both certified and uncertified personnel.

The ratio of African-American to Caucasian teachers was moderately, negatively correlated with graduation rate in 2004 only (2004: -.444, p = .000; 2005: ns). That relationship was reversed in the regression analyses, where the ratio of African-American to Caucasian teachers explained a positive 6.1% of the variation in the 2005 graduation rate uniquely. This relationship was even stronger when outliers, including those in the ratio of African-American to Caucasian teachers, were removed: 9.7%. This is another case, like school size, where statistical tests that account for variable interrelatedness can show more than bivariate correlations. There is some evidence that students learn more from teachers of their own race (Dee, 2003; Hanushek et al., 2005). Atlanta City Schools and some schools in the DeKalb County district have almost 100% African-American enrollment. Atlanta City schools often have a majority of African-American teachers, too. These results may be further evidence of the value of students learning from teachers of their own race. Since this study did not investigate learning per se, perhaps having teachers acting as role models who have graduated both from high school and from college make a difference in the number of students who graduate. Atlanta City Schools also have a very low proportion of part-time teachers, possibly indicating a more stable teacher population. The inclusion of data about teacher turnover in schools with both high

proportions of African-American enrollment and African-American teachers might illuminate this relationship further.

There was an increase in graduation rate between the years of 2004 and 2005, a positive sign that NCLB is working in the Atlanta area. One must be cautious in such an assessment, however, since this study only encompassed evidence from two years. Also, as research has shown, schools and teachers can be pressured into behaviors that artificially increase test scores or graduation rate (Jacob & Levitt, 2004). For instance, students doing poorly can be referred to special education where their test scores will not be counted (Booher-Jennings, 2005) or can be pressured to drop out of school (Fine, 1986). Using the Cumulative Promotion Index (CPI), a measure from which this study's persistence measure was derived, Orfield et al. (2004) determined graduation rate in Georgia in 2001 to be 55.5%, well below the national average of 68.0%. They also calculated graduation rates for the nation's 100 largest districts, which included all of the districts examined in this study. As compared with those calculations, graduation rates have risen in all five districts, both as reported by the Georgia Department of Education and in persistence measures (see Table 7). This provides longer term evidence that there have been real improvements in graduation rates in Georgia.

Admittedly, there are other factors that may contribute to the rate of graduation at a school that have not been measured by this study. However, these are all factors on which data are collected by Georgia Department of Education and ones on which policy decisions are made. The differences between the outcomes of the correlations versus the regressions speak both to the strong interrelations between the explanatory variables and

to the difficulty of making clear policy decisions on limited data. There is not one answer for improving graduation rate.

What is the relationship, if any, of teacher characteristics and student dropout rate?

Dropout rate could be perceived as the opposite of graduation rate. Theoretically, the number of graduates plus the number of retained students plus the number of transferred students plus the number of dropouts should add up to total student enrollment. At the very least, one might expect dropout rate to be close to equaling 100% minus the graduation rate. This is not the case, however. Dropout rate for all students between ninth and twelfth grades varies among the studied schools between zero and 10%, averaging 2.8%. Considering that graduation rate averages about 75%, there seems to be a large gap in the data. Surely, the number of retained and transfer students is not so large as to fill this gap. Similarly, dropout rate and graduation rate are only moderately correlated (2004: -.574, $p = .000$; 2005: -.591, $p = .000$). These disparities are particularly surprising considering that graduation rate is partly calculated from dropout rate (State of Georgia, 2003b) and graduation rate significantly increased between the years of 2004 and 2005 while the percentage of dropouts did not change significantly.

In regression analyses, the influence of teacher characteristics, percent of students on free or reduced lunch, and school size combined to explain 49-63% of the variance in dropout rate in the high schools around Atlanta, Georgia (see Table 16). Similar to the results for graduation rate, the percent of students on free or reduced lunch had the largest unique contribution to the explanation of variance, between 14.7% and 35.8%. The strength of the correlation between the ratio of students on free or reduced lunch and

dropout rate was only moderate (2004: .426, $p = .001$; 2005: .374, $p = .003$). The proportion of students in poverty in a school was also more likely to increase with dropout rate, as has been found in other studies (Orfield et al., 2004; Rumberger, 2001).

In both years, dropout rate was weakly, positively correlated to the ratio of bachelor's to graduate degrees held by teachers (2004: .303, $p = .015$; 2005: .278, $p = .028$). This suggests that teachers with higher degrees do offer something to students to help keep them in school. As staying in school is a good first step to graduating from school, this is a helpful finding. However, there was not a significant unique contribution of the ratio of degrees to dropout rate in the regression analyses. This finding is more in line with the findings of other researchers (Hanushek et al., 2005; Rivkin et al., 2005).

The proportion of teachers with less than one year experience has been used as a proxy for teacher turnover since teachers leaving the profession leave openings for new teachers (Loeb et al., 2005). A constant influx of new teachers means less stability for a school, an important factor in retaining students until graduation (Hill et al., 2003). New teachers are simply less effective at improving student achievement (Hanushek et al., 2005) and students of high-minority and high-poverty schools are more likely to have teachers in their first few years of teaching (Clotfeller et al., 2005). The results of this study are mixed in regard to the benefit or detriment of the ratio of new teachers. Correlations are weak between the ratio of teachers with less than one year experience and those with more experience and dropout rate, for instance, and the relationship changes from negative to positive between years (2004: -.298, $p = .018$; 2005: .252, $p = .046$).

The same relationship was seen in the regression analyses: the ratio of new teachers had a negative, unique contribution in 2004 and a positive one in 2005, after outliers were removed (see Table 16). In both years, the unique contribution was about 5% of the variance in dropout rate. Admittedly, most other studies examining the impact of new teachers focus on their influence on exam scores while this study examined graduation rate and dropout rate. One possible explanation is that schools and students benefit from a certain proportion of new teachers as they bring new enthusiasm and ideas that they have learned in their certification programs to their new positions. If the proportion of new teachers gets too high, however, the negative impacts of their inexperience outweigh the positive impact of their enthusiasm. Enthusiasm without the direction offered by more experienced teachers is harmful to student achievement. A more thorough quantitative or qualitative study might examine the benefits as well as the detriments of new teachers as every school is likely to have a certain proportion of first and second year teachers in any given year (Podgursky, 2006).

Research on the importance of teacher experience to teacher quality usually finds the first year or two are the most difficult for teachers and that teacher quality does not improve significantly beyond the first five years (Hanushek et al., 2005; Kane et al., 2006). It is therefore unfortunate that the Georgia Department of Education School Report Cards (State of Georgia, 2005a) only separate teacher experience groups into under-one-year experience and subsequent ten-year increments of experience (see Table 1). For a more precise sense of the proportion of relatively inexperienced teachers, a better listing would include a category under two years or under five years. The average

years of teacher experience was negatively correlated with dropout rate only weakly and only significantly in 2005 (2004: ns; 2005: -.276, $p = .029$). Average years of experience did not have a unique contribution in regressions. If teacher quality does not increase with increasing years of experience, this result is unsurprising (Hanushek et al., 2005; Kane et al., 2006).

The only other variable that was correlated with dropout rate was the percent of core subject teachers that were highly qualified. It was a weak, negative correlation that was only significant in 2004 (2004: -.249, $p = .049$; 2005: ns). It is intriguing that the percent of highly qualified teachers should have more influence on dropout rate than graduation rate, considering that graduation requires that students pass standardized examinations ostensibly taught by those teachers. However, it appears that teachers with traditional certification in their teaching areas, the requirement for being a highly qualified teacher (State of Georgia, 2003b), may help to keep students in school in a similar manner to teachers with graduate degrees. The percent of highly qualified teachers was not a significant unique contributor in regression analyses.

Two other variables made unique contributions to explaining the variance in dropout rate: the ratio of African-American teachers to Caucasian teachers and the ratio of part-time to full-time teachers. The ratio of African-American to Caucasian teachers has the same type of influence as with graduation rate: between 5% and 18% of the variance in dropout rate was explained by the proportion of African-American teachers. Thus, in this region, schools with more African-American teachers have a lower dropout rate. Considering that schools in the Atlanta region average about 50% African-American

students, ranging up to 100%, this may be another corroboration of the benefit of race-matching for students and teachers (Dee, 2003).

The ratio of part-time to full-time teachers, while not correlated with dropout rate, also contributes uniquely to its variance. In 2005 only, the proportion of part-time teachers positively contributed 4% to 7%. If students have fewer full-time teachers, they are more likely to drop out. No literature was found on the impact of part-time teachers on high school students. This result, however, might align itself with the findings on teacher turnover (Lankford et al., 2002; Loeb et al., 2005). If it can be assumed that part-time teachers are less likely to be long-term teachers, at least as part-time faculty, the impact on students may be negative for the same reasons as teacher turnover. One district of the five examined, Cobb County, had consistently more part-time faculty than the others, averaging a ratio of 0.61 part-time to full-time faculty (range: 0.419-0.747) as compared to a ratio of about 0.05 in other districts (range: 0-0.159). When regressions were examined without the data from Cobb County, the ratio of part-time faculty did not make a unique contribution to the variance in dropout rate. The impact of this variable may merit further examination.

There are other factors that may contribute to the rate of dropout at a school that have not been measured by this study. It is fascinating that the factors that improve graduation rate are generally different than those that decrease dropout rate. While a researcher might initially think that graduation rate and dropout rate could be studied together as one, these results clarify that the issues are distinct from one another and, while interrelated, need independent as well as joint attention.

What is the relationship, if any, of teacher characteristics and student persistence rate?

This study used two alternative measures to graduation rate: persistence to senior year, i.e., the ratio of seniors to freshmen from four years previous, and persistence to graduation, i.e., the ratio of graduates to freshmen from four years previous (Losen, 2005; Orfield et al., 2004). Due to apparent district restructuring, only persistence calculations between 2000 and 2004 were viable, leaving this study with only one year of data. Persistence to senior year in 2004 was strongly correlated with graduation rate in 2004, as would be expected (.752, $p = .000$; outliers removed, .757, $p = .000$). Students must remain in school through their senior year in order to graduate. This measure also allows for a better sense of how many students are passing through high school in the proper time-frame: four years. Persistence to graduation was less strongly correlated with graduation rate in 2004 (.438, $p = .000$; outliers removed, .601, $p = .000$). This is slightly more confusing but it must be remembered that this measure includes students who have been retained and thus may have spent more than four years in high school before graduating or have transferred into or out of the district since their freshman year. As compared with the graduation rate calculated by the CPI (Orfield et al., 2004), persistence using either measure in Georgia has been increasing since 2001 (see Table 7). As a potentially more accurate measure of graduation rate, this is another positive sign that NCLB efforts are working to increase high school graduation in Georgia. The State of Georgia has promised a program that tracks all students individually so that graduation and dropout rates will be counted more accurately and there will no need for alternative measures like persistence (State of Georgia, 2005b). Until that time, however, persistence

appears to be a good alternate or additional measure of graduation that may be used to judge progress in improving graduation rate in Georgia and nationally.

In regression analyses, the combination of school and teacher characteristics explained 61.8% or, after outliers had been removed, 64.2% of the variance in persistence to senior year (see Table 17). In persistence to graduation, 53.4 % of the variance was explained, or 63.2% after outliers were removed. Again, unique contribution was largely made up by the percent of students on free or reduced lunch, though not as much as had been explained by graduation rate (persistence to senior year, 14.8-16.8% and persistence to graduation, 6.4-9.6%). In both cases, the amount of unique contribution by the percent of enrollment of students on free or reduced lunch decreased when outliers were removed from the predictor variables. It is possible that the unique impact of poverty is actually smaller than has been perceived by researchers using graduation rate as a measure because the combined impact of the other variables is greater when using persistence. If so, this could be perceived as a somewhat hopeful outcome since schools, teachers, and policy makers can change school and teacher variables more readily than the home lives of the students. School conditions can be improved, teachers trained to handle the challenges of students in poverty, and money appropriated for these activities. The difference in impact of poverty on student outcomes depending on the outcome variable would make an excellent avenue for future research.

In regression analyses, the unique explanation of the variation in persistence to senior year was composed of fewer variables than the unique explanation of the variation in persistence to graduation. After the percent of students on free or reduced lunch, 3.8%

of the variance in persistence to senior year was uniquely explained by the proportion of new teachers in the school, once the outliers were removed. Similarly, 5.6% and 6.5%, without outliers, of the variance in persistence to graduation was explained by the proportion of new teachers in the school. In both types of persistence, this influence of new teachers was positive, unlike the mixed influence seen in dropout rate. One interpretation of this result could be that a certain proportion of new teachers brings new enthusiasm and methods to a school and has a positive effect on students. However, as noted with the uncertain impact of new teachers on dropout rate, too many new teachers may result in more negative than positive impacts. Since Podgursky (2006) suggests that a certain proportion of new teachers is inevitable as teachers retire or leave the profession, this result may encourage policy makers who are trying to attract more new teachers as well as sustain their efforts of retaining current teachers. A balance of new and more experienced teachers is probably the most important to student success.

Persistence to graduation alone was also explained by student-to-teacher ratio, the proportion of part-time teachers, and, once the outliers were removed, the proportion of teachers with graduate degrees. These results suggest that making the leap from senior year to actual graduation may require additional characteristics of teachers. Considering the implementation of the examinations required for graduation, these teacher characteristics may be the ones most important for helping students pass those exams, an interesting avenue of future research.

Even though school size was significantly correlated with persistence to graduation (.378, $p = .003$), school size did not make a unique contribution to persistence

to graduation, so it is interesting that there was a positive unique contribution from student-to-teacher ratio. School size and student-to-teacher ratio were weakly correlated with each other in 2004 (.295, $p = .019$). Again, it is unfortunate that persistence was not available for both years since student-to-teacher ratio increased significantly from 2004 to 2005 and might have shown a more distinctive pattern. However, if students are graduating at high rates from larger classes, hiring higher quality teachers for those larger classes is likely more important than hiring more but lower quality teachers to staff smaller classes. This finding also corroborates the evidence that class size is not of great importance for secondary students (Lakdawalla, 2002b).

Interestingly, the ratio of part-time to full-time teachers also had a positive unique contribution to make to persistence to graduation, 4.2-4.7%. The ratio of part-time faculty was also the only teacher characteristic significantly correlated with persistence to graduation (.312, $p = .016$). While the ratio of part-time faculty seems to be associated with increased dropout rate, it is also associated with increased persistence to graduation. It is possible that, like new teachers, part-time faculty bring an enthusiasm and freshness with them that is not seen as often in full-time faculty. When regressions were conducted without data from Cobb County which has an unusually high proportion of part-time faculty, the proportion of part-time faculty did not have a unique contribution to explaining the variance.

Finally, the ratio of teachers with bachelor's degrees to those with graduate degrees had a negative unique contribution to persistence to graduation, 4.0%. In a similar manner to the correlation between graduation rate and the ratio of teachers with

bachelor's degrees in 2004 (-.292, p = .022), more teachers with graduate degrees may help students to achieve graduation. Despite research evidence to the contrary, the practice of paying teachers more for graduate degrees may be validated here (Darling-Hammond, 2000; Hanushek, Kain, & Rivkin, 1999). However, the ratio of bachelor's degrees was not correlated significantly with persistence to graduation and was only correlated with graduation rate in 2004. Without the corroborating evidence of two years of persistence data and consistent significant correlations, this may be a spurious result.

It is very interesting that persistence seemed to share more explanatory variables with dropout rate than with graduation rate. This may speak to the accuracy of persistence in that it succeeds in more closely matching the students who are graduating with those who are failing to graduate. On the other hand, persistence was only weakly correlated with dropout rate: persistence to senior year (-.421, p = .001) and persistence to graduation (-.292, p = .025). It is difficult to assess the validity of persistence as an alternative calculation of graduation rate. Further research and larger datasets may help solidify persistence or the Cumulative Promotion Index as viable measures (Orfield et al., 2004).

Other Relationships and Discovery

There were correlations between percents of enrollment of student subgroups and predictor variables that were interesting or had been noted by previous research. For instance, most student subgroups (African-American, Caucasian, Hispanic, students on free or reduced lunch) were significantly correlated with each other. Of the variables examined, only the percent enrollment of students with disabilities was not significantly

correlated with any other enrollment subgroup. African-American enrollment was strongly, positively correlated with enrollment of students on free or reduced lunch (2004: .811, $p = .000$; 2005: .828, $p = .000$), a corroboration of the evidence that high-minority and high-poverty schools are often the same schools (Hill et al., 2003; Miller, 2005; Orfield et al., 2004). While graduation rates were negatively correlated with percent of students on free and reduced lunch and dropout rate was positively correlated with it, it cannot be assumed that all high-poverty schools are failing schools but the trend has been corroborated in this study (McGee, 2004). The strong correlation between African-American enrollment and enrollment of students on free or reduced lunch forced this study to choose between the two populations in regression analyses because of collinearity concerns. Due to its greater explanatory value in regressions enrollment of students on free and reduced lunch was chosen over African-American enrollment, though both race and poverty have impacts on teachers and students (Dee, 2003; Freeman, Scafidi, & Sjoquist, 2002; Scafidi et al., 2005).

There was a strong, negative correlation between African-American enrollment and Caucasian enrollment (2004: -.933, $p = .000$; 2005: -.925, $p = .000$). This might initially cause one to think that schools in the Atlanta area were segregated. However, it must be recalled that African-American and Caucasian students made up the majority of all students. On average, African-American students made up 50% of enrollment in schools, ranging from 0-100% enrollment. Caucasian students averaged 35% enrollment, ranging from 0-90% enrollment. Thus some schools are segregated and some are mixed (see Figure 2). Even though there were a few schools that have up to half Hispanic

enrollment, Hispanic enrollment averaged only 7% enrollment and was often less than one percent. Enrollment of African-American students was also negatively correlated with enrollment of Hispanic students (2004: -.331, p = .008; 2005: -.331, p = .008) though Hispanic enrollment was not significantly correlated with Caucasian enrollment. African-American enrollment was positively correlated with proportion of African-American teachers (2004: .694, p = .000; 2005: .622, p = .000) and Caucasian enrollment was negatively correlated with proportion of African-American teachers (2004: -.607, p = .000; 2005: -.542, p = .000). Surprisingly, Hispanic enrollment was not significantly correlated with percent of Hispanic teachers (2004, .209, p = .100; 2005, .177, p = .166). Perhaps more interesting was that African-American and Caucasian teachers showed a similar pattern to African-American and Caucasian students but were more clustered with their own races (see Figure 1). Except for DeKalb County, districts appeared to be quite segregated as well. Though this study has corroborated evidence that students receive more benefit from teachers of their own race (Dee, 2003; Scafidi et al., 2005), desegregation efforts may need to focus both on students and staff of schools if it is determined that students in diverse schools are actually more successful.

Though this study only encompassed two years, there was significant increase in percent African-American and Hispanic enrollment between 2004 and 2005 and a significant decrease in Caucasian enrollment (see Table 7). This could either mean that more African-American and Hispanic students are entering the public schools or that Caucasian students are leaving the public schools. Both of these explanations are feasible since Atlanta has been known to attract African-American families (Dewan & Goodman,

2006), the Hispanic population is rising nationally (U.S. Department of Education, 2003), and Caucasians have been known to remove their children from urban public schools, either putting them in private schools or leaving urban areas altogether (Clotfeller, 2001). These changes in student enrollment suggest that the demographics of Atlanta are changing and that will have an impact on schools.

While not strong, there was a correlation between percent enrollment of students on free or reduced lunch and the proportion of new teachers (2004: .305, $p = .015$; 2005: ns). Even though there is tentative evidence in this study that a certain proportion of new teachers can actually improve students' chances of graduating, it has been found frequently that teachers in their first year of teaching do not produce as much student achievement as more experienced teachers (Darling-Hammond, 2000; Hanushek et al., 2005). It has also been shown that minority students and those in poverty are more likely to have a new teacher than more affluent and Caucasian students (Clotfeller et al., 2005). Because of this tendency, minorities and students in poverty fall behind a little more each year they have an inexperienced teacher, exacerbating the gap in test scores and graduation rates between Caucasians and minorities seen across the nation (Hanushek, 2001).

The proportion of new teachers was weakly, negatively correlated with student-to-teacher ratio (2004: -.328, $p = .009$; 2005: ns). While this is a weak correlation and only significant in one of the two years, it suggests that in schools that had a higher student-to-teacher ratio, there were fewer new teachers, raising the possibility that some schools are choosing to increase class size rather than hire new teachers, possibly due to

limited fiscal resources (Lakdawalla, 2002b). The proportion of new teachers was also negatively correlated with the percent of highly qualified core subject teachers in 2004 (2004: -.399, $p = .001$; 2005: ns). This is a weak negative correlation that nonetheless suggests that new teachers are less likely to be highly qualified in core subjects. This may be an artifact of bureaucracy since new teachers may start new jobs within a few weeks of graduating from their certification programs and their transcripts may not reach their new employers until after the count of highly-qualified teachers has been done. Alternatively, schools may have been hiring teachers before they finished their course of study. Since this negative correlation disappeared in 2005, either the correlation was spurious or the increased national pressure to staff schools with highly qualified teachers encouraged certification schools to expedite transcript dispersal or schools are simply not hiring new teachers who do not have a diploma in hand.

Average years of teacher experience was weakly correlated with the percent of highly qualified core subject teachers: (2004: .295, $p = .019$; 2005: ns). As one might expect that more experienced teachers are more likely to be qualified, it is surprising that this is such a weak correlation between average years of experience and highly qualified teachers. However, it is possible that teachers hired before the advent of NCLB do not have the proper credentials to be considered highly qualified by the new requirements or are teaching outside of the subject area in which they have their degrees. With the increased pressure nationally to staff schools entirely with highly qualified teachers, these older teachers may receive additional pressure to take the state examinations to properly qualify them via new testing options (State of Georgia, 2003b).

The percent of enrollment of students receiving free or reduced lunch was strongly, negatively correlated with the percent of highly qualified core subject teachers (2004: -.605, p = .000; 2005: -.627, p = .000). Considering that the average percent of highly qualified teachers in these Georgia schools was 96% and increasing, it is distressing to see that the schools with fewer highly qualified teachers were consistently those with more students in poverty. This does align with the national trend, however. Poor schools cannot attract a large pool of applicants for open positions and may often be required to accept anyone willing to teach, whether qualified or not, when the school year begins and there is no one to take some of their classes (Feller, 2006). There is also a moderate positive correlation between school size and the percent of highly qualified teachers (2004: .295, p = .019; 2005: .265, p = .036), again suggesting that larger schools have the budgets to attract and hire more qualified, and possibly higher quality, teachers (Krei, 1998).

There were weak correlations between the proportion of part-time teachers and, positively, the proportion of teachers with bachelor's degrees (2004: .287, p = .023; 2005: .320, p = .010) and, negatively, the proportion of African-American teachers (2004: -.307, p = .003; 2005: -.311, p = .013). Thus, part-time faculty seem more likely to be less educated and Caucasian. It is possible that teachers with only a bachelor's degree have more difficulty getting full-time jobs than those with graduate degrees but the evidence that teachers are needed at many schools makes that unlikely. There seems no theoretical reason for there to be a race difference. Cobb County hires many more part-time faculty than the other school districts examined and this preponderance of part-time teachers may

slant these results since Cobb County has mostly Caucasian teachers. Conversely, the results may be slanted by the fact that Atlanta City School District has the highest proportion of African-American faculty and reported no part-time faculty during 2004.

As expected, the ratio of male teachers to female teachers seems to have no impact on graduation rate, dropout rate, or persistence (Hanushek et al., 2005). Men make up about half of the teachers in the public high schools in the Atlanta region (Table 4). The proportion of male teachers was weakly positively correlated with the proportion of new teachers (2004: .271, $p = .032$; 2005: .300, $p = .017$) and weakly negatively correlated with average years of teacher experience (2004: ns; 2005: -.326, $p = .009$) suggesting that men are more likely to be in the early years of their careers. Either men are sufficiently new to the teacher workforce that their numbers are not represented in the later years of experience, an unlikely supposition, or men may be more likely than women to be drawn away from teaching into other, possibly more lucrative, careers (Lakdawalla, 2002a). The proportion of male teachers was also weakly negatively correlated with the percent of highly qualified core subject teachers (2004: -.293, $p = .020$; 2005: ns). In combination with the evidence that men are likely to be more highly represented in the earlier years of teaching, this weak negative correlation with highly qualified teachers suggests that they may not be entering the teacher workforce through traditional routes. Perhaps men are more likely to be pulled from other careers into teaching via alternative certification programs, like Georgia's Teacher Alternative Preparation Program (TAPP) (Georgia Professional Standards Commission, 2001).

The ratio of African-American teachers to Caucasian teachers was correlated with the proportion of new teachers (2004: .502, $p = .000$; 2005: ns) and the percent of highly qualified teachers (2004: -.579, $p = .000$; 2005: -.559, $p = .000$). Though there was moderately strong positive correlation between the proportion of African-American teachers and new teachers, the relationship should be treated cautiously since it is different between years. It is also possible that there was a large influx of new, African-American teachers in 2004 that in 2005 were counted with the teachers in the 1-10 years experience category (see Table 1). This could be largely driven by Atlanta City Schools which employ a particularly high proportion of African-American teachers and may have been attempting to increase this proportion in the last few years. The negative correlation between African-American teachers and percent of highly qualified teachers is an interesting corroboration of the idea that teacher certification programs and examinations are an unequal obstacle to minorities (Angrist & Guryan, 2003). This correlation suggests that either African-American teachers are poorly represented among teachers of core subjects or that they are entering the workforce with preparation not recognized by NCLB. Considering that this correlation did not change between years, it appears that schools are not making a concerted effort to convert their African-American teachers to highly-qualified status through the testing options created as Georgia outlined its route to compliance with NCLB (State of Georgia, 2003b).

Conclusions

For graduation rate, dropout rate, and persistence, the strongest unique contributor in regressions was the enrollment of students on free or reduced lunch, negatively for

graduation rate and persistence and positively for dropout rate. As African-American enrollment was strongly correlated with enrollment of students on free or reduced lunch, schools with high African-American enrollment also show low rates of graduation and high rates of dropout.

> The growing segregation of our public schools, cited in The Civil Rights Project's 2004 report, *Brown at 50: King's Dream or Plessy's Nightmare* is likely a contributing factor to low graduation rates. Almost 9 of 10 intensely segregated minority schools also have concentrated poverty. These schools are characterized by a host of problems, including lower levels of competition from peers, less qualified and experienced teachers, narrower and less advanced course selection, more student turnover during the year, and students with many health and emotional problems related to poverty and to living in ghetto or barrio conditions. Few whites, including poor whites, ever experience such schools (Orfield et al., 2004, p. 6).

Students who have little choice in where to attend high school are often choosing to drop out rather than continue at failing schools (Sunderman, Kim, & Orfield, 2005). There are positive signs, however. Graduation rate is increasing and Georgia's promise of individual tracking of students will soon allow for a more realistic counting of graduation, transfer, and dropout. There was also evidence that even persistence has increased since 2001. Dropout rate did not increase, though it did not decrease either.

The most surprising result was the apparent reversal of the impact of school size. Simple correlations and linear or quadratic regressions suggested a positive relationship:

larger schools have higher graduation rates (see Figure 3). But when the factors concomitant with larger schools were removed, i.e., better facilities, more teachers, more course offerings, the impact of larger schools on graduation rates was negative. These results support the mission of the Gates Foundation to split large high schools into smaller ones with good facilities and teachers (Gates, 2005).

Teachers are vital to the increase in graduation rate and persistence. Together, all the predictor variables explained over 70% of graduation rate, over 50% of dropout rate, over 60% of persistence to senior year, and over 50% of persistence to graduation. Few teacher characteristics showed unique contributions, meaning that the impact of teachers cannot be narrowed down to one or two variables. Any changes in teacher preparation or situation must account for multiple factors. This is not a simple answer for policy makers but does highlight the value of teachers to the future of American schooling.

Recommendations for Future Research

While there were few clear answers found in this study, the avenues of research opened were many. Further research into the influences on graduation rate, dropout rate, and persistence could take several directions. One might examine student outcomes for each subgroup, that is, race, free or reduced lunch, disabilities, in relationship with teacher and school characteristics. One might examine student outcomes from high schools in other urban centers. One might examine student outcomes from high schools in non-urban places. One might examine student outcomes from high schools with different racial make-ups. The Atlanta region is dominated by African-American and Caucasian students so future research could compare Atlanta with high schools in regions

dominated by other racial groups or composed of a greater variety of races and ethnicities. As the percent of students on free or reduced lunch made such a large unique contribution, one might examine how the impact differs when predicting outcome variables, that is, graduation rate versus persistence. One might use qualitative methods to deepen the data analysis, for example, interviews about student success with teachers, students, and administrators. One might examine the effect of the teacher characteristics on the outcome of standardized examinations as they are required for graduation, assuming teachers could be appropriately linked to the exams their students were taking. The presence of significant year effects in this study strongly suggests the need for examination of these outcomes over the course of more years.

There are also many avenues of research that involve a deeper examination of teacher characteristics. One might collect more information about the impact of teacher training on student outcomes, that is, the quality of the institution where teachers received their education training and how many courses they took in their content specialization as well as pedagogical classes. One might re-examine the student outcomes using data from teachers in their first two to five years of teaching since that is the time of the most growth in teacher experience (Hanushek et al., 2005). One might include information on actual teacher turnover to the list of teacher characteristics and examine how that impacted graduation and dropout rates and persistence.

No literature was found on the impact of part-time teachers on high school students. While it is likely that the high ratio of part-time to full-time teachers in Cobb County is due to district policies, future research might investigate why the district has

such policies. For instance, Wal-Mart has used a disproportionate number of part-time workers to avoid having to pay benefits (Joyce, 2006). Research could examine the characteristics of part-time teachers, i.e., their education level, gender, race, experience, and turnover rate, and exactly how students are affected by a large proportion of part-time teachers.

REFERENCES

Angrist, J. D., & Guryan, J. (2003). Teacher testing, teacher education, and teacher characteristics. *American Economic Review, 94*(2), 241-246.

Ballinger, J. (2000). Programs aim to stop teacher washout. *Journal of Staff Development, 21*(2), 28-33.

Ballou, D. (2002, Summer). Sizing up test scores. *Education Next,* 10-15.

Ballou, D., & Podgursky, M. (1997). *Teacher pay and teacher quality*. Kalamazoo, MI: E. Upjohn Institute for Employment Research.

Barker, K. S. (2005). *Overcoming barriers to high school success: Perceptions of students and those in charge of ensuring their success.* Unpublished doctoral dissertation, University of Texas, San Antonio.

Barro, S. M., & Kolstad, A. (1987). *Who drops out of high school? Findings from high school and beyond* (Contractor report OE 300-83-0256). Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, Center for Education Statistics.

Barton, P. E. (2005a). *One-third of a nation: Rising dropout rates and declining opportunities*. Princeton, N.J.: Educational Testing Service, Policy Information Center.

Barton, P. E. (2005b). *Unfinished business: More measured approaches to standards-based reform* (Policy Information Report). Princeton, N.J.: Educational Testing Service, Policy Information Center.

Berry, C. (2004, Fall). School inflation. *Education Next, 4,* 56-62.

Black, S. (2004). Helping teachers helps keep them around. *Education Digest, 70*, 46-51.

Bloch, D. P. (1996). Career development and workforce preparation: Educational policy versus school practice. *The Career Development Quarterly, 45*, 20-40.

Booher-Jennings, J. (2005). Below the bubble: "Educational triage" and the Texas Accountability System. *American Educational Research Journal, 42*(2), 231-268.

Bush, G. W. (2006). *State of the union address*. Washington, D.C.: U.S. Government Printing Office.

Caldas, S. L., & Bankston, C. L., III. (1997). Effect of school population socioeconomic status on individual academic achievement. *Journal of Educational Research, 90*, 269-277.

Card, D., & Rothstein, J. (2006). *Racial segregation and the black-white test score gap* (Working paper 12078). Cambridge, MA: National Bureau of Economic Research.

Chaplin, D. (2002, Fall). Tassels on the cheap: Treating the GED as a high-school diploma masks a declining graduation rate. *Education Next,* 24-29.

Charlotte Advocates for Education. (2004). *Role of principal leadership in increasing teacher retention: Creating a supportive environment*. Charlotte, NC: Author.

Civic Enterprises. (2006). The silent epidemic: Perspectives of high school dropouts.

Clotfeller, C. T. (2001). Are whites still fleeing? Racial patterns and enrollment shifts in urban public schools, 1987-1996. *Journal of Policy Analysis and Management 20*, 199-221.

Clotfeller, C. T., Ladd, H. F., & Vigdor, J. (2004). Do school accountability programs make it more difficult for low-performing schools to attract and retain high quality teachers? *Journal of Policy Analysis and Management, 23*(2), 251-271.

Clotfeller, C. T., Ladd, H. F., & Vigdor, J. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review, 24*, 377-392.

Colgan, C. (2004). Is there a teacher retention crisis? *American School Board Journal, 191*(8), 22-25.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence [Electronic Version]. *Education Policy Analysis Archives*, 8. Retrieved June 24, 2006 from http://epaa.asu.edu/epaa/v8n1/.

Darling-Hammond, L., Berry, B., & Thoreson, A. (2001). Does teacher certification matter? Evaluating the evidence. *Educational Evaluation and Policy Analysis, 23*, 57-77.

Dee, T. S. (2003). Teachers, race and student achievement in a randomized experiment. Spring 2004. Retrieved July 3, 2006, from http://www.educationnext.org/unabridged/20042/dee.pdf

Dee, T. S. (2004). The race connection. *Education Next, 4*, 52-59.

Dee, T. S. (2005). *Teachers and the gender gaps in student achievement* (Working paper 11660). Cambridge, MA: National Bureau of Economic Research.

Dee, T. S., & Jacob, B. A. (2006). *Do high school exit exams influence educational attainment or labor market performance?* (Working paper 12199). Cambridge, MA: National Bureau of Economic Research.

Dee, T. S., & Keys, B. J. (2005a). Does merit pay reward good teachers? Evidence from a randomized experiment. Retrieved July 3, 2006, from http://www.educationnext.org/unabridged/20051/60.pdf

Dee, T. S., & Keys, B. J. (2005b, Winter). Dollars and sense: What a Tennessee experiment tells us about merit pay. *Education Next, 5,* 60-67.

Dewan, S., & Goodman, B. (2006, March 11). Gentrification changing face of new Atlanta. *New York Times,* pp. A1, A9.

Donlevy, J. (2000). The dilemma of high-stakes testing: What is school for? *International Journal of Instructional Media, 27*(4), 331-337.

Duncombe, W., & Yinger, J. (2005). How much more does a disadvantaged student cost? *Economics of Education Review, 24*, 513-532.

Echenique, F., & Fryer, R. G., Jr. (2005). *On the measurement of segregation* (Working paper 11258). Cambridge, MA: National Bureau of Economic Research.

Ediger, M. (2000). Purposes in learner assessment. *Journal of Instructional Psychology, 27*(4), 244-249.

Ehrenberg, R. G., Brewer, D. J., Gamoran, A., & Wilms, J. D. (2001). Class size and student achievement. *Psychological Science in the Public Interest, 2*(1), 1-30.

Ehrenberg, R. G., Goldhaber, D. D., & Brewer, D. J. (1995). Do teachers' race, gender, and ethnicity matter? Evidence from the National Educational Longitudinal Study of 1988. *Industrial & Labor Relations Review, 48*(3), 547-561.

Feller, B. (2006). No states meet teacher-quality goal set in federal law: Now nine, D.C., and Puerto Rico could lose funding [Electronic Version]. *The Boston Globe*. Retrieved May 13, 2006 from http://www.boston.com/news/education/k_12/articles/2006/05/13/no_states_meet_teacher_quality_goal_set_in_federal_law/.

Fine, M. (1986). Why urban adolescents drop out of public high school. *Teachers College Record, 87*(3), 393-409.

Finn, C. E., Jr. (2005a, Winter). Paying teachers properly. *Education Next, 5,* 3.

Finn, C. E., Jr. (2005b, Winter). Things are falling apart: Can the center find a solution that will hold? *Education Next,* 27-32.

Finn, C. E., Jr. (2006a). Obstacles on the route from high school to college. *School & College, Section B of the Chronicle of Higher Education, 52*(27), 40-42.

Finn, C. E., Jr. (2006b, Winter). Things are falling apart: Can the center find a solution that will hold? *Education Next,* 27-32.

Finn, J. D. (2006). *The adult lives of at-risk students: The roles of attainment and engagement in high school* (NCES 2006328). U.S. Department of Education. National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Finn, J. D., & Achilles, C. M. (1990). Answers and questions about class size: A statewide experiment. *American Educational Research Journal, 27*(3), 557-577.

Fowler, W. J., & Walberg, H. J. (1991). School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis, 13*(2), 189-202.

Freeman, C., Scafidi, B., & Sjoquist, D. L. (2002). *Racial segregation in Georgia public schools, 1994-2001: Trends, causes, and impact on teacher quality* (Working paper). Atlanta, GA: Andrew Young School of Policy Studies, Georgia State University.

Fryer, R. G., Jr., & Levitt, S. D. (2004). Understanding the black-white test score gap in the first two years of school. *The Review of Economics and Statistics, 86*, 447-464.

Gardner, R., III, & Miranda, A. H. (2001). Improving outcomes for urban African American students. *Journal of Negro Education, 70*, 255-263.

Gates, W. (2005). Prepared remarks at the National Education Summit on High Schools. Retrieved September 10, 2006, from http://www.gatesfoundation.org/MediaCenter/Speeches/BillgSpeeches/BGSpeechNGA-050226.htm

Georgia Department of Education. (2005). Retrieved May 25, 2006, from www.doe.k12.ga.us/index.asp

Georgia Department of Education. (2004). What is a Needs Improvement school? Retrieved August 15, 2006, from http://www.doe.k12.ga.us/doe/media/04/072304.asp

Georgia Department of Education. (2005). State salary schedule, 2005-2006. Retrieved June 20, 2006, from http://app.doe.k12.ga.us/ows-bin/owa/qbe_reports.public_menu?p_fy=2000

Georgia Professional Standards Commission. (2001). Georgia TAPP (Teacher Alternative Preparation Program). Retrieved September 8, 2006, from http://www.gapsc.com/GATAPP/home.asp

Georgia Professional Standards Commission. (2006). Routes to certification. Retrieved August 12, 2006, from http://www.gapsc.com/TeacherCertification/Documents/routes.asp

Gill, S., & Reynolds, A. J. (1999). Educational expectations and school achievement of urban African American children. *Journal of School Psychology, 37*(4), 403-424.

Glass, G. V., Cahen, L. S., Smith, M. L., & Filby, N. N. (1982). *School class size: Research and policy*. Beverly Hills, CA: Sage.

Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*, 129-145.

Goldhaber, D. D., & Brewer, D. J. (2001). Evaluating the evidence on teacher certification: A rejoinder. *Educational Evaluation and Policy Analysis, 23*, 79-86.

Gordon, J. M. (2004). *Looking at high school dropout problems from students' perspectives: Finding a solution (Quebec).* Unpublished doctoral dissertation, McGill University.

Greene, J. P. (2005, Winter). A "comprehensive" problem: The disconnect between fantasy and reality. *Education Next,* 23-26.

Gritz, R. M., & Theobald, N. D. (1996). The effects of school district spending priorities on length of stay in teaching. *Journal of Human Resources, 31*, 477-512.

Haertl, E. H. (1999). Validity arguments for high-stakes testing: In search of the evidence. *Educational Measurement, Issues and Practice, 18*(4), 5-9.

Haney, W. (2000). The myth of the Texas miracle in education [Electronic Version]. *Education Policy Analysis Archives*, 8. Retrieved June 24, 2006 from http://epaa.asu.edu/epaa/v8n41.

Hanushek, E. A. (2001). Black-white achievement differences and governmental interventions. *American Economic Review, 91*(2), 24-28.

Hanushek, E. A. (2003). The importance of school quality. In Koret Task Force on K-12 Education (Ed.), *Our schools and our future: ...Are we still at risk?* (pp. 141-173). Palo Alto, CA: Hoover Press.

Hanushek, E. A., Kain, J. F., O'Brien, D. M., & Rivkin, S. G. (2005). *The market for teacher quality* (Working paper 11154). Cambridge, MA: National Bureau of Economic Research.

Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (1999). *Do higher salaries buy better teachers?* (Working paper 7082). Cambridge, MA: National Bureau of Economic Research.

Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (2004). Why public schools lose teachers. *Journal of Human Resources, 39*, 326-354.

Hardy, L. (2006, May). News analysis: Half full or half empty? Scrutinizing the effects of NCLB. *American School Board Journal,* 4-6.

Hendrie, C. (2003). Gates grants to assist with 168 alternatives to traditional schools. *Education Week, 22*(25), 11.

Here one year, gone the next: Summarizing the teacher turnover data for 64 ACORN neighborhood schools, 2002-2003 to 2003-2004. (2002). Chicago, IL: Illinois ACORN.

Hill, P. T., Guin, K., & Celio, M. B. (2003). Minority children at risk. In Koret Task Force on K-12 Education (Ed.), *Our schools and our future: ...Are we still at risk?* (pp. 111-139). Palo Alto, CA: Hoover Press.

Howard, A. (2001). Examining poor and affluent students' perceptions of academic achievement. *Academic Exchange Quarterly, 5*(2), 95-100.

Hoxby, C. M. (2005, Summer). Inadequate yearly progress: Unlocking the secrets of NCLB. *Education Next,* 46-51.

Hoxby, C. M., & Leigh, A. (2005). Wage distortion. *Education Next, 5*, 50-56.

Imber, M. (2004, November). Adequacy in school funding. *American School Board Journal, 191,* 46-47.

Ingersoll, R. M. (2000). *Turnover among mathematics and science teachers in the U.S.* Washington, D.C.: National Commission on Mathematics and Science Teaching for the 21st Century.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499-534.

Jacob, B. A. (2002). *Accountability, incentives, and behavior: The impact of high-stakes testing in the Chicago Public Schools* (Working paper 8968). Cambridge, MA: National Bureau of Economic Research.

Jacob, B. A. (2003, Winter). High stakes in Chicago. *Education Next, 3,* 66-72.

Jacob, B. A., & Lefgren, L. (2006, Spring). When principals rate teachers: The best--and the worst--stand out. *Education Next,* 59-64.

Jacob, B. A., & Levitt, S. D. (2003). Rotten apples: An investigation of the prevalence and predictors of teacher cheating. *Quarterly Journal of Economics, 118*, 843-877.

Jacob, B. A., & Levitt, S. D. (2004). To catch a cheat. *Education Next, 4*, 68-75.

Jencks, C., & Phillips, M. (1998, September-October). America's next achievement test: Closing the black-white test score gap. *American Prospect, 40,* 44-53.

Joyce, A. (2006). Critics say Wal-Mart grows part-timers to cut benefits [Electronic Version]. *Washington Post*, D02. Retrieved September 10, 2006 from http://www.washingtonpost.com/wp-dyn/content/article/2006/05/25/AR2006052502162.html.

Kane, T. J., Rockoff, J. E., & Staiger, D. O. (2006). *What does certification tell us about teacher effectiveness? Evidence from New York City* (Working paper 12155). Cambridge, MA: National Bureau of Economic Research.

Kane, T. J., & Staiger, D. O. (2002). The promise and pitfalls of using imprecise school accountability measures. *Journal of Economic Perspectives, 16*(4), 91-114.

Kaufman, P., Alt, M. N., & Chapman, C. D. (2004). *Dropout rates in the United States: 2001* (NCES 2005-046). U.S. Department of Education. National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Koretz, D. M. (2002). Limitations in the use of achievement tests as measures of educators' productivity. *Journal of Human Resources, 37*(4), 752-777.

Koretz, D. M., & Barron, S. I. (1998). *The validity of gains on the Kentucky Instructional Results Information System (KIRIS)* (MR-792-PCT/FF). Santa Monica, CA: RAND

Koretz, D. M., & Deibert, E. (1996). Setting standards and interpreting achievement: A cautionary tale from the National Assessment of Educational Progress. *Educational Assessment, 3*(1), 53-81.

Kozol, J. (1991). *Savage inequalities*. New York: HarperPerennial.

Krei, M. S. (1998). Intensifying the barriers: The problem of inequitable teacher allocation in low-income urban schools. *Urban Education, 33*(1), 71-94.

Krueger, A., & Whitmore, D. (2000). *The effect of attending a small class in the early grades on college-test taking and middle school test results: Evidence from Project STAR* (Working paper 7656). Cambridge, MA: National Bureau of Economic Research.

Kupermintz, H. (2003). Teacher effects and teacher effectiveness: A validity investigation of the Tennessee Value Added Assessment System. *Educational Evaluation and Policy Analysis, 25*(3), 287-298.

Lakdawalla, D. (2002a, June 19, 2006). The declining relative quality of teachers. Retrieved July 3, 2006, from http://www.educationnext.org/unabridged/20023/lakdawalla.pdf

Lakdawalla, D. (2002b, Fall). Quantity over quality. *Education Next,* 67-72.

Lange, C. M. (1998). Characteristics of alternative schools and programs serving at-risk students. *High School Journal, 81*(4), 183-198.

Lankford, H., Loeb, S., & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis, 24*(1), 37-62.

Lee, V. E., Dedrick, R. F., & Smith, J. B. (1991). The effect of social organization of schools on teachers' efficacy and satisfaction. *Sociology of Education, 64*, 190-208.

Lemonick, M. D. (2006). Are we losing our edge? *Newsweek, 167,* 22-33.

Levitt, S. D., & Dubner, S. J. (2005). *Freakonomics: A rogue economist explores the hidden side of everything*. New York: HarperCollins.

Linn, R. L., Graue, M. E., & Sanders, N. M. (1990). Comparing state and district results to national norms: The validity of the claims that "everyone is above average". *Educational Measurement, Issues and Practice, 4*(4), 5-11.

Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teaching conditions predict teacher turnover in California schools. *PJE. Peabody Journal of Education, 80*(3), 44-70.

Losen, D. J. (2005). Graduation rate accountability under the No Child Left Behind Act. In G. L. Sunderman, J. S. Kim & G. Orfield (Eds.), *NCLB meets school realities: Lessons from the field* (pp. 105-120). Thousand Oaks, CA: Corwin Press.

Ludwig, J. (2003, Summer). The great unknown: *Educational Achievement and Black-White Inequality*[Check the Facts]. *Education Next, 3,* 79-82.

Luyten, H. (1994). School size effects on achievement in secondary education. Evidence from the Netherlands, Sweden and the USA. *School Effectiveness and School Improvement, 5*(1), 75-99.

Ma, X., & MacMillan, R. B. (1999). Influences of workplace conditions on teachers' job satisfaction. *Journal of Educational Research, 93*, 39-47.

Manswell Butty, J.-A. L. (2001). Teacher instruction, student attitudes, and mathematics performance among 10th and 12th grade Black and Hispanic students. *Journal of Negro Education, 70*, 19-37.

McAdams, D. R. (2002, Summer). Enemy of the good. *Education Next, 2,* 23.

McDill, E. L., Natriello, G., & Pallas, A. M. (1985). Raising standards and retaining students: The impact of the reform recommendations on potential dropouts. *Review of Educational Research, 55*(4), 415-433.

McGee, G. W. (2004). Closing the achievement gap: Lessons from Illinois' Golden Spike high-poverty high-performing schools. *Journal of Education for Students Placed at Risk 9*, 97-125.

McMillen, M., Kaufman, P., Germino Hausken, E., & Bradby, D. (1993). *Dropout rates in the United States: 1992* (NCES 93-464). Washington, D.C.: National Center for Education Statistics.

Milanowski, A. T. (2004). The relationship between teacher performance evaluation scores and student achievement: Evidence from Cincinnati. *PJE. Peabody Journal of Education, 79*(4), 33-53.

Miller, M. J. (2005). *Accounting for student and school success in high-poverty, high-minority schools: A constructivist approach.* Unpublished doctoral dissertation, University of Texas, San Antonio.

Mirel, J. (2005, Winter). The traditional high school: Historical debates over its nature and function. *Education Next,* 14-21.

Monk, D. H. (1994). Subject matter preparation of secondary mathematics and science teachers and student achievement. *Economics of Education Review, 13*(2), 125-145.

Mont, D., & Rees, D. I. (1996). The influence of classroom characteristics on high school teacher turnover. *Economic Inquiry, 34*(1), 152-167.

Morris, J. E. (2004). Can anything good come from Nazareth? Race, class, and African American schooling and community in the urban south and midwest. *American Educational Research Journal, 41*(1), 69-112.

Murnane, R. J., & Olsen, R. J. (1990). The effects of salaries and opportunity costs on length of stay in teaching: Evidence from North Carolina. *Journal of Human Resources, 25*(1), 106-124.

Myers, D. E., & Ellman, F. M. (1983). *Early exits from high school and post-high school transitions*. Washington, D.C.: Decision Resources Corporation.

National Center for Educational Statistics. (1993). High school and beyond. Retrieved October 16, 2006, from http://nces.ed.gov/surveys/hsb/

National Center for Educational Statistics. (2002). National Education Longitudinal Study of 1988. Retrieved October 15, 2006, from http://nces.ed.gov/surveys/nels88/

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, D.C.: U.S. Department of Education.

National Commission on Mathematics and Science Teaching for the 21st Century. (2000). *Before it's too late*. Retrieved June 20, 2006, from http://www.ed.gov/inits/Math/glenn/report.pdf.

Newell, R. J. (2002, November). A different look at accountability: The EdVisions Approach. *Phi Delta Kappan, 84,* 208-211.

No Child Left Behind Act of 2001, 20 U.S.C. § 6301 (2002).

Odden, A. (2004). Lessons learned about standards-based teacher evaluation systems. *PJE. Peabody Journal of Education, 79*(4), 126-137.

Orfield, G., Losen, D., Wald, J., & Swanson, C. B. (2004). *Losing our future: How minority youth are being left behind by the graduation rate crisis*. Cambridge, MA: The Civil Rights Project at Harvard University. Contributors: Advocates for Children of New York, The Civil Society Institute.

Papke, L. E. (2005). The effects of spending on test pass rate: Evidence from Michigan. *Journal of Public Economics, 89*, 821-839.

Perkins-Gough, D. (2005). The perils of high school exit exams. *Educational Leadership, 63*(3), 90-91.

Podgursky, M. (2005). *Is teacher pay "adequate"?* (Research Working Paper WP05-10). Harvard University, MA: Taubman Center.

Podgursky, M. (2006, Spring). Is there a "qualified teacher" shortage? *Education Next,* 27-32.

Popham, W. J. (1999). Why standardized tests do not measure educational quality. *Educational Leadership, 56*(6), 8-15.

Portes, A., & Wilson, K. (1976). Black-white differences in educational attainment. *American Sociological Review, 41*, 414-451.

Riffert, F. (2005). The use and misuse of standardized testing: A Whiteheadian point of view. *Interchange, 36*, 231-252.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73*(2), 417-458.

Rothstein, R. (2004, February). Testing our patience: Standardized tests have their uses. But current federal law uses testing to destroy learning. *The American Prospect,* 45-47.

Rumberger, R. W. (1981, April 12-17). *Why kids dropout of schools.* Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA.

Rumberger, R. W. (1987). The impact of salary differentials on teacher shortages and turnover: The case of mathematics and science teachers. *Economics of Education Review, 6*(4), 389-399.

Rumberger, R. W. (2001). *Why students drop out of school and what can be done.* Paper presented at the Conference on Dropouts in America: How severe is the problem? What do we know about intervention and prevention?, Harvard University, MA.

Rumberger, R. W., & Palardy, G. J. (2005). Test scores, dropout rates, and transfer rates as alternative indicators of high school performance. *American Educational Research Journal, 42*(1), 3-42.

Scafidi, B., Sjoquist, D. L., & Stinebrickner, T. R. (2005). Race, poverty, and teacher mobility [Electronic Version]. *Economics of Education Review*. Retrieved July 14, 2006 from ScienceDirect database, DOI: 10.1016/j.econedurev.2005.08.006.

Slavin, R. E. (1990). Class size and student achievement: Is smaller better? *Contemporary Education, 62*(1), 6-12.

Speilhofer, T., Benton, T., & Schagen, S. (2004). A study of the effects of school size and single-sex education in English schools. *Research Papers in Education, 19*(2), 133-159.

State of Georgia. (2003a). 2002-2003 Annual report card on K-12 public schools. Retrieved August 15, 2006, from http://reportcard.gaosa.org/yr2003/k12/Demographics.asp?TestType=Demographics&ID=660:198

State of Georgia. (2003b). About the 2002-2003 Report Card. Retrieved June 20, 2006, from http://reportcard.gaosa.org/yr2003/k12/about.asp#D2

State of Georgia. (2005a). 2004-2005 Annual report cards on K-12 public schools. Retrieved August 15, 2006, from http://reportcard2005.gaosa.org/k12/Accountability.aspx?TestType=acct&ID=660:198

State of Georgia. (2005b). *Consolidated state application accountability workbook for state grants under Title IX, Part C, Section 9302 of the Elementary and Secondary Education Act (Public Law 107-110)* (Revised for 2004-05). Washington, D.C.: U.S. Department of Education, Office of Elementary and Secondary Education.

Sunderman, G. L., Kim, J. S., & Orfield, G. (Eds.). (2005). *NCLB meets school realities: Lessons from the field*. Thousand Oaks, CA: Corwin Press.

Sunderman, G. L., & Mickelsen, H. (2000). Implementing Title I schoolwide programs in a complex policy environment: Integrating standards and school reform in the Chicago Public Schools. *Journal of Negro Education, 69*, 361-374.

Swanson, C. B. (2003). *Keeping count and losing count: Calculating graduation rates for all students under NCLB accountability*. Washington, D.C.: The Urban Institute.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn and Bacon.

Theobald, N. D. (1990). An examination of the influence of personal, professional, and school district characteristics on public school teacher retention. *Economics of Education Review, 9*(3), 241-250.

Theobald, N. D., & Gritz, R. M. (1996). The effect of school district spending priorities on the exit paths of beginning teachers leaving the district. *Economics of Education Review, 15*(1), 11-22.

Towns, D. P., Cole-Henderson, B., & Serpell, Z. (2001). The journey to urban school success: Going the extra mile. *Journal of Negro Education, 70*, 4-18.

U.S. Department of Education. (2003, October 8). Prepared remarks for Secretary Rod Paige at the high school leadership summit. Retrieved July 18, 2006, from http://www.ed.gov/print/news/speeches/2003/10/10082003.html

U.S. Department of Education. (2004, April 1). Statement of Susan Sclafani, Assistant Secretary for Vocational and Adult Education: Fiscal year 2005 budget request for vocational and adult educational programs. Retrieved October 16, 2006, from http://www.ed.gov/news/speeches/2004/04/04012004c.html

Vail, K. (2004, November). Remaking high school. *American School Board Journal,* 14-19.

Varble, M. E. (1990). Smaller class size = higher achievement scores? *Contemporary Education, 62*(1), 38-45.

Vedder, R. (2003, Summer). Comparable worth. *Education Next, 3,* 14-19.

Vigdor, J. L. (2006). *The new promised land: Black-white convergence in the American South, 1960-2000* (Working paper 12143). Cambridge, MA: National Bureau of Economic Research.

Warner, M. (2004). Netting an elusive breed. *Education Next, 4*, 38-43.

Western, B., Schiraldi, V., & Ziedenberg, J. (2003). *Education & incarceration*. Washington, D.C.: Justice Policy Institute.

Zhao, Y. (2006). Are we fixing the wrong things? *Educational Leadership, 63*(8), 28-31.

APPENDICES

APPENDIX A: INSTITUTIONAL REVIEW BOARD

Auburn University

Auburn University, Alabama 36849

Office of Human Subjects Research
307 Samford Hall

Telephone: 334-844-5966
Fax: 334-844-4391
hsubjec@auburn.edu

August 18, 2006

MEMORANDUM TO: Nora Stevens
Educational Foundations, Leadership and Technology

PROTOCOL TITLE: "An Examination of the Relationship between Teacher Characteristics and Student Outcomes in Southeastern Urban High Schools"

IRB FILE NUMBER: 06-149 EX 0608

APPROVAL DATE: August 17, 2006
EXPIRATION DATE: August 16, 2007

The referenced protocol was approved "Exempt" from further review under 45 CFR 46.101 (b)(4) by IRB procedure on August 17, 2006. You should retain this letter in your files, along with a copy of the revised protocol and other pertinent information concerning your study. If you should anticipate a change in any of the procedures authorized in this protocol, you must request and receive IRB approval prior to implementation of any revision. Please reference the above IRB File Number in any correspondence regarding this project.

If you will be unable to file a Final Report on your project before August 16, 2007, you must submit a request for an extension of approval to the IRB no later than August 1, 2007. If your IRB authorization expires and/or you have not received written notice that a request for an extension has been approved prior to August 16, 2007, you must suspend the project immediately and contact the Office of Human Subjects Research for assistance.

A Final Report will be required to close your IRB project file.

If you have any questions concerning this Board action, please contact the Office of Human Subjects Research at 844-5966.

Sincerely,

Niki L. Johnson, JD, MBA, Director
Office of Human Subjects Research
Research Compliance Auburn University

cc: Dr. William Spencer
Dr. James Witte

APPENDIX B: OUTLIERS REMOVED FROM ANALYSES

Variable	School District	School	2004 Outlier Value (z-score)	2005 Outlier Value (z-score)
Graduation Rate	Atlanta	Therrell	.321 (-3.02)	
Dropout Rate	Cobb	Osborne		.098 (3.79)
Hispanic Enrollment	DeKalb	Cross Keys	.49 (4.83)	.54 (4.83)
	DeKalb	Meadowcreek	.35 (3.22)	.39 (3.27)
Male: Female Teachers	Atlanta	Mays	.980 (3.44)	
	Atlanta	South Atlanta	1.026 (3.80)	
African-American: Caucasian Teachers	Atlanta	Therrell	14.00 (4.20)	
	Atlanta	Douglass	12.63 (3.73)	25.00 (6.09)
Less than One Year Experience	Atlanta	Washington	.400 (3.84)	
Highly Qualified Teachers	DeKalb	Towers		.825 (-3.00)
	DeKalb	Stone Mountain	.804 (-4.33)	.825 (-3.00)