Research in Social Sciences and Technology

Advance Placement and The Achievement Gap in the 21st Century: A Multiple Linear Regression of Marginalized Populations in AP Enrollment

Bonnie Bittman[1], Alex P. Davies[2], William B. Russell III[3], Ekaterina Goussakova[4]

Abstract

The analysis of the College Board's Advanced Placement (AP) enrollment focused on marginalized populations' (i.e., African American, Hispanic, and poor students) limited access and the schools' efforts to bridge the gaps. Little research has been done on marginalized populations' AP passage rates. The researchers of this correlational study investigated AP enrollment and passage rates in public and charter high schools in Florida ($n = 355$) by comparing the enrollment and passage proportions amongst Caucasian, African American, and Hispanic students as well as the proportions of students who received free or reduced lunch. The results showed a weak, positive relationship between proportions of Hispanic, African American, and Caucasian students passing AP exams and the proportion of AP students enrolled. There was a strong, positive relationship amongst the proportions of African-American, Hispanic, and Caucasian students who passed the exam. However, a weak, negative relationship was found between the proportions of students who were enrolled in AP classes and those who received free or reduced lunch. There was also a negative relationship between Hispanic, African American, and Caucasian students passing the AP exam and the percentage of the school's population enrolled in free or reduced lunch. The findings suggest that schools with high poverty rates have a low enrollment rate of students in AP courses. The focus on AP enrollment rates for minority students has led to increased rates of minorities successfully completing advanced coursework, but there is still a need for similar focus on high poverty schools.

***Keywords**:* Advanced Placement, marginalized populations, AP passage rates, poverty

Introduction

The Advanced Placement (AP) program offered by the College Board has been in existence since the 1950s. By completing a subject specific exam at the end of the school year with a passing score of 3 or above on a 5-point scale high school students can receive college credit from an admitting university. The number of exams offered by the College Board has

[1] Ph.D Candidate, University of Central Florida, bonnie.bittman@ucf.edu
[2] Ph.D Candidate, University of Central Florida, alex.davies@ucf.edu
[3] Prof. Dr. University of Central Florida, Russell@ucf.edu
[4] Ph.D Candidate, University of Central Florida, Ekaterina.Goussakova@ucf.edu

increased from 10 in 1960 to 34 presently (Ackerman, Kanfer, & Calderwood, 2013). The College Board has increased its offerings to include the hard sciences (e.g., physics, biology, chemistry), foreign languages (e.g., English, German, Japanese), and the social sciences (e.g., European history, psychology, economics). Thus, the number of exams taken by students has increased from 10,000 in 1960 to 3.93 million in 2013 (College Board, 2013).

A vast body of research exists on the historically limited access to AP programs for marginalized populations, including African American and Hispanic students as well as students from low socio-economic backgrounds (Conger, Long, Iatarola, 2009; Corra, Carter, & Carter, 2011; Davis, Davis, & Mobley, 2013; Estacion et al., 2011; Hale, 2007; Kerr, 2014; Ohrt, Lambie, & Ieva, 2009; Ndura, Robinson, & Ochs, 2003; Solorzano & Ornelas, 2004). Beginning in 2009, access and completion rates of accelerated programs, including dual enrollment, have been calculated into each of Florida's high school's grade (Florida Legislature, 2008). Additionally, there has been a steady diversification amongst the students enrolled into AP enrollment.

Purpose Statement

Previous research on AP enrollments and passage rates in Florida was done using 2002-2003 school year data (Conger et al., 2009). In fact, much of the recent studies regarding AP enrollment in Florida has referred to AP enrollment data prior to the 2008 Senate Bill 1908. The most recent data were reported by Estacion et al. (2011) for the 2006-2007 school year. The current study set out to investigate high school students' AP enrollment and passage rates by analyzing the 2011-2012 AP enrollment and passage rates of students from marginalized populations in Florida. More specifically, the current study sought to determine whether a relationship existed amongst students who successfully passed the AP exams (i.e., a score of 3 or

higher on a 5-point scale), the students who received free or reduced lunch, and the total percentages of Caucasian, Hispanic, and African American students who took the AP exams in Florida during the 2011-2012 school year. As such, the guiding research question for the current study was as follows: Was there a relationship amongst students who a) successfully passed the AP exams (i.e., scoring a 3 or higher on a 5-point scale), b) the percentage of students who had received free or reduced lunch, and c) the total percentages of Caucasian, Hispanic, and African American students who took the AP exams in Florida during the 2011-2012 school year?

Review of the Literature

The benefits and drawbacks of the AP programs have been investigated for decades. Early on, the differences in race, ethnicity, and socioeconomic status (SES) were not considered. In a comparative study on AP enrollment versus non-AP, college courses (n = 108 matched pairs), Bergeson (1967) did not find any statistically significant differences between the students who skipped preliminary courses in college (i.e., accelerants) and equally-gifted students who followed the regular process of enrollment. The findings indicated that the students' grades were comparable, allowing Bergeson to advocate for AP enrollment. Rice (1967) expressed a strong opposition to the exemptions in English composition. "Language proficiency is far too elusive a term to be meaningful when applied to individuals […] I have yet to encounter a freshman, however gifted, who could not benefit immeasurably from the experience of writing" (Rice, 1967, p. 184).

Over the decades, there has been a steady growth in the number of students taking AP classes. Having successfully taken at least one AP course has considerable bearing on college admission in favor of the student who took it (Ndura et al., 2003; Solorzano & Ornelas, 2004). Accepted at over 90% of colleges and universities in the United States (College Board, 2013),

AP exams have become one of the most significant tools for students in the college application process. Sadler et al. (2014) highlighted the fact that admission to the Ivy League schools is influenced not only by the number of AP courses taken, but also by the fact that students who pass those courses "receive 'bonus points' when their high school rank-in-class is calculated" (p. 1). Therefore, students who are not enrolled into AP courses may be at a significant disadvantage with regards to college admission (Solorzano & Ornelas, 2004).

Ackerman, Kanfer, and Calderwood (2013) found that in college, "students with greater numbers of AP-based course credits tended to complete fewer, lower level courses and a greater number of higher level courses" (p. 2). Students' average AP scores strongly correlated with their first year's grade point average (GPA) in college. Student achievement in AP classes was found to be the single best predictor of success in college, after the students' high school GPA (Dougherty, Mellor, & Jian, 2006). Davis, Davis, and Mobley (2013) reported that high school students who have successfully passed their AP exams consistently showed higher GPAs while in college and were more likely to graduate.

Advanced Placement Enrollment Gaps

Research has shown that students who have successfully completed AP courses have a head-start on their college education compared to the students who have not successfully completed an AP course. Despite the increasing number of students enrolling into AP courses, racial minority students are underrepresented and disproportionately enrolled as compared to their Caucasian peers nationwide (Davis et al., 2013; Kerr, 2014; Ndura et al., 2003; Ohrt et al., 2009). Referencing College Board's 2012 statistics on national AP enrollment, Davis et al. (2013) reported that Caucasians made up more than half of the students who were enrolled in AP courses, nationally, at 57.1%, Hispanics made up 17%, and Asians and Pacific Islanders made up

10.3%. African Americans made up 14.7% of the national student population; however, they only made up 9% of all students enrolled in AP courses in 2012. A study by the U.S. Department of Education demonstrated that racially diverse students were three times more likely to earn a Bachelor's degree just by attempting an AP course (as cited in Davis et al., 2013).

Drawing upon students' 2002-2003 SAT scores from the North Carolina Department of Public Instruction archive, Cora, Carter, and Carter (2011) compared the expected and the actual AP enrollment levels in 47 courses of students consisting of both African Americans (N = 1499, male = 1199 or 21.92%, female = 1300 or 23.77%) and Caucasians (N = 2680, male = 1359 or 24.84%, female = 1321 or 24.14%). Cora et al. (2011) found that Caucasian students were enrolled into more AP courses across the board than their African American peers. Additionally, the researchers found that the students' race was a stronger predictor than their gender regarding AP enrollment. Gendered differences were observed within each racial category with more female than male enrollments.

Furthermore, Kerr (2014) concluded that the majority of factors leading to the lack of AP enrollment among racial minority students include "poverty issues, peer relationships/pressure, and absence of parental support" (p. 481). Additionally, based on a survey taken by racial minority students from her own school, Kerr (2014) reported the most common response showed that "non-White students believe the overly White complexion of advanced classes indicates that [AP courses] are geared toward White students only" (p. 481). Although the reasons for not enrolling into AP courses were not discussed, Kerr (2014) referenced College Board's 2012 statistics indicating that 300,000 racial minority high school students did not enroll into a single AP course despite having been identified as possessing appropriate AP skills and potential.

Marginalized Population and Advanced Placement Passage Rates

With respect to the various racial groups of students, Hispanic and African American students' AP course enrollment and passage rates are the most concerning. Davis et al. (2013) referenced College Board's recognition of African Americans as being the most underrepresented student group regarding AP enrollment, at both national and state levels, and also scoring significantly lower on the exams than all other racial groups. Solorzano and Ornelas (2004) stated that in reviewing "the educational pipeline-irrespective of how educational outcomes are measured, Latina/o and African American students do not perform as well as [Caucasian students]" (p. 15). Only 4.1% of all African American students who took an AP exam in 2011 passed, and nearly 50% of these students scored the lowest possible score on the exam as compared to their Caucasian peers of whom less than 16% scored the lowest possible score (as cited in Davis et al., 2013). For Hispanic and African American students, parents and/or caregivers (e.g. grandparents, older siblings, babysitters) can be the students' greatest support or impediment to pursuing higher education. Not having role models to discuss higher education may be a detriment to the students' overall educational development (as cited in Ohrt et al., 2009).

Institutional Efforts to Address Advanced Placement Issues

To help address the discrepancy in the academic achievement gap for all racial minority students, with attention to Hispanic and African American students, various schools have taken a collaborative approach among faculty, administration, counselors, and parents to increase the number of racial minority students enrolled in AP courses (Davis et al., 2013; Kerr, 2014; Ohrt et al., 2009). Ohrt, Lambie, and Ieva (2009) described a school-wide model that was done, as a non-study, to identify Hispanic and African American students who demonstrated potential for successful completion of an AP course. This particular school had an enrollment of 2,692

students (Caucasian = 41%, Hispanic = 40%, African American = 9%), and the remaining percentage included students from Asian, Native American, and multiracial backgrounds. Approximately 11% of the Hispanic students and 8% of the African American students were already enrolled in AP courses. The school counselor met with the school's faculty, administrators, parents and/or guardians, and students to create and implement a program that would identify those who showed AP potential based on their SAT and/or National Merit Scholarship Qualifying Test scores. Identified students and their families would attend information sessions on the realities and benefits of enrolling into AP courses as well as college admission processes. Students received support services and mentoring from the school's counselors along with administration and faculty who were, themselves, either Hispanic or African American. Additionally, current AP-enrolled, Hispanic and African American students mentored the newly identified AP students. Ohrt et al. (2009) reported that for the following school year, Hispanic and African American student AP enrollment increased by 37%. Nineteen students were identified, and 16 completed a total of 25 AP courses. Only 12.5% enrolled in the AP program passed the exam with a score of 3 or higher.

In addition, Davis et al. (2013) found that the African American students who received support services scored higher than the African American students who chose not to receive the support services; however, it was not significant at an alpha of .05. The African American students receiving the services scored significantly better than the national norms for African Americans who also took the same AP Psychology exam. Ironically, there was no significant difference in scores between the African American students receiving the support and the Caucasian students at the school who took the exam, but there was significance between the African American students who did not receive the support services and the Caucasians.

Following a similar research design and methodology of Ohrt et al. (2009) and Davis et al.'s (2013) studies, Kerr (2014) and her team of faculty, counselors, and administrators identified racial minority students with AP potential for social studies and met with them and their parents to discuss the courses and program. The results showed the overall enrollment into AP history courses among the racial minority students had increased from 23% to 34%. Additionally, the 9th grade saw an increase from 16% to 26%. Although an increased enrollment occurred at 1% for the African American students and 1.5% for the Hispanic students, Kerr pointed out that the number of African American and Hispanic students combined who enrolled into the AP courses was not as large as the increase in enrollment for the Caucasian students.

Marginalized Students and Advanced Placement in Florida

Conger, Long, and Iatarola (2009) used data from the Florida Department of Education's Education Data Warehouse, sampling the students from grades 9-12 (n = 118,050) during the 2002-2003 school year. Conger et al. (2009) found that "Hispanic and black students' course-taking rates are higher than those of white students when we condition on these pre–high school characteristics. Poverty gaps are also reduced by 68 to 77 percent with these controls." (p. 573). Furthermore, due to the increased enrollments of African American and Hispanic students in magnet schools, minority students had similar scores to Caucasian students' when access to the AP courses was equal. In addition, Conger et al. (2009) noted that the increased access of marginalized populations to AP courses may be attributed to the shift in state policies. In particular, the Florida Legislature passed Bill 1908 in 2008 addressing the issues of access and success of marginalized students to AP courses.

According to Estacion et al. (2011), only 7.3% of Florida students in grades 11-12 were enrolled in college credit equivalent courses during the 2006-2007 school year with dismal

enrollments for Hispanic students. Only 9% of Hispanic students were enrolled compared to the 23% of Caucasian students. Hispanic students who received free or reduced lunch were at 31%, and Caucasians were at16% as compared to 31%). Furthermore, Caucasians were the highest racial category enrolled into AP courses, and they outperformed all other races in the courses in Florida. The enrollment data continued to indicate limited access to AP courses for African American and Hispanic students as well as students from low socioeconomic backgrounds, thus leaving these students at a disadvantage regarding their pursuit for higher education.

Teachers and administrators have already begun to address the AP issues regarding marginalized student populations in Florida (Davis et al., 2013; Kerr, 2014; Ohrt et al., 2009). Hale (2007) shared his experience of teaching AP English to the African American student population that was considered to be at the high school's lowest quartile, academically, during the 2004-2005 school year. Despite the resistance from other faculty, Hale succeeded in empowering the students through African American literature and capitalizing on their socio-cultural and oral literary traditions. Students thrived on the complex mature topics that Hale presented, brought their incredulous friends to the doors of the class as proof that they were taking AP English, and lent school readings to their parents. "Teachers gave these students the most boring materials […] Their minds were awesome, but their speaking and written skills had gone to the wayside […] It was their raw African American poverty that allowed them to see easily into many of the passages and essays" (Hale, 2007, p. 124). The students were encouraged to visit Mr. Hale's college English class. Even though none of the students scored a 3 or higher on the AP English exam at the end of the course, ultimately, most chose to go to college upon their high school graduation. As it has been shown, even though considerable research regarding enrollment gaps and AP issues exists, Florida could benefit from additional studies on the AP

enrollment and passage rates among its African American and Hispanic students and its students who receive free or reduced lunch.

Methodology

The researchers employed quantitative statistics and ran a statistical analysis to answer the following question: Was there a relationship amongst students who a) successfully passed the AP exams (i.e., scoring a 3 or higher on a 5-point scale), b) the percentage of students who had received free or reduced lunch, and c) the total percentages of Caucasian, Hispanic, and African American students who took the AP exams in Florida during the 2011-2012 school year? The researchers' null hypothesis included the following: There was no statistically significant relationship among students who successfully passed the AP exams, the percentage of students who received free or reduced lunch, and the total percentages of Caucasian, Hispanic, and African American students who took AP exams in Florida during the 2011-2012 academic year. This research is necessary to examine marginalized populations' access to AP courses and passage rates in high schools within Florida, and advanced analysis investigating patterns of enrollment and success rates Florida had not been conducted at the time of the study. This analysis can illuminate issues to access and success for students and can assist stakeholders in increasing opportunities for all high school students in Florida.

Sampling Procedure

The sample size of this study included 355 public and charter high schools from the state of Florida. Select schools were excluded from the study for two reasons. First, to ensure each school had enough teacher allocations to offer both standard and AP level classes, any school with a population of less than 1,000 students in grades 9-12 was eliminated. Next, schools that did not offer any AP classes were also eliminated because they conflicted with the research

question examining AP enrollment and passage rates. The public and charter high schools (N = 355) ranged in population from 1,009 to 4,245 (M = 1,921, SD = 572.2) as shown in Table 1.

Table 1

Descriptive Statistics for Student Population in 2011-2012 School Year

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Total student population 2011-2012	355	3236.0	1009.0	4245.0	1921.000	572.2208
Valid N (listwise)	355					

Measurement

This quantitative analysis employed Pearson's product moment correlation was conducted because the research question looked for the relationship between two interval data variables at a time and is useful in this study as a descriptive statistic (Lomax & Hahs-Vaughn, 2012). The alpha level was set at .05**.**

The statistic is reliable because the correlation is using population level data, with little room for interpretation. Concerning validity, the lack of categories offered by the Florida Department of Education's Division of Accountability, Research, and Measurement (ARM) limits the number of relationships that can be examined to find a causal relationship, but the categories provided are central to the research question.

Procedure

The procedure for this study began by developing a focus on AP enrollment within Florida and an examination of the data available on the Florida Department of Education ARM's website. All data were accessed through the Florida Department of Education's Division of Accountability Research & Measurement (ARM) website (http://www.fldoe.org/about-us/division-of-accountability-research-me.stml). Additional research requests were made to the department, if needed. By focusing on access and passage rates of marginalized population to AP

classes, the researchers examined statewide data for AP enrollment rates, AP passage rates, school population levels, socioeconomics levels, and race. The data that was used for this study was available to the public at no cost.

The data were combined into a single data set by hand using *Microsoft's Excel* workbook and exported to *IBM's SPSS* where all analyses were conducted. The quality of the study was assured through data checks performed routinely by all researchers. The following data were collected: the schools' names and their corresponding school districts as well as the schools' 2011-2012 total student population, the percentage of AP students in grades 10-12, the percentage of students who received free or reduced lunch, the total percentages of Caucasian, Hispanic, and African American students scoring 3-5 on AP tests during the 2011-2012 school year. All data were merged into a single data set, and any missing values were excluded from the analysis. A Pearson's product moment correlation was conducted for all 355 cases comparing individual variables to the 2011-2012 school year passing rate.

A Pearson's product moment correlation was chosen as a statistical procedure for this study because the hypothesis is testing for relationships with data that are interval/ratio in scale, set at an alpha of .05. The assumption of independence was met via population data. The assumption of linearity was reasonable given a review of scatterplots of the variables shown in Figure 1 below.

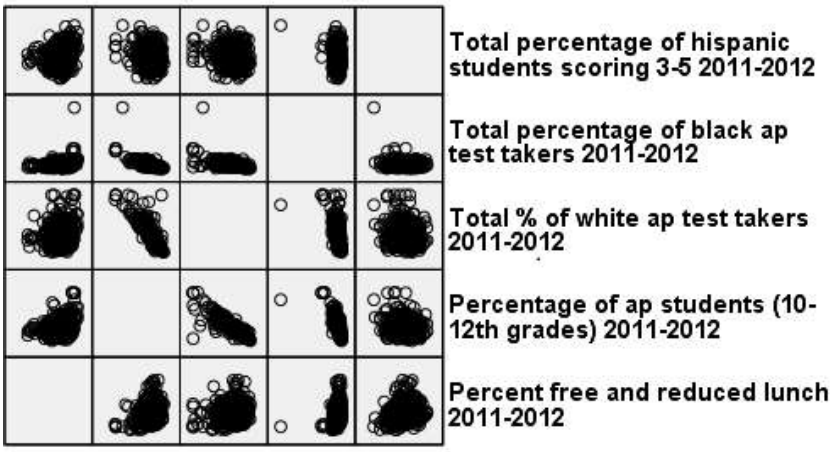

Figure 1. Scatterplots of the Variables

Results

In analyzing the correlation set, all 10 of the 10 correlation coefficients were statistically significant ($p < .001$) as shown in Table 2 (see Appendix). There was a positive relationship between the following pairs: the total percentage of Hispanic students scoring a 3-5 on the AP exams and the percentage of AP enrolled students in grades 10-12 ($r = .221$, $n = 314$, $p < .001$), the total percentage of African American students scoring a 3-5 on the AP exams and the percentage of AP enrolled students in grades 10-12 ($r = .277$, $n = 248$, $p < .001$), and the total percentage of Caucasian students scoring a 3-5 on the AP exams and the percentage of AP enrolled students in grades 10-12 ($r = .239$, $n = 334$, $p < .001$). These three positive relationships indicated that when the total percentages of Hispanic, African American, and Caucasian students scoring a 3-5 on the AP exams increased, the percentage of AP enrolled students in grades 10-12 increased as well.

Three more positive relationships were found. The first positive relationship was in the total percentage of African American students scoring a 3-5 on the AP exams and the total percentage of Hispanic students scoring a 3-5 ($r = .816$, $n = 239$, $p < .001$) indicating that as the

total percentage of African American students scoring a 3-5 on the AP exams increased, the total percentage of Hispanics scoring a 3-5 did as well. The next positive relationship was between the total percentage of Caucasian students scoring a 3-5 on the AP exams and the total percentage of Hispanic students scoring a 3-5 (r = .862, n = 296, p < .001) indicating that as the total percentage of Caucasian students scoring a 3-5 on the AP exams increased, the total percentage of Hispanics scoring a 3-5 did as well. The final positive relationship was between the total percentage of Caucasian students scoring a 3-5 on the AP exams and the total percentage of African American students scoring a 3-5 (r = .825, n = 231, p < .001) suggesting that as the total percentage of Caucasian students scoring a 3-5 on the AP exams increased, the total percentage of African American students scoring a 3-5 increased as well.

Although significance was found, four relationships were negative as shown in Table 2 (see Appendix). The four negative relationships are as follows: the percentage of AP enrolled students in grades 10-12 and the percentage of students who received free or reduced lunch (r = -.254, n = 355, p < .001), the total percentage of Hispanics scoring a 3-5 on the AP exams and the percent of students who received free or reduced lunch (r = -.286, n = 314, p < .001), African American scoring a 3-5 on the AP exams and the percentage of students who received free or reduced lunch (r = -.279, n = 248, p < .001), and Caucasian students scoring a 3-5 on the AP exams and the percentage of students who received free or reduced lunch (r = -.289, n = 334, p < .001). These negative relationships suggest that as the percentage of AP enrolled students and the total percentages of Hispanic, African-American, and Caucasian students scoring a 3-5 on the AP exams increased, the percentage of students who received free or reduced lunch decreased.

Within the positive relationships, the relationships that were correlated with the percentage of AP enrolled students in grades 10-12 had a mildly-medium effect based on

Cohen's (1988) correlational effect size. The relationships between the total percentages of African American and Hispanic students scoring a 3-5 (r^2 = .67), the total percentages of Caucasian and Hispanic students scoring a 3-5 (r^2 = .74), and the total percentages of Caucasian and African American students scoring a 3-5 (r^2 = .69), all had rather large effect sizes according to Cohen (1988). Within the negative relationships, the total percentages of Hispanic, African American, and Caucasian students scoring a 3-5 had the same, medium effect size of .08 based on Cohen (1988). The relationship between the percentage of AP enrolled students in grades 10-12 and the percentage of students who received free or reduced lunch had an effect size of .06 suggesting a mildly-medium effect size based on Cohen. Using *G*Power* (Faul et al., 2007), from the lowest to the greatest correlation coefficient (r = .221-.862), post hoc power ranged from relatively high power, at .98, to a perfect power of 1.

Discussion

This study examined high school students' AP enrollment and passage rates using the 2011-2012 AP enrollment and passage rates of students from marginalized populations in Florida. Previous research regarding AP enrollment and passage rates for the state of Florida was completed with data from the 2002-2003 school. This study analyzed the relationship amongst students who passed the AP exams, students receiving free or reduced lunch, and the total percentages of Caucasian, Hispanic, and African American students who participated in AP exams during the 2011-2012 school year in Florida. Pearson product correlations were examined between students who a) successfully passed the AP exams (i.e., scoring a 3 or higher on a 5-point scale), b) the percentage of students who had received free or reduced lunch, and c) the total percentages of Caucasian, Hispanic, and African American students who took the AP exams in Florida during the 2011-2012 school year.

The scope of the study was narrow, focused on a single state in the United States, serving to update previous research that was conducted in 2002-2003 regarding marginalized population enrollment in AP courses in Florida. Despite the narrow focus, this research study updated the literature focused on racial minority students and AP enrollment rates. In doing so, this research study illuminates the need for stakeholders to continue to encourage minority enrollment in AP coursework and to emphasize to those students that passing the AP exam is possible. Additionally, the inclusion of students who qualify for free and reduced lunch as a variable indicates a particular marginalized, student population that should be examined in future research regarding AP coursework.

This research study found both positive and negative correlations in regards to the variables investigated. Advanced Placement enrollment rates of Caucasian, Hispanic, and African American students were positively and strongly correlated with the passing scores of Caucasian, Hispanic, and African American students on AP exams. This indicates that Hispanic and African American students who are enrolled in AP classes were successful in passing the AP exam. The historic disenfranchisement of Hispanic and African American students can be ameliorated slightly through the continued enrollment of Hispanic and African American into AP coursework.

Despite the positive correlation between the different races and passage rates, a negative association was found between the percentage of Caucasian, Hispanic, and African American students and students from low socio-economic backgrounds. With a negative, weak correlation, these results suggest that schools with higher proportions of low-SES students do not encourage enrollment in AP coursework as emphatically as schools with a lower proportion. This troubling trend has the potential to significantly hamper students from low socioeconomic backgrounds

from future success in their post-secondary schooling as well as continuing the marginalization of individuals from low socioeconomic backgrounds.

Efforts have been made to bridge the achievement gap, as it relates to AP, across various racial groups, particularly among African American, Hispanic, and Caucasian student populations. Following similar methods of Davis et al. (2013), Kerr (2014), and Ohrt et al. (2009), parental involvement is a crucial component for students' academic success (Kilinc et al, 2016; Mauch & Tarman, 2016; Tarman, 2016; Tarman & Acun, 2010). Depending on the resources available, schools can hold after and/or before school tutoring sessions in which AP teachers will be available to tutor AP-enrolled students on their coursework (Hoffmann, 2017). Inviting parents, regardless of racial or socioeconomic backgrounds, to these sessions will help keep them updated on their children's progress as well as informed of the material that is being taught. As a result, this may place parents in a better position to assist their children with their AP coursework and assignments. As previous researchers suggested (Davis et al., 2013; Kerr, 2014; Ohrt et al., 2009) when schools recognize students who have AP potential, particularly from African American and Hispanic backgrounds, they may conference or hold informational meetings that detail the AP program and its courses for the parents, particularly for the parents who may not understand what AP is nor realize the positive effects that such a program may have on their children's academic career. Counselors can work with the student's teachers to develop a plan of action that is specific to each student and his or her AP course that outlines the steps that will be taken to ensure academic success in the course.

The current study highlights the continuing issue regarding AP enrollment and passage rates among student populations that are considered to be marginalized by mainstream education, particularly African American and Hispanic student populations and students from low

socioeconomic backgrounds. The results from this study show that students from racially diverse backgrounds who enroll into AP programs are successful in passing the exams. However, schools do not particularly acknowledge the academic potential that students from low socioeconomic backgrounds, as indicated by their free and reduced lunch status, may have if enrolled into an AP course. Thus, this finding highlights the need for the academic counseling and informational meetings with parents, along with the tutoring sessions with the parental involvement, regarding AP programs for these students as well.

Considering the nature of correlational designs, cause and effect relationships cannot be established without an experimental component (Gall, Gall, & Borg, 2007; Waters & Russell, 2016). The current study did not include such a component as it pulled data from a pre-existing database. Furthermore, the limiting number of variables examined did not provide concrete evidence of a causal relationship between the SES level and race with success on AP exams. The current study included data from Florida schools which may not be representative of national trends. However, the researchers of the current study sought to investigate the AP enrollment and passage rates from within the state of Florida only. Future research includes analyzing this data at a national level rather than just limiting it to an individual state. Research regarding students from low socioeconomic backgrounds enrolled into AP courses is also an area that is often overlooked. Another marginalized student population that could be considered includes English language learners. Additionally, researchers continuing this work may consider analyzing the data to see how students' gender affects their enrollment and passage rates of AP courses.

Appendix

Table 2

Pearson Correlations Coefficient Results

		Percentage of ap students (10-12th grades) 2011-2012	Percent free and reduced lunch 2011-2012	Total percentage of hispanic students scoring 3-5 2011-2012	Total percentage of black students scoring 3-5 2011-2012	Total percentage of white students 3-5 2011-2012
Percentage of ap students (10-12th grades) 2011-2012	Pearson Correlation	1	-.254**	.221**	.277**	.239**
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	92654.144	-643751.275	18546.236	18699.368	22452.352
	Covariance	261.735	-1818.506	59.253	75.706	67.424
	N	355	355	314	248	334
Percent free and reduced lunch 2011-2012	Pearson Correlation	-.254**	1	-.286**	-.279**	-.289**
	Sig. (2-tailed)	.000		.000	.000	.000
	Sum of Squares and Cross-products	-643751.275	69245016.197	-676982.822	-492030.474	-720398.556
	Covariance	-1818.506	195607.390	-2162.884	-1992.026	-2163.359
	N	355	355	314	248	334
Total percentage of hispanic students scoring 3-5 2011-2012	Pearson Correlation	.221**	-.286**	1	.816**	.862**
	Sig. (2-tailed)	.000	.000		.000	.000
	Sum of Squares and Cross-products	18546.236	-676982.822	88551.310	55419.363	72662.228
	Covariance	59.253	-2162.884	282.912	232.854	246.313
	N	314	314	314	239	296
Total percentage of black students scoring 3-5 2011-2012	Pearson Correlation	.277**	-.279**	.816**	1	.825**
	Sig. (2-tailed)	.000	.000	.000		.000
	Sum of Squares and Cross-products	18699.368	-492030.474	55419.363	71770.114	55489.786
	Covariance	75.706	-1992.026	232.854	290.567	241.260
	N	248	248	239	248	231

Total percentage of white students 3-5 2011-2012	Pearson Correlation	.239**	-.289**	.862**	.825**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	Sum of Squares and Cross-products	22452.352	-720398.556	72662.228	55489.786	100945.206
	Covariance	67.424	-2163.359	246.313	241.260	303.139
	N	334	334	296	231	334

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

References

Ackerman, P. L., Kanfer, R., & Calderwood, C. (2013). High school advanced placement and student performance in college: STEM majors, non-STEM majors, and gender differences. *Teachers College Record, 115*(10), 1-42.

Bergeson, J. B. (1967). Academic performance of college students granted advanced standing as a result of participation in the advanced placement program. *Journal of Educational Research, 61*, 151-152.

Child Nutrition Programs - Income Eligibility Guideline (March 25, 2011). *USDA Food and Nutrition Service Notice*, 76 Fed. Reg. 16725.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Conger, D., Long, M.C., & Iatarola, P. (2009). Explaining race, poverty, and gender disparities in advanced course-taking. *Journal of Policy Analysis and Management, 28*(4), 555-576.

Corra, M., Carter, S. J., & Carter, S. K. (2011). The interactive impact of race and gender on high school advanced course enrollment. *Journal of Negro Education, 80*(1), 33-46.

Davis, P., Davis, M. P., & Mobley, J. A. (2013). The school counselor's role in addressing the Advanced Placement equity and excellence gap for African American students. *Professional School Counseling, 17*(1), 32-39.

Dougherty, C., Mellor, L., Jian, S. (2006). The relationship between Advanced Placement and College Graduation. *National Center for Educational Accountability*. Retrieved from http://eric.ed.gov/?id=ED519365

Estacion, A., Cotner, B. A., D'Souza, S., Smith, C. A. S., Borman, K. M. (2011). Who enrolls in dual enrollment and other acceleration programs in Florida high schools? Issues & answers. *Regional Educational Laboratory Southeast, 119*, 1-33.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.

Florida Legislature. (2008). *Senate Bill 1908*. Retrieved April 1, 2015, from http://archive.flsenate.gov/data/session/2008/Senate/bills/billtext/pdf/s1908er.pdf

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction.* Boston, MA: Pearson Education, Inc.

Hale, D. P. (2007). The lowest quartile African Americans taking advanced placement language and literature. *Clearing House, 80*(3), 123-125.

Hoffmann, M. (2017). An Exploratory Study: Mobile Device Use for Academics. *Research in Social Sciences and Technology, 1*(1), 1-35.

Kerr, R. (2014). "Advanced classes? They're only for white kids": How one Kansas school is changing the face of honors and Advanced Placement courses. *Action in Teacher Education, 36*, 480-489.

Kilinc, E., Kilinc, S., Kaya, M., Baser, E., Turkuresin, H., & Kesten, A. (2016). Teachers' attitudes toward the use of technology in social studies teaching. *Research in Social Sciences and Technology, 1*(1), 59-76.

Lomax, R. G., & Hahs-Vaughn, D. L. (2012). *An introduction to statistical concepts.* New York, NY: Routledge.

Mauch, J. & Tarman, B. (2016). A historical approach to social studies laboratory method. *Research in Social Sciences and Technology, 1*(2), 55-66.

Ohrt, J. H., Lambie, G. W., & Ieva, K. P. (2009). Supporting Latino and African-American students in Advanced Placement courses: A school counseling program's approach. *Professional School Counseling, 13*(1), 59-63.

Ndura, E., Robinson, M., & Ochs, G. (2003). Minority students in high school Advanced Placement courses: Opportunity denied. *American Secondary Education, 32*(1), 21-38.

Rice, L. H. (1967). Menace of advanced placement in English. *Improving College and University Teaching, 15*, 183-183.

Sadler, P. M., Sonnert, G., Hazari, Z., & Tai, R. (2014). The role of advanced high school coursework in increasing STEM career interest. *Science Educator, 23*(1), 1-13.

Solorzano, D. G., & Ornelas, A. (2004). A critical race analysis of Latina/o and African American Advanced Placement enrollment in public high schools. *The High School Journal, 87*(3), 15-26.

Tarman, B. (2016). Innovation and education. *Research in Social Sciences and Technology, 1*(1), 77-97.

Tarman, B., & Acun, I. (2010). Social studies education and a new social studies movement. *Journal of Social Studies Education Research, 1*(1), 1-16.

The College Board. (2013). *Annual AP program participation 1956-2013* (The College Board Publication). Retrieved from http://media.collegeboard.com/digitalServices/pdf/research/2013/2013-Annual-Participation.pdf

The College Board. (2013). *AP government and politics United States student score distributions*. (The College Board). Retrieved from http://media.collegeboard.com/digitalServices/pdf/ap/apcentral/ap13_govn_pol_US_ScoringDist.pdf

Waters, S. & Russell, W.B. (2016). Virtually Ready? Pre-service teachers' perceptions of a virtual internship experience, *Research in Social Sciences and Technology, (1)*1, 1-23.