

## Texas High School Students' Ap/Ib Performance Rates: An 11-Year Study

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### ABSTRACT

This study represents an analysis of trends of Texas students by ethnicity who scored at or above the criterion on the Advanced Placement (AP) or International Baccalaureate (IB) examinations over the past 11 years. Archival data from the Texas Education Agency Academic Excellence Indicator system were analyzed for all traditional public high schools with students taking these exams. The percentage of students who scored successfully on these exams has remained unchanged over the past 11 years. Furthermore, achievement gaps by ethnicity continue to persist. Statistically significant differences were present in the percentages of students who scored at or above the criterion with medium effect sizes.

### Keywords:

### INTRODUCTION

Declines in secondary educational performance and widening achievement gaps in the United States impact the country's ability to compete in a global and technological marketplace (Cooper, Hersch, & O'Leary, 2012; Council on Foreign Relations, 2012; Haveman & Wilson, 2007). Moreover, researchers have noted growing disparities in student achievement on national examinations by gender, income levels, and race (Barnes, Slate, & Rojas-LeBouef, 2010; Combs et al., 2010; Corra et al., 2011; Flowers, 2008; Fowler, Joyner, & Slate, 2011; Handwerk, Tognatta, Coley, & Gitomer, 2008; Holmes, 2013; Klopfenstein, 2004a, 2004b; Koch, 2012; Moore & Slate, 2008; Ndura, Robinson, & Ochs, 2003; Preston, 2006; Solórzano & Ornelas, 2002). Over the past several decades, federal and state educational policies have focused reform efforts towards closing the gaps in academic achievement for U.S. high school students. Texas has been one of the leaders in college readiness and has implemented reform initiatives to alleviate soaring college remediation costs. Specific measures that emerged included developing common core standards, boosting graduation requirements, increasing access to college preparatory coursework, and requiring a high school exit exam (Achieve, 2009; Conley, 2010; Domestic Policy Council, 2006).

Despite reform efforts from educators and policymakers, disparities in performance in advanced coursework courses (i.e., Advanced Placement [AP] and International Baccalaureate [IB] courses) for Hispanic, Black, and low-income students persist (ACT, 2011; Balfanz & Legters, 2004; Kirp, 2010; Reardon, Baker, & Klasik, 2012). The result of this inequitable access and performance can impact college preparation and college admissions decisions, thereby impacting long-term career choices (Bailey & Dynarski, 2011; Flores & Gomez, 2011). This study represents a comprehensive analysis of the trends of Texas high school student's scores on the AP/IB examinations over the past 11 years with an analysis of the differences of scores among ethnic groups.

### REVIEW OF RELATED LITERATURE

One key ingredient to entering the U.S. workforce is a college degree (Bailey & Dynarski, 2011; Noah, 2012). Over the past 30 years, the competition level for scarce freshmen spaces at elite U.S. colleges has escalated (Bound, Hershbein, & Long, 2009). However, the supply of freshmen slots has not kept pace with the demand. Although the reasons for this competition abound, certain criteria have emerged as vital in the college application package. These criteria include high school grade point average, class rank, and rigor of curriculum (i.e., AP or IB programs). In addition, AP/IB course grades can also affect many of the college admissions criteria.

Historically, academic achievement gaps have been highlighted throughout the educational process, which prompted the *No Child Left Behind* legislation. The U.S. Department of Education (2001) defined the achievement gap

in education as the differences on standardized examinations between Black and Hispanic students in comparison to their White peers. One approach to addressing gaps in college readiness preparation has been the escalation of in use of the College Board's AP program to add additional rigor into the high school curriculum to prepare students for college coursework. However, in the 8th annual *AP Report to the Nation* released by the College Board (2012), Hispanic and Black students continue to be underrepresented in the AP classroom.

To alleviate the disparities in access to these courses, policymakers and educators have pushed to enroll more students in the AP and IB programs (College Board, 2012; Kyburg, Hertberg-Davis, & Callahan, 2007). However, access does not equal success in these advanced courses. Over the past 5 years, several scholars have indicated that performance on advanced coursework exams for low-income students and Black and Hispanic students might be stagnating or even declining (Holmes, 2013; Koch, 2012; Moore & Slate, 2008).

Nationally, disparities in the percentage of students who pass the criterion score of 3 on the AP exam continue to persist. Also, disparities in exam scores have emerged by geographic location within the United States. For example, in New Hampshire, almost 75% of students scored a 3 or higher whereas in Mississippi only 33% of students scored a 3 or higher. In the District of Columbia, which is predominantly Black, 50% of the 2011 AP exam scores were a 1 (Associated Press, 2012).

In 2008, Moore and Slate examined 2 years of statewide AP data collected from over 8,000 Texas public high schools. Findings from their study indicated that student success in the advanced courses differed as a function of ethnicity and gender. Specifically, Moore and Slate (2008) noted that White students were twice as likely to enroll in AP courses as Black or Hispanic students were. When analyzing exam scores on the AP tests, these scholars stated that only 50% of those Texas students who enrolled in an AP course actually took the AP exam. Of the students who took the AP exam, approximately 40% scored at or above the AP criterion score of 3 in both years. White students and Hispanic students were more likely than Black students to score at or above the criterion of 3 on the AP test (Moore & Slate, 2008).

In a more recent study, Koch (2012) analyzed the AP performance of Hispanic students from California, Texas, and Arizona in math (Calculus AB, Calculus BC, and Statistics) and English (English Language and Composition and English Literature and Composition) from 1997 to 2011. Koch indicated that all three states had significant increases in AP enrollments by Hispanic students from 1997 to 2011. It was also noted in the study that the average high AP scores for students in all three states occurred in the late 1990s, whereas the lowest average AP scores occurred in the late 2000s. Of the three states within the study, Texas had the lowest percentage of Hispanic students who scored a 3 or higher on all AP exams. Furthermore, it was noted that the percentage of Hispanic students who scored a 3 or higher on the overall AP scores in all three states had declined from 1997 to 2011 (Koch, 2012).

To determine the extent to which national trends were present in overall AP exam performance, Holmes (2013) conducted an analysis of ethnic and gender differences in AP exam performance of U.S. high school students over a 16-year time period. Findings from this study indicated that Asian students had far higher overall AP performance scores than did White, Black, and Hispanic students. Although the number of Hispanic and Black students who participated in AP exams had risen, their AP exam scores had actually declined. Holmes (2013) concluded that the large numbers of failing exam scores represented millions of public dollars wasted on AP expansion policies.

In sum, reform efforts at the federal and state level have included targeting the rigor of high school curriculum through the expansion of AP/IB course enrollment. However, several researchers (e.g., Holmes, 2013; Koch, 2012; Moore & Slate, 2008) have indicated the persistence of gaps in AP access and performance along race and income lines despite these reform efforts. Continued analysis of the long-term performance levels on AP/IB examinations by ethnicity remain warranted.

## METHOD

The purpose of this study was to examine long-term advanced course (i.e., AP, IB) performance rates among Texas public high school students (i.e., from the 2001 school year to the 2012 school year) to determine the extent to which differences exist by ethnicity and the extent to which these differences have changed. The Texas Education Agency (2011) defines AP/IB Results as

The examination results of the College Board's Advanced Placement (AP) courses and the International Baccalaureate's (IB) Diploma Program courses taken by Texas public school students. High school students may take one or more of these examinations, ideally upon completion of AP or IB courses, and may receive advanced placement or credit, or both, upon entering college. Generally, colleges award credit or advanced placement for scores of 3, 4, or 5 on AP examinations and scores of 4, 5, 6, or 7 on IB examinations. (para 13)

Participants from this study were selected from all traditional public high schools throughout the state of Texas. Participants also included those students who self-identified into one of the four largest ethnic categories (i.e., Black, Hispanic, White, or Asian). Students who were excluded from the study included those students who attended private, charter, and alternative high schools; students categorized by the TEA as Limited English Proficient; students with learning disabilities; and students from other ethnic categories or multi-ethnic (i.e. comprising two or more ethnicities) that constituted less than 1% of the total population of students. Based on parameters set by the state, all participants were enrolled in either the 11th or 12th grade during the school year.

The three research questions included in the study were as follows: (a) What are the percentages of high school students by ethnicity (i.e., Black, Hispanic, White, and Asian) who scored at or above the criterion on at least one advanced academic course exit examination (i.e., AP or IB) for each school year, 2001-2012?, (b) What is the difference in the percentages of students by ethnicity (i.e., Black, Hispanic, White, and Asian) who scored at or above the criterion on at least one advanced academic course exit examination (i.e., AP or IB) for each school year, 2001-2012?, and (c) What is the trend regarding the percentages of students by ethnicity (i.e., Black, Hispanic, White, and Asian) who scored at or above the criterion on at least one advanced academic course exit examination (i.e., AP or IB) from 2001 to 2012?

A non-experimental research design was used to analyze the AP/IB examination performance rates of Texas public high school students. Archival data for the past 11 school years were obtained from the Texas Education Agency's Academic Excellence Indicator System database. After review and acceptance by a university IRB, the data were downloaded and recoded for each participating Texas high school. Assumptions for normality, linearity, and homogeneity were checked prior to conducting the inferential statistical procedure. The parametric ANOVA procedure, due to its robustness, was calculated to address the inferential research question (Field, 2009; Harris, 1998).

## RESULTS

For this investigation of the performance on advanced course examinations of Texas high school students by ethnicity, three research questions were analyzed for each of the 11 school years of data available (i.e., from 2001 to 2012). The first question is a descriptive research question and the second question is an inferential research question. The final question is a trend research question used to analyze trends in student performance in advanced coursework by ethnicity from 2001-2012.

### RESEARCH QUESTION 1

Presented in Table 1 are the descriptive statistics for the percentages of Texas examinees by ethnicity (i.e., Black, Hispanic, White, and Asian) with at least one AP or IB examination scores at or above the criterion scores (i.e., 3 on AP or 4 on IB) from 2001-2012. For each of the 11 years of study, a higher percentage of Asian students had at least one AP or IB score at or above the criterion score than did White, Black, or Hispanic students. Black students had the lowest percentage of students to have at least one AP or IB score at or above the criterion score for each of the 11 years. Both the percentages of Hispanic and Asian students to have at least one AP or IB scores at or above the

criterion score declined from 2001 to 2012. From 2001 to 2012, the total number of students who scored at or above the criterion on AP/IB examinations declined by 8%.

Table 1: Descriptive Statistics for the Percentage of Examinees s by Ethnicity With at Least One AP or IB Score at or Above the Criterion Score (3 on AP or 4 on IB) from 2001-2002 to 2011-2012 school years.

Year	Black		Hispanic		White		Asian	
	M	SD	M	SD	M	SD	M	SD
2001-2002	29.91	24.56	46.61	25.75	45.08	23.19	59.89	21.94
2002-2003	32.59	23.79	47.19	26.15	47.58	24.53	65.28	20.06
2003-2004	32.61	25.08	47.95	25.18	47.12	23.55	61.55	21.02
2004-2005	31.61	25.21	46.13	24.83	43.51	23.33	60.44	20.83
2005-2006	29.25	23.70	42.60	23.98	43.37	23.11	55.52	24.80
2006-2007	27.96	23.19	42.76	23.74	41.75	23.75	57.35	23.37
2007-2008	31.67	24.66	38.82	23.75	44.25	23.25	57.61	23.00
2008-2009	28.21	23.28	38.87	23.53	43.36	23.66	56.37	22.98
2009-2010	31.41	24.58	40.66	23.75	45.08	24.50	57.49	22.54
2010-2011	29.50	23.77	39.58	23.68	46.16	24.45	57.36	23.02
2011-2012	30.27	23.55	37.54	23.21	45.66	24.52	58.32	23.07

**RESEARCH QUESTION 2**

A univariate analysis of variance procedure (ANOVA) was conducted to determine the extent to which the percentage of student examinees with at least one AP or IB score at or above the criterion score (i.e., 3 on AP or 4 on IB) differed as a function of ethnic membership. Statistically significant differences were noted between ethnic groups for each year within the study. Scheffé post hoc procedures were then computed for pairwise comparisons of the ethnic groups (i.e., Asian, Black, Hispanic, White). Effect sizes were also reported with the partial eta squared statistic (Cohen, 1988).

Statistically significant differences were noted for each of the school years within this study. For the 2001-2002 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1364) = 45.52, p < .001, \eta^2 = .09$ , a medium effect size (Cohen, 1988). For the 2002-2003 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1426) = 54.46, p < .001, \eta^2 = .10$ , a medium effect size (Cohen, 1988). For the 2003-2004 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1510) = 49.11, p < .001, \eta^2 = .09$ , a medium effect size (Cohen, 1988). For the 2004-2005 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1607) = 56.37, p < .001, \eta^2 = .09$ , a medium effect size (Cohen, 1988). For the 2005-2006 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1632) = 49.27, p < .001, \eta^2 = .08$ , a medium effect size (Cohen, 1988). For the 2006-2007 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1684) = 65.46, p < .001, \eta^2 = .10$ , a medium effect size (Cohen, 1988). For the 2007-2008 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1769) = 59.69, p < .001, \eta^2 = .09$ , a medium effect size (Cohen, 1988). For the 2008-2009 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1869) = 76.43, p < .001, \eta^2 = .11$ , a medium effect size (Cohen, 1988). For the 2009-2010 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1837) =$

61.77,  $p < .001$ ,  $\eta^2 = .09$ , a medium effect size (Cohen, 1988). For the 2010-2011 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1893) = 76.73$ ,  $p < .001$ ,  $\eta^2 = .11$ , a medium effect size (Cohen, 1988). For the 2011-2012 school year, the ANOVA revealed a statistically significant difference,  $F(3, 1981) = 87.30$ ,  $p < .001$ ,  $\eta^2 = .12$ , a medium effect size (Cohen, 1988).

Table 2 represents a summary of the partial eta squared values and effect size results for the percentage of high school students who scored at or above the criterion score on an AP/IB exam by school year. Over the past 11 years, the effect sizes for the percentage of students who scored at or above the criterion score on an AP/IB examination ranged from .08 to .12. As such, these partial eta squared values reflected medium effect sizes (Cohen, 1988).

Table 2: *Partial Eta Squared and Effect Sizes for the percentages of High School Students who Scored at or Above the Criterion on an AP/IB exam by School Year*

School Year	$\eta^2$	Effect Size	Ethnic Group with the smallest %	Ethnic Group with the largest %
2001-2002	.09	Medium	Black	Asian
2002-2003	.10	Medium	Black	Asian
2003-2004	.09	Medium	Black	Asian
2004-2005	.09	Medium	Black	Asian
2005-2006	.08	Medium	Black	Asian
2006-2007	.10	Medium	Black	Asian
2007-2008	.09	Medium	Black	Asian
2008-2009	.11	Medium	Black	Asian
2009-2010	.09	Medium	Black	Asian
2010-2011	.11	Medium	Black	Asian
2011-2012	.12	Medium	Black	Asian

**RESEARCH QUESTION 3**

The percentage of students who scored at or above the criterion on the AP/IB examinations from all ethnic groups varied over the past 11 years. However, graphically portrayed in Figure 1 is the presence of gaps in academic performance by ethnic group. Specifically, gaps exist between the percentage of Asian students in comparison to the percentage of White, Hispanic, and Black students who scored at or above the criterion on the AP/IB examinations. The largest gap in academic performance on the AP/IB examinations is between Asian and Black students. Asian students were almost twice as likely as Black students to score at or above the criterion on the AP/IB examinations in each school year. The percentage of Hispanic students who scored at or above the criterion on the AP/IB examinations also declined more than any other ethnic group during the 11 years of the study. The percentage of White and Hispanic students who scored above the criterion on the AP/IB examinations were almost identical until the gap began to widen between the two ethnic groups in the 2007-2008 school year.

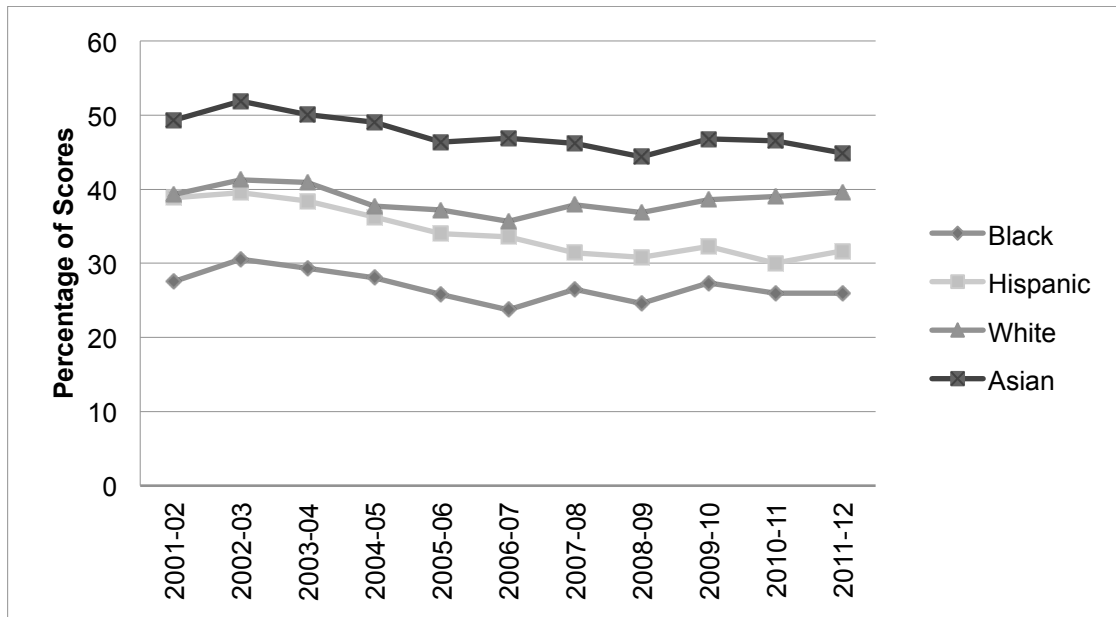


Figure 1. Overall mean percentages of scores by student ethnic groups who scored at or above the criterion on the AP/IB examinations by school year.

**DISCUSSION**

The gaps in academic performance on AP/IB examinations has widened over the past 11 years between White and Hispanic students, Asian and Hispanic students, and Black and White students. The largest decline in the percentage of students who scored at or above the criterion was between the percentage of Asian and Hispanic students for each of the 11 years within the study. In the 2001-2002 school year, the difference in the percentage of Hispanic (46.60%) and Asian (59.89%) students who completed an advanced course was 13.29%. By the 2011-2012 school year, the difference in the percentage of Hispanic (37.54%) and Asian (58.32%) students who completed an advanced course had increased to 20.78%.

The achievement gap also widened between the percentage of White and Hispanic students who scored at or above the criterion on the AP/IB examinations over the past 11 years. In the 2001-2002 school year, the difference in the percentage of White (45.08%) and Hispanic (46.60%) students who scored at or above the criterion on the AP/IB examinations was 1.52% with a greater percentage of Hispanic students performing well on the AP/IB examinations. However, by the 2011-2012 school year, the difference in the percentage of White (45.66%) and Hispanic (37.54%) students who scored at or above the criterion on the AP/IB examinations had increased to 8.12% with a greater percentage of White students performing well on the AP/IB examinations.

Achievement gaps on these examinations were also evident between the percentage of White students who scored at or above the criterion on the AP/IB examinations in comparison to Black students; although, this gap has increased only slightly over the past 11 years. In the 2001-2002 school year, the difference in the percentage of White (45.08%) and Black (29.92%) students who completed an advanced course/dual enrollment course was 15.16%. However, by the 2011-2012 school year, the difference in the percentage of White (45.66%) and Black (30.27%) students who scored at or above the criterion on the AP/IB examinations had widened slightly to 15.39%.

Over the past 11 years, a significant decline in the percentage of students in Texas who scored at the criterion or better on the AP/IB examinations was noted. Despite greater access and participation levels within Texas, only minor changes by ethnicity were noted for the past 11 years. Statistically significant differences were present with medium effect sizes. Very little change was observed in the percentages of Black and White students who scored successfully on these exams over the past decade. However, the percentage of Hispanic and Asian students who scored at or above the criterion on these exams actually declined in at least 3 to 5 years within the study.

The results from this study confirmed prior research that noted the persistence of gaps by ethnicity in the performance level on the corresponding exams (College Board, 2012; Holmes, 2013; Koch, 2012; Moore & Slate, 2008). Over 50% of Asian students took the AP/IB exams in Texas and performed well enough to potentially earn college credit. The outlook was much bleaker for Black and Hispanic students, whereas a smaller percentage of these students took the exams and were successful. Therefore, the educational reform efforts by federal and state educational agencies seemed to have benefited Asian students rather than the less affluent Black and Hispanic students the efforts were designed to assist.

The findings from this study also coincided with the claim by Lichten (2010) who noted a rapid increase in the access to AP courses by underprepared students would yield diminishing performance levels. Lichten (2010) also predicted this rapid increase and its diminishing performance levels would result in diminishing confidence and respect for the AP program. If more students are taking these advanced course exams, but are not faring well or are doing worse, conclusions about the effectiveness of these exams have been questioned (Holmes, 2013; Klopfenstein & Thomas, 2009). Indeed, as a result of this study, we concur that the increased participation levels have resulted in widening gaps in performance for Black and Hispanic students when compared to White and Asian students in Texas. In the end, the disparities between ethnic groups tend to favor Asian students over all other ethnic groups.

Continued issues of unequal access and performance in AP/IB programs have serious implications for the country. First, continued disparities in performance on advanced course favor Asian and White students over Black and Hispanic students. These disparities will result in unequal access to college and unequal costs associated with attending college. Finally, these disparities in unequal access to college will further manifest into unequal future economic opportunities for the fastest growing populations in the United States.

## CONCLUSION

Educators and policymakers have expressed concerns that the future workforce will not meet the needs of industry. The burgeoning growth of underprepared Black and Hispanic students presents a unique challenge to educators, especially in preparation for further postsecondary education. Over the past decade, researchers have focused on AP participation levels in states with increasing Hispanic populations such as Florida, California, Arizona, and Texas to determine any inequities in performance levels. However, very few studies exist that have analyzed a decade of performance on AP/IB examinations by student ethnicity since the implementation of *No Child Left Behind* and Texas' *Closing the Gaps* legislation. Educators and policymakers should use the disparities in results by ethnic group presented in this study to review current policies and practices surrounding the use and funding of AP and IB programs and examinations. Even with recent reform efforts in education, the results from this study indicate that gaps in performance on these exams have actually widened over the past decade.

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