The Influence of Advanced Placement Enrollment on High School GPA and Class Rank: Implications for School Administrators*

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Abstract

As high schools offer more pre-Advanced Placement (pre-AP) and Advanced Placement (AP) courses to prepare students for college academics, students often are given quality grade point average (GPA) points to help compensate for the rigorous curriculum. In states where class ranking determines automatic university admission, fluctuations of class ranking might influence students' decisions regarding whether or not to enroll in AP courses. Using a correlational design, a convenience sample of 116 high school graduate transcripts was analyzed for pre-AP and AP course completion, GPA, and class rank. Data were analyzed using measures of correlation and multiple regression. Results of a transcript analysis for pre-AP and AP course completion confirmed that the number of completed pre-AP and AP courses was a strong predictor of high school GPA and class rank. The findings suggest that as educators begin to understand the implications of AP course enrollment on the post-secondary educational options available to students, educators might alter the advice given to students as they embark on their college planning. Implications for school administrators are discussed.

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2 Sumario en español

Como colegios secundarios ofrecen Colocación más-pre avanzado (pre-AP) y Colocación Avanzada (AP) los cursos para preparar a estudiantes para académicos colegiales, los estudiantes a menudo son dados calidad promedio de punto de grado (GPA) los puntos para ayudar a compensar el plan riguroso. En estados donde catalogan situar determina admisión automática de universidad, las fluctuaciones de situar de clase quizás influyan las decisiones de estudiantes con respecto a sin tener en cuenta si matricularse en cursos de AP. Utilizando un diseño correlacional, una muestra de conveniencia de 116 colegio secundario expedientes que graduados fueron analizados para el pre-AP y terminación de curso de AP, para GPA, y para grado de clase. Los datos fueron analizados utilizar medidas de correlación y múltiples retroceso. Los resultados de un análisis de expediente para el pre-AP y terminación de curso de AP confirmaron que el número de pre-AP y cursos completado de AP fue un pronosticador fuerte de colegio secundario GPA y grado de clase. Las conclusiones sugieren que como educadores comienzan a comprender las implicaciones de matriculación de curso de AP en las opciones educativas poste-secundarios disponibles a estudiantes, los educadores quizás alteren el consejo dado a estudiantes como se embarcan en su planificación del colegio. Las implicaciones para administradores de escuela son discutidas.

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3 The Influence of Advanced Placement Enrollment on High School GPA and Class Rank: Implications for School Administrators

As the United States searches for ways to educate the nation's future workforce, high school graduates' preparedness for college is under scrutiny (Strong American Schools, 2008; U.S. Department of Education, 2008). As many as 40% of recent high school graduates state that there are gaps between their high school education and the skills, abilities, and work habits that are required of them in post-secondary education and in the work force (Hart, 2005). Up to 40% of first-year college students will leave their universities

[1] http://www.ncpeapublications.org/latest-issue-ijelp.html

because of the adjustments required to adapt to college life (Rickinson & Rutherford, 1996); and of the students entering college nationally, only 64% complete a degree within 6 years (Cook & Pullaro, 2010). Gerdes and Mallinckrodt (1994) reported that college students tended to overestimate their abilities to adjust academically and socially to life in college. Although personal factors (i.e., self-esteem and ethnic identity) and interpersonal factors (i.e., support from parents and peers) also might contribute to college students exiting from college (Toews & Yazedjian, 2009), one third of university students identified academic work as the primary reason for withdrawing from college (Hart, 2005). Clearly, a problem exists as more college graduates are required to maintain the U.S. economy and more high school graduates are unprepared for the academic demands of post-secondary education.

In 1999, Adelman reported that "academic intensity and quality of one's high school curriculum" (p. 5) prepared students for a bachelor's degree; this was particularly true with Black and Hispanic students. The author went on to state that participation in Advanced Placement (AP) courses was strongly correlated to completion of a bachelor's degree (Adelman, 1999). Regardless of their achievement level in the courses, students who took more advanced coursework were more college ready than were those who did not take advanced courses (ACT, 2004). Adelman's (2006) Answers in the Tool Box replication study indicated the importance of an academically intense curriculum that included one or more AP courses. Further, students who complete rigorous coursework in high school have additional and better options after high school graduation, whether in advancing their education, workplace training, or military training (ACT, 2004; Shireman, 2004). However, Klopfenstein and Thomas (2009) found that taking the AP courses alone did not guarantee that students would develop the discipline and study skills required in college. Instead, they suggested that students who had not mastered those skills first enroll in college preparatory classes that emphasized the skills of "note taking, study skills, and intellectual discipline" (p. 887).

Despite reports over the past 25 years emphasizing the importance of a rigorous curriculum, almost one third of U.S. high school students do not take the advanced coursework that was recommended for all students in 1983 (ACT, 2004; U.S. Department of Education, 2008). The Education Trust (2005) reported that high-impact high schools (i.e., high schools that produced large academic growth among students who entered significantly behind academically; The Education Trust, 2005) offer open enrollment to AP and honors courses but barriers still exist for entry into advanced courses at average-impact high schools (i.e., high schools that produced average academic growth; The Education Trust, 2005). In high schools attended by low income and minority students, little attention is paid to rigorous instruction past an eighth-grade level, the level of state standardized assessments (Shireman, 2004).

Current high school programs are expected to prepare students to meet the demands of society, including entry into post-secondary educational institutions (Van Reusen, Shoho, & Barker, 2001). As technology moves the U.S. economy from a manufacturing focus to a service focus and other economies are strengthened through globalization, the U.S. educational system is increasingly criticized for not producing the employees needed for the future (Bottoms & Young, 2008; Freidman, 2005). A college degree has become more essential in the United States if workers wish to maintain middle class lifestyles (Lavin, 2000; Nitri, 2001). It is estimated that 80% of the fastest growing careers will require education beyond a high school diploma (The Education Trust, 2005). Despite the need for advanced degrees, only 25% of students who enter kindergarten in the United States complete a college degree 19 years later (U.S. Department of Education, 2008). Shortages of qualified workers will jeopardize the economic growth of states and eventually the nation (Bottoms & Young, 2008).

Despite the importance of college education, historically, high school students have been unprepared for college. Approximately 30% of freshmen students enroll in one or more remedial courses, most often for mathematics, reading, or writing (National Center for Educational Statistics, 1998). The rates for minority students and those enrolled in 2-year public institutions were higher, with more than 40% of freshmen enrolled in remedial courses (National Center for Educational Statistics, 1998). In a 1996 study, Rickinson and Rutherford found that 40% of college students did not believe that their prior educational experiences had prepared them sufficiently to cope with courses in their chosen college majors and that the gap between their high school education and college education was too large.

Greene and Forster (2003) reported that only 32% of public high school students left high school qualified

to attend a 4-year college. Too many students matriculated in community colleges with open admission programs, only to register in non-credit remedial and developmental courses (Bottoms & Young, 2008). Moreover, less than 10% of college instructors at 2-year colleges surmised that most of their students come to college very well prepared (Hart, 2005). According to the ACT (2004) report, only 22% of students were academically prepared for college-level work in English, mathematics, and science. Further, less than 20% of Black and Hispanic public high school students departed high school prepared for college, leaving them minimally represented as qualified college applicants. In addition, more than one half of all college students reported that they left high school unprepared for the academic work of college and lacked the study habits that were expected of them in college (Hart, 2005).

Despite the academic unpreparedness, students are still admitted into colleges and are enrolled in adult basic education courses (Greene & Forster, 2003). Almost one third of students entering post-secondary training or college also must enroll in at least one remedial course in college. Furthermore, the more remedial courses students must take, the greater the chance the students will not complete a college degree (ACT, 2004; Adelman, 1999). Many college instructors report that they spend time teaching material that students should have learned in high school (Hart, 2005). Indeed, post-secondary institutions and state governments spend an estimated $2 billion each year on remediation costs for students who are unprepared academically for college (Barnett, 2002; Fulton, 2010, Strong American Schools, 2008).

To address the need for a more rigorous curriculum to prepare students better for post-secondary education, College Board has expanded its AP program by 134% from the 2001 testing period to the 2011 testing period. In 2011, more than 1.97 million students participated in one or more AP examinations (College Board, 2011). To encourage high school students to enroll in the AP courses, it has become common practice for high schools and universities to award quality grade point average (GPA) points to students who enroll in these more demanding courses (Geiser & Santelices, 2004). Due to the possible negative impact on their GPAs, class rankings, and college admissions, the issuance of quality points helps to compensate students for the increased rigor of AP coursework (Sadler & Tai, 2007). Hawkins (2004) reported that the top determinants used to decide college admission in 2003 were grades in college preparatory courses, overall GPA, class rank, and standardized admissions tests. Hawkins also reported that 69% of high schools used weighted high school GPAs as a method to adjust for academically challenging courses. In Texas and California, all students meeting a specific threshold of class rank are guaranteed admission to state public colleges and universities (Horn & Flores, 2003; Texas Administrative Code, 2010). With the increased emphasis placed on GPA and class rank for college admission, do the quality points given to students who elect to enroll in AP courses compensate for the risks of a more rigorous curriculum? Limited studies exist outside of the 2002 California study where Solórzano and Ornelas reported that university assigned quality points to AP and honors courses unfairly inflated the GPAs of the students who had access to multiple AP courses as compared to the GPAs of students who had access to a limited number of AP courses. Specifically, more than one half of California's comprehensive high schools, most of which were located in rural or urban areas, offered less than five AP courses; students of these schools were disadvantaged in the competitive admissions process for California's flagship university where the average student admitted completed 16 AP courses and earned quality GPA points from the university (Solórzano & Ornelas, 2002).

4 Theoretical Framework

Two theoretical concepts helped frame the context of this study: cognitive load theory and social capital theory. Developed by John Sweller (1988), cognitive load theory was used to study information processing and problem solving. This theory indicates that the more expertise a person holds is equated to the number of schemas that a person has acquired through experiences of learning. Sweller (1988) defined schemas as the mental framework people have for processing and remembering information. The more practice and exposure a person has, the more schemas he or she will possess. As applied to the current study, we expected that the more exposure that students have to advanced courses such as pre-AP and AP, the more the students' preparedness for advanced course work would increase as they moved from pre-AP to AP course work.

James Coleman's (1998) social capital theory helps to explain the role of schools in creating students

who are prepared for post-secondary education. Coleman believed that effective social relationships that are present in schools lead to the investment of time and resources to create greater human capital in students. As it applies to this study, we expected that high school students who graduated with more pre-AP and AP course completions would have experienced more social capital and human capital investment from their increased exposure to the advanced courses and the increased rigor of moving from pre-AP to AP course completion.

5 Purpose of Study

The purpose of the current study was to examine the relationship between the number of Pre-AP and AP courses taken by high school students and both the students' GPAs and class rank. It was hoped that investigating the relationship between the number of pre-AP and AP courses and students' GPAs and class rank would assist school leaders as they inform students and parents regarding the academic readiness benefits of taking pre-AP and AP courses. Moreover, it was hoped that educators will be better prepared to discuss the realities of a challenging curriculum that might affect students' GPAs, class rankings, and, possibly, the post-secondary educational institution of their choice.

6 Research Question

The following research question was addressed: To what extent do pre-AP course completion and AP course completion predict high school students' GPAs and class ranks? Further, the following hypotheses were addressed:

1. High school students with more pre-AP course completions have higher GPAs and class ranks.
2. High school students with more AP course completions have higher GPAs and class ranks.

7 Method

7.1 Selection of Participants

For the purpose of this study, a convenient sample was used (Johnson & Christensen, 2010). Data from a small, single, specialized high school in an urban school district in Texas were used to determine the correlation among GPA, Pre-AP, AP, and class rank. A small sample from one school also allowed for threats for internal validity to be minimized. For example, as pre-AP and AP course offerings increased within the school, school district and the state, the expectations for students to take the courses also increased. Studying one graduating class in one school allowed for minimal data variances resulting from varied expectations placed on the students, schools, and districts. In addition, choosing the specialized school allowed for reference point data to be collected without accounting for special learning programs such as those for students with special learning needs and students with limited English proficiency.

The graduating class comprised 116 students, with 41 students (35%) being males and 75 (65%) students being females. The ethnic composition of the high school students comprised 29 African American students (25%), 86 Hispanic students (74%), and 1 White student ($< 1\%$). The percentage of participants who completed at least one semester of a pre-AP course was 84%, and 86% completed at least one semester of an AP course. However, 4% of the participants completed neither a pre-AP nor an AP course. The participants took an average of 7.78 semesters of pre-AP courses and 5.8 semesters of AP courses. The sample size was sufficient for a regression analysis based on Green's (1991) recommendations of minimum sample size for a multiple regression. Each student's final GPA and class rank were included as dependent variables.

7.2 Instruments

Data were collected using recent high school graduates' transcripts. Final high school transcripts for 116 students were individually reviewed and analyzed for completion of pre-AP and AP courses, as indicated

by the transcript coding of pre-AP and AP courses. Transcript analyses can be an arduous task (Adelman, 1983) so care was taken to minimize human error and to ensure data validity. Structural validity (Johnson & Christensen, 2010; Onwuegbuzie, Daniel, & Collins, 2009) was present in the analyses of the transcripts in that the transcripts used the coding required by state and district guidelines. Because courses completed during the school year were entered by district programming of the student information system, any threats to the structural validity might have occurred if students earned credit from schools outside of the school district that were manually entered into the student information system. Unfortunately, a comparison between students' non-district transcripts and the students' final transcripts analyzed in this study was not possible.

7.3 Procedures

Because the transcripts reported courses by semesters, completed courses were counted by semesters. Using the transcript coding, the researchers looked for codes indicating that a course was pre-AP or AP. To increase inter-coder reliability (Johnson & Christensen, 2010), transcripts were analyzed by one researcher and then verified by the school's registrar who was responsible for the coding of the transcripts in an electronic student information system. Each transcript was checked for the pre-AP and AP coding and marked with the number of semesters completed in each type of course.

The researchers were provided the list of final ranks and GPAs of the graduated students. It is important to note that, in this sample, students' final ranks and GPAs were computed on all courses taken prior to the final spring semester of the senior year before graduation. Therefore, pre-AP and AP semester course completions during the semester prior to graduation are included on the transcripts but not in the final GPAs and rankings of the students.

7.4 Research Design

A quantitative study incorporating a correlational research design was used for this study. The independent variables of the numbers of pre-AP and AP course semesters completed were measured on a ratio scale. The dependent variable of GPA was measured on an interval scale, whereas the dependent variable of class rank was measured on an ordinal scale.

7.5 Analysis

For each group, we calculated the mean and standard deviation relating to the students' semester completion of pre-AP and AP courses. In addition, tests for normality of the variables (i.e., skewness and kurtosis) were conducted. A correlational analysis first was conducted using SPSS. Second, an all possible subsets (APS) multiple regression (Onwuegbuzie & Daniel, 2003; Thompson, 1995) was used to identify which, if any, of the types of courses (pre-AP or AP) predicted students' final high school GPAs. In the APS regression, separate regressions of all variables in all possible combinations were calculated to determine the best set of predictor variables for GPA. To determine statistical significance, an alpha level of $p < .05$ was established for all analyses. Effect sizes were reported for all statistically significant findings.

8 Results

Means and standard deviations related to the non-categorical variables of interest, specifically, the number of semesters completed in pre-AP courses and the number of semesters completed in AP courses, are presented in Table 1. Each score for each individual was obtained independently; therefore, the assumption of independence was met for GPA, the number of semesters completed in pre-AP courses, and the number of semesters completed in AP courses. Examination of the scatterplots (not presented) involving GPA and the other variables suggested positive linear relationships between GPA and completion of Pre-AP and AP courses. Based upon these findings, the assumption of linearity was met. Because the assumptions for independence and linearity were met, conducting correlational analyses was justified.

Table 1

Mean and Standard Deviation for the Semesters of Pre-AP and AP Courses Completed by High School Students

Variable	*n*	*M*	*SD*
pre-AP	116	7.78	6.52
AP	116	5.81	4.11

With respect to the distribution of scores underlying the non-categorical variables, the skewness and kurtosis coefficients showed no departure from normality for GPA, Pre-AP courses, and AP courses. Specifically, for GPA, both the standardized skewness (i.e., skewness divided by the standard error of skewness = 1.44) and the standardized kurtosis (i.e., kurtosis divided by the standard error of kurtosis = -1.64) coefficients were between -3.00 and 3.00, suggesting no serious departure from normality (Onwuegbuzie & Daniel, 2002). Similarly, for the number of semesters of Pre-AP courses taken by students, both the standardized skewness (2.26) and standardized kurtosis (-2.14) coefficients were within the bounds of normality. The number of semesters of AP course enrollment also was within the bounds of normality, with the standardized skewness coefficient of 0.77 and standardized kurtosis coefficient of -2.40.

Before the multiple linear regression was performed, a series of Pearson's product-moment correlation coefficients (i.e., Pearson's r) was computed to determine the relationship between GPA and the two independent variables. The Bonferroni adjustment was applied to take into account the fact that the correlation coefficients were computed, such that the total experimentwise error rate did not exceed 5% (e.g., Chandler, 1995; Ho, 2006; Manly, 2004; Vogt, 2005). This correction was undertaken by dividing the nominal alpha value by 2 (i.e., $0.5/2 = .025$). Therefore, the adjusted level of statistical significance was .025. After applying the Bonferroni adjustment, the series of Pearson's r revealed that both relationships were statistically significant. Specifically, GPA was statistically significantly related to Pre-AP courses completed ($r[116] = .55$, $p < .001$) and AP course completion ($r[116] = .61$, $p < .001$). Cohen's (1988) criteria suggested that the relationships between number of pre-AP courses completed and the number of AP courses completed and GPA were very large.

An APS multiple linear regression (Onwuegbuzie & Daniel, 2003; Thompson, 1995) was used to identify an optimal combination of independent variables that predicted GPA. Using this technique, all possible models involving one or all of the independent variables were examined. This method of analysis has been advocated by many statisticians (e.g., Onwuegbuzie & Daniel, 2003; Thompson, 1995). Using APS regression, separate regressions were calculated for the one possible pair of independent variables and each of the two variables independently—yielding a total of three multiple regression models. The three models were compared to identify the best subset of independent variables according to the criterion of the maximum portion of the variance explained (*R2)*, which provides an important measure of effect size (Cohen, 1988).

Table 2 presents the *R2* values for each of the three multiple linear regression models. It can be seen that the multiple linear regression model with the largest *R2*values was the model containing both the pre-AP course completion score and the AP course completion score ($R2 = .418$. Of the two single variable models, AP course completion had a slightly larger effect size ($R2 = .366$) than did Pre-AP course completion ($R2 = .308$). Therefore, students who completed both pre-AP and AP courses throughout their high school studies earned higher high school GPAs as compared to students who completed pre-AP or AP courses only. Because schools offer pre-AP courses as a way to prepare for the rigor of AP courses, the two-variable model of completion of pre-AP and AP courses also met the standard of parsimony.

Table 2

R2 Values for the Three Multiple Regression Models

Multiple Linear Regression Model	R^2
Two-Variable Model	
1. Pre-AP, AP	.408
One-Variable Models	
2. Pre-AP	.308
3. AP	.366

Table 3 presents, for the selected two-variable model, the unstandardized regressions coefficients and intercept, the standard error of the unstandardized coefficients, the standardized regression coefficients, the structure coefficients, the semi-partial correlations, the partial correlations coefficients, and the squared multiple correlation coefficient (*R2*) of the chosen model, as well as tolerance statistics, variance inflation factors, and condition numbers. This model indicated that the number of pre-AP course completions and the number of AP course completions contributed statistically significantly ($F[2, 113] = 40.62$, $p < .0001$) to the prediction of high school GPA. Pre-AP and AP course completion combined explained 41.8% of the variation in high school GPA. For multiple regression models in behavioral science, *R2* values between 2% and 12.99% suggest small effect sizes, values between 13% and 25.99% suggest medium effect sizes, and values of 26% or greater suggest large effect sizes (Cohen, 1988). Thus, the selected final model represented a very large effect size.

Table 3

Selected Multiple Regression Model for Predicting GPA

Variable	Regression Coefficient	Standard Error	*t* value	Standard Regression Coefficient	Structure Coefficient	Squared Part	Squared Partial	Tolerance	VIF	Condition Index
INTERCEPT	2.05	0.090	22.81***					-	-	1.00
Pre-AP	0.03	0.010	3.18**	0.29	.86**	.228	.287	0.61	1.63	3.33
AP	0.08	0.016	4.63***	0.42	.94**	.332	.399	0.61	1.63	4.43

VIF = Variance Inflation Factor
Part = Semi-Partial Correlation Coefficient
Partial = Partial Correlation Coefficient

Model $R^2 = .418$, $F(2, 113) = 40.62, p < .0001$

Adjusted $R^2 = .408$

* $p < .05$, ** $p < .01$, *** $p < .000$

With respect to the assumptions for the chosen two-variable multiple linear regression model, the Durbin-Watson coefficient of 2.03 was satisfactorily close to 2 to suggest that for any two observations, the residual terms were uncorrelated (i.e., lack of autocorrelation), which is a desirable outcome. Both the histogram of

the standardized residuals and the normal probability plot (not presented) indicated that the residuals in the model were normally distributed because of the bell-shaped curve and straight line observed, which satisfied an important assumption associated with simple linear regression. An examination of the standardized residuals pertaining to each of the participants revealed that four participants had standardized residuals that exceeded 2.00, and no participants had a standardized residual larger than 3.00. Because this number represents only 3.45% (i.e., 4/116) of the total sample, the number of participants with the large standardized residuals is less than the 5% that might be expected by chance and, therefore, suggests little cause for concern.

An examination of the tolerance statistics, the variance inflation factors, and the condition indices of the selected regression model indicated that no multicollinearity was present. Both the variance inflation factors, which represent the degree that the variance of an individual regression coefficient has been magnified by the presence of collinearity, were much less than 10, suggesting little evidence of multicollinearity (Myers, 1986). Both variance inflation factors were reasonably close to 1.00, indicating no relationship between the two independent variables. Condition indices, which represent the ratio of the largest to the smallest eigenvalues, also provided information about the strength of linear dependency between the independent variables. Table 3 shows that both condition indices were much less than 1,000 (Myers, 1986), suggesting that multicollinearity was not present. Also, both tolerance statistics were greater than 0.2 (Field, 2009), which also suggested an absence of multicollinearity.

From the partial and semi-partial correlation coefficients (Table 3), it can be seen that the number of completed AP courses was the best predictor of GPA. An examination of the structure coefficients (Table 2), using a cutoff correlation of 0.3 as recommended by Lambert and Durand (1975) as an acceptable minimum coefficient, suggested that both completion of pre-AP courses and AP courses made important contributions to the model. In summary, the selected final regression model suggested that high school students with the highest GPAs tended to have the most completed pre-AP and AP courses.

The regression equation was as follows:

GPA = 2.05 + 0.03 * semesters completed of Pre-AP courses + 0.07 * semesters completed of AP courses.

This equation indicated that each completed pre-AP semester course was associated with a 0.03 increase in GPA. Consequently, every eight semesters of pre-AP courses completed was associated with a 0.24 increase in GPA. In addition, each completed semester AP course was associated with a 0.07 increase in GPA; therefore, every eight semesters of AP courses completed was associated with a 0.56 increase in GPA. Consequently, the more pre-AP and AP courses completed might contribute significantly to students' GPA and consequently, class rank.

9 Discussion

The purpose of this study was to investigate the extent to which pre-AP and AP courses predict high school students' GPA and class rank. The results indicated that students who complete multiple semesters of both pre-AP and AP course work had earned higher GPAs and ultimately graduate with a higher class rank. Specifically, AP course work completion was associated with slightly higher GPAs than pre-AP courses, but students who took both pre-AP and AP courses attained the highest GPAs. These results are relevant to students, parents, and educators as they plan for students' post-secondary educational opportunities. Parents, students, and educators must be aware that students' choices to enroll in pre-AP and AP courses can alter students' educational opportunities available after high school graduation.

Our findings support Solórzano and Ornelas's (2002) claim that quality points assigned for AP and honors courses are positively related to students' GPAs. Because of the implications in the college admissions process, our findings support Solórzano and Ornelas's (2002) argument that all students, regardless of race, ethnicity, and economic background, should have the same access to AP courses. Students who enroll and graduate from high schools that offer few AP and honors courses are at a severe disadvantage in post-secondary educational choices compared to the college choices of students who attend high schools where more than a dozen AP courses are offered. Adelman's (1983, 1999, 2006) argument for a more rigorous curriculum is further supported by Solórzano and Ornelas's (2002) finding and those of our study, suggesting that students who take pre-AP and AP courses are better prepared for college than are those students who do not complete

pre-AP and AP courses. This supports Sweller's (1988) cognitive load theory, which suggested that merely being enrolling in AP courses increased the schemas that students possessed and, therefore, increased the cognitive thinking capacities of students.

Another consideration is the grade levels and maturity of the students during when courses are completed. Most pre-AP courses are completed when students are in Grades 9 and 10, when many students are not fully aware of their GPAs, class ranks, and how they influence the college admissions process. Students in Grades 11 and 12 might have a better understanding of the potential influence of quality points in GPAs and might choose to enroll in AP courses as a way to boost their GPAs and potentially their class ranks. The lack of maturity and experience for underclassmen students enrolling in pre-AP courses also might be explained by both Sweller's (1988) cognitive load theory and Coleman's (1998) social capital theory. As Grade 9 and Grade 10 students enroll in the pre-AP courses they begin to gain the experience and confidence necessary to enroll and to complete successfully AP courses during Grades 11 and 12.

The results have several practical implications for high school counselors, administrators, teachers, and students. High school students might be hesitant in taking advanced courses because of the perception that they will negatively affect their GPAs. This information might reassure some high school students that taking their first pre-AP or AP course will not have a large negative impact on their GPAs if they do not perform as well as expected in the courses. School counselors and school administrators now have more information when discussing the benefits of students enrolling in pre-AP and AP courses with students and parents. Despite College Board's position of open access to AP courses for all students, high school policies still vary when determining who may enroll in an AP course (Sadler & Tai, 2007). Some schools might allow all students to enroll in AP courses, whereas another school might require students to complete prerequisite courses or to pass an examination to show their preparedness for the academic rigor of AP coursework (Nyberg, 1993).

School administrators also must consider the increased pressure to prepare students for admission into institutions of higher education (Van Reusen et al., 2001), which includes student enrollment in advanced courses (Hawkins, 2004; Solórzano & Ornelas, 2002). When students misunderstand the impact of AP courses on the GPAs or when restrictions are placed on students who want to enroll in AP courses, fewer students matriculate in AP courses. The lack of student access to AP courses or the lack student and parent demand for the AP courses might lead school administrators not to offer AP courses (Iatarola, Conger, & Long, 2011) or other advanced courses.

When considering increasing social capital (Coleman, 1998) in schools, administrators must revisit the policies in place that prevent students from enrolling in advanced courses. Determining students' placement in AP courses solely on previous test scores, grades in prerequisite courses, or teacher recommendations creates a culture where students' past outcomes determine their future opportunities. Instead of relying on an "aptitude-oriented educational system" (p. 56), school administrators might consider Resnick's (1995) proposed effort-based educational system. In this type of system, students of all ability levels would be encouraged to take advanced courses that require the cognitive skills that are needed for post-secondary education and the workforce. Students would begin to equate their present and future efforts with their ability to succeed in rigorous courses (Resnick, 1995). As students who might normally be restricted from advanced courses and understand how their effort impacts their success in the course, school administrators begin to build the social capital (Coleman, 1998) that students require from their high school learning experiences prior to enrolling in post-secondary education.

Although the indicators suggest that students who enroll and complete pre-AP and AP courses tend to have higher GPAs and, therefore, class ranks, caution should be used when interpreting the findings. Participants in this study were urban high school graduates from a small, specialized high school with limited or no students in special populations such as students with limited English and students with special learning needs. The participants in this study were not representative of participants from comprehensive high school campuses; thus, generalizability to a larger population is limited (Creswell, 2009; Johnson & Christensen, 2010). Although caution was taken decrease threats to internal validity (Johnson & Christensen, 2010) in the coding of the transcripts, it is reasonable to believe that some human error might have occurred in the school's coding of students who enrolled in the school from outside of the district. However, because of the

smaller size of the school and the small numbers of students who matriculate from outside of the district, any human error of this sort should be minimal.

Replication and expansion of this study utilizing a larger sample size, longitudinal data, and measures to assess variables such as student motivation would provide a broader analysis of the influence of pre-AP and AP course completions for high school students. In addition, further research on the number of pre-AP and AP courses completed compared with the college applications submitted and the college attended might enhance the knowledge of influence of pre-AP and AP course completions for high school students.

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