

# A MULTI-YEAR ANALYSIS OF ASIAN GENDER DIFFERENCES ON ADVANCED PLACEMENT EXAMS\*

George Moore  
John R. Slate

This work is produced by The Connexions Project and licensed under the Creative Commons Attribution License †

## Abstract

The performance of Asian boys and girls on Advanced Placement (AP) exam overall scores across the United States for the past 14 years was analyzed. For each of the 14 years of data analyzed, Asian boys had statistically significant higher percentages of overall AP exam scores of 5 than did Asian girls. In addition, the gap between the mean performance of Asian boys and girls did not change over this 14-year time period. Implications of our findings are presented and recommendations for future research are made.



NOTE: This manuscript has been peer-reviewed, accepted, and endorsed by the National Council of Professors of Educational Administration (NCPEA) as a significant contribution to the scholarship and practice of education administration. In addition to publication in the Connexions Content Commons, this module is published in the *International Journal of Educational Leadership Preparation*,<sup>1</sup> Volume 6, Number 4 (October - December, 2011), ISSN 2155-9635. Formatted and edited in Connexions by Theodore Creighton and Brad Bizzell, Virginia Tech and Janet Tareilo, Stephen F. Austin State University. The assignment of topic editor and double-blind reviews monitored by IJELP Editor, Linda Lemasters, George Washington University.

## 1 Sumario en español

El desempeño de chicos y chicas asiáticos en la ADvanced Placement (AP) examen las cuentas generales a través de Estados Unidos fueron analizadas durante los últimos 14 años. Para cada uno de los 14 años

\*Version 1.1: Oct 23, 2011 6:48 am GMT-5

†<http://creativecommons.org/licenses/by/3.0/>

<sup>1</sup><http://www.ncpeapublications.org>

de datos chicos que analizados y asiáticos tuvieron porcentajes más altos estadísticamente significativos de cuentas generales de examen de AP de 5 que hizo a chicas asiáticas. Además, el vacío entre el desempeño malo de chicos y chicas asiáticos no cambió sobre este período de tiempo de 14 años. Las implicaciones de nuestras conclusiones son presentadas y las recomendaciones para futura investigación son hechas.

NOTE: Esta es una traducción por computadora de la página web original. Se suministra como información general y no debe considerarse completa ni exacta.

## 2 Introduction

Gender differences in overall achievement and on Advanced Placement examination performance have been well documented in the extant literature (e.g., American Association of University Women [AAUW], 1998, 2004; Benbow, 1988, Buck, Kostin, & Morgan, 2002; Moore, Combs, & Slate, 2010; Olszewski-Kubilius, & Turner, 2002; Spelke, 2005). Moreover, a body of literature related to Asian students and their overall achievement and AP performance exists (cf., Brandon, 1991; Nguyen, 2002; Thernstrom & Thernstrom, 2003, Moore, Joyner, Martinez-Garcia, & Slate, 2010; Moore & Slate, 2008; Moore, Slate, & Martinez-Garcia, 2009, 2010). We were not able to locate any AP literature in which gender differences between Asian boys and Asian girls were analyzed.

Understanding the differences that exist (e.g., racial, economic disadvantage, gender) helps educators and policy makers to meet the needs of all students. Recognizing that differences exist between boys and girls of Asian descent is often not a top priority with educators and policy makers. Students benefit through the rigor of the AP courses, and they benefit by receiving advanced college credit for entry-level courses based on acceptable scores on the AP exams. In this article, we report the results of 14 years of AP data analyses and make recommendations for future research and for school leaders, teachers, and counselors.

## 3 Review of Related Literature

The AAUW (1998, 2004) posited that the gender gap in science and mathematics exists, although it has decreased over the past two decades. Girls are not enrolling in the Science Technology Engineering and Mathematics (STEM) courses at the same rate as boys in high school and college. The AAUW (2004) described the existence of several projects designed to attract more girls to the STEM courses. College Board (2010, 2011) reported more boys than girls took STEM-related courses (i.e., chemistry, physics, calculus, and computer science). Spelke (2005), however, argued that the gap between boys and girls taking advanced mathematics classes has closed.

Breland, Danos, Kahn, Kubota, and Bonner (1994) analyzed girls' and boys' performance on AP History exams and reported boys tend to score at a higher level on multiple-choice exam questions, however, no statistically significant differences were present between boys and girls on open-ended questions. Beller and Gafni (2001) documented similar trends in the 1988 International Assessment of Educational Progress (IAEP) in mathematics. Gender differences were noticeably greater on the multiple-choice items than on the open-ended questions. However, for the 1991 IAEP, a greater gender difference existed in favor of the boys on the open-ended questions. Beller and Gafni (2001) asserted that the "inconsistent results challenge the simplistic assertion that girls perform relatively better on OE test items; they suggest that item format alone cannot account for gender differences in mathematic performance..." (p.16).

Moore and Slate (2010) analyzed AP performance data comparing American Indian students with White students. They identified statistically significant differences between White students' and American Indian students' participation and performance in AP courses and exams. Moore and Slate further asserted that American Indian females did not perform at the same level as American Indian males on the overall AP examination results. However, on the Biology, Psychology, and English Language & Composition exams, no statistically significant differences existed between American Indian females and American Indian males.

Moore, Combs, and Slate (2010) investigated gender differences related to participation and performance in AP courses in the United States for the May 2007 administration. They did not analyze the data as

function of gender and ethnicity. In their study, Moore, Combs, and Slate (2010) identified statistically significantly higher levels of performance for girls in only 2 out of 12 exams analyzed even though girls were enrolled in greater numbers in 10 of the 12 most frequently taken AP courses.

In *The 7th Annual Report to the Nation*, the College Board (2011) reported more girls than boys in Hispanic/Latino, African American/Black, and American Indian populations participated in the AP programs. However, no report of differences in AP exam performance was present for Asian boys and girls or for White boys and girls.

Researchers (Moore et al., 2011; Moore, Slate, & Martinez-Garcia, 2009, 2010) have analyzed AP participation and performance of Asian students. Moore et al. (2011) examined the differences in achievement between Asian students residing in Canada and Asian students residing in the U.S. They documented that Canadian Asian AP students outperformed Asian students living in the U.S. on 11 of 13 exams. Similar results existed on the Calculus BC and the Statistics exam between Canadian Asian students and Asian students in the U.S. Moore et al. (2011) did not analyze gender data for Canadian and U.S. Asian students.

Moore, Martinez-Garcia, and Slate (2010) analyzed the performance of Asian students compared to White students over a 12-year period from 1997 to 2008. Overall AP exam performance was compared for each year, and for each of the 12 years, Asian students posted higher scores than White students. For each of the 12 years, slightly more than one-third of the Asian students and more than one-third of White students did not achieve the minimum score required by most universities for advanced credit.

In a 2-year Texas study, Moore and Slate (2008) described the percentages of students taking AP exams and the percentage of students meeting the minimum score of 3 required for advanced college credit. For school years 2004-2005 and 2005-2006, a higher percentage of girls enrolled in advanced classes. However, for both school years a higher percentage of boys met the minimum score of 3. Moore and Slate (2008) did not examine AP participation and performance as a function of gender or ethnicity.

## 4 Significance of Study

Students who take AP exams and score a 3, 4, or 5 may receive advanced credit or placement depending on the university they attend. Some universities will only award advanced credit for exam scores of 4 or 5, and then some universities will accept a 3 in some courses but only 4 or 5 in the majority of courses. Regardless of the university policy, students and their families may benefit in the admissions process when AP course credits appear on the transcripts (Geiser & Santelices, 2004; Santoli, 2002), and they may benefit financially by meeting the minimum standard AP exam scores required for advanced credit in beginning college courses.

When reporting AP examination scores, the College Board combines Asian and Pacific Islander students in the results. Disaggregated data from the two groups revealed that Pacific Islander students tend to score below Asian students (Thernstrom & Thernstrom, 2008). For school administrators and teachers to serve all students' needs, they should investigate the differences between boys and girls of various populations. Asian boys and girls successes rarely appear in the AP literature, and even though scholars (e.g., Brydolf, 2009; Cherian & Bodenhausen, 2000; Empelo, 2006; Kim & Yeh, 2002; Lee, 1996; Wing, 2007) have refuted the stereotypes often associated with Asian students, a number of students may go unnoticed who present various learning issues. Gaining a better understanding of the successes of Asian students may help school leaders, curriculum specialists, and teachers to create policies and processes that benefit all Asian students.

## 5 Purpose of the Study

Our purpose in conducting this study was to analyze the overall performance of Asian boys and Asian girls on overall Advanced Placement exam performance for the past 14 years. We wanted to determine the extent to which the average AP exam scores differed for this ethnic group by gender. Moreover, we wanted to ascertain the extent to which any trend was present over time in the overall AP exam performance of Asian boys compared to the overall AP exam performance of Asian girls.

## 6 Research Questions

In this study, the following research questions were addressed: (a) What is the difference between Asian boys and Asian girls on their overall performance on Advanced Placement exams for the 2010 test administration?; (b) This same research question was repeated for each of the remaining 13 test administrations; and (c) What trend is present in the overall AP exam performance of Asian boys compared to the overall AP exam performance of Asian girls?

## 7 Method

### 7.1 Participants

Data from the 1997 through the May, 2010 administration of the Advanced Placement exams for students across the U.S. were obtained for this study. Present in The College Board dataset ([http://www.collegeboard.com/student/testing/ap/exgrd\\_sum/2010](http://www.collegeboard.com/student/testing/ap/exgrd_sum/2010)) are excel files for student performance at each state level and an aggregated file for student performance in the U.S. The national performance excel data files and/or the pdf files were downloaded for this study. Within this file contains information on student AP exam performance separated by ethnic membership and by gender. For purposes of this study, performance on the overall AP exams of Asian boys and of Asian girls was selected.

### 7.2 Instrumentation and Procedures

Archival data were acquired from a College Board website ([http://www.collegeboard.com/student/testing/ap/exgrd\\_sum/2010](http://www.collegeboard.com/student/testing/ap/exgrd_sum/2010)). The website contains an excel file and/or pdf file for student enrollment in AP courses and performance on AP exams for each state and for the nation for 1997 through 2010. Each of these files contains information on student performance separated by ethnic membership and by gender. Along with state by state excel files, the College Board also provides a national summary report. We utilized their national summary report excel files and/or national summary report pdf files for the 1997 through the May, 2010 AP exam administrations for this investigation. These years represent all of the national report files available.

## 8 Results

To determine the extent to which differences were present between Asian boys and Asian girls on Advanced Placement exam performance, Pearson chi-square procedures were performed. Because frequency data were present for each ethnic group's performance on their overall Advanced Placement exam score (i.e., 5, 4, 3, 2, 1), a Pearson chi-square procedure is viewed as the appropriate procedure to utilize when one variable is categorical (i.e., gender) and the other variable involves a frequency count (i.e., number of students who obtained a score of 5, a 4, a 3, a 2, or a 1). For the first research question in which the focus was placed on overall AP exam scores between Asian boys and girls for the 2010 test administration, the result was statistically significant,  $\chi^2(4, N = 431136) = 2509.25, p < .001, \text{Cramer's } V = .08$ . The effect size for this statistically significant result was small (Cohen, 1988). In Table 1, 24.91% of Asian boys had the highest exam scores, a 5, compared with 19.47% of Asian girls. Regarding exam scores that are not accepted typically by universities, 36.60% of Asian girls had scores in these categories, compared to 31.27% of Asian boys.

### Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys

**and for Asian Girls for the 2010 Exam Administration**

Exam Scores	Asian Boys Percentage of Total and <i>n</i>	Asian Girls Percentage of Total and <i>n</i>
5	24.91% ( <i>n</i> = 52,094)	19.47% ( <i>n</i> = 43,230)
4	22.20% ( <i>n</i> = 46,426)	20.99% ( <i>n</i> = 46,608)
3	21.61% ( <i>n</i> = 45,189)	22.93% ( <i>n</i> = 50,918)
2	15.92% ( <i>n</i> = 33,294)	18.36% ( <i>n</i> = 40,769)
1	15.35% ( <i>n</i> = 32,098)	18.24% ( <i>n</i> = 40,510)

**Table 1**

For the second research question in which the focus was placed on overall AP exam scores between Asian boys and girls for the 2009 test administration, the result was statistically significant,  $\chi^2(4, N = 396202) = 2518.69, p < .001$ , Cramer's  $V = .08$ . The effect size for this statistically significant result was small (Cohen, 1988). For the 2008 AP test administration, the result was statistically significant,  $\chi^2(4, N = 364391) = 2074.13, p < .001$ , Cramer's  $V = .08$ . The effect size for this statistically significant result was small (Cohen, 1988). For these two years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the 2010 test administration. Readers are directed to Tables 2 and 3 for the AP exam percentages for 2009 and 2008.

**Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2009 Test Administration**

Exam Scores	Asian Boys Percentage of Total and <i>n</i>	Asian Girls Percentage of Total and <i>n</i>
5	25.16% ( <i>n</i> = 48,004)	19.46% ( <i>n</i> = 39,988)
4	22.17% ( <i>n</i> = 42,299)	20.99% ( <i>n</i> = 43,115)
3	21.51% ( <i>n</i> = 41,031)	22.70% ( <i>n</i> = 46,639)
2	16.46% ( <i>n</i> = 31,393)	19.28% ( <i>n</i> = 39,613)
1	14.69% ( <i>n</i> = 28,035)	17.56% ( <i>n</i> = 36,085)

**Table 2**

**Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2008 Test Administration**

Exam Scores	Asian Boys Percentage of Total and <i>n</i>	Asian Girls Percentage of Total and <i>n</i>
5	23.09% ( <i>n</i> = 40,362)	17.81% ( <i>n</i> = 33,771)
4	21.52% ( <i>n</i> = 37,599)	20.33% ( <i>n</i> = 38,557)
3	22.23% ( <i>n</i> = 38,836)	23.49% ( <i>n</i> = 44,549)
2	17.32% ( <i>n</i> = 30,266)	19.79% ( <i>n</i> = 37,550)
1	15.83% ( <i>n</i> = 27,666)	18.58% ( <i>n</i> = 35,235)

**Table 3**

Concerning the 2007 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 333794) = 1546.13, p < .001$ , Cramer's  $V = .07$ . The effect size for this statistically significant result was small (Cohen, 1988). For the 2006 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 299871) = 1659.06, p < .001$ , Cramer's  $V = .07$ . The effect size for this statistically significant result was again small (Cohen, 1988). For these two years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the previous three years. Readers are directed to Tables 4 and 5 for the AP exam percentages for 2007 and 2006.

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2007 Test Administration***

Exam Scores	Asian Boys Percentage of Total and $n$	Asian Girls Percentage of Total and $n$
5	22.38% ( $n = 35,820$ )	17.46% ( $n = 30,443$ )
4	22.34% ( $n = 35,751$ )	21.14% ( $n = 36,856$ )
3	22.99% ( $n = 36,782$ )	24.41% ( $n = 42,558$ )
2	18.06% ( $n = 28,898$ )	20.62% ( $n = 35,947$ )
1	14.23% ( $n = 22,769$ )	16.36% ( $n = 28,510$ )

Table 4

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2006 Test Administration***

Exam Scores	Asian Boys Percentage of Total and $n$	Asian Girls Percentage of Total and $n$
5	21.28% ( $n = 30,357$ )	16.19% ( $n = 25,458$ )
4	22.09% ( $n = 31,526$ )	20.97% ( $n = 32,969$ )
3	23.52% ( $n = 33,559$ )	24.64% ( $n = 38,735$ )
2	19.14% ( $n = 27,306$ )	22.14% ( $n = 34,809$ )
1	13.97% ( $n = 19,936$ )	16.04% ( $n = 25,216$ )

Table 5

Regarding the 2005 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 276202) = 1685.83, p < .001$ , Cramer's  $V = .08$ . The effect size for this statistically significant result was again small (Cohen, 1988). Regarding the 2004 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 244296) = 1359.13, p < .001$ , Cramer's  $V = .07$ . The effect size for this statistically significant result was again small (Cohen, 1988). For these two years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the previous five years. Readers are directed to Tables 6 and 7 for the AP exam percentages for 2005 and 2004.

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys***

**and Girls for the 2005 Test Administration**

Exam Scores	Asian Boys Percentage of Total and $n$	Asian Girls Percentage of Total and $n$
5	20.68% ( $n = 27,135$ )	15.71% ( $n = 22,777$ )
4	22.12% ( $n = 29,033$ )	20.27% ( $n = 29,388$ )
3	23.66% ( $n = 31,048$ )	24.91% ( $n = 36,110$ )
2	19.32% ( $n = 25,357$ )	22.36% ( $n = 32,412$ )
1	14.21% ( $n = 18,651$ )	16.75% ( $n = 24,291$ )

**Table 6****Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2004 Test Administration**

Exam Scores	Asian Boys Percentage of Total and $n$	Asian Girls Percentage of Total and $n$
5	20.79% ( $n = 24,093$ )	15.76% ( $n = 20,241$ )
4	21.75% ( $n = 25,195$ )	20.44% ( $n = 26,254$ )
3	24.18% ( $n = 28,017$ )	25.69% ( $n = 33,004$ )
2	19.39% ( $n = 22,465$ )	22.51% ( $n = 28,911$ )
1	13.88% ( $n = 16,085$ )	15.59% ( $n = 20,031$ )

**Table 7**

For the 2003 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 225314) = 1584.23, p < .001$ , Cramer's  $V = .08$ . The effect size for this statistically significant result was small (Cohen, 1988). Regarding the 2002 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 205974) = 1224.72, p < .001$ , Cramer's  $V = .08$ . The effect size for this statistically significant result was again small (Cohen, 1988). For these two years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the previous seven years. Readers are directed to Tables 8 and 9 for the AP exam percentages for 2003 and 2002.

**Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2003 Test Administration**

Exam Scores	Asian Boys Percentage of Total and $n$	Asian Girls Percentage of Total and $n$
5	20.01% ( $n = 21,436$ )	14.38% ( $n = 16,995$ )
4	21.76% ( $n = 23,314$ )	20.71% ( $n = 24,479$ )
3	25.29% ( $n = 27,092$ )	26.39% ( $n = 31,195$ )
2	20.46% ( $n = 21,923$ )	23.78% ( $n = 28,102$ )
1	12.48% ( $n = 13,375$ )	14.73% ( $n = 17,403$ )

**Table 8**

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2002 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	20.05% ( $n = 19,655$ )	15.04% ( $n = 16,235$ )
4	22.32% ( $n = 21,883$ )	20.96% ( $n = 22,623$ )
3	25.38% ( $n = 24,881$ )	26.55% ( $n = 28,665$ )
2	19.54% ( $n = 19,156$ )	23.21% ( $n = 25,054$ )
1	12.69% ( $n = 12,447$ )	14.24% ( $n = 15,375$ )

**Table 9**

Concerning the 2001 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 184337) = 1355.43, p < .001$ , Cramer's  $V = .09$ . The effect size for this statistically significant result was small (Cohen, 1988). For the 2000 AP test administration, the result was again statistically significant,  $\chi^2(4, N = 167490) = 783.61, p < .001$ , Cramer's  $V = .07$ . The effect size for this statistically significant result was small (Cohen, 1988). For these two years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the previous nine years. Readers are directed to Tables 10 and 11 for the AP exam percentages for 2001 and 2000.

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2001 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	18.88% ( $n = 16,676$ )	13.31% ( $n = 12,783$ )
4	21.58% ( $n = 19,054$ )	20.29% ( $n = 19,483$ )
3	25.58% ( $n = 22,588$ )	27.02% ( $n = 25,948$ )
2	21.27% ( $n = 18,779$ )	25.33% ( $n = 24,321$ )
1	12.69% ( $n = 11,206$ )	14.06% ( $n = 13,499$ )

**Table 10**

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 2000 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	18.85% ( $n = 15,379$ )	14.45% ( $n = 12,413$ )
4	22.06% ( $n = 17,996$ )	20.84% ( $n = 17,899$ )
3	26.36% ( $n = 21,508$ )	27.56% ( $n = 23,673$ )
2	20.09% ( $n = 16,393$ )	23.31% ( $n = 20,020$ )
1	12.64% ( $n = 10,316$ )	13.85% ( $n = 11,893$ )

**Table 11**



Regarding the 1999 AP test administration, the result was statistically significant,  $\chi^2(4, N = 145654) = 843.95, p < .001$ . The effect size for this finding was .08 (Cramer's  $V$ ), small (Cohen, 1988). Concerning the 1998 AP test administration, the result was statistically significant,  $\chi^2(4, N = 127633) = 644.64, p < .001$ . The effect size for this finding was .07 (Cramer's  $V$ ), small (Cohen, 1988). With respect to the 1997 AP test administration, the result was statistically significant,  $\chi^2(4, N = 117650) = 415.64, p < .001$ . The effect size for this finding was .06 (Cramer's  $V$ ), small (Cohen, 1988). For these three years of data, percentages of Asian boys and girls who obtained scores of 5, 4, 3, 2, and 1 were commensurate with the percentages reported for the previous 11. Readers are directed to Tables 12, 13, and 14 for the AP exam percentages for 1999, 1998, and 1997.

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 1999 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	19.36% ( $n = 13,932$ )	14.33% ( $n = 10,562$ )
4	22.02% ( $n = 15,844$ )	20.76% ( $n = 15,302$ )
3	26.04% ( $n = 18,737$ )	27.59% ( $n = 20,338$ )
2	20.55% ( $n = 14,785$ )	23.76% ( $n = 17,511$ )
1	12.02% ( $n = 8,652$ )	13.56% ( $n = 9,991$ )

**Table 12**

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 1998 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	19.31% ( $n = 12,000$ )	14.35% ( $n = 9,394$ )
4	21.79% ( $n = 13,550$ )	21.36% ( $n = 13,989$ )
3	27.22% ( $n = 16,921$ )	28.65% ( $n = 18,760$ )
2	20.61% ( $n = 12,813$ )	23.42% ( $n = 15,336$ )
1	11.06% ( $n = 6,872$ )	12.21% ( $n = 7,998$ )

**Table 13**

***Frequencies and Percentages of Overall Advanced Placement Exam Scores for Asian Boys and Girls for the 1997 Test Administration***

Exam Scores	Asian BoysPercentage of Total and $n$	Asian GirlsPercentage of Total and $n$
5	18.98% ( $n = 11,046$ )	14.87% ( $n = 8,842$ )
4	21.99% ( $n = 12,796$ )	21.34% ( $n = 12,690$ )
3	27.54% ( $n = 16,022$ )	29.22% ( $n = 17,376$ )
2	20.05% ( $n = 11,664$ )	22.18% ( $n = 13,189$ )
1	11.44% ( $n = 6,655$ )	12.39% ( $n = 7,370$ )

**Table 14**

An examination of the numbers of Asian American students who completed AP exams shows 209,101 Asian boys who completed AP exams in 2010, compared with 222,035 Asian girls who completed AP exams in 2010. These numbers are higher than the number of Asian boys who completed AP exams in 1997 ( $n = 58,183$ ) and the number of Asian girls who completed AP exams in 1997 ( $n = 59,467$ ). The difference of the number of Asian boys and Asian girls who completed AP exams across this 14-year time period reflects an increase of over 300%.

***Means on Overall Advanced Placement Exam Scores for Asian Boys and Girls for All 14 Years***

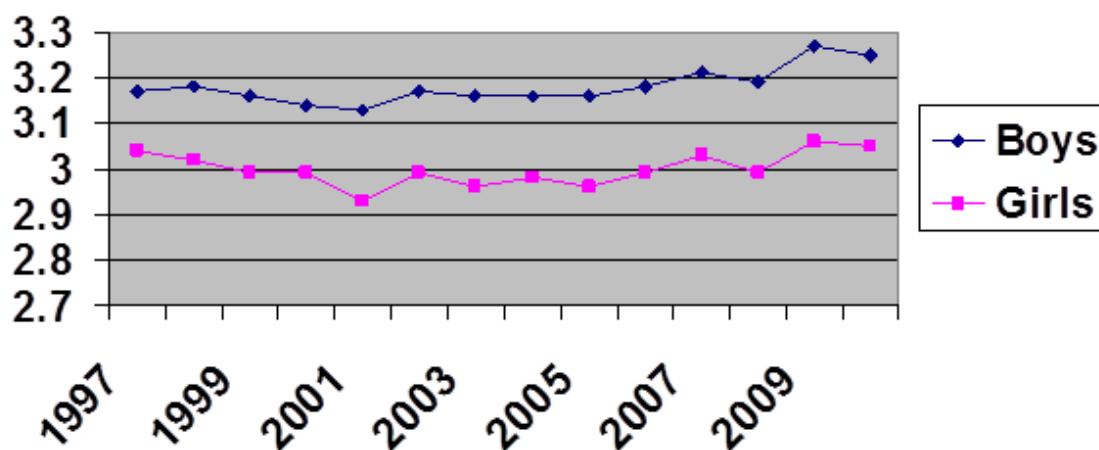
Year	Asian Boys		Asian Girls	
	n	M	n	M
2010	209,101	3.25	222,035	3.05
2009	190,762	3.27	205,440	3.06
2008	174,729	3.19	189,662	2.99
2007	160,020	3.21	174,314	3.03
2006	142,684	3.18	157,187	2.99
2005	131,224	3.16	144,978	2.96
2004	115,855	3.16	128,441	2.98
2003	107,140	3.16	118,174	2.96
2002	98,022	3.17	107,952	2.99
2001	88,303	3.13	96,034	2.93
2000	81,592	3.14	85,898	2.99
1999	71,950	3.16	73,704	2.99
1998	62,156	3.18	65,477	3.02
1997	58,183	3.17	59,467	3.04

**Table 15**

Another statistic of importance is the average AP exam score. In 1997, Asian boys had an average AP exam score of 3.17, compared an average AP exam score of 3.04 for Asian girls. In the most recent year, 2010, Asian boys' average AP exam score was 3.25, compared to an average AP exam score of 3.05 for Asian girls. Across all 14 years, the mean for Asian boys remained above 3.00 whereas the mean for Asian girls dropped below 3.00 for 9 of the 14 years. Table 15 depicts the average AP exam scores for Asian boys and girls from 1997 through 2010. Figure 1 shows a visual depiction of these averages.

*Figure 1. Average Advanced Placement Exam Score for Asian Boys and Girls From 1997 Through 2010*

## Asian Boys and Girls Average AP Exam Score From 1997 Through 2010



2

### 9 Discussion

Lee (2006) and Mickleson (2003) suggested that gender in Asian American students was an important factor to examine. Therefore, in this study, we analyzed the AP exam score performance of Asian boys and of Asian girls for the past 14 years, 1997 through 2010, test administrations. The overall AP exam scores obtained by Asian boys, as compared to Asian girls' scores, were statistically significantly higher in all instances. The average AP exam score difference between Asian boys and Asian girls increased from the 1997 to the 2010 exam administrations.

Our purpose was to analyze AP exam data to determine if differences existed, but we did not attempt to determine why differences exist. Therefore, a few questions arise for further research: (a) What is the difference in self-efficacy for AP success between Asian boys and Asian girls?; (b) How do AP teachers perceive gender differences between Asian boys and girls?; (c) What cultural influences might play a part in these results?; (d) What familial influences might play a part in these results?; (e) What guidance processes are available for students entering AP classes?; and (f) What rigorous curriculum exists for students prior to the AP experience?

Brydolf (2009) and Lee (2006) posited that differences exist within the ethnic grouping of Asian, Asian American, or Pacific Islander. Within each are many different groupings, with different cultural patterns existing among these various groups. As reported by Thernstrom and Thernstrom (2008), Pacific Islander students tend to score below Asian students. Educators will serve their Asian students better if they know more about the various cultures in which these students live. As students come from many cultures, school officials must be aware of any preconceived ideas about all Asian and Pacific Islander students being the same or having the same backgrounds. Furthermore, we suggest caution for all school personnel regarding the stereotypes and The Model Minority myth (Brydolf, 2009; Cherian & Bodenhausen, 2000; Empelo, 2006;

<sup>2</sup>[http://cnx.org/content/m41412/latest/moore\\_slatefigure1.png/image](http://cnx.org/content/m41412/latest/moore_slatefigure1.png/image)

Kim & Yeh, 2002; Lee, 1996; Wing, 2007; Zhao & Qui, 2009).

Over the 14 years of AP exam scores examined in this study, many Asian American boys and girls did not receive the scores required for advanced credit at numerous universities across the United States. However, girls were less likely to receive the scores—3, 4, or 5—required at most universities, and they were also less likely to score a 4 or a 5 as required at some of the most prestigious schools in the U.S. Moore, Combs, and Slate (2010) and Moore, Slate and Martinez-Garcia (2010) reported similar results across various AP exams.

Educators should study the prerequisite skills and knowledge for all AP courses offered in their systems to determine the degree of alignment of curriculum, instruction, and assessment. Teachers should identify Asian American girls' learning needs so improved learning experiences enhance these students' performance on AP exams. Furthermore, educators should view the scope and sequence of the entire school curriculum to ensure students have access to a rigorous curriculum prior to their enrollment in AP classes (Moore & Slate, 2008).

Readers should be cautious in the extent to which they make generalizations from our findings. The extent to which our findings hold true across multiple years is unknown. Second, students who take AP courses and who complete AP exams are self-selected. Thus, the extent to which students who take AP exams are representative of Asian, Asian American, and Pacific Islander students, in this case, is unknown. Therefore, until our findings are replicated by other researchers, caution is warranted.

## 10 References

- American Association of University Women. (1998). *Gender gaps: Where schools still fail our children*. Washington, DC: Author.
- American Association of University Women. (2004). *Under the microscope: A decade of gender equity projects in the sciences*. Washington, DC: Author.
- Beller, M., & Gafni, N. (2000). Can item format (multiple choice vs. open-ended) account for gender differences in mathematics achievement? *Sex Roles, 42*(1), 1-21.
- Benbow, C. P. (1988). Sex differences in mathematical reasoning ability in intellectually talented preadolescents: Their nature, effects, and possible causes. *Behavioral and Brain Sciences, 11*, 169-232.
- Brandon, P. R. (1991). Gender differences in young Asian Americans[U+02BC] educational attainments. *Sex Roles, 25*(1-2), 45-61. doi:10.1007/BF00289316
- Breland, H. M., Danos, D. O., Kahn, H. D., Kubota, M. Y., & Bonner, M. W. (1994). Performance versus objective testing and gender: An exploratory study of an advanced placement history examination. *Journal of Educational Measurement, 31*, 275-293.
- Brydolf, C. (2009). Getting real about the 'Model Minority:' Asian Americans and Pacific Islanders fight their stereotype. *Education Digest, 74*(5), 37-44.
- Buck, G., Kostin, I., & Morgan, R. (2002). *Examining the relationship of content to gender-based performance differences in Advanced Placement exams*. College Entrance Examination Board: NY.
- Cherian, S., & Bodenhausen, V. (2000). When positive stereotypes threaten intellectual performance: The psychological hazards of "Model Minority" status. *American Psychological Society, 11*, 399-402.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- College Board. (2010). *The 6th annual AP report to the nation*. Retrieved from <http://professionals.collegeboard.com/p/annual-ap-report-to-the-nation-2010-subject-reports.pdf>
- College Board. (2011). *The 7th annual AP report to the nation*. Retrieved from <http://professionals.collegeboard.com/p/annual-ap-report-to-the-nation-2011.pdf>
- Empleo, A. C. (2006). Disassembling the Model Minority: Asian Pacific Islanders identities and their schooling experiences. *Multicultural Perspectives, 8*(3), 46-50.
- Geiser, S., & Santelices, V. (2004). *The role of Advanced Placement and honors courses in college admissions*. Retrieved from <http://repositories.cdlib.org/cshe/CSHE-4-04/>
- Kim, A., & Yeh, C. J. (2002). Stereotypes of Asian American students. *Eric Digests*. Retrieved from <http://www.ericdigests.org/202-4/asians.html>

- Lee, S. J. (1996). Behind the model-minority stereotype: Voices of high- and low-achieving Asian American students. *Anthropology & Education Quarterly*, 25, 413-429.
- Lee, S. J. (2006). Additional complexities: Social class, ethnicity, generation, and gender in Asian American student experiences. *Race, Ethnicity and Education*, 9(1), 17-28. doi: 10.1080/13613320500490630
- Moore, G. W., Combs, J. P., & Slate, J. R. (2010, August). *Gender differences in Advanced Placement exam participation and performance: A national study*. Paper presented at the National Council of Professors of Educational Administration. Washington, DC.
- Moore, G. W., Joyner, S. A., Martinez-Garcia, C., & Slate, J. R. (2011, April). *Advanced Placement courses and Asian student performance: An international study*. Roundtable presentation at the annual conference of the American Educational Research Association, New Orleans, LA.
- Moore, G. W., & Slate, J. R. (2008). Who's taking the Advanced Placement courses and how are they doing: A statewide two-year study. *The High School Journal*, 19(1), 56-67. doi:10.1353/hsj.0.0013
- Moore, G. W., Slate, J. R., & Martinez-Garcia, C. (2009). Advanced Placement exam performance and Asian students: A national study. *Asian Journal for Educational Research and Synergy*, 1(2), 13-23.
- Moore, G. W., Slate, J. R., & Martinez-Garcia, C. (2010). A twelve-year examination of Advanced Placement courses and Asian student performance. *Asian Journal for Educational Research and Synergy*, 2(2), 82-92.
- Nguyen, L. (2002). *Characteristics of the traditional Asian family*. Retrieved from <http://www.coedu.usf.edu/zalaquett/>
- Olszewski-Kubilius, P., & Turner, D. (2002). Gender differences among elementary school-aged gifted students in achievement, perceptions of ability, and subject preference. *Journal for the Education of the Gifted*, 25, 233-268.
- Santoli, S. P. (2002). Is there an Advanced Placement advantage? *American Secondary Education*, 3(2), 23-35.
- Spelke, E. S. (2005). Sex differences in intrinsic aptitude for mathematics and science? A critical review. *American Psychologist*, 60, 950-958.
- Thernstrom, A., & Thernstrom, S. (2003). *No excuses: Closing the racial gap in learning*. New York, NY: Simon and Schuster.
- Wing, J. Y. (2007). Beyond Black and White: The Model Minority Myth and the invisibility of Asian American students. *The Urban Review*, 39, 455-487.
- Zhao, Y., & Qui, W. (2009, January). How good are the Asians? Refuting four myths about Asian American academic achievement. *Phi Delta Kappan*, 90, 338-334.