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EVALUATION OF AN INTERVENTION TO IMPROVE COLLEGE STUDENT
ACADEMIC PERFORMANCE, RETENTION, AND GRADUATION RATES

by

Shardae Laniece Dawkins

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Abstract

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This single-institution longitudinal study is used as an evaluative opportunity to examine the impact of the ACAD 1100 freshman orientation course on actual academic achievement, retention, and graduation outcomes. Expounding on a previous study by Burgette and Magun-Jackson (2008), some additional covariates (ACT and SES) were added to ensure ACAD and non-ACAD groups were comparable. For students in the two freshman cohorts examined, results of logistic regression as well as multiple regression analyses revealed that ACAD participation is advantageous in year-to-year persistence and college achievement at two-tailed significance $p < .05$ during all four years. Additionally, ACAD significantly increased the probability of four year graduation for all participants. Novel additions to the previous research are the notable impact of the SES by race interaction when looking at outcomes for different subgroups. This study provides evidence that previously identified differential higher education outcomes by race could be largely due to differences in socio-economic status.

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Evaluation of an Intervention to Improve College Student Academic Performance, Retention, and Graduation Rates

The Discipline of Program Evaluation

Program evaluation is used to determine the worth, merit, value, or significance of some intervention (Patton, 2008, p.5) by describing the intended goals and assessing the extent to which they were achieved. Stufflebaum (2001) defines an evaluation as a study designed and conducted to assist some audience in assessing an objects merit. Essential characteristics of any evaluation are that it is systematic, intentional, and data based (Patton, 2008, p. 41). Program evaluations are conducted for a variety of purposes including aiding in decisions about continuing, improving, or expanding a program; assessing the utility of new programs and initiatives; and increasing the effectiveness of program management and administration (Rossi, Lipsey, & Freeman, 2004). Evaluation plans must be tailored to the particular program and its circumstances with revisions and modifications as needed (Rossi et al., 2004). The form and scope of evaluations are dependent upon the purpose of the stakeholders, the nature of the problem being evaluated, as well as the organizational context in which the evaluation is conducted (Rossi et. al., 2004). Typically one or more of five program domains are evaluated: (1) need for the program; (2) design of program; (3) program implementation; (4) program impact or outcomes; and (5) program efficiency (Rossi et. al., 2004).

Fundamental to Patton's concept of utilization-focused evaluation is usefulness to those individuals within the organization that will actually make use of the findings (primary users). Emphasis on specifying intended uses of the evaluation and catering the design accordingly creates a "personal factor" that distinguishes Patton's method of

evaluation from others (Patton, 2008, p. 77). Design and execution of an evaluation that asks and answers meaningful questions for primary stakeholders is critical. The evaluation must be user friendly and geared towards the interests of the intended users within the organization. Communication between the evaluators and the stakeholders (i.e., program management) throughout the entire process is an integral part of the overall success or failure of any evaluation. The evaluator(s) should ensure commitment and support of the stakeholders by actively involving them in planning and designing the evaluation. Certain questions should be posed prior to beginning a program evaluation: what are the overall program goals; what is the purpose of the evaluation; what specific program areas are to be examined; how will the results of the evaluation be used; and how do they affect the existence and/or future of the program. Patton asserts that “useful evaluation supports action” (Patton, 2008, p. 40). Another important characteristic of the evaluation is that it be data-driven. The current study employs elements of a utilization-focused evaluation.

Student Retention and Success in Higher Education

Issues surrounding student retention have long been a focal point in the higher education literature. From a utilitarian perspective, universities with higher retention rates are less likely to lose revenue and student service programs. Additionally, Bachelor degree holders continue to earn fifty percent more than individuals with only a high school diploma (Sidle & McReynolds, 1999). However, benefits of student persistence are not limited to the respective students and universities; employers also have a large stake in well-educated college graduates, who constitute the future workforce. In 2000, the U.S. Department of Labor reported that, by 2012, the number of jobs requiring

advanced skills will outnumber those requiring only basic skills by two to one (Lotkowski, Robbins, & Noeth, 2004). Local organizations look to the established universities and colleges to produce well-educated, prepared employees. To meet these needs, universities are tasked with applying interventions, such as the extended freshman orientation course, to ensure students persist, excel, and graduate at higher rates than before. The changing demands of the workplace necessitate that a higher percentage of the population acquire the skills provided by a college education (Sidle & McReynolds, 1999). McGrath and Braunstein (1997) suggest that colleges utilize readily available institutional data to conduct research allowing faculty and administrators to increase their understanding of the retention problem within the institutions.

Despite the national attention to college drop-out rates, attrition still remains surprisingly high. According to the National Center for Public Policy and Higher Education (NCPPE), only 73.6% of freshmen (enrolled in 2002) returned for their second semester (2007). The college entrance testing organization, ACT (2004) reported that of all undergraduate students enrolled at a given four-year institution between 1995 and 1996, only 55% completed their degree within six years at that same institution. Tinto (1988) suggests that “programs and evaluation strategies must be employed to determine what forms of institutional action are most effective in treating the roots of departure at different points in the student career” (p. 451). Over the past 20 years, much attention has been given to the potential value of extended freshman orientation courses. Realizing that most students are likely to leave between their first and second years of college (Terenzini, 1987), many institutions of higher education began implementing extended freshman orientation or seminar courses.

First Year Experience

The term freshman orientation seminar has been used to describe two types of courses: one centers on an extended orientation of students to the campus and higher education, whereas the other is designed for students to work with faculty on a specific academic topic of interest (Barefoot & Fidler, 1996). Although the very first freshman seminar was implemented at Lee College in Kentucky in 1882, some records trace the beginnings of the extended orientation-focused seminar to Boston University in 1888. Shifts in educational philosophy caused fluctuations in the interest and implementation of such seminars. Dwindling numbers of traditional-aged students and extremely high student drop-out rates, particularly for freshman and sophomores, sparked a rebirth of curiosity about freshman seminars in the mid-1970s. In response to the large increase in first generation and minority students attending college, courses aimed at enhancing student success became of increasing importance (Schnell & Doetkott, 2002).

A 2009 survey by of freshman seminars conducted by the National Resource Center for The Freshman Year Experience and Students in Transition revealed that of the 1,019 responding accredited institutions, 87.3% were already offering some form of freshman seminar. With so many colleges and universities modeling freshman seminar courses in the likeness of USC's First Year Experience, most courses are very similarly designed with the key focus on helping students acclimate to college life and providing them with long-term academic skills in an effort to reduce attrition and increase the number of graduating students.

Barefoot and Fidler (1996) identify some of the difficulties that may impede the success of freshman seminars. Having a reputation for producing outcomes (mainly

increased retention and academic success), such courses are often held to a higher expectation than others within the college curriculum. This standard could potentially create unrealistic expectations for all parties involved concerning the success of such extended orientation courses. Another problem identified is the absence of extrinsic rewards and incentives for faculty who teach freshman seminar courses. As one might imagine, such a lack of reward for faculty diminishes the motivation and willingness to teach the extended freshman orientation course resulting in a large number of non-faculty instructors.

Academic Preparedness

The issue of college retention and academic achievement cannot be considered in isolation. A student's academic preparedness prior to enrollment at a college or university should be given adequate attention as it plays an integral role in predicting success in post-secondary education. The construct of academic preparedness, often used interchangeably with the term college readiness, is defined by a student's accomplishments. Greene and Forester (2003) identify three "hurdles" students must overcome in order to achieve college readiness: graduate from high school; take certain classes that are pre-requisites to college entrance; and demonstrate basic literacy skills. As high schools all across the country struggle to combat low graduation rates, this problem carries over and becomes magnified at the collegiate level. The underwhelming statistics are disconcerting, with public high schools achieving only around 70% graduation rates (Greene & Forester, 2003). Not only are high school students struggling to graduate, a large percentage of the graduates leave high school underprepared with regard to necessary academic skills to pursue post-secondary education or job skills

required for a career. Of those 70% receiving high school diplomas, a mere 32% are estimated to possess the qualifications to attend four year institutions (Green & Forester, 2003).

According to the National Educational Longitudinal Study (NELS) conducted in 2000, a student is considered “minimally qualified” for college if he/she meets at least one of the following criteria: (1) Rank at or above 54th percentile in their high school class; (2) Have a GPA of a 2.7 or higher; (3) Have a composite SAT score of 820 or above; (4) Have a composite ACT score of 19 or higher; and (5) Score at or above the 56th percentile on the 1992 NELS aptitude test (Bedsworth, Colby, & Doctor, 2006). It should be noted that these criteria reflect the least selective institutions’ entrance requirements. Only about 37 % of all high school graduates meet the minimum levels of academic preparation as defined by the 2000 NELS (Bedsworth et al., 2006). These students have a “50% chance of obtaining a bachelor’s degree; in contrast, students who fall short have only a 14 % chance of completing college” (Bedsworth et al., 2006, p. 5). In addition to standardized test scores, rigorous high school curricula have a major impact on bachelor degree attainment regardless of socio-economic status and race (Bedsworth et al., 2006). Exposing deficits in high school graduates’ academic preparedness gives insight into the retention problems at many four year universities and colleges across the country.

Retention Literature

Several models of student departure and withdrawal have been proposed in the literature (Astin, 1993; Holland, 1987; Pascarella, 1985; Pascarella & Terenzini, 1991, 2005; Tinto, 1993). Of these, Tinto’s model of Student Departure has been fundamental

in identifying main factors affecting attrition. Within his model, Tinto emphasizes the importance of students developing a social network as well as the integrating themselves into the institution (Tinto, 1988). Integration into the college experience is best achieved through interaction with both peers and faculty. Along these same lines, Astin (1993) found that the most positive change in students' affect and cognition is related to peer and faculty contact. Student-to- student and student-to-faculty interaction is often an explicit goal of freshman seminars (Barefoot & Fidler, 1996). Numerous higher education and retention researchers have found empirical evidence for Tinto's model (Astin, 1993; McGrath & Braunstein, 1997; Pascarella & Terenzini, 1983, 2005; Terenzini, 1987, 2005).

A comprehensive review of a decade of research on student persistence and retention by Pascarella and Terenzini (2005) found that persistence and graduation are consistently associated with specific characteristics including high school academic achievement, full-time continuous enrollment, immediate entry to college following high school, and academic and social engagement with peers and faculty. Numerous studies have addressed various social and academic factors affecting retention (Astin, 1993; McGrath & Braunstein, 1997; Pascarella & Terenzini, 1983, 2005; Terenzini, 1987, 2005; Tinto, 1988).

Retention studies at colleges and universities throughout the United States yield information about the overall effectiveness of the respective extended freshman orientation courses. As an example, a 2001 longitudinal study conducted at Ohio University, Athens found support for the effectiveness of their extended orientation course. The University of Ohio extended freshman orientation is taught by non-faculty

and offered on a voluntary basis. Its curriculum addresses academic improvement skills, campus resources, as well as educational and career planning. Results of this matched design study revealed second year retention of orientation participants was higher than that of non-participants as were graduation rates (Williford, Chapman, & Kahrig, 2001).

Another extended orientation program, comparable to that of the University of Ohio was evaluated by Schnell and Doetkott (2002). This freshman seminar introduced students to campus resources and various topics such as study skills, goal setting, and time management. Schnell and Doetkott (2002) found similar results using a matched comparison groups design reporting higher retention of freshman seminar students. In addition, over a four-year period, students enrolled in the freshman seminar were consistently retained at a higher rate than those in the matched group (Schnell & Doetkott, 2002). Other studies have shown that higher college achievement (GPA) is related to higher retention (Sidle & McReynolds, 1999). More recently an unpublished dissertation by Gaskins (2009) found that students having higher high school GPA, living on campus, and participating in a first year program tended to be retained at higher rates.

ACAD 1100 – Freshman Orientation Course

Background. First offered at the University of Memphis in 1990, the “Introduction to the University” course (ACAD 1100) was instituted to combat low retention rates and enhance student academic performance. This extended orientation course was specifically designed to assist freshmen with making the transition to higher education by introducing them to the expectations and opportunities provided by the University of Memphis. The 3-hour course curriculum addresses topics such as problem solving, critical thinking, financial management, campus diversity, as well as career

planning and development. Additionally, freshmen are introduced to various university resources including but not limited to technology, library, and health/wellness resources.

The University of Memphis' Office of Institutional Research reported 1,959 students enrolled as first time, full-time students at The University of Memphis in the fall of 2004. One year later in 2005, approximately 28% of this cohort dropped out or withdrew from the University. Thereafter, the number of students retained continues to decrease from year to year with only 57% of the original 2004 class remaining after two years. Graduation rates are even more discouraging with a mere 12.9% of the original cohort graduating in four years and less than a third of students (29.4 %) obtaining their degrees in five years. These statistics are a clear indication of the major retention problem the University of Memphis faces.

Previous studies at the University of Memphis. Two studies assessing the effectiveness of the ACAD program have been completed. The most recent, a 2008 longitudinal study conducted by Burgette and Magun-Jackson at the University of Memphis (2008) investigated the effect of the freshman orientation course on retention for the 2001 cohort. Persistence from year to year was assessed for four years (2001-2005), specifically focusing on the differences between retention rates for whites and blacks. College achievement (GPA) was treated as a second outcome measure. The study population consisted of 1193 total students divided into two groups: those who voluntarily participated in ACAD 1100 (n = 608) and those who did not (n = 585). These authors evaluated the following variables for their ability to predict persistence using multiple regression: student background (race and gender), high school achievement (GPA), commitment to major (decided or undecided), freshman orientation, and college

achievement (GPA earned for previous fall semester). College achievement functioned as both a predictor and outcome variable in this study. As an independent variable, college achievement was one of five predictors of persistence. As a dependent variable, the effect of the freshman orientation course on college GPA was assessed.

Of the 1,193 students composing the 2001 cohort, 803 (67%) persisted to the second year. Racial differences reached statistical significance for students who did not take ACAD 1100, with blacks being less likely to persist than whites. Some gender differences in persistence were found with black females returning at a higher rate than males; however, there was no significant gender difference among whites. In the third and fourth years, results for persistence revealed that freshman orientation no longer had a significant effect on retention. Differences due to race and gender did not reach significance with regard to persistence. Only high school GPA had a significant relationship with persistence in year 3 and 4. Persistence in year 5 showed a significant difference for gender with females being more likely to persist than males.

Using multiple regression, Burgette and Magun-Jackson (2008) found Fall GPA, high school GPA, participation in freshman orientation, and race to have a significant relationship with college achievement. Higher college GPAs were seen in the following students: whites; students with higher high school GPAs; and students taking the orientation course. Some racial differences did exist worth noting. For black students the most significant impact on GPA was participation in freshmen orientation course, whereas white students' high school GPA was the more significant variable. Over all five years, college GPA was an important variable in students' persistence. High school GPA was also important having an impact on four of the five years. Participation in the

freshman orientation class had no impact on retention of students beyond year 2; and college GPA beyond the first year.

The researchers recommended follow ups to their current study, to include qualitative interviews with faculty and staff to gain a more thorough understanding of the ACAD 1100 topics and the process by which they are selected for inclusion in the curriculum. Additionally, the researchers suggested that other variables could be selected to account for individual differences within the study population (Burgette & Magun-Jackson, 2008).

These are excellent opportunities for follow-up research. The current study expects to further develop the previously summarized study's design by considering additional predictor variables and ensuring the comparability of the study groups. Realizing that observational data is not truly experimental in design, researchers can only aspire to have very similar comparison groups. In explaining the parallels of the experimental and control groups, the previous study only suggests that "the students who took this course were representative of the 2001 freshman population" at the University of Memphis "in terms of Race, Gender, In/Out-of-State, ACT Scores, High School GPA, Age, and if financial aid was offered to the student" (Burgette & Magun-Jackson, 2008, p.240). No further details, such as statistical findings, to support the assertion of comparable ACAD and non-ACAD groups are offered. Another notable design issue concerns the omission of ACT score and some socio-economic status variables as a predictors of college achievement and persistence. Score on standardized college entrance tests, such as the ACT, are often used in retention studies due to the high correlation between such standardized test scores and academic success. When

considering meaningful factors that influence academic success, a group of researchers suggested using “integrative approach to design and develop programs and policies that address both the academic and non-academic factors that relate to college retention and performance, and that recognize differences among student populations.” (Lowtski, et. al., 2004). The current study finds socio-economic status to be just such a relevant non-academic factor.

Study Hypotheses

The current study uses a retrospective, quasi-experimental design to evaluate the effectiveness of the ACAD 1100 course with respect to its impact on academic achievement, retention, and graduation rates. Students in the two groups (ACAD and non-ACAD participants) were compared using relevant predictors as covariates including: high school GPA, standardized test score (ACT), sex, race, and SES. For recruiting, administrative, and advising purposes, these predictors are extremely important when attempting to identify and place incoming students who would most benefit from participation in the ACAD program. An assessment of the University of Memphis’ ACAD 1100 course will give the institution, students, and other stakeholders insight into the effectiveness of the program. Results of the study could have major implications for recruitment and selection of students for the both the University and ACAD 1100 course. Consequently, findings may be used to endorse or improve the program. For the purposes of evaluation, the following hypotheses are offered:

H1: ACAD participants will:

- a) be retained at higher rate than non-ACAD participants
- b) Have higher GPA at the end of years 1 and 2 than non-ACAD participants
- c) Have higher four and six year graduation rates than non-ACAD participants

H2: Academically prepared (ACT of 19 and above) ACAD students will have higher GPAs than academically prepared, non-ACAD students at the end of years 1 and 2

H3: Academically underprepared (ACT below 19) ACAD students will have higher GPAs than academically prepared, non-ACAD students at the end of years 1 and 2

Methodology

Participants

For the purposes of this study, participants were selected from the two incoming classes of new degree-seeking, first-year students who entered the University of Memphis during the 2007 and 2008 fall semesters. Established parameters of this study required students to be full-time enrolled with zero credits, taking a minimum of 12 credit hours, and within the traditional student age range of 17 to 21. Students from high schools in the state of Tennessee constituted the vast majority of incoming freshmen for both cohorts encouraging the researcher to focus on only within-state students. A total of 2,089 students enrolled in the 2007, and 2,050 in 2008.

After some exploratory analyses of the data, it was decided that only students identified by race as black or white would be included in the study as these two races constituted the overwhelming majority, 91.06%, of the 2007 and 2008 freshman classes. Also noteworthy is that the final sample is comprised solely of in-state students. A total of 87.68% of University of Memphis freshmen reported a Tennessee school as their high school of record. Including only these in-state students allows for a more specified and, presumably, more comparative sample group. The final sample used for the current study totaled 3,191 students across the two cohorts.

Procedure

Student data was collected from the University of Memphis' Institutional Research database. These archival records contained pre-enrollment information for the incoming freshmen each fall semester from 2007 to 2008 such as ACT score, high school name, zip code, rank, and GPA. Biographical data including sex and race was also collected along with pre-enrollment data. Post-enrollment student records for these cohorts including college GPA for each academic year, academic major, and semester/year of graduation was also obtained. Seeing as no major programmatic changes to the ACAD 1100 course occurred between the two years, the fall 2007 and fall 2008 freshman cohorts were combined for analyses. Additionally, neither the university's criteria for enrollment or degree of selectivity deviated notably across the two years.

The two cohorts were coded and tracked year-to-year with their respective groups. For example, second year retention equated to return for 2008-2009 academic year for the 2007 cohort, while the 2008 cohort was considered retained in year 2 if students returned for the 2009-2010 academic year. Using the comparison group (students not taking the ACAD 1100 course), the researcher analyzed differences between ACAD 1100 participants and non-participants with respect to the following outcomes: retention (return for subsequent year(s)), academic performance (GPA), and persistence to graduation. Logistic regression was utilized to assess retention as well as persistence to graduation. "Generally, logistic regression is well suited for describing and testing hypotheses about relationships between a categorical outcome variable and one or more categorical or continuous predictor variables" (Peng, Lee, & Ingersol, 2002, p.4). To measure the impact on academic performance, multiple regression analysis was employed.

To identify any existing race effects, each of the current study's hypotheses were analyzed separately for three different sample populations: all students (black and white), white students only, and black students only to expose differential racial outcomes that are covert when examining the all students group. Additionally, this is seemingly appropriate given the previous study conducted by Burgette and Magun-Jackson (2008) found significant differences for race in relation to retention and college achievement.

To further investigate potential combined effects of race with other study predictor variables, interaction terms were introduced. Interactions “speak to the multiplicative effect between two or more predictors. Determining if interactions are present in the model is particularly important when one predictor is a risk factor” (Peng & So, 2002, p. 42). Several versions of the logistic and multiple regression models, including and excluding interaction terms, were tested to identify the best model fit to the outcome data. However, it should be noted that these interactions were only included in the models for which they added value by improving the fit of the overall model as measured by the likelihood ratio chi-square statistic. The result of this pre-analysis led the researcher to identify three notable interaction terms for inclusion in the study: race×ACAD, and gender×race were included in evaluation of year-to-year persistence; race×SES and gender×race were covariates in the assessment of college GPA; and race×SES was considered in the analysis of graduation.

To include a measure of socio-economic status (SES), zip codes of students' reported high schools were used to identify average household median income. Students were noted as being above or below the state of Tennessee's average household median income of \$43,303 as reported by the United States Census Bureau's Current Population

survey, 2012-2014 Annual Social and Economic Supplements (U.S. Census Bureau, 2014).

Because random assignment of subjects is not a viable option due to the voluntary nature of participation in ACAD 1100, the current study cannot use a true experimental design. When considering the literature addressing the impact of freshman orientation programs on retention, the use of matched comparison groups is most prevalent (Glass & Garrett, 1995; Schnell & Doetkott, 2002; Sidle & McReynolds, 1999; Williford et al., 2001). However, case-to-case matching on enrollment characteristics was not achievable in the current study due to the large proportion of black students that enrolled in the ACAD 1100 course (77%). In a previous study completed by Burgette and Magun-Jackson (2008), ACAD participants were found to be racially representative of the university's population. This does not hold true for the current study. Only 23% of black students opt out of the course across the two cohorts examined. Using case matching would significantly degrade the sample and create matched groups not racially representative of the 2007 and 2008 freshman classes. As such, the previously described method was utilized in lieu of case-to-case matching.

Results

The influence of ACAD on the dependent variables (year-to-year retention, college GPA, and graduation) were assessed treating the following five independent factors as covariates: race, gender, SES, ACT, and high school GPA. Using these factors increases confidence in the comparability across the ACAD and non-ACAD groups as it relates to pre-enrollment characteristics. High school rank, though collected, was omitted from the final analyses as it was found to be very highly correlated with high school

achievement, $r(1755) = -.62, p < .05$, represented by students' high school GPA (see Table 1). In addition to the presence of collinearity between these two prior achievement variables, the high school rank data point was missing for over half of students in the population. As a result, high school rank was withdrawn as a predictor in the study due to its confounding nature as well as incomplete data. Table 1 shows the correlations between all the original predictor variables including high school rank for the entire sample. Table 2 displays the demographic and pre-enrollment statistics for the ACAD and non-ACAD groups.

Table 1

Correlations among Descriptive Statistics for Key Study Variables and HSGPA

	<i>M (SD)</i>	Sex	Race	SES	HSGPA	HS Rank	ACT	ACAD
Sex	.41 (.49)		.16*	.10*	-.12*	.13*	.17*	-.09*
Race	.59 (.49)			.43*	.12*	.16*	.54*	-.25*
SES	.61 (.49)				-.07*	.45*	.30*	-.13*
HSGPA	3.19 (.48)					-.62*	.35*	-.07*
HS Rank	123.99 (97.81)						-.05*	-.00
ACT	22.24 (3.82)							-.33*
ACAD	.63 (.48)							

Note. *N*'s range from 1757 to 3191 due to missing data in High School rank variable. For sex, 0 = male, 1 = female. For race, 0 = black, 1 = white. For SES, 0 = below average median income, 1 = at or above average median income. HSGPA= high school GPA. HS Rank = high school rank. ACAD = ACAD 1100 Course. For ACAD, 0 = did not take course, 1 = took course.* $p < .05$.

Table 2
Demographics of ACAD 1100 Participants, 2007 and 2008

<i>Variables</i>	ACAD 1100 Students	Non-ACAD 1100 Students	All Students (n=3,191)
Sex			
Female	62.39%	53.15%	58.95%
Race			
Black	49.45%	24.39%	40.11%
SES			
Below Average	43.76%	30.53%	38.83%
HSGPA	3.17 (.46)	3.24 (.51)	3.19 (.48)
HS Rank	123.67 (97.67)	124.5 (98.11)	123.98 (.48)
ACT	21.26 (3.53)	23.88 (3.71)	22.24 (3.82)

Note. *N*'s range from 1757 to 3191 due to missing data in High School rank variable. For sex, 0 = male, 1 = female. For race, 0 = black, 1 = white. For SES, 0 = below average median income, 1 = at or above average median income. HSGPA= high school GPA. HS Rank = high school rank. ACAD = ACAD1100 Course. For ACAD, 0 = did not take course, 1 = took course.**p* < .05.

Year-to-Year Persistence

Second Year Persistence. Of the 3,191 students in the 2007 and 2008 freshman classes included in the study, 2,441(76.5%) returned for their second year. Logistic regression was utilized to assess the impact of the study covariates on year-to-year persistence. The following covariates were included in the analyses: gender, race, SES, high school GPA, ACT, ACAD, gender×race interaction, and race×ACAD interaction. The overall model is significant at the $p < .01$ level according to the likelihood ratio chi-square statistic (critical value = 154.13 [$df = 8$]). The McFadden's R^2 was .044 with the interaction terms contributing to the improved fit of the final overall model (Table 3). Participation in ACAD 1100 significantly increased the probability of students returning for their second year, $b = .52$, Wald $\chi^2(1) = 11.05$, $p < .01$. In addition to ACAD, high school GPA, SES, and ACT also significantly contributed to increased likelihood of second year persistence in the all students sample. The two interaction terms, gender by race ($b = .44$, Wald $\chi^2(1) = 5.71$, $p < .05$) and race by ACAD ($b = -.52$, Wald $\chi^2(1) = 7.37$, $p < .01$), both reached significance in second year persistence. To further explore these interactions, independent analyses by race were conducted by for both the white and black student samples.

Some racial differences in outcomes were found when conducting the logistic regressions separately for each race. Gender reached significance only for white students (Table 4) with white females being more likely to return for the second year than white males ($b = -.31$, Wald $\chi^2(1) = 7.60$, $p < .01$). Gender was a better predictor for white students' persistence rates than black students. Participation in ACAD 1100 was only significant for the black students sample second year persistence ($b = .58$, Wald $\chi^2(1)$

=12.88, $p < .01$), while ACAD proved not significantly beneficial in increasing second year persistence for the white student sample. Black students that participated in ACAD had a higher probability of returning for second year than black, non-ACAD participants; however, there is virtually no difference in second year retention between white ACAD students and white non-ACAD students (Table 5).

Some commonalities across race samples were also identified when assessing second year persistence. Regardless of race, having an SES median income above the state average positively impacted persistence to year two for both samples: white students ($b = .54$, Wald $\chi^2(1) = 16.58$, $p < .01$) and black students ($b = .38$, Wald $\chi^2(1) = 6.38$, $p < .01$). High school GPA was also highly predictive of second year persistence for both races: white student sample ($b = .95$, Wald $\chi^2(1) = 55.40$, $p < .01$) and black student sample ($b = .47$, Wald $\chi^2(1) = 8.21$, $p < .01$).

Third Year Persistence. A total of 2,032 (83.2%) students of the 2,441 enrolled in the second year, persisted to year three. This equates to 63.7% of the original freshman cohort still being enrolled in by the third year of college. When examining gender and race, white students had higher rates of return (white females = 88.08%, white males = 84.8%) for year three than their black peers (black females = 77.6%, black males = 79.2%). The logistic regression model was significant at the $p < .01$ level according to the likelihood ratio chi-square statistic (critical value = 246.57 [$df = 8$]); the McFadden's R^2 was .059. ACAD students were significantly more likely to return for their third year, $b = .46$, Wald $\chi^2(1) = 10.28$, $p < .01$. Both the interaction terms were significant in the third year persistence overall model: gender by race ($b = -.52$, Wald $\chi^2(1) = 10.07$, $p < .01$) and race by ACAD ($b = -.33$, Wald $\chi^2(1) = 3.73$, $p < .05$).

Table 3
Year-to-Year Persistence of All Student Sample

	2 nd Year			3 rd Year			4 th Year		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	-0.09	(-.20, .38)	0.35	.19	(-.06, .45)	2.24	0.12	(-.13, .36)	0.85
Race	-0.02	(-.38, .35)	0.01	.19	(-.14, .52)	1.24	0.01	(-.32, .33)	0.00
SES	.48	(.29, .68)	23.57**	.54	(.36, .71)	36.58**	.58	(.41, .75)	43.98**
High School GPA	.77	(.57, .96)	58.39**	.97	(.79, 1.15)	114.01**	1.09	(.91, 1.26)	146.78**
ACT	.07	(.04, .10)	18.68**	.06	(.03, .08)	16.80**	.05	(.02, .07)	12.83**
ACAD	.52	(.21, .83)	11.05**	.46	(.18, .73)	10.28**	.36	(.08, .64)	6.38*
Gender X Race	.44	(-.80, .08)	5.71*	-.52	(-.84, -.20)	10.07**	-0.29	(-.60, .03)	3.25
Race X ACAD	-.52	(-.89, -.14)	7.37**	-.33	(-.67, .00)	3.73*	-0.15	(-.48, .19)	0.75
Model Statistics									
Model, <i>df</i> (8)	154.13**				246.57**				281.28**
Pseudo R ²	.04				.06				.06
Wald χ^2	141.70**				220.73**				250.84**

p* < .05. *p* < .01.

Table 4
Year-to-Year Persistence of White Student Sample

	2 nd Year			3 rd Year			4 th Year		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	-.31	(-.53, -.09)	7.60**	-.29	(-.49, -.08)	7.67**	-.14	(-.33, .06)	1.84
SES	.54	(.28, .79)	16.58**	.50	(.26, .74)	16.91**	.54	(.30, .77)	20.37**
High School GPA	.95	(.70, 1.20)	55.40**	1.10	(.86, 1.33)	85.45**	1.15	(.92, 1.37)	98.07**
ACT	.04	(.01, .08)	5.79*	.03	(-.00, .06)	3.01	.02	(-.02, .05)	.89
ACAD	-.02	(-.25, .20)	.04	.08	(-.12, .29)	.66	.16	(-.04, .36)	2.47
Model Statistics									
Model, <i>df</i> (5)	114.46**			150.34**			153.45**		
Pseudo R ²	.05			.06			.06		
Wald χ^2	104.13**			135.56**			138.88**		

p* < .05. *p* < .01.

Table 5
Year-to-Year Persistence of Black Student Sample

	2 nd Year			3 rd Year			4 th Year		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	.03	(-.26, .32)	.04	.15	(-.11, .40)	1.26	.07	(-.18, .33)	.33
SES	.38	(.09, .68)	6.38**	.54	(.28, .80)	17.04**	.58	(.32, .83)	19.96**
High School GPA	.47	(.15, .79)	8.21**	.81	(.53, 1.09)	31.80**	1.04	(.75, 1.32)	51.93**
ACT	.11	(.05, .17)	14.68**	.11	(.06, .16)	19.28**	.12	(.07, .17)	23.63**
ACAD	.58	(.26, .89)	12.88**	.53	(.25, .82)	13.30**	.47	(.18, .76)	10.08**
Model Statistics									
Model, <i>df</i> (5)	46.51**			94.64**			127.31**		
Pseudo R ²	.03			.06			.07		
Wald χ^2	42.58**			83.68**			109.75**		

p* < .05. *p* < .01.

Differential outcomes noted in race were further explored in separate analyses which revealed very similar results in year three persistence as seen in year two: gender reached significance for the white student sample ($b = -.29$, Wald $\chi^2(1) = 7.67$, $p < .01$), but not the black student sample; and ACAD was significant for the black student sample, not the white student sample. The likelihood of white females persisting to their third year was significantly better than white males ($b = -.29$, Wald $\chi^2(1) = 7.67$, $p < .01$). The impact of ACAD on student retention in year three was statistically significant for the black student sample ($b = .53$, Wald $\chi^2(1) = 13.30$, $p < .01$), but not for the white student sample. This is also true of the ACT variable, which significantly impacted year three persistence only for the black student sample ($b = .11$, Wald $\chi^2(1) = 19.28$, $p < .01$). Predictor variables SES and high school GPA did not show differential outcomes by race; both factors were statistically significant for black and white students persisting to year three.

Fourth Year Persistence. In the fourth year, over half (57.1%) of the original cohort is still enrolled. Of the 2,032 students noted in year three, 1,822 (89.7%) return for year 4. The overall model of fourth year persistence was significant at the $p < .01$ level according to the likelihood ratio chi-square statistic (critical value = 281.28 [$df = 8$]); the McFadden's R^2 was .064 (see Table 3). ACAD remains impactful for student persistence to the fourth year ($b = .36$, Wald $\chi^2(1) = 6.38$, $p < .05$). Additionally, high school GPA, ACT, and SES reach significance in the fourth year persistence. Though the results of the full model did not indicate significant racial differences (Table 3), separate logistic regressions by race were still explored. Results are slightly different for persistence by race. In year 4, only SES ($b = .54$, Wald $\chi^2(1) = 20.37$, $p < .01$) and high school GPA (b

= 1.15, Wald $\chi^2(1) = 98.07, p < .01$) are significant for the white student sample. Gender is no longer a significant factor for white students in year 4 and ACAD remains insignificant as seen in year 3 (Table 4). The story is much different for black students in year 4 (Table 5). Gender is the only variable that is not significant for black students persisting to year 4. Moreover, each predictor variable reaches statistically significant two-tailed $p < .01$ levels. For the fourth year, ACAD participation significantly increased the likelihood of black student persistence, $b = .12$, Wald $\chi^2(1) = .23.63, p < .01$.

Academic Achievement

College Achievement – Year 1. To assess the impact of the study predictors on students' college academic achievement (measured by college GPA), standard multiple regression method was employed. Academic success in year one was largely impacted by race, SES, high school GPA, ACT score, ACAD participation, and interactions: gender×race and race×SES with the overall model reaching significance ($R^2 = .3183$, $R^2_{Adjusted} = .3161$, $F(8, 2432) = 141.95, p < .001$). The inclusion of the two interaction terms contributed to a better model fit to the college achievement outcome data resulting in approximately 32% of variance in first year GPA being accounted for by the model. Table 6 displays that ACAD significantly contributed to increased first year college GPA for the all student sample. Using multiple regression reveals that incoming freshman from the 2007 and 2008 cohorts were more likely to have increased first year college GPAs if they: were white students; had a median household income above the state average; had higher high school GPAs; had higher ACT scores, and/or participated in the ACAD 1100 course. Gender was the only variable that did not reach significance in the model.

Though the gender variable did not reach significance, the interaction of race by gender was found significant in the multiple regression model, $\beta = -.21$, $t(2441) = -3.38$, $p < .001$. The SES by race interaction also reached significance for first year college GPA, $\beta = -.24$, $t(2441) = -3.73$, $p < .001$, suggesting that white, high SES students actually had lower GPAs than black, high SES students (Table 6).

Separate analyses conducted for the black and white student samples further expose differences in outcomes by race indicated by the significant interactions in the full model, but first commonalities are detailed. Participation in ACAD was found to have significant, positive impact for both the black and white student samples. Tables 8 and 9 show that, for both races, high school GPA, ACT, and ACAD were significant beyond the two-tailed .001 significance level. Of these three, high school GPA was the most predictive of college academic success for both races, $\beta = .57$, $t(1448) = 14.27$, $p < .001$ for the white student sample and $\beta = .65$, $t(981) = 11.28$, $p < .001$ for the black student sample. Differential racial outcomes when predicting first year GPA are identified in the gender and SES predictor variables. Gender is found to be significant for white students; more specifically, white males are likely to have lower first year college GPAs than white females, $\beta = -.11$, $t(1448) = -3.17$, $p < .05$. SES matters more for black students' academic success than for white students, reaching significance for black students, $\beta = .30$, $t(981) = 5.68$, $p < .001$.

Table 6
College Achievement of All Student Sample

	1 st Year		2 nd Year		3 rd Year		4 th Year	
	<i>B</i>	t	<i>B</i>	t	<i>B</i>	t	<i>B</i>	t
Gender	.09	1.86	.04	.90	-.01	-.23	.02	.58
Race	.52**	9.14	.36**	7.24	.32**	7.12	.30**	5.81
SES	.31**	6.66	.22**	5.38	.15**	3.97	.12**	2.99
High School GPA	.59**	17.89	.49**	16.91	.38**	14.49	.35**	12.07
ACT	.04**	8.80	.04**	9.37	.03**	8.48	.03**	7.00
ACAD	.15**	4.83	.06*	2.47	.05*	2.08	.07**	2.60
Gender X Race	-.21**	-3.38	.10	-1.84	-.06	-1.24	-.07	-1.38
Race X SES	.24**	-3.73	-.15**	-2.59	-.11**	-2.07	-.05	-.83
Model Statistics								
Model, <i>df</i> (8)		141.95*		129.18**		104.18**		69.85**
<i>Adjusted R</i> ²		.32		.34		.31		.29

p* < .05. *p* < .01.

Table 7
College Achievement Results of White Student Sample

	1 st Year		2 nd Year		3 rd Year		4 th Year	
	<i>B</i>	t	<i>B</i>	t	<i>B</i>	t	<i>B</i>	t
Gender	-.11**	-3.17	-.05	-1.78	-.07*	-2.46	-.05	-1.47
SES	.07**	1.52	.08*	2.15	.05	1.43	.08	1.86
High School GPA	.57**	14.27	.49**	14.71	.40**	13.02	.35**	9.89
ACT	.03**	6.06	.03**	6.34	.03**	6.56	.03**	5.30
ACAD	.13**	3.75	.04	1.33	.05	1.92	.06*	1.98
Model Statistics								
Model, <i>df</i> (5)		84.17**		86.61**		74.31**		40.88**
<i>Adjusted R</i> ²		.23		.25		.24		.20

* $p < .05$. ** $p < .01$.

Table 8
College Achievement Results of Black Student Sample

	1 st Year		2 nd Year		3 rd Year		4 th Year	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Gender	.10	1.78	.04	.47	-.02	-.40	.02	.50
SES	.30**	5.68	.20**	4.25	.14**	3.10	.12**	2.57
High School GPA	.65**	11.28	.50**	9.43	.36**	7.41	.36**	7.15
ACT	.07**	7.13	.07**	7.51	.04**	5.50	.04**	4.74
ACAD	.20**	3.17	.13*	2.35	.05	.89	.09**	1.72
Model Statistics								
Model, <i>df</i> (5)		56.64**		45.39**		26.95**		21.43**
<i>Adjusted R</i> ²		.22		.22		.16		.16

p* < .05. *p* < .01.

College Achievement – Year 2. Findings for the second year GPA revealed that the standard multiple regression model reached significance with the combination of study predictors accounting for approximately thirty percent of variance in second year GPA ($R^2 = .3381$, $R^2_{Adjusted} = .3355$, $F(8, 2032) = 129.18$, $p < .001$). Participation in ACAD 1100 showed significant positive impact on college achievement for the all student sample in the second year. Similar to first year findings, students were more likely to have increased second year college GPAs if they: were white students; had an median household income above the state average; had higher high school GPAs; had higher ACT scores, and/or participated in the ACAD 1100 course (see Table 6). The two predictors with the largest impact on second year achievement, as measured by the beta coefficient, were high school GPA ($\beta = .49$, $t(2032) = 16.91$, $p < .001$) and race ($\beta = .36$, $t(2032) = 7.24$, $p < .001$) respectively. The interaction term SES by race ($\beta = -.15$, $t(2032) = -2.59$, $p < .05$) reached significance for the all student sample in year 2; however, the gender by race interaction term did not.

Individual multiple regressions conducted for the white and black student samples revealed three common predictors with significant positive impact on second year GPA: high school GPA, SES, and ACT. Participation in ACAD 1100, however, was found only significantly predictive of second year GPA for the black student sample, $\beta = .13$, $t(767) = 2.35$, $p < .05$. Closer examination of the SES predictor variable reveals that, though significant for both the black and white student samples, SES is more important for the black student sample with respect to impact on second year college GPA (Table 8). Having a high SES equates to .20 increase in predicted second year GPA for black students as compared to .07 increase for white students' GPA.

College Achievement – Year 3. The multiple regression assessing third year achievement was significant, $R^2 = .3149$, $R^2_{Adjusted} = .3119$, $F(8, 1822) = 104.18$, $p < .001$. Results in Table 6 suggest that students with the following characteristics are likely to have a higher third year GPA: white students; students with median household income above the state average; higher high school GPA, and/or higher ACT scores. For the third year, participation in ACAD is shown to have a significant, positive impact on college GPA in the all student sample ($\beta = .05$, $t(1822) = 2.08$, $p < .05$). The two variables with the largest impact on third year GPA were high school GPA ($\beta = .38$, $t(1822) = 14.49$, $p < .001$) and race ($\beta = .32$, $t(1822) = 7.12$, $p < .001$) respectively.

Individual multiple regressions conducted for the white and black student samples revealed high school GPA and ACT score as the only two common predictors with significant positive impact on third year GPA. The SES variable that reaches significance for black students in year three, but not white students (see Table 7 and Table 8). In fact, second only to high school GPA, SES is highly impactful for black students, $\beta = .14$, $t(674) = 3.10$, $p < .05$. Unique to the white student sample, gender reached significance in assessing third year college GPA with white females having a slight advantage over white males, $\beta = -.06$, $t(1136) = -2.46$, $p < .05$. It should be highlighted that the third year is the first time participation in ACAD does not reach significant levels for either race, even though positive effects on GPA for the black student sample were found in years 1 and 2.

College Achievement – Year 4. The study predictors continued to impact college GPA in year four with the overall multiple regression model being significant, $R^2 = .2938$, $R^2_{Adjusted} = .2896$, $F(8, 1352) = 69.85$, $p < .001$. Several factors were found to

significantly increase students' fourth year college GPA: identifying race as white; having a median household income above the state average; participating in ACAD; having higher high school GPA and ACT scores. Fourth year college achievement was positively impacted by participation in ACAD ($\beta = .07$, $t(1352) = 2.60$, $p < .01$) as seen in the analysis of the previous three years (Table 6). Gender and the two interaction terms did not have significant impact on academic success in year four.

When regressions were completed separately for each race, findings for black students high school GPA ($\beta = .36$, $t(544) = 7.15$, $p < .001$), SES ($\beta = .12$, $t(544) = 2.57$, $p < .05$) and ACT ($\beta = .04$, $t(544) = 4.74$, $p < .001$) had significant effects on fourth year GPA (Table 8). However, white students were more likely to have increased success in year 4 if they had higher high school GPAs, $\beta = .35$, $t(796) = 9.89$, $p < .001$; higher ACT scores, $\beta = .03$, $t(796) = 5.30$, $p < .001$; and participated in the ACAD 1100 course, $\beta = .06$, $t(796) = 1.98$, $p < .05$. ACAD reaching significance for white students' GPA in the fourth year is notable given the absence of significance in the second or third year (Table 7).

Graduation

Graduation – 4 and 6 Year. Using logistic regression, four and six year graduation rates were assessed in relation to the study predictor variables. Of the original cohort, 779 (24.4%) students obtained a degree in four years. Results of the logistic regression for the all student sample revealed that the overall model was significant at the $p < .01$ level according to the likelihood ratio chi-square statistic (critical value = 254.41 [$df = 7$]); the McFadden's R^2 was .07. Additionally, each of the study predictors achieved significance in four year graduation (see Table 9). The race by SES interaction positively

contributed to improving the overall model fit to the graduation outcome, and thus was included in the analysis. Participation in ACAD 1100 significantly increased the likelihood of graduation in four years, $b = .32$, $\chi^2(1) = 11.11$, $p < .01$. Students most likely to achieve graduation in four years were: females; identified race as white; students with median household income above the state average; students with higher high school GPAs and ACT scores; as well as those who participated in ACAD 1100 course. The race \times SES interaction reached significance in predicting four year graduation, $b = -.41$, $\chi^2(1) = 4.34$, $p < .05$.

When conducting the logistic regressions separately for each race, similarities in significant variables are clear across both race samples. Regardless of race, high school GPA, SES and ACAD were significant predictors of four year graduation (see Table 10 and Table 11). For the white student sample, gender reached significance with white females having an increased likelihood to complete college in four years as compared to white males, $b = -.27$, $\chi^2(1) = 6.41$, $p < .05$. However gender fails to approach statistically significant levels in the black student sample.

Six year graduation rates were assessed by logistic regression, and omit students who graduated in four years as they are deemed ineligible. By the study definition, six year graduates also includes individuals obtaining a degree in five years. A total of 666 (20.8%) students completed their bachelor's degree in five or six years. Detailed in Table 9, the McFadden's R^2 was noticeably smaller than the other models at .02. Only two of the variables in the model significantly predicted six year graduation in the all student sample: SES, $b = .35$, $\chi^2(1) = 5.36$, $p < .05$, and high school GPA, $b = .66$, $\chi^2(1) = 39.18$,

$p < .01$. Unlike four year graduation findings, ACAD did not have significant impact on students completing their degrees in five and six years.

Table 9
Graduation Results for All Student Sample

	4 Year Graduation			6 Year Graduation		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	-.25	(-.43, -.07)	7.30**	-.09	(-.28, .08)	1.03
Race	.39	(.07, .71)	5.72*	-.05	(-.39, .28)	.09
SES	.75	(.45, 1.05)	23.99**	.35	(.05, .64)	5.36*
High School GPA	1.01	(.81, 1.21)	94.76**	.66	(.45, .86)	39.18**
ACT	.06	(.03, .08)	14.07**	-.00	(-.03, .03)	.05
ACAD	.32	(.13, .50)	11.11**	.03	(-.16, .22)	.08
Race X SES	-.41	(-.80, -.02)	4.34*	.12	(-.28, .52)	.35
Model, <i>df</i> (8)			228.24**			64.64**

* $p < .05$. ** $p < .01$. Six Year Graduation includes students that complete college in 5 or 6 years.

When conducting separate logistic regressions for each race, no notable differences in variable significance were found. The results for six year graduation rates were very similar for both races. Regardless of race, gender, ACT, and ACAD were not statistically predictive of six year graduation (see Table 10 and Table 11). Two variables, however were significant for both races, SES: white students ($b = .45$, Wald $\chi^2(1) = 9.66$,

$p < .01$); black students ($b = .33$, Wald $\chi^2(1) = 4.55$, $p < .05$) and high school GPA: white students ($b = .53$, Wald $\chi^2(1) = 16.45$, $p < .01$); black students ($b = .89$, Wald $\chi^2(1) = 26.40$, $p < .01$).

Table 10
Graduation Results for White Student Sample

	4 Year Graduation			6 Year Graduation		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	-.27	(-.49, -.06)	6.41*	-.05	(-.27, .17)	.20
SES	.36	(.11, .62)	7.61**	.45	(.17, .73)	9.66**
High School GPA	1.17	(.91, 1.42)	80.78**	.53	(.27, .79)	16.45**
ACT	.03	(.00, .07)	3.95*	-.02	(-.06, .02)	1.20
ACAD	.29	(.07, .50)	6.88**	-.04	(-.26, .18)	.13
Model, <i>df</i> (5)			133.30**			24.56**

* $p < .05$. ** $p < .01$. Six Year Graduation includes students that complete college in 5 or 6 years.

Table 11
Graduation Results for Black Student Sample

	4 Year Graduation			6 Year Graduation		
	<i>b</i>	<i>CI</i> (95%)	Wald χ^2	<i>b</i>	<i>CI</i> (95%)	Wald χ^2
Gender	-.17	(-.50, .16)	1.02	-.18	(-.50, .15)	1.14
SES	.65	(.35, .96)	17.43**	.33	(.03, .64)	4.55*
High School GPA	.73	(.39, 1.08)	17.27**	.89	(.55, 1.23)	26.40**
ACT	.11	(.05, .16)	14.31**	.05	(-.01, .11)	2.83
ACAD	.40	(.03, .78)	4.49*	.19	(-.17, .55)	1.05
Model, <i>df</i> (5)			65.51**			44.52**

* $p < .05$. ** $p < .01$. Six Year Graduation includes students that complete college in 5 or 6 years.

Academically Prepared Students in ACAD

This study's second and third hypotheses particularly focus on the impact of ACAD when also considering students' academic preparedness upon entering college. Examining only students considered to be college-ready, as measured by an ACT score of 19 or higher, multiple regression was employed to assess impact on college GPA. A total of 2,044 students were found to be college ready using the study definition. It should be noted here that there will be a focus on reporting the influence of the ACAD variable on GPA outcomes as the other predictor variables have been previously detailed for the entire sample. Results reveal that it is indeed advantageous for academically prepared students to participate in ACAD, $\beta = .10$, $t(2,043) = 3.06$, $p < .05$. Students participating in ACAD have significantly higher first year GPAs than their college-ready peers who do

not take the ACAD 1100 course. The same analysis was conducted for each race individually to look for differential outcomes. A total of 632 (64.1%) black students were identified as college-ready, and ACAD was found to be significant with black college-ready, ACAD students outperforming their black college-ready, non-ACAD peers ($\beta = .18, t(632) = 2.60, p < .05$). A very similar positive result can be reported for white college-ready, ACAD participants having higher first year GPAs than white, college-ready non-ACAD students ($\beta = .13, t(1392) = 3.71, p < .05$).

When repeating the same multiple regression analyses to predict second year achievement amongst college ready students, ACAD no longer has a significant impact on college GPA for all students. Investigation of racial differences revealed that white, college-ready ACAD students no longer have a significantly higher GPA than college-ready non-ACAD students that was seen in first year outcomes. The effects of ACAD fade for this subgroup. Black college-ready students, however, continue to reap benefits of ACAD participation in the second year showing higher GPAs than black, college-ready non-ACAD students, $\beta = .16, t(512) = 2.60, p < .05$. The effects of ACAD fades beyond year two for all for college-ready students; ACAD no longer reaches significant levels as it relates to the impact on college GPA in years three and four. This was also true when the multiple regression analysis was conducted separately by race.

Academically Underprepared Students in ACAD

Multiple regression analyses were conducted to assess if ACAD could improve college GPA for academically underprepared students above that of college-ready, non-ACAD students. The third hypothesis investigates the impact of the ACAD course on college GPA for students who enter college underprepared in direct comparison to non-

ACAD students that are academically prepared upon enrollment. As such, only ACAD students having an ACT below 19 and non-ACAD students with a 19 or better on the ACT were included in this particular analysis. Results revealed that when a student is underprepared for college, ACAD does not have a significant effect on GPA for the all students group. However when differential outcomes by race were examined, black students who enter college underprepared and participate in ACAD outperform their black college-ready, non-ACAD peers having significantly higher GPAs in years 1, $\beta = .41$, $t(485) = 3.04$, $p < .05$, and 2, $\beta = .29$, $t(376) = 2.16$, $p < .05$.

Discussion

This longitudinal study seeks to investigate the role and impact of the ACAD 1100 course offered at the University of Memphis as an effective intervention for increasing college student retention, academic success, and graduation. A previous study (Burgette & Magun-Jackson, 2008) explored the ACAD 1100 course in relation to retention and academic success. The current study expounds on those findings by exploring graduation as an additional outcome, as well as conducting independent analysis by race for each outcome to provide more insight into documented differential outcomes. Furthermore, differences between academically prepared students and academically underprepared students who participate in ACAD 1100 was also addressed.

Findings revealed that participation in the ACAD 1100 course significantly increased the likelihood of college students returning for years two, three and four supporting the retention of hypothesis 1A. Additionally, ACAD students were found to have higher GPAs than their non-ACAD peers during all four years of college validating hypothesis 1B. Also, ACAD participants had significantly greater likelihood of

graduation in four years, but not for six year graduation. Given these findings, hypothesis 1C is only partially validated with some noteworthy findings warranting further discussion. When testing hypothesis 2, results found ACAD participation to be advantageous for college-ready students in first year college GPA. However, this effect disappears in the second year. The last hypothesis, hypothesis 3, is rejected with no supporting evidence that participation in ACAD remedies entering college underprepared as measured by first and second year college GPA.

With the predictor variables acting as covariates in the logistic regression, persistence to year two was significantly increased by participation in ACAD for the all student sample. Additionally, the race by ACAD interaction reached significance (Table 3). Conducting separate analysis by race did not provide insight into potential causes of the racial differences in impact of ACAD on persistence. The results revealed ACAD as significant for the black student sample, but not for the white student sample.

To further investigate the significant race by ACAD interaction, margins analysis was utilized to illustrate differences in predicted persistence when students are separated into their respective SES groups (0 - low and 1- high). Overall, the black student sample was estimated to persist to the second year at higher rates than the white student sample, regardless of SES or ACAD (Table 12). Within the black student sample, ACAD participants had a significantly higher probability of persisting to year two than those who opted out of the course when SES backgrounds were similar. As such, black students most likely to be retained in year two had high SES and took the ACAD course; while the least likely to be retained were characterized by absence of ACAD and low SES students. Another interesting finding was discovered when looking across SES groups for black

students. For low SES, black ACAD students, persistence estimates were quite similar to the high SES black non-ACAD students (Table 12). This implies that, for this particular subgroup, there is something about ACAD participation that greatly minimizes the negative risks associated with low SES in relation to persistence.

Within the white student sample, students with similar SES backgrounds persisted to year 2 at virtually the same rate irrespective of ACAD participation. Opposite the results of the black student sample, persistence probability was only notably increased for the white student sample when SES changed from low to high. These findings have both positive and negative implications depending on the students' race. Overall, participation in the ACAD 1100 course decreases the likelihood of second year attrition for black students only, while having a high SES seems to be a primary combatant of attrition for white students (Table 12). ACAD was also found to be significant in predicting persistence to years 3 and 4 for all students regardless of race and SES combination. Participation in the ACAD course was beneficial to all students. Similar to second year persistence results, predictive margins show ACAD having progressively more positive impact in years 3 and 4 for white students.

Very similar to the retention findings, the predicted probability of graduating in four years for black students with high SES is slightly greater than that of their white, high SES peers (Table 13). Conversely, black students with low SES have the lowest probability of achieving four year graduation. A difference as a function of exists when students are from lower SES backgrounds; while this phenomenon is not present in the high SES group. Furthermore, participation in ACAD increases the probability of graduation for all students, regardless of race and SES combination.

Table 12
Predictive Margins of All Student Persistence

		2 nd Year			3 rd Year		4 th Year	
	Race by ACAD	Margin	CI (95%)	Margin	CI (95%)	Margin	CI (95%)	
Low SES	Black	0	.78	(.66, .77)	.53	(.47, .60)	.47	(.40, .53)
	Black	1	.81	(.78, .84)	.64	(.61, .68)	.55	(.51, .60)
	White	0	.68	(.63, .72)	.53	(.48, .58)	.44	(.39, .49)
	White	1	.68	(.63, .72)	.56	(.51, .60)	.49	(.44, .54)
High SES	Black	0	.80	(.76, .85)	.66	(.60, .72)	.61	(.55, .67)
	Black	1	.87	(.85, .90)	.76	(.72, .79)	.69	(.65, .73)
	White	0	.77	(.74, .80)	.66	(.62, .69)	.58	(.54, .62)
	White	1	.77	(.74, .80)	.68	(.65, .71)	.63	(.60, .66)

Note. Non-ACAD participants = 0; ACAD participants = 1.

Table 13
Predictive Margins of All Student Graduation

			Four Year Graduation		Six Year Graduation	
Race by SES			Margin	CI (95%)	Margin	CI (95%)
Non-ACAD	Black	0	.13	(.10, .15)	.16	(.13, .20)
	Black	1	.23	(.19, .28)	.22	(.17, .26)
	White	0	.17	(.14, .21)	.16	(.12, .19)
	White	1	.23	(.20, .26)	.23	(.20, .26)
ACAD	Black	0	.16	(.13, .19)	.17	(.14, .20)
	Black	1	.29	(.25, .34)	.22	(.18, .26)
	White	0	.23	(.18, .27)	.16	(.12, .20)
	White	1	.29	(.26, .32)	.23	(.21, .26)

Note. Low SES = 0; High SES = 1.

Table 14
Predictive Margins of All Student College GPA

			1 st Year		2 nd Year		3 rd Year	
Race by SES			Margin	CI (95%)	Margin	CI (95%)	Margin	CI (95%)
Non-ACAD	Black	0	2.30	(2.22, 2.38)	2.58	(2.52, 2.65)	2.72	(2.66, 2.78)
	Black	1	2.76	(2.67, 2.85)	2.91	(2.83, 2.99)	3.02	(2.95, 3.09)
	White	0	2.62	(2.53, 2.70)	2.81	(2.73, 2.88)	2.87	(2.80, 2.94)
	White	1	2.82	(2.76, 2.88)	2.98	(2.94, 3.03)	3.06	(3.02, 3.11)
ACAD	Black	0	2.45	(2.39, 2.52)	2.65	(2.59, 2.71)	2.77	(2.72, 2.82)
	Black	1	2.90	(2.82, 2.99)	2.98	(2.90, 3.05)	3.07	(3.01, 3.14)
	White	0	2.76	(2.69, 2.84)	2.87	(2.81, 2.94)	2.92	(2.86, 2.98)
	White	1	2.97	(2.92, 3.02)	3.05	(3.01, 3.09)	3.11	(3.08, 3.15)

Note. Low SES = 0; High SES = 1.

Academic achievement in college is a very visible, easily quantifiable measure of success for many institutions of higher education and their corresponding freshman orientation courses. When assessing college achievement in all four years, ACAD participation increased students' college GPA over non-ACAD students (Table 6). This is a notable finding as the previous study (Burgette & Magun-Jackson, 2008) reported the significant effects of ACAD washing out after year one for both persistence and college GPA. Using margins analysis, further exploration of the significant interaction of SES by race revealed some consistent findings. Within the ACAD groups, low income, black students had the poorest academic performance. Because ACAD was beneficial to all students, those black students who did not take ACAD were predicted to have the worst GPAs in years 1 through 3. Even when SES is high, white students outperform black students (Table 14). This is true in both the ACAD and non-ACAD groups. In fact, low-income white students in the non-ACAD group outperformed high-income black, ACAD students in years 3 and 4. This suggests that, even with high income background and access to an intervention, black students are being outpaced in college academics. This coincides with Burgette and Magun-Jackson's (2008) findings that "controlling for all other variables, whites had higher GPAs than blacks" and (Burgette & Magun-Jackson, 2008, p. 255). The college achievement outcome clearly depicts the intertwined impact of racial and SES factors.

Because ACAD is considered a type of intervention and considering the importance of college-readiness in the higher education literature, it was useful to contrast GPA effects for academically-prepared students with those considered academically underprepared for college (ACT below 19). College-ready ACAD students

only had an advantage over college-ready non-ACAD students in the first year with respect to GPA. In the second year, these effects diminish for the all student sample, but remain significant for the black student sample. These findings support the more liberal application of the ACAD intervention for all students, not just those who enter college underprepared. The ACAD course has positive residuals for college-ready students, giving them an academic boost beyond their college-ready peers that bypass ACAD. The argument could be made that these findings are the spurious result of the ACAD course itself being low in difficulty level relative to other college classes. If this is true, higher grades in ACAD would be easily obtainable and contribute to boosted first year GPAs for participants over non-participants. This is certainly a consideration for future research and further exploration, especially given that the effects wash out after the first year.

Also of interest was whether underprepared ACAD students gain advantage in GPA over their academically prepared, non-ACAD peers. The findings determine that ACAD does not overcome the deficit of entering college underprepared, and the third hypothesis is rejected. In the all student sample, ACAD had no significant impact on college GPA in any of the years suggesting that ACAD does not completely remedy or supersede poor pre-college achievement. Essentially, ACAD provides students with the necessary resources and skills which contribute to higher levels of academic achievement, but not above and beyond the benefits of college readiness. Contradictory to the finding for the all students group, separate analysis for black students showed differential outcomes with underprepared students having significantly better first and second year college GPAs than their black, college-ready non-ACAD peers. This, in addition to the previously noted positive outcomes for black students, provides very clear

evidence of the major benefits ACAD has for this subgroup. The differential outcomes found in this study support a review of the literature concerning relevant predictors of college retention by Reason (2009) in which the author emphasizes “that researchers should examine the differential effects related to race and ethnicity in higher education research” (Reason, 2009, p. 493).

Though much attention has been placed on race, SES, and ACAD, the researcher does not take for granted the large and seemingly long-term positive impact of pre-enrollment aptitude, specifically high school GPA, on college success. High School GPA was consistently a significant factor in college student retention from year to year, achievement, and graduation. This supports much of the existing retention literature emphasizing the importance of high school GPA in college success. The body of college retention literature has long emphasized the strength of such cognitive factors when predicting college GPA (Astin, 1993; Schmidt et al., 2009). Though a very strong predictor, one study suggests that prior academic aptitude still only accounts for a “modest amount of variance of a student’s academic performance in college” (Sparkman, Maulding, & Roberts, 2012, p. 642). In a study about emotional intelligence and college success, Sparkman, et al posit that “success in college, as defined by student retention and academic performance, may be related to other variables or combinations of variables” (Sparkman et al., 2012, p. 642). Findings from the current study support this line of thought and emphasize the important role that SES plays in the differential outcomes by race in higher education.

To further contribute to the retention literature and provide a more detailed analysis of the impact of ACAD 1100 on the study outcomes, the current work explored

significant differences in outcomes based on students' SES label. Consequently, findings suggest that differential outcomes by race, identified in the current and previous studies (Burgette & Magun-Jackson, 2008), could be more accurately attributed to socio-economic status (SES) or a combination of race and SES, rather than race alone. This should be further explored in future research utilizing alternative definitions of the SES variable to assess if the current study's findings are spurious due to the use of median household income to demarcate SES. Surprisingly, very few longitudinal studies on college retention and success include a socio-economic predictor variable, while students' race is almost always a factor. It is, nonetheless, an area for concentration with one study reporting a 30 percentage point gap in six year graduation rates between high-income (56%) and low-income (26%) students (Engstrom & Tinto, 2008).

The exposure of these differential outcomes is very informative and could be strategically utilized in marketing the ACAD course and selectively recruiting students to participate. Regardless of pre-enrollment characteristics, black students seem to benefit the most from taking the class across the three main outcomes reported here. Given the well-documented research literature that the majority of students that drop-out do so within their first two years of college (Terenzini, 1987); and students returning for their second year of college have a much greater chance of achieving graduation, the current study's findings provide support for the viability of the ACAD course. The course's significant, positive impact on higher retention and graduation rates could act as a very useful recruitment statistic. The mention of improved academic achievement and graduation rates may attract a larger pool of applicants and prospective students. It has been suggested that retention "may be a significant indicator of institutional quality and

impact” (Pascarella, 1986, p. 100) and that retention has become a barometer of institutional effectiveness used as a measure of an institution’s commitment to its students” (Schnell & Doetkott, 2002, p. 381).

With the majority of students being local state residents, it could be posited that there is a high probability they will stay in the state post-graduation. As a result, local employers could benefit from the University of Memphis producing greater numbers of high achieving graduates that will transition into the workforce. Considering this expectation, the university is taxed with supporting the matriculation of students through their respective academic programs to degree attainment. The current study suggests that ACAD is exactly one way that the university is making significant contributions to both these goals.

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