

# ACT/SAT SCORES AND ACADEMIC PERFORMANCE OF BUSINESS STUDENTS: ARE MARKETING MAJORS DIFFERENT?

*Praveen Aggarwal, University of Minnesota Duluth  
Rajiv Vaidyanathan, University of Minnesota Duluth  
Linda Rochford, University of Minnesota Duluth*

## ABSTRACT

*Despite the widespread use of standardized test scores such as the ACT and SAT in the college admissions process, it is surprising that relatively few studies have examined the correlation between ACT/SAT scores and the academic achievement of business students. Using a nationally representative sample, this study examines the issue and finds a significant correlation between standardized test scores and cumulative college GPA. Further and more interestingly, these correlations vary by major. ACT scores seem to be more strongly correlated to marketing student achievement while SAT scores seem to correlate more strongly with achievement (GPA) of students in other business majors. The implications of these findings are discussed.*

*Keywords: ACT and SAT scores, Business education, Marketing majors, Correlates of college GPA.*

## INTRODUCTION

Many colleges and universities are experiencing record enrollments. The number of high school aged students is expected to increase through 2010 to 30.2 million students (Frances 1998) from recent estimates of approximately 16.4 million students (U.S. Census 2002). The enrollment pressures are particularly severe for business schools as an increasing percentage of undergraduates are picking business majors. Among undergraduates with a declared major, the greatest number opted for business, 19 percent of all majors (Horn, Peter, Rooney 2002). At Notre Dame, 32 percent of students choose to major in business (Trombello 2003) much to the chagrin of Arts and Letters faculty. Given this environment, effective screening, and selection of applicants has become increasingly important for business schools that would like to limit enrollments based on merit/potential of such applicants. Traditionally, business schools have used an array of indicators to try and identify the likelihood of student success in college-level work. Among other instruments, standardized tests are used by a vast majority of admissions offices as indicators of students' potential for success in college. Virtually every college-bound student in the US takes either the ACT or SAT college admission test. College and university admission offices use the results of this exam, in combination with such factors as high school rank, high school GPA, extracurricular activities, essays and interviews to select and admit students.

Given the importance of standardized tests in the college admissions process, it is surprising that there have been few studies to examine how well these tests predict academic performance of college students in various business majors. The few studies that have looked generally at the ability of the SAT and ACT scores to predict academic achievement of business students have found no relationship between SAT/ACT scores and academic achievement of first and second year college business students (Barney et al. 1987, 1985). The objective of this paper is to examine this relationship more closely. The key questions we seek to answer are whether (a) the SAT or ACT scores predict (in the sense that they correlate with) the academic performance of business students, (b) one test is better than the other at predicting performance of business students in general, and (c) one test is better than the other at predicting performance in various business majors. We are specifically interested in the ability of these tests to predict collegiate performance of marketing majors relative to other business majors. Despite an extensive literature review, we were unable to find any other study that has looked at these tests in the context of student performance by business majors.

We first review the literature on the objectives of the SAT and ACT. We then summarize the vast and controversial literature on the use of these tests as predictors of college performance. Finally, we report our findings on the relationship between SAT/ACT and business student college performance based on the National Post Secondary Student Aid Study (NPSAS) 2000 data of undergradu-

ate college students. Finally, we discuss some possible implications of our findings.

## COMPARING SAT AND ACT

Many colleges use either the ACT or the SAT as the predominant admission instrument. Colleges on the east and west coast, as well as private colleges, tend to prefer SAT over ACT. ACT seems to be a popular test in the Midwest and South. For example, only 13 percent of California high schools graduates took the ACT test in 2002 while 65 percent of Minnesota graduates and 99 percent of Illinois graduates took the ACT (ACT 2002c). These differences in test preference may be the result of where and what type of institution students choose to apply. Since most students tend to apply to and attend university in or near their home state, the predominance of SAT in California could be due to historic preference for the SAT in the University of California and Cal State Systems. However, many schools will accept either test. Increasingly, universities are changing their policies to accept either one of these popular standardized admission tests. For universities that accept either test, formulae have been developed in order to produce concordant tables converting scores between the two tests (Schneider and Dorans 1999).

The SAT (at various times standing for the Scholastic Aptitude Test and the Scholastic Assessment Test) is the nation's oldest and most widely used college entrance exam (FairTest 2002). The SAT I is a general exam covering two broad areas: verbal and math. Each area is scored on a 200–800 point scale. Unlike the ACT, the test content is independent of high school curricula and was designed primarily to predict first-year college grades. However, it has been vigorously debated in the literature whether the test in fact does this (e.g., Crouse and Trusheim 1989; Slack and Porter 1980). The College Board, which administers the SAT, argues that the verbal tests focus on critical reading and the math section focuses on problem solving – both important abilities for college achievement (College Board 2001). Colleges and universities usually use either the distinct sub-test scores or the composite scores in order to predict college academic performance/achievement, generally measured by GPA.

With an increasing amount of debate on the shortcomings of general aptitude tests and fears about the monopolistic dominance of the ETS (the company under contract to the College Board to produce and administer the test), a rival testing company, named the American College Testing, was formed in 1959 by University of Iowa Professor E.F. Lindquist (University of California Board of Admissions 2002). This test quickly became popular among public universities in the Midwest and the South. The ACT measures subject-specific knowledge on a variety of subjects such as social studies, mathematics,

natural sciences, and English (Beguiristain 2002). The contents of the ACT tests are based on the judgments of high school and college instructors about the academic knowledge and skills students need to succeed in typical first year college courses (University of California 2002).

Most universities today accept standardized test scores from either the SAT or the ACT. Given the apparent belief that these tests are interchangeable pieces of evidence of college success potential (McManus 1991), it becomes important to understand the differences between these tests.

### Differences in the Nature of the Tests

A key difference between the tests can be summarized by this quote: “The SAT is a test of academic aptitude that measures a student’s *ability to learn*. It is designed to provide information as independently as possible from high school curricula, measuring more abstractly defined educational aptitudes. . . . The ACT, on the other hand is a test of educational development and measures *how much the student has already learned*. It mirrors the high school experience, being more closely tied to curriculum and covering concepts taught in most secondary schools” (McManus 1991, p. 339, emphasis added).

### Differences in Student Performance

Smyth (1995) found that among students taking both the ACT and SAT, 85 percent score in a higher percentage on the ACT than the SAT. He partially attributes this result to differences in the characteristics of students taking the test. SAT takers are more affluent than ACT takers, ACT has a larger percentage of female test takers, and there are significant differences in the percentage of minorities across both tests. The question of taking the test more than once is also discussed. Generally, students are advantaged by taking the SAT or ACT a second time. Once again, there are significant differences with more white students and affluent students taking the tests more than once (Smyth 1995). Multiple tests create questions for admission offices in how to “count” the results – only the most recent test score, the best test score, or even selectively taking the best sub-test scores from multiple tests.

### ACT AND SAT: PREDICTIVE ABILITY

As discussed briefly earlier, the ability of the SAT and ACT to predict performance in college has been widely debated in the literature. Not everyone agrees how well these tests can predict academic performance.

Mouw and Khanna (1993), in their review of predictors of academic success grouped SAT and ACT scores together (as “standardized test scores”) and concluded

that the best predictors of academic success were high school academic performance and aptitude test performance (both ACT and SAT). While useful in demonstrating that these tests can be useful predictors, this does not help to explain how well each test predicts college performance.

According to ACT, Inc., the use of both ACT scores and high school GPA effectively predicts academic success in the first year of college where “success” is defined as a “C” or higher (ACT 2002b). High school GPA is a slightly better predictor when success is defined this way but for higher levels of college performance (B+ or higher) the ACT results are effective while high school GPA is not (ACT 2002b).

In a study of graduates between 1980 and 1990, SAT scores were found to make a substantial contribution to predicting cumulative GPA and the combination of high school GPA and SAT were better predictors than either independently. In addition, SAT or SAT plus high school GPA were better predictors of cumulative GPA than of college graduation (Burton and Ramist 2001).

So, how well do these test scores correlate with academic performance in college? The correlation between SAT and GPA is affected by the restriction of range of talent taking the test. That is, at highly selective institutions, students with high scores may achieve lower grades because of the rigor of courses at these schools. Ramist (1984) found that for institutions with an unrestricted range of students, the average correlation of SAT and high school record with first year GPA was 0.65 (among 21 institutions with an unrestricted range) versus a median of 0.55 among the remaining 664 institutions in the study.

The restriction of range issue is one that has been leveled, indirectly, at the results of the University of California (UC) Regents studies of SAT by the College Board. The UC Regents report concludes that SAT scores add very little incremental predictive power for first year GPA among the various predictor variables evaluated. For example, r-squared values ranged between 0.107 and 0.138 for SAT I and first year GPA over the period of 1996 to 1999. High school GPA and first year UC GPA correlations ranged from 0.170 and 0.119 over this same time period. The Director of the College Board noted that the University of California students are a “very select group” and that the results might not be generalizable beyond that group (Kim 2001). In another study, the uncorrected SAT and first year GPA correlation was 0.36, while rising to 0.57 if corrected for restrictions to range and criterion validity, and 0.65 if corrected for restrictions to range, criterion validity and course grading (Camara and Echternacht 2000).

In a review of studies relating SAT verbal, SAT math and the combined SAT score with undergraduate GPA, the weighted average correlations were 0.40, 0.41, and 0.36 respectively (Burton and Ramist 2001). In studies of

engineering and computer science majors, the correlation between college GPA and SAT verbal scores (0.21, 0.23 respectively) was lower than that for SAT math scores (0.43, 0.35 respectively) (Shoemaker 1986). Wescott (1989) found significant relationships between cumulative and major GPA and SAT results for industrial arts/technology education majors. Ernest (1970) found the high school rank to be a better predictor of academic success of college music majors compared to ACT or MSAT (Minnesota Scholastic Aptitude Test).

Finally, in an explanation of gender differences observed in the predictive ability of the SAT, it was found that the SAT will “underpredict” GPA for women and “overpredict” GPA for men (Burton and Ramist 2001). This was hypothesized to be because men have historically taken more math and science courses that are generally more stringently graded. When adjusted for the actual course taking patterns of men and women, the differences between men and women were reduced or eliminated.

### SAT AND ACT FOR BUSINESS STUDENTS

Despite the large body of literature on the relationship between the SAT and college performance, there appear to be few attempts to look at the predictive power of the SAT and ACT for specific academic disciplines and still fewer by specific business majors. Kobrin and Milewski (2002) in a study of students with discrepant high school GPA and SAT scores, found differences in intended major for those having a higher high school GPA than suggested by the SAT scores. However, there weren't any significant differences among discrepant and nondiscrepant groups regarding intent to study business and commerce.

In a study focused specifically on business students, Pharr and Bailey (1993) examined the relationships between student ACT/SAT scores, GPA for lower-level prerequisite business coursework as well as outcome measures of success and difficulty. Success variables were defined in terms of GPA for core business courses, major specific GPA, math course GPA, overall GPA. Difficulty variables included the number of withdrawals and repeats of courses and the number of semesters required to complete the undergraduate degree. The authors found that ACT/SAT scores were significantly and positively correlated with the various success outcomes as expected. However, there was no corresponding significant negative correlation between ACT/SAT scores and difficulty measures. In predicting academic success or difficulty, SAT/ACT scores were poorer discriminators than GPA.

Bean and Bernardi (2002) examined the relationship between the Education Testing Services Major Fields Test in business (MFT), often used as an outcome measure of academic program performance among colleges of business, and SAT math and verbal scores. They found a

significant correlation between math and verbal SAT scores and the MFT score. Regression results showed that verbal SAT and gender were significant in the model while math SAT was not. This suggests that the verbal aptitude as measured by the SAT may contribute to success in the business program. This study, however, did not include important variables such as GPA in the analysis.

It has been suggested that the most appropriate way to determine the predictive ability of college test scores is to disaggregate samples by major. Studies have found that students migrate to majors with grading standards that best fit their level of preparation (Willingham 1985). In other words, better students will select majors that have more demanding grading standards. Thus, range reduction will lead to lower correlations between upper division course grades and admission predictors such as the SAT (Burton and Ramist 2001). That is, since students with high test scores tend to cluster in disciplines with more rigorous grading patterns, the relatively lower grades they receive mask the true predictive ability of the SAT I scores (University of California Board of Admissions 2002). Among the more leniently graded courses were physical education, art, music, theater, and education courses while the most stringently graded courses were in the sciences, engineering, and calculus (Ramist, Lewis, and McCamley 1990). Elliott and Strenta (1988) controlled for grading standards and observed an increase in correlation of admission measures and college GPA from 0.57 to 0.62 in the first year and from 0.41 to 0.51 in the senior year.

Keller, Crouse, and Trusheim (1994) boosted the predictive ability of SAT/ACT scores to predict freshman GPA by adjusting GPA for differences in grade distribution or grading difficulty across freshman courses. The regression equation for unadjusted freshman GPA increased R-squared by 0.04 with the addition of SAT to high school GPA in the model while the regression equation for adjusted freshman GPA resulted in a 0.087 increase in R-squared by adding SAT to high school GPA in the regression. However, the authors found that the use of adjusted SAT/ACT along with high school GPA for determining admissions would affect only a very small percentage of admissions overall. For example, the method would admit more engineering students, where grading standards are more stringent and admit fewer education students.

However, in a study of the predictive validity of the SAT among University of California students (Geiser and Studley 2001), when the sample was disaggregated by intended major, SAT I proved to be a weak predictor with beta weights ranging from -0.05 (for students intending to major in physical science, math, or engineering) to 0.12 (for students intending to major in the biological sciences). The negative beta in the case of sciences, math and engineering students is particularly interesting given the

theory that these are the disciplines that tend to have the students with the higher SAT scores.

Ward, Ward, Wilson, and Deck (1993) and Booker (1991) demonstrated a relationship between ACT scores and GPA in the Intermediate Accounting I course for African American accounting students. Both the composite ACT score and the math component score showed some significant but inconsistent differences among students grouped by accounting grade (Ward et al. 1993). Using the Schéffé method of multiple comparisons, there were no significant differences in composite ACT scores between the students earning As and the students earning Bs in the course. However, there were significant differences between A students and C students as well as A students and D/F students in terms of composite ACT scores. Math ACT scores were only significantly different between A and D students under the Schéffé comparison. This study was limited to one subgroup of students rather than the general population of accounting students.

Thus, the key question of interest – whether the ACT or SAT might be good predictors of academic performance for business students in specific majors – remains unanswered. We attempt to answer this question by analyzing data from a large, nationally representative, public data set from the NPSAS.

## DATA

The data used in this study was collected by Research Triangle Institute (RTI) and MPR Associates, under contract with the National Center for Education Statistics (NCES). The Center is the primary federal organization responsible for collecting data related to education in the United States. This dataset, part of the 1999–2000 National Postsecondary Student Aid Study (NPSAS 2000), is based on information from approximately 50,000 undergraduate students enrolled at approximately 1,000 postsecondary institutions during the academic year. The sample is representative of approximately 16.5 million undergraduates enrolled anytime between July 1, 1999 and June 30, 2000 in the United States. The web address for the NCES site is <http://nces.ed.gov/> and the dataset used in this study can be accessed through the Data Analysis System (DAS) portion of the web site at <http://nces.ed.gov/das/>.

## METHODOLOGY

In order to study the research questions raised in this paper, we began with an identification of variables of interest in the NPSAS dataset. Variable “GPA21” was identified as the dependent variable of our model. This variable represents the cumulative GPA of students and was standardized to a 4.00 scale (and multiplied by 100). Three different measures of SAT scores were identified:

SAT verbal score (TESATVRE), SAT math core (TESATMRE), and overall SAT score (TESATCRE). For ACT scores, five different measures were identified: ACT English scores (TEACTERE), ACT reading score (TEACTRRE), ACT math score (TEACTMRE), ACT science score (TEACTNRE), and ACT composite score (TEACTCRE). All SAT and ACT scores were reported after recentering and were constructed by NCES from data collected through agency reports or institution reports. After identifying the dependent and independent variables, we constructed subsets for each of the five business majors identifiable in the dataset based on their field of study (MAJORS). The five majors included in this analysis were: accounting, management systems (MIS), finance, marketing, and management. We also include economics major in our analysis but note that ACT data were not available for economics major, so the discussion of economics major is limited to SAT dataset only.

NCES provides researchers with a web based interactive data analysis system (DAS) that allows researchers to select variables and submit requests for tables and correlation matrices electronically (through ftp). We used the procedures outlined in the DAS manual to select variables, define subsets, submit requests for correlation matrices, and retrieve output files.

## RESULTS

Before conducting any major-specific analysis, we first compared the correlations of ACT and SAT overall scores to GPA for all business majors. There were a total of 1,222 business students for whom ACT scores were available, and another 2,138 business students for whom SAT scores were available. The correlation between ACT and GPA was 0.2821, whereas it was 0.3746 for SAT and GPA. The difference is statistically significant at  $p < 0.01$ . Thus, given that the two tests differ in their predictive ability for business majors in general, we went to the next level of analysis to look at the differences across majors. Also note that while we discuss the role of admission variables (SAT and ACT) in *predicting* the achievement measure (GPA) for different majors, our conclusions are based strictly on correlational analysis. In other words, we are measuring associations in this analysis, and causality is neither being claimed nor implied.<sup>1</sup>

The correlations between cumulative GPA and ACT/SAT scores by majors are reported in Tables 1 and 2. The correlations obtained in our analysis for SAT scores and GPA are in the range reported by Camara and Echternacht (2000) for SAT and first year GPA.

**TABLE 1**  
**SAT SCORES: CORRELATION WITH GPA**

	Verbal	Math	Overall	Sample Size
<b>Marketing</b>	<b>.2760</b>	<b>.2411</b>	<b>.2871</b>	213
Accounting	.3352	.3142	<b>.3541</b>	264
Finance	.3349	.3788	<b>.3925</b>	251
MIS	.3417	.3675	<b>.3859</b>	204
Management	.3106	.3108	<b>.3437</b>	928
Economics	.4676	.4522	<b>.5097</b>	273

**TABLE 2**  
**ACT SCORES – CORRELATION WITH GPA**

	English	Math	Reading	Science	Overall	Sample Size
<b>Marketing</b>	<b>.3741</b>	<b>.4330</b>	<b>.2664</b>	<b>.3710</b>	<b>.4444</b>	114
Accounting	.1331	.2554	.1195	.1807	<b>.1903</b>	173
Finance	.1030	.2038	.1167	.2013	<b>.1619</b>	132
MIS	.2221	.2364	.0341	.2273	<b>.1886</b>	132
Management	.2893	.3104	.2734	.2794	<b>.3369</b>	645

The first interesting thing to note in the tables is that among all majors, marketing has the lowest correlation with the overall SAT score. On the other hand, marketing has the highest correlation of all majors with ACT scores. Thus, two related conclusions can be drawn from these two tables:

- a. ACT and SAT scores differ in their abilities to predict success across majors. An overall chi-square test indicates that the differences are significant among majors for SAT ( $\chi^2 = 11.14$ ,  $df = 5$ ,  $p < 0.05$ ) and ACT ( $\chi^2 = 11.05$ ,  $df = 4$ ,  $p < 0.05$ ). The  $\chi^2$  statistic was calculated after applying the Fisher Z-transformation.
- b. ACT scores (overall) are a better predictor of success among marketing majors than among other business majors. Similarly, SAT scores (overall) perform poorly in predicting success among marketing majors when compared to predicting success among other business majors.

In order to test the statistical significance of differences between correlations across majors, we ran additional z-tests. We compared the correlation for marketing majors to that for other majors (after accommodating for the different sample sizes (n) for different majors). For SAT scores, although the correlation was the lowest for marketing, the differences between marketing and other majors were not statistically significant (except for economics majors, which was significantly higher than marketing;  $p < 0.01$ ). However, the differences for ACT scores were large and statistically significant. The correlations and the statistical significance of their differences are reported in Table 3.

Here, we observe that ACT scores are more strongly correlated to the academic performance measure (GPA) for marketing majors as compared to other business majors. Thus, it is reasonable to conclude that ACT scores (overall) are a better predictor of success for marketing majors than for other majors (except management major where the difference is statistically insignificant).

Lastly, we ran additional analysis to find out which of these tests is better suited for predicting academic performance within each of the business majors. In other words, we wanted to test if the correlations of ACT/SAT to GPA for each of the business majors were significantly different. As can be seen in Tables 1 and 2, the correlations are higher for all majors (except marketing) for SAT scores. It appears that SAT is a better predictor of success for all business majors except marketing. The results of this analysis are reported in Table 4.

Thus, compared to ACT, the SAT I score is more strongly correlated to success for accounting, finance, and MIS majors. The difference is statistically insignificant for management majors, and is *reversed* for marketing majors where ACT scores are a better predictor of success.

### DISCUSSION AND CONCLUSION

While most prior studies have looked at the predictive ability of standardized tests for first year college GPA, our study looks at cumulative GPA across all years. Given that all business students take primarily liberal education courses in their first year, looking at students across all years allows us to capture students' performance in courses specific to their majors.

Although some prior research has suggested that there is no relationship between the scores of business students on standardized tests and their subsequent performance in college (Barney et al. 1987, 1985), our study found a relationship that is consistent with the magnitude of correlations shown in prior studies among students in other (non-business) areas of study. We explored this relationship further and found that the predictive ability of the SAT and ACT for business student performance is not the same. Overall, the SAT seems to be a significantly better predictor of cumulative college GPA than the ACT. Further, the relationship between the test scores and college performance seems to vary across the different majors. The ACT shows a stronger relationship with

	Overall	Difference (Marketing- Other major)	z-value	Significance (p-value)
Marketing	.4444	–	–	–
Accounting	.1903	0.2541	2.34	<b>0.01</b>
Finance	.1619	0.2825	2.43	<b>0.01</b>
MIS	.1886	0.2558	2.22	<b>0.01</b>
Management	.3369	0.1075	1.24	0.10

**TABLE 4**  
**COMPARISON OF SAT AND ACT SCORES CORRELATIONS TO GPA**

	<b>SAT Overall Score</b>	<b>ACT Overall Score</b>	<b>Difference (SAT-ACT)</b>	<b>z-value</b>	<b>Significance (p-value)</b>
Marketing	.2871	.4444	-0.1573	1.55	<b>0.06</b>
Accounting	.3541	.1903	0.1638	1.80	<b>0.03</b>
Finance	.3925	.1619	0.2306	2.32	<b>0.01</b>
MIS	.3859	.1886	0.1973	1.92	<b>0.02</b>
Management	.3437	.3369	0.0068	0.15	0.44

college GPA for marketing majors, while the SAT scores correlate more strongly with college GPA for other business majors including MIS, finance, and accounting. ACT and SAT perform similarly in their predictive abilities for management majors.

The differences in the pattern of correlations may be based on the fundamental differences between the ACT and SAT tests in overall philosophy, content, and design (ACT Inc. 2002a; McManus 1991; Schneider and Dorans 1999). The SAT tests academic aptitude – the ability to learn information independent from high school curricula. SAT has been described as a test of “developed ability.” It is a test of essentially two “languages” – English and mathematics. Half of the test evaluates quantitative abilities and there is a “correction” made for guessing at questions which can negatively affect a student’s score.

The ACT, on the other hand, is a test of educational development. It measures how much the student has learned so far. It is more closely tied to curricula covered in the content areas of English, mathematics, reading, and science reasoning (ACT Inc. 2002a). Only a quarter of the test is based on quantitative abilities and there is no penalty for wrong answers.

One can speculate that the ACT is a better predictor of marketing student GPA because, in contrast to SAT, the ACT focuses on what a student has learned so far (application of knowledge) than of the ability to learn (knowledge acquisition ability). It then becomes important to understand why the performance of marketing majors is more influenced by a student’s mastery of the basic high school curricula (in English, math, reading, and science) than by his or her general aptitude or ability to learn. It is interesting to note that marketing and management majors are quite similar in the sense that ACT predicts performance for these two majors at about the same level (Table 3). A possible explanation for this could be that marketing and management are more general disciplines that require

students to apply critical thinking and analytical skills to a relatively common knowledgebase, the foundation of which is laid in the high school curriculum. On the other hand, disciplines like accounting, finance, and MIS depend on students acquiring a new knowledgebase and then operating within the domain of this new knowledge. Given the more technical nature of these majors, students need to acquire new knowledge beyond what they were exposed to in high school. Thus, it is more critical for them to be good at acquiring new knowledge than at applying or extending knowledge acquired in high school.

Also, of the five majors examined in this study (for which we have both ACT and SAT data), the three majors that can be more easily called quantitative in nature are finance, MIS, and accounting. Recall also that only a quarter of ACT is quantitative, whereas SAT is half quantitative. Thus, it should come as no surprise that SAT is a better predictor for these majors as it has a significantly higher weight for quantitative abilities than the ACT. However, interestingly correlations are relatively low for *both* the verbal and math sections of the SAT for marketing majors and relatively high for other majors (Table 1). Similarly, looking at the correlations of ACT sub-test scores with GPA (Table 2), we see that the correlations of all the subtests (including math) with GPA is high for marketing majors and low for other majors, suggesting that further research is needed on why ACT scores correlate highly with marketing student GPA and SAT scores correlate highly with GPA of other business students.

Essentially, our results show that standardized tests can be effective predictors of business student performance in college. Further, the predictive ability of these tests varies by major. College counselors and admissions officers should recognize that the ACT scores may be a better predictor for performance in the marketing major while the SAT scores may be a better predictor of performance in other business majors.

In future extensions of this research, it would be interesting to test hypotheses explaining the possible reasons for the observed differences between majors. It would also be worthwhile to explore the impact of other variables (such as high school grades, demographic variables, participation in voluntary activities, participation in internships, number of hours worked) on academic performance in business majors. Finally, since these results are based on a single dataset that includes data collected from a variety of sources in 1999–2000, it is important to validate these results with other data sets. Although the

sample sizes were relatively large, it would be worthwhile to examine the generalizability of these patterns with additional data sets.

The tests themselves are also undergoing a number of changes and it would be interesting to evaluate whether changes made in the nature of the tests have an appreciable impact on predictive ability. Given the burgeoning numbers of college bound students and expected continued reliance upon the SAT and ACT for admissions by US colleges and universities, further research into the potential predictive ability of the tests is a valuable undertaking.

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## ENDNOTE

<sup>1</sup> We thank an anonymous reviewer for bringing this to our attention.

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