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THE RELATIONSHIP AMONG AFRICAN AMERICAN STUDENTS'
SAT REASONING TEST SCORES AND PARTICIPATION
IN ADVANCED PLACEMENT COURSES
IN ONE LARGE URBAN SCHOOL DISTRICT
IN A SOUTHERN STATE IN 2010-2011

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the School of Teaching, Learning, and Leadership
in the College of Education
at the University of Central Florida
Orlando, Florida

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2012

Major Professor: Rosemarye Taylor

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ABSTRACT

The purpose of this study was to provide insight into the relationship of Advanced Placement (AP) participation on closing the achievement gap between African American students and other ethnic/racial groups (White, Hispanic, and Asian) in a large urban school district in a southern state. Two major issues were considered: (a) the impact of high school student Advanced Placement participation on SAT Reasoning Test scores and (b) the correlation between increased high school student Advanced Placement participation and closing the academic achievement gap between African American and other ethnic/racial groups.

A significant difference was found to exist in the mean SAT Reasoning Test scores among different ethnic/racial groups during the 2010-2011 school year. African American student mean scores were significantly lower on the SAT Reasoning Test when compared to all ethnic/racial groups identified in this study, regardless of the independent variable (no AP participation, one AP course, two or more AP courses). However, the results did indicate that African American participation in AP courses was significantly lower than all other ethnic/racial groups in this school district. Additionally, information was provided for school leaders regarding the development of a systematic approach to creating equity and access for African American students to fully engage in a college going culture through participation in Advanced Placement courses.

To all my family and friends;
those who sacrificed for me to be here;
those who have been with me along the way;
and those who will follow me and continue the struggle!

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The temperament, tenacity, and resiliency I look for in the principals that I select to lead urban schools were all tested in me as I toiled over the road to complete this educational journey. Upon reflection of the journey, it is clear that I must acknowledge those that supported and motivated me to get to this place. Although this journey was challenging, the process is one that holds tremendous value.

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extraordinary heights in your own life. I look forward to teaching you about all of life's wonders and observing you as you take your place among the great men in our family!

TABLE OF CONTENTS

LIST OF TABLES	ix
CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS.....	1
Introduction.....	1
Theoretical Framework.....	6
Statement of the Problem.....	11
Purpose of the Study.....	12
Research Questions.....	13
Definition of Terms.....	14
Methodology.....	15
Population.....	15
Data.....	15
Procedures.....	16
Delimitations.....	16
Limitations.....	16
Assumptions.....	17
Significance of the Study.....	17
CHAPTER 2 LITERATURE REVIEW	18
Introduction.....	18
Historical Perspective	18
The Academic Achievement Gap.....	22
PSAT/NMSQT SAT and AP Relationship.....	31
Advantages to Increased AP Participation.....	35
Summary.....	41
CHAPTER 3 METHODOLOGY	44
Introduction.....	44
Statement of the Problem.....	44
Purpose of the Study.....	45
Population.....	45
Research Questions.....	46
Instrumentation.....	47
Data Collection.....	47
Data Analysis.....	48
Summary.....	48

CHAPTER 4 ANALYSIS OF DATA	50
Introduction.....	50
Purpose of the Study	50
Research Questions.....	51
Data and Demographics	52
Analysis of Data.....	53
Research Question 1	53
Research Question 2	56
Research Question 3	58
Ancillary Analysis	61
Summary.....	66
CHAPTER 5 SUMMARY, DISCUSSION, AND CONCLUSIONS	70
Introduction.....	70
Purpose of the Study	70
Research Questions.....	71
Data and Demographics	72
Summary of the Findings.....	73
Research Question 1	73
Research Question 2	74
Research Question 3	75
Discussion of Findings.....	76
Conclusions.....	79
Implications for Practice	81
Recommendations for Future Research	84
Summary.....	84
APPENDIX A FULTON COUNTY SCHOOLS RESEARCH APPROVAL LETTER	86
APPENDIX B INSTITUTIONAL REVIEW BOARD APPROVAL.....	88
APPENDIX B INSTITUTIONAL REVIEW BOARD APPROVAL.....	88
LIST OF REFERENCES	90

LIST OF TABLES

Table 1 Total SAT Analysis by Ethnicity for Students Who Took No Advanced Placement (AP) Course (N = 3,043).....	55
Table 2 Total SAT Analysis by Ethnicity for Students Who Took One Advanced Placement (AP) Course (N = 1,141).....	58
Table 3 Total SAT Analysis by Ethnicity for Students Who Took More Than One Advanced Placement (AP) Course (N = 2,522).....	60
Table 4 Demographic Characteristics for the 14 Target High Schools	62
Table 5 Mean SAT Performance by Socioeconomic Status and Number of Advanced Placement (AP) Courses Taken	63

CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

American public schools are unparalleled in their charge to educate all children who reside within their borders. The children who are students in American public schools represent a large variety of racial, ethnic, and cultural groups. Throughout its history, schools have been used as a tool to standardize the many ethnic and cultural groups represented in a common code of civility. According to Spring (2004),

The struggle over cultural domination in the United States began with the English invasion of North America in the sixteenth century and continues today in the debate over multiculturalism. One reason for the nineteenth-century development of public schools was to ensure the dominance of Anglo-American values that were being challenged by Irish immigration, Native Americans, and African Americans. Public schools became defenders of Anglo-American values with each new wave of immigrants. In the twentieth century, the culture wars were characterized by Americanization programs, civil rights movements demanding representation of minority cultures in public schools, and the multicultural debate. (p. 205)

As a whole, African American students have not been successful in American public schools when compared to the White majority. The struggle for a quality education for African Americans has been long and continuous. According to Chubb and Loveless (2002), the overall average African American student in the K-12 arena

performs academically about the same as the average White student in the lowest levels of that group. The academic achievement gap that exists between African American and White students has had a devastating effect on the ability of African American students to pursue higher education and ultimately acquire the necessary financial stability afforded to those classified as middle class. The debate over the lack of success of African American students in public schools has occurred on federal, state, and local levels of government.

As noted in a report by the National Task Force on Minority High Achievement (1999), the socioeconomic status of students, in general, was one of the most accurate predictors of student achievement. In addition, the report stated that “Students from low-income homes, or who have parents with little formal education, are much more likely to be low achievers and much less likely to be high achievers than students from high-income families” (National Task Force on Minority High Achievement, 1999, p. 8). The Oregon Department of Education (2005) stated, “This gap—which primarily affects poor, minority and disenfranchised youth—has existed for over 30 years, since it first was measured in the 1970’s” (p. 1).

There are a variety of theories related to why minority groups achieve at lower levels than their White classmates. According to Hall and Kennedy (2006), the achievement gap that exists between White and some minority groups in relation to standardized test scores has been watched for decades and still persists in American schools. Scores on standardized tests are one gauge used to measure the academic achievement levels of public school students. Thompson (2007) stated that “the same

message tends to surface: In general, the scores of Blacks and Latinos trail those of other groups, especially whites” (p. 22). According to Everson and Millsap (2004), in comparison to Whites, there is a greater chance that minority students will attend schools that are of a lower quality. These schools have fewer teacher and material resources, and have a greater chance of producing lower test scores and high school dropouts. The lack of recorded academic success by African American students on standardized tests and the gap that exists between African American and White students can cause educators to develop varying conclusions about the test scores. According to Thompson (2007), there are five prevailing factors many educators assume about the low performance on standardized tests of African American students: (a) African Americans are not as smart as Asian and White students; (b) social conditions, such as poverty, contribute to African American students not being successful on standardized tests; (c) the tests contain cultural biases; (d) African American students are lazy, apathetic, and unmotivated; and (e) African American parents do not care about their children’s education.

According to Hilliard, Perry, and Steele (2003), many public high schools have perpetually tracked African American students in classes with low levels of academic rigor. Participation in rigorous coursework in the public school causes students to cultivate the skills and academic experiences to have a greater chance to successfully navigate through the collegiate setting. The National Task Force on Minority High Achievement (1999) reported that students who graduated in the top of their classes had a greater likelihood of entering and graduating from college when compared to their average and below average classmates.

Burton, Whitman, Baraya, Cline, and Kim, (2002) stated, “The Advanced Placement Program (AP) is a program with high academic standards that introduces students to a college curriculum and allows them to earn college level credit while still in high school” (Burton et al., p. 1). Students of all racial groups participate in advanced placement classes in public high schools across the country. However, the College Board (2011) reported that though African American students comprised 14.6% of graduating seniors in U.S. public schools, they made up only 8.6% of the AP examinee population. In addition, the College Board (2011) reported that White students made up 60.5% of graduating seniors in U.S. public schools and 57.9% of the AP examinee population. According to Morgan and Klaric (2007), students who participated in one or more AP classes in high school had a greater opportunity to excel at the collegiate level. The environment in which AP curriculum is delivered is very beneficial to students who wish to pursue post secondary education. Klopfenstein (2004) stated that, “The academic culture provided by the AP Program can be particularly beneficial to minority students who may not be exposed to a culture of learning in other places” (p. 2). The College Board has determined AP exams are scored on a 1-5 scale. A score of a level 3 or higher on an AP exam signifies a passing score. According to Dougherty, Mellor, and Jian (2006), African American students who passed an AP exam had a 28% greater probability of graduating from college than African American students who did not take an AP course high school. African American students who took an AP class and did not obtain a level 3 or higher on the exam had a 22% greater probability of graduating from college than those African American students who did not take an AP class in high

school. African American students who participated in an AP class but did not sit for an AP exam had a 16% greater probability of graduating from college than those students who did not take AP courses in high school.

Departments of education, school districts, and colleges and universities have attempted to address the achievement gap that exists in schools. However, according to Codjoe (2006), “Studies rarely document and investigate the successful educational experiences of black students in North America” (Codjoe, p. 33). In every institution there are those African American students who are successful and achieve high levels of academic achievement. The characteristics of African American students who achieve high levels of success in public schools and more specifically in Advanced Placement courses and standardized tests are similar to those of their White classmates (Brideman & Wendler, 2004). According to Bridgeman and Wendler (2004), “Many minority students achieve high SAT scores, pursue challenging courses in high schools, take leadership roles in extracurricular activities, and go on to succeed in selective colleges” (p. 1).

Bridgeman and Wendler also reported,

It is impossible to tell from the current data whether succeeding in demanding courses leads to high SAT scores, or whether possessing the reading and math skills measured by the SAT causes students to do well in these courses, or whether some outside factor leads to success in both the school-based and test-based assessments. (p. 2)

The National Task Force on Minority Achievement (1999) reported that “it is undeniable that high academic achievement helps people gain access to high quality

advanced education and, subsequently, to top-notch career options” (p. 4). The question then is “How are successful African American students performing in the academic arena of standardized tests, Advanced Placement classes, and competitive college admissions requirements?” This study addressed the relationship of participation in Advanced Placement courses to Scholastic Achievement Test scores of African American high school students in the target school district during the 2010-2011 school year.

Theoretical Framework

Addressing the needs of every student subgroup was an edict of the No Child Left Behind Act of 2001. Failure to show improvement in all student subgroups may lead to the perception that a school is less than adequate, even failing. Through the barrage of reports and other forms of data, it is clear that there is an achievement gap that plagues the American public school system (Burriss & Welner, 2005). According to Evans (2005), “The achievement gap, the persistent disparity between the performance of African American and Hispanic students and that of White and Asian American students, is perhaps the most stubborn, perplexing issue confronting American schools today” (Evans p. 582).

The practice of tracking students into low and high level academic tracks may be a contributing factor to the achievement gap. According to Burriss and Welner (2005), “African American and Hispanic students are overrepresented in low-track classes and underrepresented in high-track classes” (p. 595).

In some of America's best public high schools, administrators and teachers play the gatekeeper role in relation to allowing access to Advanced Placement classes far too often. Traditionally, students have been selected for participation in these courses in part due to their teacher-pleasing behaviors and/or their academic ability. According to Evans (2005), "Teachers, they argue, are too often racist, even if subtly and unconsciously, and too often parochial in their pedagogy" p. 583). Evans (2005) further stated that, "teachers both expect too little of black and Hispanic students and give them too little outreach and support" (p. 583). Even with this harsh notion, it must be recognized that there are those teachers who create an environment that fosters the idea of community similar to that of an extended family. These teachers take a very personal approach to educating all young people. They have high expectations for every member of the class and address that expectation on a daily basis to students and parents (Love & Kruger, 2005).

According to the Ethnic NewsWatch (2003),

School Administrators and guidance counselors often believe that black students are less capable and less able to learn. They routinely track black students at an early age into vocational training or into a curriculum that is not college preparatory. Black students are rarely recommended for inclusion in gifted education, honors, or advanced placement programs. Once placed on the slow academic track, most black kids can never escape. By the time black students are juniors and seniors in high school, they are typically so far behind their White counterparts in the critical subject areas necessary to perform well on

standardized tests that they have little hope of ever matching the scores of Whites on the SAT. (p. 4)

Opening the doors to a more rigorous curriculum may be a factor toward closing the achievement gap. According to Evans (2005), “Closing the gap is widely seen as important not just for our education system but ultimately for our economy, our social stability, and our moral health as a nation” (p. 582).

Institutions all across the nation have African American students who excel academically despite the odds. Bridgeman and Wendler (2004) stated, “Many minority students achieve high SAT scores, pursue challenging courses in high schools, take leadership roles in extracurricular activities, and go on to succeed in selective colleges” (p. 1). Success on the SAT Reasoning Test is one measure institutions use to determine academic excellence. According to Chew (2006), “Among the record 1.4 million college-bound students in the class of 2004 who took the SAT, another record number of these SAT takers, 37 percent were minority” (p. 1). Even with this record number, Chew (2006) stated, “Overall, however, African Americans still score the lowest on the exam compared to other minority groups” (p. 1).

Creating a culture of equity and access may cause a change in the alarming reality facing African American students in relation to high level courses and low SAT scores. The Ethic NewsWatch (2003) reported, “A major reason for the SAT racial gap appears to be the fact that black students who take the SAT have not followed the same academic track as white students” (p. 1). Another factor to consider in regard to the poor

performance of African American students on the SAT is the outside-of-school preparation that is often required. According to Malveaux (2004),

Students have such test anxiety about their SAT performance that their parents spend hundreds, if not thousands of dollars, for preparation materials that range from the \$70 book to the \$1,000 coaching. What does this infusion of capital mean to students of color, especially those of modest means, whose parents can barely afford the \$70 handbook, not to mention \$1,000 coaching? It means that the racial economic gaps that already exist are being widened. It means that the youngsters that can't afford the SAT prep classes are likely to earn lower scores and to have access to a different set of colleges, than their income-enhanced competitors. (p. 2)

African American students who excel academically may have to face institutionalized discriminatory practices and beliefs by teachers, administrators, and peers that create obstacles in their academic path (Neblett, Phillip, Cogburn, & Sellers, 2006). These factors have been overcome by many African American students. The teachers who teach these students possess specific qualities that aid students in persevering. There are many teachers who are effective in teaching diverse populations. They create environments that are respectful of the cultural differences that exist in the classroom. In addition, they use those differences as a resource in the learning environment. These teachers also have high expectations for all students, and a strong sense of efficacy (Burton et al., 2002).

Nationally, African American students make up 14.6% of public school graduating seniors and 8.6% of graduating seniors taking an AP Exam in U.S. public schools (College Board, 2011). The evidence seems to support the notion that equity and access are not readily available to African American students. Solorzano (2004) stated,

Schools that serve urban, low income Latina/o and African American communities have low student numbers in AP courses; and even when Latina/o and African American students attend high schools with high numbers of students enrolled in AP courses, they are not equally represented in AP enrollment. We call this structure and process “Schools within School”. (p. 3)

The creation of a school culture that fosters equity and access requires work on the part of all stakeholders. The creation of a college-going culture is an avenue to helping African American students gain access to the advantages that rigorous course work provides students (Burton et al., 2002). According to Solorzano (2004), if the following six conditions are developed a school will be poised to create a college going culture:

A school culture supportive of advanced study and college going

Student participation in rigorous academic courses

Student access to qualified teachers

Student access to intensive academic support

The school developing a multicultural college-going identity

The school connects with parents and the community around advanced study.

(p. 9)

Statement of the Problem

In a particular southern state, African American students made up 34.8% of the overall student population and 24% of the high school Advanced Placement examinee population (College Board, 2011). Among the 24% AP examinee population of African American graduating seniors, only 11.6% scored a 3 or higher on an AP examination at any point in their high school careers. African American students in a particular southern state comprised 32% of college bound seniors taking the SAT Reasoning Test in 2011. The mean score in critical reading for 2011 college bound African American seniors in this particular southern state was 428; in mathematics, the mean score was 424; and on the writing examination, the mean score was 417. These scores were 91 points below those of White students in reading, 94 points lower in mathematics, and 87 points lower in writing during the same year (College Board, 2011). The problem that was addressed in this study was the under representation of African American students in rigorous courses and the academic achievement gap that existed in a particular district in a southern state.

The lack of rigorous course work the majority of African American students attempt during their high school years translates into lower test scores and fewer opportunities to compete for scholarships and positions at many four-year postsecondary institutions. Morgan and Klaric (2007) stated that “students who earned a 3 or better on one or more AP exams were more likely to graduate from college in five years or less compared to students who did not take an AP course” (p. 1). According to Burton et al. (2002). Participation in rigorous coursework increases students’ opportunities to earn

college credit in high school. This level of coursework also improves students' confidence in their ability to succeed and improves skills for succeeding in college. This participation holds true for all students who participate in Advanced Placement courses. It holds even greater significance for those students who come from families without experience in college attendance, without a book culture at home, and for those who are among a peer group that does not value an education as a means to a promising future. Burton et al. (2002) also stated, "Minority students who are not educationally or economically disadvantaged may encounter stereotyped expectations and treatment, which are themselves barriers" (p. 1).

Purpose of the Study

There is an under representation of African American public school students enrolled in Advanced Placement (AP) courses (College Board, 2011). On average, African American public school students score lower than any other ethnic group in relation to the SAT Reasoning Test (SAT) (College Board, 2011). Participation in Advanced Placement classes among African American public high school students in a target school district, in a particular southern state, was studied in relation to scores on the SAT Reasoning Test among African American public high school students enrolled in the target school district. Data were requested from the target school district's office of accountability for the 2010-2011 school year. The purpose of this study was to determine the extent to which AP participation among African American students impacted the academic achievement gap in the target school district when comparing combined SAT

Reasoning Test scores to that of other racial/ethnic groups (White, Hispanic, and Asian). As the target school district develops strategies to address the achievement gap and student acceptance into post secondary education, a strategic approach could be developed to include greater access to A.P. courses if the relationship warrants it.

Research Questions

The following research questions guided this study:

1. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?
2. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?
3. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic,

Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

Definition of Terms

For the purpose of this study, commonly used terms are defined as follows:

Achievement Gap: A gap in academic achievement persists between minority and disadvantaged students and their White counterparts.

Advanced Placement Courses (AP): A program comprised of 35 courses in 20 subject areas. Each course is developed by a committee composed of college faculty and AP teachers, and covers the breadth of information, skills, and assignments found in the corresponding college course.

African American: A black American of African descent.

Grade Point Average (GPA): The average grade earned by a student calculated by dividing the grade points earned by the number of credits attempted.

Preliminary SAT/National Merit Scholarship Qualifying Test (PSAT/NMSQT): College Board and the National Merit Scholarship Corporation co-sponsored standardized test that provides first hand practice for the SAT Reasoning Test. The test also enters students in competition for scholarships, and assesses student's skills necessary for college level work.

SAT Reasoning Test (SAT): College Board standardized test that measures critical reading, mathematics, and writing skills. The scores are used by colleges and universities as part of criteria for admissions requirements.

Methodology

Population

The population for this study was 11th- and 12th-grade African American students enrolled in comprehensive high schools in a large urban district in a southern state during the 2010-2011 academic year. During the 2010-2011 year, the district had 17 high schools that were divided among four distinct areas. Areas 1, 2, 3, and 4. The sample included students from 14 of the 17 high schools in each of the four named zones. The three high schools not selected were identified as alternative or selective enrollment high schools. In addition, these schools did not offer AP courses for students during the 2010-2011 school year.

Data

Data for the 2010-2011 academic year were obtained from the school district's Instructional Accountability Department. The data included all 11th- and 12th-grade students enrolled in comprehensive high schools in the district. The data identified students by school, student number, gender, and race/ethnicity. In addition, the data included the following information: (a) 2010-2011 high school grade level; (b) 2010-2011 socioeconomic designation; (c) 2010-2011 Advanced Placement test scores; (d)

2010-2011 SAT mathematics scores; (e) 2010-2011 SAT critical reading scores, and (f) 2010-2011 SAT writing scores.

Procedures

The data included all 11th- and 12th-grade African American students from comprehensive high schools in the target school district. It included the information stated in the data section. These data were imported into the Statistical Package for the Social Sciences, Version 18 (SPSS) computer software for analysis. Analysis of Variance (ANOVA) was performed to compare data of African American students with that for all other demographic groups.

Delimitations

The study was delimited to comprehensive public high schools in the target school district during the 2010-2011 school year. The study was delimited to African American 11th- and 12th-grade students in attendance at the comprehensive high schools during the 2010-2011 academic year. The study focused on factors related to African American students only and not those of other ethnic and racial groups within a school or program.

Limitations

The results of the study were limited by the accuracy of the data obtained from the district's Instructional Accountability Department as it related to the SAT scores of students and student AP test scores. The study was also limited by the accuracy of the

data obtained from College Board as it related to the SAT scores and Advanced Placement scores. The study was further limited by students' and parents' self reports of ethnicity and economic status. This information could not be verified.

Assumptions

Assumptions in this study included the following: (a) data acquired from the target school districts' Instructional Accountability Department were accurate; (b) data acquired from College Board about SAT scores were accurate; (c) data acquired from target school district's Instructional Accountability Department and College Board provided valid measures; (d) the data acquired, measured, and analyzed regarding 11th- and 12th-grade African American students were important to the district and educators nationally.

Significance of the Study

This study provided for the collection and analysis of data that reported relationships and trends of African American students who participated in rigorous classes in the high schools in the target district. It increased the body of research on successful African American high school students and highlighted Advanced Placement courses as a strategy used with this population in closing the academic achievement gap. School districts and administrators may be able to use this information when strategically planning to increase equity and access as it relates to Advanced Placement courses.

CHAPTER 2 LITERATURE REVIEW

Introduction

This chapter presents key reasons for investigating the relationship between SAT Reasoning Test (SAT) scores and participation in Advanced Placement (AP) courses among African American students in a particular large urban school district. In identifying the literature that was reviewed, a number of books and journals from the researchers' personal library were selected. The majority of literature obtained and reviewed for this study was gathered with the use of tools made available through The University of Central Florida library. EBSCO host, ERIC database, Dissertation and Theses and Abstracts, and other logical searches were primary sources. Online searches of journals and prior dissertations were conducted using descriptors such as achievement gap, African American student achievement, Advanced Placement participation, SAT participation/results, and academic rigor and college readiness/success.

This chapter has been organized to include a discussion of relevant literature reviewed in preparation for this study. The following areas of research are discussed: (a) historical perspective, (b) the academic achievement gap, (c) the examination of the PSAT/NMSQT SAT and AP relationship, (d) advantages to increased AP participation.

Historical Perspective

At the turn of the 20th century, a system of academic units required for college admissions was developed by The Carnegie Foundation for the Advancement of Teaching (Carnegie, 1971). The development of the system that required students to

attend elementary and secondary school for 12 years prior to college admission took on several forms during the early part of the 20th century.

In 1951, the transition from high school to college became a focus of the Ford Foundation; and the Fund for the Advancement of Education was created (Whitlock, 1978). The Fund for the Advancement of Education (1957) reported that certain high school students were prepared for college level course work. Financial support was provided for over 400 high school juniors to enter college two years early; the success of these students in the collegiate arena supported the establishment of the fund.

Mollison (2006) noted that in 1956 the Educational Testing Service for the College Board conducted the first Advanced Placement (AP) examinations. Approximately 1200 students from 104 different American high schools took the examinations in 11 different subject areas. The early test takers were predominately male students who were receiving their education from elite public high schools and private preparatory schools. According to Atkinson and Geiser (2009),

AP exams were originally intended for use in college placement: Colleges and Universities used AP exam scores mainly to award course credits, allowing high achieving students to place out of introductory courses and move directly into more advanced college work. (p. 9)

Mollison (2006) wrote the following:

The idea for the program emerged from the elite colleges, prep schools, and high schools in two collaborations. One was initiated by Kenyon College and the other by Harvard, Princeton, and Yale as a way of accelerating and fortifying the

education of the nation's future leaders in anticipation of cold war national security demands. (p. 34)

The 1957 launch of the Russian a man-made satellite, *Sputnik*, caused concern among Americans. The public educational system was heavily scrutinized by the media, legislators, and the general public who struggled with the belief that the Russians had a superior educational system in light of their ability to beat Americans into space (Bracey, 2002).

In 1965, the Elementary and Secondary Education Act (ESEA) was passed by the U.S. Congress. According to Kantor (1991), ESEA was to apply pressure to states so that they would begin reforming education systems and take recommendations from the federal government through specific funding. Programs aimed at higher education opportunities for minority and low-income students were created as a result of ESEA. Exposure and access to college-level courses through programs such as AP were identified as an option for these students.

With the 1983 release of *A Nation at Risk* by The National Commission on Excellence in Education, once again, the attention of the public was focused on the quality of the public education system. The paper highlighted several indicators of risk: declining SAT scores, steady decline in science, mathematics, and reading scores on national assessments, and declining standardized test scores and literacy rates. American students had not placed first or second in 19 tests when compared to other industrialized nations and were last seven times (*A Nation at Risk*, 2001). As a result of this report, the College Board AP Program gained recognition as a program that could help students gain

the necessary skills and knowledge to be successful in college. More than 50 years later, AP had grown to provide a rigorous educational experience for over 1.8 million students in 35 different course offerings (College Board, 2011). Mollison (2006) noted that even with the tremendous growth of AP the program essentials remained the same. Mollison stated, “High school students take college level courses, taught by teachers in their schools, and then take exams designed by the College Board to show that they have mastered the subject at college level proficiency” (p. 34). Atkinson and Geiser (2009) stated, “Over time, however, AP has come to play an increasingly important role in admissions at selective institutions, and its role in admissions is now arguably more important than its placement function” (p. 9). AP exams are scored from 1 to 5 with 1 being the lowest score and 5 being the highest; students only get a passing score for a 3 or higher (College Board, 2010).

According to Atkinson and Geiser, (2009), over the last century the use of standardized testing for college admissions has evolved and seen tremendous growth in its significance. Atkinson and Geiser (2009) stated, “Fewer than 1,000 examinees sat for the first ‘College Boards’ in 1901” (p. 1). Lemann (1999) noted that in 1926 an alternative to the College Boards was introduced. The Scholastic Aptitude Test (SAT) differed from older tests in that instead of assessing student knowledge in college preparatory courses, it measured aptitude or general ability for learning. Atkinson and Geiser (2009) stated, “The SAT grew out of the experience with IQ testing during the First World War, when two million men were tested and assigned an IQ based on the results” (p. 4). Atkinson and Geiser wrote the following:

The framers of those tests assumed that intelligence was a unitary, inherited attribute, that it was not subject to change over a lifetime, that it could be measured in a single number, and that individuals could be ranked and assigned their place in society accordingly. Although the SAT was more sophisticated from a psychometric standpoint, it evolved from the same questionable assumptions about human talent and potential. (p. 4)

Since its development, the SAT has evolved significantly. What the test intended to measure and its name have changed. Atkinson and Geiser (2009) noted that in 1990 the College Board changed the name of the test to the “Scholastic Assessment Test” in an effort to sever the connection to the IQ tradition. Atkinson and Geiser further noted that six years later the name was dropped altogether so that the initials would not stand for anything. Atkinson and Geiser (2009) stated, “Official descriptions of what the test is supposed to measure have also evolved over the years from ‘aptitude’ to ‘generalized reasoning ability’ and now ‘critical thinking’” (p. 5). At the time of the present study, the official title was the SAT Reasoning Test.

The Academic Achievement Gap

In response to racial, ethnic, and socioeconomic inequalities in education, the federal government reauthorized the 1965 Elementary and Secondary Act (ESEA) and passed the No Child Left Behind Act of 2001 (NCLB). The policy further positioned public schools to make student achievement and closing the academic achievement gap in a systematic way, a priority for educators (Rowley & Wright, 2011).

The New America Foundation (2011) reported the following:

Since its initial passage in 1965, ESEA has been reauthorized seven times, most recently in January 2002 as the No Child Left Behind Act. Each reauthorization has brought changes to the program, but its central goal of improving the educational opportunities for children from lower income families remains. The 1994 reauthorization, the Improving America's Schools Act, put in place key standards and accountability elements for states and local school districts that receive funding under the law. These accountability provisions were further developed in the most recent reauthorization, the No Child Left Behind Act. (p. 1)

According to the National Task Force on Minority High Achievement (1999), African American and other minority groups achieve lower test scores and grades than Asians and Whites as early as second or third grade. This trend often continues throughout the entire K-12 experience (Murphy, 2009). The differences in the quality of educational experiences that contribute to the achievement gap ultimately impact the quality of life of students in their adult years.

The National Task Force on Minority High Achievement (1999) reported, "Educationally underrepresented minorities have much less opportunity to pursue well paying professional careers and are much more likely to hold low-wage jobs that provide few chances for advancement" (p. 1). America's increasing diversity, coupled with the educational achievement gap, can potentially lead to greater inequality and social conflict. Increasing the success levels of minority students allows for greater access and

integration into society's institutions and at leadership levels in the work place (National Task Force on Minority High Achievement, 1999).

Both the SAT and AP reflect a broader issue related to the academic achievement gap. Gaston Caperton, President of the College Board, explained.

The score gaps for different racial, ethnic and socioeconomic groups that we see on the SAT also appear on virtually every measure of achievement, including other standardized tests and classroom grades, and they show up as early as fourth grade. (Roach, 2001)

Caperton further explained that these differences are a powerful illustration of a persistent social problem in the nation: inequitable access to high-quality education.

According to the College Board, (2011) approximately 1.6 million students who graduated from high school in 2010 took the SAT at some point during their high school career. Recent SAT score trends show that there has continued to be academic disparity between African American students and White students at both the national and local levels. Though ethnic diversity in SAT test takers has increased, with more African American students taking the SAT now than ever before (9% in 2000, 12% in 2009, and 13% in 2011), they have continued to receive lower scores (College Board, 2011). In 2011, African American students underperformed as compared to their White peers (428 vs. 528 in Critical Reading, 427 vs. 535 in Mathematics, and 417 vs. 516 in Writing). A breakdown of SAT scores for 2011 shows a similar minority achievement gap by gender as well, with African American males underperforming on all three SAT sections compared to their White peers (425 vs. 531 in Critical Reading, 435 vs. 552 in

Mathematics, and 405 vs. 507 in Writing). African American females similarly underperformed as compared to their White peers (430 vs. 526 in Critical Reading, 422 vs. 520 in Mathematics, and 426 vs. 524 in Writing).

In Georgia, 2011 student SAT means were below the national average for all three sections (485 vs. 497 in Critical Reading, 487 vs. 514 in Mathematics, and 473 vs. 489 in Writing). African American students comprised 32% of all Georgia SAT test takers in 2011, with scores of 428 for Critical Reading, 424 for Mathematics, and 417 for Writing. White students comprised 52% of all GA SAT test takers, with scores of 519 for Critical Reading, 518 for Mathematics, and 504 for Writing. A breakdown of Georgia SAT scores for 2011 revealed a similar trend by gender as well, with African American males underperforming on all three SAT sections compared to their White peers (425 vs. 522 in Critical Reading, 431 vs. 535 in Mathematics, and 405 vs. 495 in Writing). African American females similarly underperformed as compared to their White peers (430 vs. 517 in Critical Reading, 418 vs. 524 in Mathematics, and 427 vs. 513 in Writing).

Most students can benefit from the rigors of AP courses. However, in 2011, the percentage of White student enrollment in AP courses exceeded that of African American students who were also enrolled in AP courses (College Board, 2011). This opportunity gap happens for a variety of reasons: (a) African American students are often not selected or encouraged by their teachers and other staff to participate in AP courses, (b) families of African American students are often not aware of the opportunities the program affords and in turn do not encourage their children to participate, and (c) parents of African American students do not formally advocate at the school level for their child

to participate in AP courses (Taliaferro & DeCuir-Gumby, 2007). The accessibility of AP courses and examinations is a major challenge in predominately African American schools. This issue is also significant in small schools, rural schools, and other schools with very limited recourses (College Board, 2011). Taliaferro and DeCuir-Gumby stated,

However, when African American students are enrolled in AP courses, they are more likely to experience feelings of alienation because they are not adequately represented in the curriculum and are often one of the few African American students in the classroom. (p. 165)

All students require some form of support in order for them to be successful in the academic arena. A myriad of support systems are often put in place for students who are not meeting standards. Taliaferro & DeCuir-Gunby (2007) stated, “In order for African American students to participate and succeed in AP courses, they need the support of both their parents and their teachers” (p. 176).

Clear parental expectations and values in regard to education often dictate how students engage in the educational process. Parents who place a high premium on the rewards of an education often create the foundation for high academic achievement to take place. Most often the parents who display these high expectations have a better chance of influencing their children if they themselves have achieved academically (Rowley & Wright, 2011). According to Taliaferro and DeCuir-Gunby (2007), African American parents are often not as visible in schools as White parents. This does not indicate that African American parents do not care or are not involved in their children’s education. Burton et al. (2002) found that underachieving students can be from any racial

group or socioeconomic level; but many of these students belong to minority groups and/or poor families. These authors wrote that with such a large percentage of African American families living in poverty, parents place more of an emphasis on finding work to support the family instead of emphasizing an education. Taliaferro and DeCuir-Gunby noted the following:

It is then assumed that they are not concerned about their children's education.

Because of this, African American parents are not as informed about problems in schools, including issues surrounding the African American students' access to AP programs. (p. 167)

McCall (1999) found that the intervention of a sincere and dedicated educator can counteract the lack of parental involvement for underachieving students. According to Rowley and Wright (2011), "Teachers can have a positive effect on students by encouraging perceptions that the teacher is caring, fair, and the quality of instruction is good" (p. 94). Taliaferro and DeCuir-Gunby (2008) found that high expectations and support from teachers can foster a sense of connectedness among students which can lead to increased effort and academic success. They also reported, "African American students need positive teacher/student relationships. Such relationships are essential to helping African American students feel as though they belong, particularly in the AP classroom" (p. 168). Rowley and Wright (2011) stated, "However, if a teacher perceives a student to be inefficient in the dominant culture due to atypical behaviors or codes of speech, or to be of average intelligence, there is a higher possibility of academic failure" (p. 94). Lower expectations of African American students often manifest themselves in

the underrepresentation of African American students in AP programs (Taliaferro & DeCuir-Gunby, 2008). Rowley and Wright further noted, “A teacher’s or administrator’s expectations become directly related to a student’s educational expectations” (p. 94). Reporting on Villegas’ 1992 teacher competencies as cited in Burton et al.(2002), the following are needed to effectively educate diverse student populations:

- To have an attitude of respect for cultural differences, a belief that all students are capable of learning, and a sense of efficacy
- To be familiar with the cultural resources their students bring to class, and aware of the culture of their own classrooms
- To implement an enriched curriculum for all students
- To build bridges between the content and the process of instruction and the cultural backgrounds of students in their classes
- To be aware of cultural differences when evaluating students. (p. 3)

In addition, a school’s environment, structure, and a strategic focus on reaching the underrepresented population, play a pivotal role in removing barriers and granting access (Flores & Gomez, 2011). The forming of positive relationships enables students to have a connection with the larger school setting. Taliaferro and DeCuir-Gunby (2008) observed that “Humans have a desire to form positive personal relationships with others. Not forming positive relationships or belonging can contribute negatively including emotional distress” (p. 168). Students and parents in underrepresented minority groups often lack a connection to the institution. Schools that have increased access to AP

courses and have begun to see some measure of success have similar characteristics in their efforts and structure. Flores and Gomes reported that:

- Schools must recruit students not in AP classes
- Middle school outreach for incoming Honor students
- A student-centered master schedule that supports smaller AP classes
- Teachers who have higher-and lower-level classes in order to groom students over time
- Rigorous prerequisites to prepare students for future AP classes
- Advertising the AP program via the website, announcements, and meetings
- Regularly informing students and parents of AP class benefits
- Using a “No Drop” AP classes policy along with a requirement for all students to take the May AP exam
- Identifying motivated teachers and provide them with quality training
- Developing a professional learning community in the AP program and across subject areas
- Having a school wide focus on writing
- Training AP teachers on scaffolding techniques
- Visiting other schools to refine and develop best practices
- Creating goals and evaluating the AP program yearly
- Redesigning the role from AP coordinator to AP advocate
- Organizing two or more AP parent meetings per year
- Collecting student input via an AP Student Council

- Implementing an after-school and/or Saturday AP tutoring session. (p. 77)

At times, schools have used AP examination grades for course placement. The validity of this practice has been evaluated in several studies (Burnham & Hewitt, 1971; Dodd, Fitzpatrick, De Ayala, & Jennings, 2002; Morgan & Crone, 1993; Morgan & Ramist, 1998). Some researchers have suggested that:

The placement of only the highest ability students into rigorous courses is without merit and that a much larger proportion of students are likely to be successful in many AP courses if identified early and given the opportunity and support needed to succeed. (Ewing, Camara, & Millsap, 2006, p. 23)

Nationally, 28.3% of 2010 seniors took an AP examination at some point during high school, a slight increase from previous years. Of this percentage, 16.9% scored a 3 or better on the exam (College Board, 2011). Nationally, African American students were underrepresented in AP with only 8.6% of seniors having taken the examination of a total of 14.6% graduating seniors (College Board, 2011). The performance of African American students on AP examinations is still far behind their White peers, even with an increase in African American students taking the examinations. The increased numbers of African American students taking AP examinations has increased the scoring gap between African American and White students (Editors, 2011). In 2010, the mean AP score for White students was 2.95. The mean AP score for African American students was 1.88 (College Board, 2011), indicating that the average African American score was a full letter grade below the average White score. In 2010, of the nearly 1.4 million AP examinations taken by White students (for all grades), a qualifying grade of 3 or above

was achieved on 62% of the tests, but African American students received qualifying grades on only 25% of their completed AP examinations. Whites were more than twice as likely as African American students to receive a qualifying grade (Editors, 2011). At the very highest level of AP test scores, the academic achievement scoring gap was even greater. Some 14.7% of White test-takers received a score of 5, equivalent to a college grade of A, but only 2.9% of African American test takers received a score of 5 (Editors, 2011).

In Georgia, African American students made up 34.8% of the overall graduating student population and only 24% of the high school Advanced Placement examinee population (College Board, 2011). Among the 24% Advanced Placement examinee population of graduating seniors, even fewer scored a 3 or higher on an AP exam at any point in their high school career (11.6%).

In sum, African American students are both nationally and in Georgia, underrepresented within the AP program. Furthermore, as is the case of the SAT Reasoning Test, the AP examination results show that African American students are not as prepared as White students for these tests at both the national and state levels.

PSAT/NMSQT SAT and AP Relationship

Although many factors, i.e., student preparation, student motivation, and parental support, have influenced students' AP examination scores, researchers have supported the linkage between Preliminary SAT/National Merit scholarship Qualifying Test (PSAT) scores being predictive of AP potential (Burton et al., 2002; College Board, 2004; Von

Secker, 2005). According to Vaughn (2010), “The PSAT measures skill in verbal reasoning, critical reading, math problem solving, and writing. These are skills developed over many years, both in and out of school” (p. 396). Camara (1997) wrote the following:

PSAT/NMSQT information has been used by high school counselors to assist in advising students in college planning, high school course selection, and for scholarship awards. Information from the PSAT/NMSQT can also be very useful for high schools in identifying additional students who may be successful in Advanced Placement courses, and assisting schools in determining whether to offer additional Advanced Placement courses. (p. 1)

According to Flores and Gomez (2011),

One student population that is often neglected, to the detriment of education in general, is the group of students who perform adequately or well in regular academic courses yet are never invited or encouraged to challenge themselves with AP coursework. (p. 66)

The College Board recommends using PSAT scores to recognize Honors/AP potential among students who may be overlooked through other identification procedures such as teacher recommendations, course grades, or self-nomination (Burton et al., 2002; College Board 2004). However, Camara (1997) reported, “PSAT/NMSQT scores can supplement existing procedure used by schools to identify additional students who may be successful in specific AP courses, but should never be used as the sole, or even the primary, indicator” (p. 2). Vaughn (2010) stated, “Identifying students for the AP

program can, in turn, play an important role in improving the opportunities for underrepresented minority students and the overall academic achievement of all students” (p. 97). Using PSAT scores to identify students to participate in AP courses should not be done just for the sake of expanding the AP program (Flores & Gomez, 2011). Flores and Gomez noted that the inclusion of these students is to allow access to AP resources and strategies “for these students to succeed in a more rigorous academic experience” (p. 66).

In many AP courses, about one third of students with PSAT scores below the national averages have Honors/AP potential and are able to attain AP exam scores of 3 or higher (Camara, 1997; Camara & Millsap, 1998). Identifying Honors/AP potential is important because, even among students whose PSAT scores are the same, it has been found that those who complete Honors or AP courses leave high school better prepared for college or the workplace than those who remain in regular-level courses (Atanda, 1999; Camara, 2003; Von Secker, 2005). Vaughn (2010) reported the following:

The most important reasons for taking the PSAT are student centered. Students receive feedback on strengths and weaknesses on skills necessary for college study and test results allow them to then focus preparations on those areas that could most benefit from additional study or practice. Results from the PSAT also allow students to see how their performance on an admissions test might compare with that of others applying to college and to enter the competition for scholarships from the National Merit Scholarship Corporation. (p. 397)

Other researchers have supported linking the PSAT to AP (Clement, DeRose, &

Sutton, 2005) and reported on two studies in Broward County (Fla.) Public Schools. The first study examined the utility of the PSAT for predicting future success on college entrance examinations and in AP courses. The second examined the relationship between PSAT scores and subsequent year AP enrollment status for 10th-grade students. Results from Study 1 revealed that the PSAT was a stronger predictor of AP examination scores than were the state-mandated assessments. Findings from the second study revealed an increasing trend in the proportion of 10th-grade PSAT students enrolled in an AP course during the following school year (Clement et al., 2005). Similarly, Ewing et al. (2006) reported the following:

Of the more than 4.2 million students who completed the PSAT/NMSQT in 2000 and 2001 as sophomores or juniors, 24% took one or more AP Examinations 19 months later. Results of this study showed that PSAT/NMSQT scores of sophomores and juniors were moderately to highly correlated with subsequent grades on 29 AP Examinations; with a median correlation of .57, and an average correlation of .56. (p. 2)

The relationship between PSAT/NMSQT scores and AP Examination grades remains strong and consistent across sophomore and junior PSAT/NMSQT test takers, gender, and ethnic groups (Ewing et al., 2006).

Additionally, the SAT has been found to be linked to AP scores. College Board research showed that students who took demanding courses such as pre-calculus, calculus, and physics attained significantly higher average SAT scores than those students who did not take rigorous courses--regardless of the students' racial or ethnic

groups (Roach, 2001). More specifically, Kirabo (2007) found that there was a 30% increase in the number of students who scored an 1100 on the SAT among students who participated in AP courses. Kirabo (2007) noted the following:

These findings are suggestive of some reasons we observe suboptimal educational choices in low-income, low-performing schools and the fact that the AP exam participation response was much larger for black and Hispanic students suggests that they had low initial participation rates because (a) peer norms did not promote taking AP courses, (b) students from these populations were less likely to have good information on how to negotiate the college application process, and (c) student expectations of likelihood of success may have been low due to sub-optimal teacher encouragement. (p.29)

According to Adams (2012), persuading parents, students, and teachers that participation in AP courses is worthwhile, and that there is value for students in the experience regardless of the exam score, is a tremendous challenge.

Advantages to Increased AP Participation

Bob Wise, the president of the Alliance for Excellent Education and former governor of West Virginia, stated the following:

There is some progress in the fact that more students are taking AP. AP is a proxy for increased rigor academically and for college and career readiness. The good news is that student demand for rigor is continuing to increase and student performance is slowly increasing. Some of it is handicapped by the availability

and the confidence level of how well they'd do. Should they take an AP course?

Should they take that risk? (Adams, 2012, p. 18)

According to Vaughn (2010), the development of a school culture focused on equity and access to AP courses for all students can assist in “reforming and revitalizing” high school education (p. 403). Many positive outcomes have been associated with AP enrollment and examination. According to Powell (1996), “AP courses have probably brought more challenging academic experiences to more students than any other single reform in recent American high school history” (p. 243). Vaughn reported the following:

The College Board asserts that work done in AP courses helps students develop skills and study habits that will be vital in higher education. In AP courses, students learn to analyze problems effectively, improve writing skills, and prepare for exams. Students who take AP courses are more knowledgeable about demands for college and university work. (p. 395)

Burris and Wellner (2005) posited that increasing the percentage of African American students in AP courses can assist in closing the academic achievement gap. Some researchers have suggested that AP fosters college persistence and success (Adelman, 1999; Dougherty et al., 2006; Geiser & Santelices, 2004; Keng & Dodd, 2008; Mattern, Shaw, & Xiong, 2009; Morgan & Ramist, 1998; Murphy & Dodd, 2009). AP has also been found to offer opportunities for traditionally underserved students to succeed (Hargrove, Godin, & Dodd, 2008; Morgan & Klaric, 2007). Vaughn (2010) reported the following:

A study of students in the City of Baltimore published by the Abell Foundation (2007) notes that AP boosts chances of success for all groups of students and that AP, in conjunction with other programs such as IB, Dual Enrollment, and Tech Prep offer promise for urban students. (p. 398)

The majority of studies centering on AP have focused on college persistence and success. In his early research, Adelman (1999) found that the academic intensity of AP as well as other rigorous coursework of a student's high school academic track could lead to college success. Some researchers have suggested that AP helps increase student achievement in particular subjects, namely science and mathematics (Gonzalez et al., 2001; Tai et al., 2010). Morgan and Ramist (1998), in their study, found that there was a difference in scores of students who passed Calculus I in college; students who scored a 3 on Calculus AB in high school out performed students who took Calculus I in College. Dodd et al. (2002) reported the following:

The validity of AP grades of 3 and compared AP and non-AP student groups. The study found that AP students who were exempted from the introductory course in calculus, biology, and English earned the same or higher grades in the subsequent course, took as many or more class hours in the subject area, and had the same or higher grades in additional courses in the subject area compared to the group of non-AP students of similar academic ability. (p. 4)

Similar results were found in more recent studies examining the link between AP and college success. Keng and Dodd (2007) found that students who placed out of introductory college courses as a result of successful AP examination grades earned

higher college GPAs and took more credit hours in the subject area of their examination than non-AP students. Murphy and Dodd (2009) reanalyzed data from Keng and Dodd's 2007 study and expanded their original work by matching all of the AP and non-AP comparison groups included in the analysis in terms of SAT scores and high school rank across the four entering freshmen cohorts (1998-2002) at the University of Texas at Austin. The study compared AP and non-AP groups across 10 high-volume AP examinations on a number of college outcomes including first-year credit hours and GPA, subject or subject area credit hours and GPA, overall college credit hours and GPA, and subsequent course grade. Results showed that for each of the 10 AP examinations studied, AP students who earned college credit as a result of their AP examination score consistently outperformed non-AP students on most outcomes (Murphy & Dodd, 2009). Mattern et al. (2009) reported the following:

For each AP Exam studied, students were divided into three groups according to their AP Exam performance (no AP Exam taken, score of 1 or 2, and a score of 3 or higher). Subsequent college success was measured by students' first-year college GPA (FYGPA), retention to the second year, and institutional selectivity. Results indicated that, even after controlling for students' SAT scores and high school GPA as measures of prior academic performance, students with an AP score of 3 or higher outperformed the other two groups. Additionally, students with an AP score of 1 or 2 tended to outperform students with no AP scores on most outcomes. (p. 1)

Keng and Dodd (2008) examined the performance of students in AP compared to non-AP students on a number of college outcome measures including first-year credit hours and GPA, subject or subject area credit hours and GPA, overall college credit hours and GPA, and subsequent course grade. Results showed that for each of the 10 AP examinations studied, AP students who earned college credit as a result of their AP examination score consistently outperformed non-AP students on most outcomes.

Several researchers have suggested AP offers opportunities for traditionally underserved students. Hargrove et al. (2008) examined performance for five cohorts of 1998-2002 Texas public high school graduates through their first year and 1998-2001 cohorts through their fourth year of Texas public higher education. For their study, student performance on college outcomes included: first- and fourth-year GPAs; first- and fourth-year credit hours earned; and four-year graduation status. Outcomes were compared across students who varied by three types of AP (course only, examination only, and both course and examination) and two types of non-AP (dual enrollment only and other course only--standard high school courses) experiences in high school. SAT scores and free or reduced- price lunch participation status were used to account for background differences among students. The researchers found that students in the AP course and examination group significantly outperformed all other groups on most college outcomes (Hargrove et al., 2008). Morgan and Klaric (2007) analyzed the academic transcripts of students who did have a recorded score on an AP examination with those students who did not have a recorded score. In most cases, students with examination scores at or above level 3 performed better academically in intermediate

college courses than did non AP students who needed introductory courses at the university. Results also showed that AP students who took at least one AP examination were more likely to graduate from college at their original institution in five years or less, controlling for SAT scores, compared to non-AP students. Morgan and Klaric (2007) found this was consistent across the four racial and ethnic groups examined (African American, Asian, Hispanic and White). In addition, they found AP students were more likely to graduate with a major in a discipline closely related to their AP examination compared to non-AP students. Specifically, they found female and underrepresented students who took AP examinations in mathematics and science were more likely to major in STEM fields, e.g., Calculus and Biology, compared to non-AP students. More importantly, the study showed that AP was correlated with diversifying the pool of students majoring in mathematics and science which, in turn, could lead to more diversity among those who are employed in these fields.

In this same vein, other researchers have indicated that AP could help to increase student achievement in science and mathematics. Tai et al. reported in 2010 on a study conducted to investigate whether students who took AP Calculus and AP science examinations were more likely to major in STEM-related disciplines than non-AP students. Taking into account relevant control variables (prior academic achievement, gender, ethnicity, parental education, socioeconomic status and eighth grade career expectations), results showed that students who took an examination in AP Calculus AB or AP Calculus BC were more likely to earn degrees in physical science and engineering concentrations compared to students who did not take any AP Calculus examinations.

Students who took an examination in AP Biology, Chemistry or Physics were more likely to earn degrees in life science concentrations than students who did not take any AP science examinations. These findings reflected on the earlier work conducted by Gonzalez et al. (2001) that demonstrated how AP students who scored a 3 or higher on the AP Physics and Calculus examinations outperformed physics and advanced mathematics students from a variety of countries around the world in the areas of science and mathematics.

Strategic communication with underrepresented students and their parents has been recognized as another key component to shifting the paradigm and motivating students to actively pursue participation in AP courses. Flores & Gomez (2011) noted that (a) AP examinations reduce tuition and the number of semesters in college; (b) AP classes improve students' writing skills, problem-solving skills, and study habits, which results in better preparation for college; (c) AP courses encourage minority students to enroll in college by providing information about college as well as stressing the importance of college; and (d) AP students are more likely to complete college in four years.

Summary

The AP program began as a way for elite high school students to gain early admission to select colleges and place out of introductory level college courses. In part, due to federal, state, and local efforts, the barriers that have prevented large numbers of underrepresented minority students from participating in AP courses have begun to be

removed in school districts across the country. The rationale behind this effort has been that increasing the access and support in advanced or rigorous courses will enable African American students to have increased opportunities and success in college.

The literature reviewed for this study suggested that more African American students are participating in AP courses and examination, and taking the SAT. The literature was clear, however, in stating that African American success on AP examinations and the SAT was lower when compared to all other ethnic and racial groups. Closing the academic achievement gap between African American students and their White peers will take an on-going effort by all levels of the educational arena.

The investigation of the possible relationship between SAT scores and the participation in AP courses in a particular urban district was the focus of this review of literature. The PAST/NMSQT was discussed as a useful tool to identify African American students who have demonstrated the potential to be successful in the AP program. This tool along with strategic efforts by teachers, counselors, and administrators will help schools develop a strategic plan to grant equity and access for African American students in those schools. The population identified in this study was African American students; however, the review of literature suggested that the processes used in identifying, placing and supporting African American students in AP courses are applicable to all students. The literature also suggested that participation in rigorous course work in the secondary school setting builds skills in African American students and can impact their ability to score well on SAT and other standardized examinations when compared to African American students who do not participate in AP and other

rigorous course work. This study was designed to further address these issues and help schools and districts understand the implications of increased participation of African American students in AP courses particularly as it related to closing the academic achievement gap.

CHAPTER 3 METHODOLOGY

Introduction

This chapter has been organized to present the methodology and procedures used in conducting this study. It includes the following sections: (a) statement of the problem, (b) purpose of the study, (c) population, (d) research questions, (e) instrumentation, (f) data collection, (g) data analysis, (h) summary.

Statement of the Problem

There has been an under representation of African American public school students enrolled in Advanced Placement (AP) courses. On average, African American public school students have scored lower than any other ethnic group in relation to the SAT Reasoning Test (SAT). The problem addressed in this study was the under representation of African American students in rigorous courses in a particular large urban district in a southern state. The lack of rigorous coursework the majority of African American students attempt during their high school years translates into lower test scores and fewer opportunities to compete for scholarships and positions at many four-year postsecondary institutions. It holds even greater significance for those students who come from families without experience in college attendance, without a book culture at home, or who are among a peer group that does not value an education as a means to a promising future.

With a federal, state, and local push to close the academic achievement gap, schools have been challenged to provide equity and access to rigorous courses. At the time of the present study, it was not known if there was a relationship between SAT scores and Advanced Placement participation among African American students. It was also not known in this particular district if there was a relationship between African American student participation in AP courses and closing the academic achievement gap.

Purpose of the Study

The purpose of this study was to determine the extent to which AP participation among African American students impacted the academic achievement gap in a target school district when comparing combined SAT Reasoning test scores to those of other racial/ethnic groups (White, Hispanic, and Asian). As the target school district develops strategies to address the achievement gap and student acceptance into post-secondary education, a strategic approach could be developed to include greater access to AP courses if a relationship was shown to exist.

Population

The population was 11th- and 12th-grade African American students enrolled in comprehensive high schools in a large urban district in a southern state during the 2010-2011 academic year. During the 2010-2011 year, the district had 17 high schools that were divided among four distinct areas: Areas 1, 2, 3, and 4. The sample included students from 14 of the 17 high schools in each of the four named zones. The three high

schools not selected were identified as alternative or selective enrollment high schools and did not offer AP courses for students during the 2010-2011 school year.

Research Questions

This study was guided by the following research questions:

1. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?
2. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?
3. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in

a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

Instrumentation

The College Board has been responsible for creating and testing the reliability and validity of the Advanced Placement (AP) examinations. The examinations are assessments used to measure achievement in corresponding courses. In addition, the College Board has been responsible for creating and testing the reliability and validity of the SAT Reasoning Test (SAT). The College Board has national protocols and strict standards that insured accuracy in addition to reliability and validity. Research in reference to reliability and validity of AP examinations and SAT tests has been conducted by the College Board (Hendrickson, Patterson, & Ewing, 2011; Mattern, Shaw, & Ewing, 2011; Patterson & Mattern, 2012; Patterson, Packman, & Kobrin, 2011).

Data Collection

In April 2012, data for the 2010-2011 academic year was obtained from the school districts' Instructional Accountability Department. The data included 11th- and 12th-grade students all comprehensive high schools in the target district. The data identified students by school, gender, and race/ethnicity. No specific student names or identifying numbers were used. In addition, the data included the following variables: (a) 2010-2011 high school grade level; (b) 2010-2011 socioeconomic designation; (c)

2010-2011 Advanced Placement test scores; (d) 2010-2011 SAT mathematics scores; (e) 2010-2011 SAT critical reading scores; and (f) 2010-2011 SAT writing scores.

AP participation, in this study, was determined by student enrollment in an AP course(s) and recorded AP exam score(s) in the same subject area. SAT participation, in this study, was determined by at least one SAT score in each of the standard areas: SAT mathematics, SAT critical reading, and SAT writing.

Data Analysis

The data included that obtained for all 11th- and 12th-grade students from comprehensive high schools in a large urban district in a southern state. The data were imported into the Statistical Package for the Social Sciences, Version 18.0 (SPSS) computer software for analysis. A one-way ANOVA was run to compare data of African American students with that of all other demographic groups.

Summary

The components of the methodology and procedures used in conducting this study were presented in this chapter. The narrative summaries provided detailed descriptions regarding sources of data. The variables were defined so as to determine if there was a relationship between SAT scores and participation in AP courses among African American students. Using these methods and procedures, the researcher was able to further examine the relationship between selected variables, i.e., socioeconomic status,

frequency of AP course participation. Chapter 4 contains an analysis of the data for the research questions and associated variables.

CHAPTER 4 ANALYSIS OF DATA

Introduction

This chapter provides the data analysis relevant to the three research questions addressed in this study. The chapter has been organized to provide a brief review of the purpose of the study and the methodology used in the data analysis. The results are presented by narrative discussion and accompanying tables organized around each of the three research questions that guided the study.

Purpose of the Study

The purpose of this study was to provide data to support the impact of Advanced Placement participation on closing the achievement gap between African American students and other ethnic/racial groups (White, Hispanic, and Asian). The researcher investigated the extent of the difference in SAT Reasoning Test scores between African American high school students and other racial/ethnic groups (White, Hispanic, Asian) when comparing students who did not participate in Advanced Placement courses and students who participated one or more Advanced Placement courses.

The focus of this study included 11th- and 12th-grade students who were identified as either African American, White, Hispanic, or Asian and were enrolled in the targeted school district during the 2010-2011 school year that had a set of combined SAT Reasoning Test scores that included critical reading, mathematics, and writing scores. Participation in AP was determined by student enrollment in an AP course and a recorded

score on the corresponding AP examination. Some students in the population had an ethnicity other than African American, White, Hispanic, or Asian. To ensure sufficient group sizes, these students were not included in the analysis. In determining the number of AP courses taken, three courses were excluded, as they were entries for sub-scores of a course: AP Calculus AB sub score (generated by any student taking AP Calculus BC), Music Aural sub score, and Music Non-aural sub score (both generated by any student taking AP Music Theory).

Research Questions

This study was guided by the following research questions:

1. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?
2. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?

3. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

Data and Demographics

In April 2012, the data were collected from the target school districts office of accountability. The population was 11th- and 12th-grade students enrolled in the selected comprehensive high schools in a large urban district in a southern state during the 2010-2011 academic year. During the 2010-2011 year, the district had 17 high schools that were divided among four distinct areas: Areas 1, 2, 3, and 4. The sample included students from 14 of the 17 high schools in each of the four named zones. The three high schools not selected were identified as alternative or selective enrollment high schools and did not offer AP courses for students during the 2010-2011 school year. In April 2012, information on 11th- and 12th-grade students from the target school district were collected for the 2010-2011 academic year identified by the following variables: school, gender, race/ethnicity, grade level, socioeconomic designation, Advanced Placement course enrollment, Advanced Placement examination scores, combined SAT Reasoning test scores. No specific student names or identifying numbers were used. The data were

organized into a table and entered into an SPSS worksheet. Several statistical procedures were used to analyze the data to answer the three research questions.

Analysis of Data

This section is arranged to facilitate responses to the three research questions that guided this study. The research questions are stated and followed by supporting narratives and tabular displays of data.

Research Question 1

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?

In order to answer this question, a one-way ANOVA was utilized. This test detects the existence of significant differences in a dependent variable among various groups of an independent variable. For this research question, the analysis was performed utilizing only those students who were determined to have not enrolled in any AP courses.

Prior to running the ANOVA, two major assumptions were checked: normality and homogeneity of variance. It was important to check the normality because an ANOVA is based on a comparison to a normal distribution. Therefore, the dependent

variable needs to indicate that it is normally distributed as well; otherwise, results may not be applicable. Normality was tested by examining skewness and kurtosis values of the distribution of standardized residual values. Both skewness and kurtosis values should be within -2 and 2. The following are the skewness and kurtosis values of each of the four independent variables: White Skewness = 0.33, Kurtosis = 0.42, African American Skewness = 0.33, Kurtosis = 0.42, Hispanic Skewness = 0.78, Kurtosis = 0.38, Asian Skewness = 0.20, Kurtosis = 0.02. All independent variables had a roughly symmetrical, bell shaped distribution. Based on this analysis, the assumption that there was a normal distribution was met.

Variability or spread of observations within each ethnicity group should be homogeneous in nature for the ANOVA to be calculated accurately. Levene's Test for Homogeneity of Variance indicates whether variances are homogeneous between groups. A non-significant result ($p > .05$) indicates homogeneous variances. The assumption in this case was not met. There was a significant result, $F(3, 3,039) = 17.27, p < .001$ when testing each ethnicity group. In spite of the assumption violation, a regular one-way ANOVA test was run. In addition, a Welch's F test was run for results verification. Welch's F features a correction so that the heterogeneous variance issue does not present problems, even with uneven group sizes, as was found in this case.

There was a significant difference, $F(3, 3,039) = 336.15, p < .001$, in total SAT performance between ethnicity groups. There was also a substantial amount of practical significance found in the analysis, and 25% of the variability in SAT performance could be explained by ethnicity, $\eta^2 = 0.25$. Welch's F was calculated due to the violation of

homogeneity of variances assumption. The test, $F(3, 428.81) = 355.54, p < .001$, corroborated the evidence that a significant difference did indeed exist. Results of Scheffe post-hoc tests to determine which means differed significantly than others were as follows: White students ($M = 1,537.15, SD = 208.02$) scored significantly higher than African American students ($M = 1,280.72, SD = 203.36$) and Hispanic students ($M = 1,418.45, SD = 246.43$). Hispanic students scored significantly higher than did African American students. Asian students ($M = 1,527.59, SD = 288.14$) scored significantly higher than both African American and Hispanic students. Descriptive statistics for each ethnicity are provided in Table 1.

Table 1

Total SAT Analysis by Ethnicity for Students Who Took No Advanced Placement (AP) Course (N = 3,043)

Ethnicity	<i>M</i>	<i>SD</i>	95% CI	
			<i>LL</i>	<i>UL</i>
White ($n = 1,474$)	1,537.15	208.02	1,526.52	1,547.78
African-American ($n = 1,235$)	1,280.72	203.36	1,269.37	1,292.07
Hispanic ($n = 168$)	1,418.45	246.53	1,380.90	1,456.00
Asian ($n = 166$)	1,527.59	288.14	1,483.43	1,571.75

Note. $F(3, 3,039) = 336.15, p < .001, \eta^2 = .25$. CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

Research Question 2

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?

A one-way ANOVA was utilized to answer this question. For this research question, the analysis was performed utilizing only those students who were determined to have participated and tested in one AP course.

Prior to running the ANOVA, two major assumptions were checked: normality and homogeneity of variance. Normality was tested by examining skewness and kurtosis values of the distribution of standardized residual values. Both skewness and kurtosis values should be within -2 and 2. The following are the skewness and kurtosis values of each of the four independent variables: White Skewness = 0.03, Kurtosis = 0.04, African American Skewness = 0.22, Kurtosis = 0.13, Hispanic Skewness = 0.59, Kurtosis = 0.37, Asian Skewness = 0.27, Kurtosis = -0.42. All independent variables had a roughly symmetrical, bell shaped distribution. Based on this analysis, the assumption that there was a normal distribution was met.

Levene's Test for Homogeneity of Variance was run to determine variability of observations within each ethnicity group. A non-significant result ($p > .05$) indicates homogeneous variances. The assumption in this case was not met. There was a significant result, $F(3, 1,137) = 4.32$, $p = .005$ when testing each ethnicity group. In

spite of the assumption violation, a regular one-way ANOVA test was run. In addition, a Welch's F test was run for results verification. Welch's F features a correction so that the heterogeneous variance issue does not present problems, even with uneven group sizes, as was found in this case.

There was a significant difference, $F(3, 1,137) = 104.81, p < .001$, in total SAT performance between ethnicity groups. There was also a substantial amount of practical significance found in the analysis in that 22% of the variability in SAT performance could be explained by ethnicity, $\eta^2 = 0.22$. Welch's F was calculated due to the violation of homogeneity of variances assumption. The test, $F(3, 198.39) = 95.64, p < .001$, corroborated the evidence that a significant difference did indeed exist. Results of Scheffe post-hoc tests to determine which means differed significantly from others were as follows: White students ($M = 1,701.25, SD = 189.83$) scored significantly higher than did African American students ($M = 1,452.72, SD = 220.96$) and Hispanic students ($M = 1,516.46, DS = 218.83$). Hispanic students scored significantly higher than did African American students. Asian students ($M = 1,676.73, SD = 237.22$) scored significantly higher than both African American and Hispanic students. Descriptive statistics for each ethnicity are provided in Table 2.

Table 2

Total SAT Analysis by Ethnicity for Students Who Took One Advanced Placement (AP) Course (N = 1,141)

Ethnicity	<i>M</i>	<i>SD</i>	95% CI	
			<i>LL</i>	<i>UL</i>
White (<i>n</i> = 704)	1,701.25	189.83	1,687.20	1,715.30
African-American (<i>n</i> = 268)	1,452.72	220.96	1,426.15	1,479.30
Hispanic (<i>n</i> = 65)	1,516.46	218.83	1,462.24	1,570.68
Asian (<i>n</i> = 104)	1,676.73	237.22	1,630.60	1,722.86

Note. $F(3, 1,137) = 104.81, p < .001, \eta^2 = .22$. CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

Research Question 3

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

A one-way ANOVA was utilized to answer this question. For this research question, the analysis was performed utilizing only those students who were determined to have participated and tested in two or more AP courses.

Prior to running the ANOVA, two major assumptions were checked: normality and homogeneity of variance. Normality was tested by examining skewness and kurtosis values of the distribution of standardized residual values. Both skewness and kurtosis values should be within -2 and 2. The following are the skewness and kurtosis values of each of the four independent variables: White Skewness = -0.21, Kurtosis = 0.12, African American Skewness = 0.13, Kurtosis = -0.04, Hispanic Skewness = -0.29, Kurtosis = 0.31, Asian Skewness = -0.66, Kurtosis = 0.03. All independent variables had a roughly symmetrical, bell shaped distribution. Based on this analysis, the assumption that there was a normal distribution was met.

Levene's Test for Homogeneity of Variance was run to determine variability of observations within each ethnicity group. A non-significant result ($\rho > .05$) indicated homogeneous variances. The assumption in this case was not met. There was a significant result, $F(3, 2,518) = 27.05, \rho < .001$ when testing each ethnicity group. In spite of the assumption violation, a regular one-way ANOVA test was run. In addition, a Welch's F test was run for results verification. Welch's F features a correction so that the heterogeneous variance issue does not present problems, even with uneven group sizes, as was found in this case.

There was a significant difference, $F(3, 2,518) = 226.16, \rho < .001$, in total SAT performance between ethnicity groups. There was also a substantial amount of practical significance found in the analysis, as 21% of the variability in SAT performance could be explained by ethnicity, $\eta^2 = 0.21$. Welch's F was calculated due to the violation of homogeneity of variances assumption. The test, $F(3, 391.42) = 171.59, \rho < .001$,

corroborated the evidence that a significant difference did indeed exist. Results of Scheffe post-hoc tests to determine which means differed significantly than others were as follows: White students ($M = 1,889.72$, $SD = 190.17$) scored significantly higher than African American students ($M = 1,607.19$, $SD = 243.98$) and Hispanic students ($M = 1,778.50$, $SD = 256.70$). Hispanic students scored significantly higher than African American students. Asian students ($M = 2,004.79$, $SD = 243.59$) scored significantly higher than students from all other groups--White, African American, and Hispanic. Descriptive statistics for each ethnicity are provided in Table 3.

Table 3

Total SAT Analysis by Ethnicity for Students Who Took More Than One Advanced Placement (AP) Course (N = 2,522)

Ethnicity	<i>M</i>	<i>SD</i>	95% CI	
			<i>LL</i>	<i>UL</i>
White ($n = 1,552$)	1,889.72	190.17	1,880.25	1,899.19
African-American ($n = 274$)	1,607.19	243.98	1,578.17	1,636.21
Hispanic ($n = 113$)	1,778.50	256.70	1,730.65	1,826.34
Asian ($n = 583$)	2,004.79	243.59	1,987.97	2,024.60

Note. $F(3, 2,518) = 226.12$, $p < .001$, $\eta^2 = .21$. CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

Ancillary Analysis

There was a significant difference in the socioeconomic status and African American enrollment in 2010-2011 in the 14 selected schools chosen for this study. Five of the high schools had student populations where greater than 50% were identified as economically disadvantaged. Percentages ranged from 57%-79%. The African American enrollment exceeded 75% in each of the 14 schools, ranging from 79%-98%. Nine of the high schools had a student population where less than 50% were identified as economically disadvantaged ranging from 5%-46%. The African American enrollment in these schools ranged from 7%-51%. Table 4 displays the demographics for the 14 target high schools in this study.

Table 4

Demographic Characteristics for the 14 Target High Schools

School	Population	Enrollment Percentages	
		African American	Economically Disadvantaged
1	1,310	96	79
2	1,845	79	73
3	1,316	84	72
4	2,256	95	69
5	2,102	98	57
6	1,445	51	46
7	1,664	27	30
8	1,948	23	29
9	2,471	14	21
10	2,333	19	13
11	1,736	13	10
12	1,615	8	8
13	2,628	8	6
14	1,895	7	5

Note. The schools are listed in descending order by the percentages of students identified as economically disadvantaged.

Based on the observation that high schools in the target school district with the highest percentages of African American students were also the high schools with the highest percentage of economically disadvantaged students, the researcher wanted to determine if there was a relationship in mean SAT Reasoning Test scores by

socioeconomic status and number of AP courses taken. The results of the analysis are in displayed in Table 5.

Table 5

Mean SAT Performance by Socioeconomic Status and Number of Advanced Placement (AP) Courses Taken

Group	<i>n</i>	<i>M</i>	<i>SD</i>	95% CI	
				<i>LL</i>	<i>UL</i>
Not Free or Reduced Lunch					
All Students	5,594	1,687.17	299.21	1,679.32	1,695.01
No AP	2,294	1,476.22	237.68	1,466.48	1,485.95
One AP	971	1,667.60	211.00	1,654.31	1,680.89
Two or More AP	2,329	1,903.10	224.12	1,894.00	1,912.21
Free or Reduced Lunch					
All Students	1,112	1,352.75	252.00	1,337.92	1,367.58
No AP	749	1,272.22	205.49	1,257.48	1,286.96
One AP	170	1,416.00	216.84	1,383.17	1,448.83
Two or More AP	193	1,609.59	257.71	1,573.00	1,646.17

Note. CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

The confidence interval of mean scores for the dependent variables was 95%. When comparing dependent variables of two independent variables, a significant

difference only occurs when confidence intervals do not overlap. The relationship was significant when comparing the mean score of all students who did not qualify for free or reduced lunch (Lower Limit =1,466.48, Upper Limit = 1,485.95), with students who did qualify for free or reduced lunch (Lower Limit = 1,257.48, Upper Limit =1,286.96) who took no AP exam. The relationship was significant when comparing the mean score of students who did not qualify for free or reduced lunch (Lower Limit =1,654.31, Upper Limit = 1680.89), with that of students who did qualify for free or reduced lunch (Lower Limit = 1383.17, Upper Limit =1,448.83) who took one AP exam. The relationship was significant when comparing the mean score of students who did not qualify for free or reduced lunch (Lower Limit =1,894.00, Upper Limit = 1,912.21) with students who did qualify for free or reduced lunch (Lower Limit = 1,573.00, Upper Limit =1,646.17) who took two or more AP exams.

During the 2010-2011 school year 6,706 11th and 12th grade students in the target school district had a recorded combined SAT Reasoning Test score. There was a significant difference in the percentage of African American 11th- and 12th-grade students who had a recorded SAT Reasoning Test score and had not participated in AP courses when compared to all other ethnic/racial groups in the study. A total of 39.5% of White students (n =3,730) had a recorded SAT Reasoning Test score and did not participate in an AP course. A total of 18.9% participated in one AP course, and 41.6% participated in two or more AP courses. A total of 60.5% of White students with a recorded SAT Reasoning Test score participated in AP courses. Of the African American students (n =1,777), 69.5% had a recorded SAT Reasoning Test score and did not participate in an

AP course; 15.1% participated in one AP course; 15.4% participated in two or more AP courses. A total of 30.5% of African American students with a recorded SAT Reasoning Test score participated in AP courses. For Hispanic students (n =346), 48.6% had a recorded SAT Reasoning Test score and did not participate in an AP course; 18.8% participated in one AP course; 32.7% participated in two or more AP courses. A total of 51.5% of Hispanic students with a recorded SAT Reasoning Test score participated in AP courses. Of Asian students (n =853), 19.5% had a recorded SAT Reasoning Test score and did not participate in an AP course; 12.2% participated in one AP course; 68.3% participated in two or more AP courses. 80.5% of Asian students with a recorded SAT Reasoning Test score participated in AP courses. Percentages for each ethnicity are provided in Table 6.

Table 6:

Advanced Placement (AP) Participation Percentages by Ethnicity

Ethnicity	% No AP	% One AP	% Two AP or More
White (n = 3,730)	39.5	18.9	41.6
African-American (n = 1,777)	69.5	15.1	15.4
Hispanic (n = 346)	48.6	18.8	32.7
Asian (n = 853)	19.5	12.2	68.3

Summary

The analysis of the data has been presented in this chapter. Three research questions provided the framework for the data analysis. Tables and accompanying narrative descriptions have been used to provide clarity regarding the quantitative analysis. The key findings included the following:

1. In the 2010-2011 school year in a large urban school district in a southern state, there was a significant difference in SAT Reasoning Test scores when comparing African American students who had not taken an AP course with other racial ethnic groups who had not taken an AP course. White students ($M = 1,537.15$, $SD = 208.02$) scored significantly higher than African American students ($M = 1,280.72$, $SD = 203.36$) and Hispanic students ($M = 1,418.45$, $DS = 246.43$). Hispanic students scored significantly higher than African American students. Asian students ($M = 1,527.59$, $SD = 288.14$) scored significantly higher than both African American and Hispanic students.
2. In the 2010-2011 school year in a large urban school district in a southern state, there was a significant difference in SAT Reasoning Test scores when comparing African American students who had taken one AP course with other racial/ethnic groups who had taken one AP course. White students ($M = 1,701.25$, $SD = 189.83$) scored significantly higher than African American students ($M = 1,452.72$, $SD = 220.96$) and Hispanic students ($M = 1,516.46$, $DS = 218.83$). Hispanic students scored significantly higher than African

American students. Asian students ($M = 1,676.73$, $SD = 237.22$) scored significantly higher than both African American and Hispanic students.

3. In the 2010-2011 school year in a large urban school district in a southern state, there was a significant difference in SAT Reasoning Test scores when comparing African American students who had taken more than one AP course with other racial ethnic groups who had taken more than one AP course. White students ($M = 1,889.72$, $SD = 190.17$) scored significantly higher than African American students ($M = 1,607.19$, $SD = 243.98$) and Hispanic students ($M = 1,778.50$, $SD = 256.70$). Hispanic students scored significantly higher than African American students. Asian students ($M = 2,004.79$, $SD = 243.59$) scored significantly higher than students from all other groups--White, African American, and Hispanic.
4. In the 2010-2011 school year in a large urban district in a southern state, a significant difference existed in the number of African American students in schools identified as economically disadvantaged when compared to other racial/ethnic groups. As a result of this observation, the means of SAT Reasoning Test scores were compared for students who did qualify for free and reduced lunch and students who did not qualify for free and reduced lunch. The relationship was significant when comparing the confidence intervals of the mean score of all students who did not qualify for free or reduced lunch (Lower Limit = 1,466.48, Upper Limit = 1,485.95), with students who did qualify for free or reduced lunch (Lower Limit = 1,257.48,

Upper Limit = 1,286.96) who took no AP examination. The relationship was significant when comparing the mean score of students who did not qualify for free or reduced lunch (Lower Limit = 1,654.31, Upper Limit = 1680.89), with students who did qualify for free or reduced lunch (Lower Limit = 1383.17, Upper Limit = 1,448.83) who took one AP examination. The relationship was significant when comparing the mean score of students who did not qualify for free or reduced lunch (Lower Limit = 1,894.00, Upper Limit = 1,912.21) with students who did qualify for free or reduced lunch (Lower Limit = 1,573.00, Upper Limit = 1,646.17) who took two or more AP examinations.

During the 2010-2011 school year, 6,706 11th- and 12th-grade students in the target school district had a recorded combined SAT Reasoning Test score. There was a significant difference in the percentage of African American 11th- and 12th-grade students who had a recorded SAT Reasoning Test score and had participated in AP courses when compared to all other ethnic/racial groups in the study. There was a 30-point difference between the percentage of African American students (30.5%) and White students (60.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses. There was a 21-point difference between the percentage of African American students (30.5%) and Hispanic students (51.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses. There was a 50-point difference between the percentage of African American students

(30.5%) and Asian students (80.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses.

CHAPTER 5 SUMMARY, DISCUSSION, AND CONCLUSIONS

Introduction

This chapter includes a restatement of the purpose of the research and a summary and discussion of the findings related to each of the research questions. Also presented are conclusions, implications for practice, recommendations for future research, and a final summary.

Purpose of the Study

The purpose of this study was to provide insight into the relationship of Advanced Placement (AP) participation and achievement of African American students and other ethnic/racial groups (White, Hispanic, and Asian). Two major issues were considered: (a) the possible impact of high school student Advanced Placement participation on SAT Reasoning Test scores and (b) the correlation between increased high school student Advanced Placement participation and closing the academic achievement gap between African American and other ethnic/racial groups (White, Hispanic, and Asian).

For this study, AP student participation and SAT Reasoning Test scores for 11th- and 12th-grade students enrolled in the 14 selected high schools in a particular large urban school district in a southern state were considered for the 2010-2011 school year. Students selected for this study had a set of combined SAT Reasoning Test scores that included critical reading, mathematics, and writing scores. Participation in AP was determined by student enrollment in an AP course and a recorded score on the

corresponding AP examination. Some students in the population had an ethnicity other than African American, White, Hispanic, or Asian. To ensure sufficient group sizes, these students were not included in the analysis.

Research Questions

This study was guided by the following research questions:

1. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?
2. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?
3. To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in

a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

Data and Demographics

All student data was collected from the target school districts office of accountability. The population was 11th- and 12th-grade students enrolled in the selected comprehensive high schools in a large urban district in a southern state during the 2010-2011 academic year. During the 2010-2011 year, the district had 17 high schools that were divided among four distinct areas: Areas 1, 2, 3, and 4. The sample included students from 14 of the 17 high schools in each of the four named zones. The three high schools not selected were identified as alternative or selective enrollment high schools and did not offer AP courses for students during the 2010-2011 school year. In April 2012, information on 11th- and 12th-grade students from the target school district were collected for the 2010-2011 academic year identified by the following variables: school, gender, race/ethnicity, grade level, socioeconomic designation, Advanced Placement course enrollment, Advanced Placement exam scores, combined SAT Reasoning test scores. No specific student names or identifying numbers were used. The data were organized into a table and entered into a SPSS worksheet. Several statistical procedures were used to analyze the data to answer the three research questions.

Summary of the Findings

The following section contains a summary of the findings for the study. The discussion has been organized around the three research questions which guided the study.

Research Question 1

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state for the 2010-2011 school year of students who did not take an AP course?

A one-way ANOVA was utilized to answer Research Question 1. This test detects the existence of significant differences in a dependent variable among various groups of an independent variable. For this research question, the analysis was performed utilizing only those students who were determined to have not enrolled in any AP courses.

The results of the analysis indicated that there was a significant difference ($F(3, 3,039) = 336.15, p < .001$) in total SAT Reasoning Test performance among ethnicity groups who had not participated in Advanced Placement courses. African American students had a significantly lower mean score on the SAT Reasoning Test than did all other ethnic/racial groups compared in the study. White ($n = 1,474$) ($M = 1,537.15$) and Asian ($n = 166$) ($M = 1,527.59$) students scored significantly higher than did African

American ($n = 1,235$) ($M = 1,280.72$) and Hispanic ($n = 168$) ($M = 1,418.45$) students. There was no significant difference in mean scores when comparing White and Asian students.

Research Question 2

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in one AP course?

A one-way ANOVA was utilized to answer Research Question 2. For this research question, the analysis was performed utilizing only those students who were determined to have participated and tested in one AP course.

The results of the analysis indicated that there was a significant difference ($F(3, 1,137) = 104.81, p < .001$) in total SAT Reasoning Test performance between ethnicity groups who had not participated in Advanced Placement courses. African American students had a significantly lower mean score on the SAT Reasoning Test than all other ethnic/racial groups compared in the study. White ($n = 704$) ($M = 1,701.25$) and Asian ($n = 104$) ($M = 1,676.73$) students scored significantly higher than African American ($n = 268$) ($M = 1,452.72$) and Hispanic ($n = 65$) ($M = 1,516.46$) students. There was no significant difference in mean scores when comparing White and Asian students.

Research Question 3

To what extent is there a statistically significant difference in the mean total combined (critical reading, mathematics, and writing) SAT score among African American students and other racial/ethnic groups (White, Hispanic, Asian) enrolled in comprehensive high schools in the target school district, in a particular southern state, for the 2010-2011 school year of students who participated and tested in two or more AP courses?

A one-way ANOVA was utilized to answer Research Question 3. For this research question, the analysis was performed utilizing only those students who were determined to have participated and tested in two or more AP courses.

The results of the analysis indicated that there was a significant difference ($F(3, 2,518) = 226.16, p < .001$) in total SAT Reasoning Test performance among ethnicity groups who participated in two or more Advanced Placement courses. African American students had a significantly lower mean score on the SAT Reasoning Test than all other ethnic/racial groups compared in the study. White students ($n = 1,552$) ($M = 1,889.72$) scored significantly higher than African American ($n = 274$) ($M = 1,607.19$) and Hispanic ($n = 113$) ($1,778.50$) students. Asian students ($n = 583$) ($M = 2,004.79$) scored significantly higher than students from all other races selected for this study.

Discussion of Findings

A significant difference was found to exist in the mean SAT Reasoning Test scores among different ethnic/racial groups during the 2010-2011 school year. African American students were the focus of this study. African American student mean scores were significantly lower on the SAT Reasoning Test when compared to all ethnic/racial groups identified in this study, regardless of the independent variable (no AP participation, one AP course, two or more AP courses). White and Asian students scored higher than both African American and Hispanic students in all three analyses. There was no significant difference in mean SAT Reasoning Test scores when comparing White and Asian students who did not participate in an AP course and students who participated in one course. There was, however, a significant difference in mean SAT Reasoning Test scores when comparing White and Asian students who participated in two or more courses. This may indicate that to have an increase in SAT Reasoning Test scores, students should enroll in more than one course.

Based on the observation that high schools in the target school district with the highest percentages of African American students were also the high schools with the highest percentage of economically disadvantaged students, the researcher wanted to determine if there was a significant difference in mean SAT Reasoning Test scores by socioeconomic status and number of AP courses taken. There was a significant difference when comparing the mean score of all students who did not qualify for free or reduced lunch with the mean score of students who did qualify for free or reduced lunch but who did not participate in AP courses. The difference was significant when

comparing the mean score of students who did not qualify for free or reduced lunch with students who did qualify for free or reduced lunch who participated in one AP course. The difference was significant when comparing the mean score of students who did not qualify for free or reduced lunch with students who did qualify for free or reduced lunch who participated in two or more AP exams. In this particular school district, the socioeconomic designation of a student significantly impacted their opportunity to participate in AP courses. There were a total of 5,594 11th- and 12th-grade students with a recorded SAT Reasoning Test score ($M = 1,687.17$) who did not qualify for free and reduced lunch. There were a total of 1,112 11th- and 12th-grade students with a recorded SAT Reasoning Test score ($M = 1,352.75$) who did qualify for free and reduced lunch. A total of 59% of all 11th- and 12th-grade students who did not qualify for free and reduced lunch with a recorded SAT Reasoning Test score had participated in the AP program. Only 33% of all 11th- and 12th-grade students who did qualify for free and reduced lunch with a recorded SAT Reasoning Test score had participated in the AP program. A total of 42% of all 11th- and 12th-grade students who did not qualify for free and reduced lunch with a recorded SAT Reasoning Test score had participated in two or more AP courses ($M = 1903.10$), and 17% of all 11th- and 12th-grade students who did qualify for free and reduced lunch with a recorded SAT Reasoning Test score had participated in two or more AP courses ($M = 1609.59$). It appears that the multiple AP course participation significantly impacted both groups' SAT Reasoning Test scores. However, the number of students who were afforded the opportunity to participate in AP courses varied considerably by socioeconomic designation.

There was a significant difference in the percentage of African American 11th- and 12th-grade students who had a recorded SAT Reasoning Test score and had participated in AP courses when compared to all other ethnic/racial groups in the study. There was a 30-point difference between the percentages of African American students (30.5%) and White students (60.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses. There was a 21-point difference between the percentage of African American students (30.5%) and Hispanic students (51.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses. There was a 50-point difference between the percentage of African American students (30.5%) and Asian students (80.5%) in the target school district with a recorded SAT Reasoning Test score who had participated in AP courses.

When comparing SAT Reasoning Test mean scores of African American Students with those of other ethnic groups in this study, the results did not indicate that African American student participation in AP courses was closing the academic achievement gap in this large urban district in a southern state. However, the results did indicate that African American participation in AP courses was significantly lower than all other ethnic/racial groups in this school district.

The researcher found that participation of the students alone may not be enough to close the achievement gap. The review of literature indicated that there are several issues related to the academic achievement gap and revealed why closing that gap is a daunting task. Most students can benefit from the rigors of AP courses. However, the percentage

of White student enrollment in AP courses exceeded that of African American students who were also enrolled in AP courses in 2011 (College Board, 2011). This opportunity gap happens for a variety of reasons: (a) African American students are often not selected or encouraged by their teachers and other staff to participate in AP courses; (b) families of African American students are often not aware of the opportunities the program affords and, in turn, do not encourage their children to participate; and (c) parents of African American students do not formally advocate at the school level for their students to participate in AP courses (Taliaferro & DeCuir-Gumby, 2007). The literature also noted that the cultural beliefs of some African American students were also an impediment to participation to rigorous course work. Some students believe and articulate that AP courses are for White kids and not for them. These troubling issues require significant investment by school leaders to create a paradigm shift for teachers, families, and students. Other considerations are K-12 grade level expectations of teachers and leaders, preparation of the teachers across the grades, and particularly those who teach AP courses.

Conclusions

This study was conducted to investigate the difference in performance on the SAT Reasoning Test between African American students and other ethnic/racial groups when comparing student participation in AP courses during the 2010-2011 school year in a large urban district in a southern state. The review of literature highlighted efforts to increase the academic rigor in American high school class rooms so that American

students are better prepared to compete globally and in the collegiate arena. At the same time, strategies and successful efforts to close the academic achievement gap that persists between African American and other ethnic/racial groups were also identified. Based on the review of literature, as well as analysis of the data collected from the school district, the following conclusions were made:

1. In this particular school district in a southern state a significant difference existed between African American students' SAT Reasoning Test scores and those of other ethnic/racial groups.
2. African American students were participating in AP courses at a significantly lower percentage than other ethnic/racial groups in this particular district.
3. One factor that could have contributed to lower SAT Reasoning Test scores during the 2010-2011 school year was the lack of participation in Advanced Placement courses by African American students.
4. A demographic divide existed in the high schools in this particular district. African American students were primarily enrolled in high schools with high concentrations of African American students.
5. A socioeconomic divide existed in the high schools in this particular district. Schools with high African American populations also had significantly higher numbers of students who qualified for free or reduced lunch. Students who qualified for free and reduced lunch scored significantly lower on the SAT Reasoning Test than students who did not qualify for free and reduced lunch.

6. Over the course of four years, students enrolled in high schools with large concentrations of non African American students participated in a much more rigorous course of study that better prepared them for the SAT Reasoning Test and college level course work.
7. Teacher quality, access to rigorous prerequisite course offerings, lack of recruitment, lack of variety in AP course offerings, and lack of proper support systems were other variables that impacted African American AP participation and SAT Reasoning Test scores.

Implications for Practice

The review of literature demonstrated that the Advanced Placement program is a way to increase rigor in American high schools. The literature and related research was also clear that the academic achievement gap still exists between African American students and other ethnic/racial groups. This gap can be measured in a variety of ways, but for the purpose of this study it was demonstrated in SAT Reasoning Test scores. This particular school district will need to build a strong strategic approach to address this gap.

Based on the review of literature and through this study, the following recommendations regarding implications for practice can be made:

1. School leaders in schools that serve high concentrations of African American students must create and implement a strategic plan that includes the development of a college-going culture and allows greater opportunity for students to participate in Advanced Placement classes. This plan should also

include very specific recruitment and support strategies. School leaders should conduct an intense investigation and research the best practices associated with AP programs in a variety of schools with varying demographics.

2. In schools where African American students are not in the majority, school leaders should be strategic in their approach to creating opportunities for these students to participate in AP courses. In many of these environments, African American students are often not selected or encouraged by their teachers and other staff to participate in these courses. It is also important for school leaders in these types of environments to develop a way to limit the amount of alienation the students may feel in these classes. Encouraging the diversification of the content where applicable and providing mentors are just a few examples of how to limit students' feelings of alienation.
3. School leaders should create targeted marketing and information sharing sessions with parents of students who are not, but should be, participating in Advanced Placement courses. Often parent advocacy for these types of classes is limited by parental lack of knowledge about AP.
4. Teacher quality and training should be emphasized. AP teacher in this environment must be clear that they will not just facilitate the class. The traditional approach to hand selecting students by teacher recommendation only will have to desist. Having a policy of open access requires that many

students will need to be taught the skills associated with college level course work.

5. Increasing the rigor in all courses within the high school curriculum will assist in preparing students for AP courses. Many advanced African American students are not exposed to rigorous coursework until the 11th grade. Exposure and participation must happen as early as possible so that the skills associated with college level work are developed. Feeder schools must offer rigorous prerequisite courses for their advanced students. African American students must begin participating in rigorous course work prior to 11th and 12th grades. For some qualified students, introduction to AP may be offered as early as ninth grade. Counselors and administrators should utilize the PSAT and AP potential to identify students who have the potential to enter AP classes prior to 11th grade.
6. At the district level, resources, infrastructure, and support systems must be allocated in a way that allows the program to grow and become institutionalized over time. Equity and access must become a priority of the district. There must be the political will to place resources where students are most in need. In addition, the district must have the will to hold school leaders and teachers accountable for the design, implementation, and results of a framework which will increase college readiness of African American students.

Recommendations for Future Research

Based on the conclusions of this study, the following are recommendations for future research:

1. A study could be conducted to analyze teacher quality and training in high poverty high schools and its impact on student achievement.
2. A qualitative study of AP participation in a school system could be conducted based on surveys from principals, teachers, AP coordinators, counselors on student access and participation in AP courses.
3. Replicate this study using a different subgroup. This will allow a researcher to consider other implications of the AP program.
4. A study could be conducted to analyze the Advanced Placement participation of African American students and student achievement in a school system where the demographic make-up of the schools is more heterogeneous.
5. A study could be initiated to analyze the characteristics of urban high schools with high rates of poverty that also have high academic achievement.

Summary

The opportunity for African American students to participate in Advanced Placement courses is smaller than that of other ethnic groups. This opportunity gap often exists because African American students are classified as not fitting the profile for admission into AP classes. The lack of rigorous course work in a high school career severely lessens the opportunity for these students to gain access and be successful in the

collegiate arena. Without the appropriate skills to successfully navigate college level coursework, an African American student has a much more limited chance of achieving the American Dream and assuming a quality of life afforded to those with a college education.

APPENDIX A
FULTON COUNTY SCHOOLS RESEARCH APPROVAL LETTER



BOARD OF EDUCATION
Linda Schultz, *President*
Linda P. Bryant, *Vice President*
Julia C. Bernath • Gail Dean • Catherine Maddox
Linda McCain • Katie Reeves
Robert M. Avossa, *Superintendent*

April 12, 2012

Donald E Fennoy II
9421 Kings Parade Blvd
Charlotte, NC 28273

Dear Mr. Fennoy:

Your request to conduct the research study **The Relationship among African American students' scholastic achievement test scores and participation in Advanced Placement courses** in Fulton County Schools has been reviewed. I am pleased to inform you that you have been granted permission for this study at the seven high schools indicated in your research application. Approval means that a school may choose to participate in this study; however, it is not mandatory that they do so, as the choice remains a local option. Please contact the individual Principals as you move forward, and share this letter of approval to indicate you have been approved at the district level. My office can assist in the collection of the data, so that will not be a burden for the individual schools.

No identification of Fulton County Schools (students' names, teachers' names, etc.) is to be included in your findings. Also, all confidentiality of records must be maintained. Once this study is complete, please send to me at the address below a copy/summary of the completed study. If I can provide additional information, please contact me at (404) 669-4933.

Sincerely,

Wayne Bellcross

Wayne Bellcross, PhD
Chief Assessment and Accountability Officer
Fulton County Schools

APPENDIX B
INSTITUTIONAL REVIEW BOARD APPROVAL



University of Central Florida Institutional Review Board
 Office of Research & Commercialization
 12201 Research Parkway, Suite 501
 Orlando, Florida 32826-3246
 Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1
FWA00000351, IRB00001138**

To: **Donald E. Fennoy II**

Date: **March 19, 2012**

Dear Researcher:

On 3/19/2012, the IRB approved the following to human participant research until 3/18/2013 inclusive:

Type of Review: UCF Initial Review Submission Form
 Project Title: **THE RELATIONSHIP AMONG AFRICAN AMERICAN STUDENTS' SCHOLASTIC ACHIEVEMENT TEST SCORES AND PARTICIPATION IN ADVANCED PLACEMENT COURSES IN ONE LARGE URBAN SCHOOL DISTRICT IN A SOUTHERN STATE IN 2010-2011**

Investigator: Donald E. Fennoy II
 IRB Number: SBE-12-08286
 Funding Agency:
 Grant Title:
 Research ID: N/A

The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 3/18/2013, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., CF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 03/19/2012 10:17:24 AM EST

IRB Coordinator

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