The Determinants of Student Performance in a University Marketing Class

James C. Brau, PhD, CFA, Department of Finance, *Brigham Young University (BYU)*
Rebekah Inez Brau, Masters Student, Department of Instructional Psychology, *BYU*
Stephen R. Owen, PhD Student, Department of Finance, *Pennsylvania State University*
Michael J. Swenson, PhD, Department of Marketing and Supply Chain, *BYU*

ABSTRACT

At a large private university, 835 undergraduate students completed a 110-question survey pertaining to an introduction to marketing class. The explanatory factors included are chosen to cover those studied in past literature as well as new pedagogical innovation variables. To test the determinants of student achievement we perform univariate and multivariate analyses to include quantile regressions on the 10^{th} and 90^{th} percentiles. The primary research objective is to provide students and instructors information on components that are most significant to learning and course outcomes. Our study allows students and instructors to give focused efforts on the factors that provide the greatest marginal benefit for student learning and outcome in an introductory university marketing class.

Keywords: Education, Business, Marketing, Pedagogy, Undergraduate, Learning, Classroom Success

INTRODUCTION

Over the past century many studies have been performed attempting to measure the variables that affect academic performance. One of the most intensive studies is that of Harris (1940) who analyzes the findings of the academic literature from 1930-1937 regarding the topic of factors affecting college grades. Munday (1970) concludes from his study of 134 universities between 1964 and 1965, that predictability is reasonably systematic. Each of these studies cover a breadth of topics and courses. However, each finds that variables such as ACT score, gender, high school GPA, student self-efficacy, work ethic, among others are viable measures of academic performance (see also Park & Kerr, 1990; Talib & Sansgiry, 2012).

The level of consistency in findings among the many studies previously performed is volatile. We presume the factors selected for our study, after extensive research on the extant literature, prove significant in trying to narrow the gap between prior research discrepancies. Some examples of variables chosen include college GPA, class attendance, required reading completed, and ACT/SAT scores. We perform a variety of tests to examine the validity of each of these variables on student course outcome. Among these tests we run regressions on different subsections of student performers, e.g., we run the main regression model but only on the top or bottom performers to allow insight in what seems to make these students perform at the various levels.

In our literature review, we discuss several previous studies and their analysis on the determinants of course outcomes. These sources cover a variety of different subjects allowing us to do comparisons across other topics of study as well. We expand on these topics by providing additional variables and determine the effects the variables have on performance. The objective is to take these variables included in previous studies and attempt to hone in on a more direct approach to a marketing class by using other, closely related business class studies applied to marketing. For example, we examine the effect of attendance in a marketing context (Stanca, 2004; Marburger, 2006). Another example is that Dills and Hernandez-Julian (2008) find transfer students perform worse that other students, on average. In our study we reach the same conclusion.

The following sections provide a review of the literature, specifically to give support to the aforementioned, and following factors used in our analysis. Again, we do not limit the literature to one specific field, rather we include all areas of academic literature. Subsequently we present our data and methods. Following data and methods is the empirical results section which highlights our findings in our multivariate regression tests, as well as quantile regression findings. We then conclude in the final section.

LITERATURE REVIEW

In preparation for this experiment, several of the variables chosen were based on previous studies. Throughout these studies, there exist some consistencies and variabilities among the results. We provide a description of the individual variables that compose the factor groups and the theoretical roots for each factor from the extant literature.

One of the most significant consistencies we find is ACT/SAT scores and college GPA (Park and Kerr, 1990; Kara, Bagheri, & Tolin, 2009). Park and Kerr (1990) report that ACT score ranks the intellectual ability before college and the GPA ranks the intellectual ability developed in college. The breadth of study on high school GPA, although not as extensive, has found some relationship with performance in various university courses (Davidobitch & Seon, 2015; Schulruf et al. 2008; Zwick & Sklar, 2005; McKenzie & Schweitzer, 2001; Stricker et al. 1996). In each of the studies, it is found that high school GPA is a strong predictor of success in college courses. Zwick & Sklar (2005) exhibit that high school GPA is a stronger predictor in first year college GPA than SAT scores.

To our knowledge, a measurement of whether or not a student is on academic scholarship at the time of the study has not been performed in previous marketing studies. All things considered, we find value added by including academic scholarship as it serves as another proxy of intelligence. Our prediction for ACT/SAT score, high school and college GPA, and students on academic scholarship consist of a positive relationship with course outcome.

A student's belief about how much they strive toward learning, academic goals, and career goals are reviewed next. It is found in several studies in various academic disciples that these three sub-factors positively influence students' performance (see Loo & Choy, 2013; Phan, 2012; Pruzer, 2011). Trine and Schellenger (1999) find that self-motivation is a significant determinant of performance in a finance course. Kara, Bagheri, and Tolin (2009) report that the expected grade at the beginning of the semester has a positive, significant correlation with grades.

Student goals are also attributed to success in challenging situations (Schweinle & Helming, 2011); research that examines and investigates the reasoning behind the drive for success. According to Schweinle and Helming, and Afzal, et al. (2010), student success is highest when they are motivated intrinsically or by mastery compared to when motivated extrinsically or through grade. Identifying the reason behind drive or motivation is a vital component in academic outcome (Vanthournout et al., 2012).

Vygotsky (1978) argues that there are differing levels of challenge that will awake the greatest drive for learning, which brings the greatest academic success, within a student. In seeking out ways to motivate students, the optimum level of challenge will help students work at their highest level of personal ability. Csikszentmihalyi (1997), among others, reminds us that flow theory is a form of positive psychology that, when in the zone, is a mental state of operation in which the person performing an activity is fully immersed in optimizing emotions and involvement within an activity.

Self-belief is the next variable we discuss. We differ from other studies because we use the measure of availability from the students themselves; previous studies have not used such student-perspective data. This allows us to test self-perception with course performance. Gladwell (2013) stated that students perform relative to how they feel—self-perception—that shapes the context of your willingness to meet challenges and complete difficult tasks. He goes on to state, "It's a crucial element in your motivation and confidence."

A variety of previous studies show that self-belief is linked to academic success and endurance among college students (Gloria et al. 1999; Lent et al. 1997; Robinson Kurpius et al. 2003). Knowing that self-belief is linked to long term academic persistence, we are curious as to the potential existence of over-confidence and the possible impact on course performance. Nonis and Hudson (2006) show that high school, on average, does not adequately prepare students for college and has an adverse effect—over-confidence. The findings of Wyatt et al. (2005) exhibits, although unrealistic belief, that over-confidence may still have an impact on success, whether it be positive or negative. In this paper we do not distinguish between realistic and unrealistic self-belief and recognize that this could create noise in the outcomes.

Murray and Wren (2003) report that the correlation of IQ with academic performance shows an interesting perspective on how skills, or ability, impact final grades. In order to separate the correlation and students' perspective of ability's impact on final grades we include the student's self-assessment in their marketing abilities and their self-assessment of personal interest in marketing.

It is believed that increased interest in a course leads to improved performance. By including the interest-in-marketing variable, we seek to determine the effects of self-rated interest in the course to the course outcomes. Kara et al. (2009) is one of several studies that show this exact belief—students with higher levels of interest in the course are more likely to succeed in that specific course (in our case marketing). Salem (2001) finds that an interaction with friends helps create an experience that may enhance their interest in the respective subject of the group. Similarly, having better relationships with peers is shown to increase the learning curve (Foy, 1994). After review of previous findings, we predict a positive correlation between marketing ability and course grade.

Our survey includes a series of variables we describe as "student bandwidth". Student bandwidth is made up of the following variables: number of credit hours a student is taking, extracurricular activity involvement, number of weekly service hours given, and number of weekly hours spent at a paid job.

Dale and Crawford (1999) state, "when jobs affect attendance they have a devastating effect on performance." Kara, Bagheri, and Tolin (2009) find that the more a student works the worse they perform in a class (see also Trine & Schellenger, 1999). Findings of the study by DeSimone (2008) report that the negative relationship between labor supply and grades are not simply attributable to less academically motivated students working long hours. Instead, students who spend longer hours in paid labor because of preference or budget constraints related to their fathers' schooling attainment and attitudes ultimately perform worse in school than they otherwise would. He also continues that rising real college costs will seemingly put added pressure on students to earn while they learn. Arano and Parker (2008) claim that, while OLS underestimates the effect of working on academic performance, student employment has a negative effect on academic performance for freshmen, but for upperclassmen, the negative effect only occurs after working long hours. They show that this negative affect is weakest for juniors, followed by seniors and sophomores. They conclude that work while in school does have its benefits as well as its opportunity costs.

Although these studies find an adverse effect on student performance, Harris (1940) among others found that work while in school is statistically insignificant and not an accurate predictor of student performance in a class. From each of these studies we see either an adverse or no relationship between the number of hours spent working and academic performance. Likewise, we can assume that the more time a student spends in service activities (less time is consequentially spent dedicated to course preparation) the worse they will perform in the course as well, although only in excess amount. Harris (1940) finds that there is a positive low, to no correlation between the number of credit hours carried and GPA in each of the four quartiles of the intelligence distribution. We predict that as students have less bandwidth to focus on (less time dedicated to) the marketing class, they will experience lower grades. Note, however, that in light of the previous literature, this is another empirical issue with no clear prediction.

Individual effort is another common topic of interest. We include several variables that we determined help measure student individual effort, such as number of hours spent per week studying for the class, number of hours spent studying during the test week for the class, attendance, percentage of assigned readings completed, hours spent with a tutor or teaching assistant, participation in a study group, number of people in the study group, and times the student goes to bed and wakes up.

Absenteeism is found to be unanimous throughout several past studies. Regular class attendance proves to reflect in a students' final grade and overall performance (Dale, 1999). Although attendance proves to be significant across all studies, the literature has various conclusions about the effect of mandatory class attendance (see Neri & Meloche, 2007; Stanca, 2004), which is outside the scope of this study. Regardless, student attendance record has been shown to be positively correlated with performance (Marburger 2001; Cohn & Johnson, 2006).

A number of studies show "introvert" behavior, compared to "extrovert" behavior, is associated with better grades (Harris, 1940). Krohn and O'Connor (2005), among others, show that the number of hours spent studying for the class at hand is negatively correlated with performance (see also Didia & Hasnat, 1998; Kara et al. 2009). Still largely unexplained, this result is found within many different studies and continues to surprise as it seems counter-intuitive. This raises the question, is there such thing as too much study? Is there an optimal amount of study that maximizes performance? Borg, Mason, and Shapiro (1989) shed some light on these questions. In their study, they separate students into two groups based on ACT/SAT scores. The group with above-average ACT/SAT scores received higher final grades as they spent more time studying. Conversely, the group with below-average scores received lower final grades as they spent more time studying. The insight we gain from this study is that it is

possible that intelligence plays a major part in individual effort. It appears that those with higher intelligence benefit more from additional studying than those with lower intelligence—the reasons why are still unknown.

Nonis and Hudson (2006) state, "It should be clearly communicated to [the students] that their abilities, motivation, and behavior work in tandem to influence their academic performance. If students are lacking in even one of these areas, their performance will be significantly lower." We use multivariate testing to control for intelligence, effort and all other effects discussed. We predict a positive correlation between individual effort and performance.

DATA AND METHODS

Our data sample for this project consists of 835 undergraduate students from a large, private university. The students were offered extra credit to complete a 110 item questionnaire. The survey was fairly extensive. There were 1,312 total students enrolled in the class rendering a response rate of 63.6%. Comparatively speaking, our response rates are excellent compared with previous studies: Graham and Harvey (2001), 8.5%; Trahan and Gitman (1995), 12%; Brau and Fawcett (2006), 18.8%; Krigman, Shaw, and Womack (2001), 34%; Brau, Ryan, and DeGraw (2006), 44.5%; and Brau et al. (2016), 60.4%.

The questions in our survey were derived by using academic literature, recommendations from professors and students, and our own ideas of what could be especially applicable to a marketing class. The survey is available upon request. Table 1 defines the primary variables of interest used in the subsequent empirical tests.

Table 1: Variable Definitions

Variable Name	Definition	Variable Name	Definition
aca_schol	Equals 1 if Academic Scholarship	interest_mkt	Interest in marketing (7-point Likert Scale)
act	ACT (on the 36 max ACT score)	major_acc	Equals 1 if Pre-Accounting Major
age	Age (16-point scale)	major_busm	Equals 1 if Pre-Business Mgmt Major
any_ta	Equals 1 if student spent any time with the teaching assistant	major_fin	Equals 1 if Pre-Finance Major
any_tutor	Equals 1 if student spent any time with the tutor	major_is	Equals 1 if Pre-Info System Major
ath	Equals 1 if student athlete	major_recm	Equals 1 if Pre-Recreational Mgmt Major
ath_schol	Equals 1 if Athletic Scholarship	male	Gender 0=female 1=male
ath_tut	Use of athletic tutor (7-point scale)	mkt_241	Equals 1 if student is in section 1
attendance	How often attend class (6-point scale)	no_mission	Equals 1 if did not serve LDS mission
byu_gpa	College GPA on a 4.0 scale	not_married	Married 0=yes, 1=no
child	Children 0=no, 1=yes	num_in_group	# of people in study group
credit_hrs	Credit hours (5-point)	other_mkt	Equals 1 if student has taken another marketing class
disability	Equals 1 if student has a University Accessibility Letter	parsib_mkt	Equals 1 if family in marketing
english	Equals 1 if English as first language	percent_read_mkt	Percentage of reading completed before class (%)
exam_daym	Day took test 1=first day 2=second day	retake_mkt	Equals 1 if retaking the class
extra_activ	Extracurricular activities (7-point scale)	sat	SAT (on a 20 point scale)
games_sem	# collegiate sports games in semester	selfrate_mkt	Skill in marketing (7-point Likert Scale)
hr_awake	Wake up time (7-point scale)	study_group	Equals 1 if in a study group
hr_bed	Time to sleep (7-point scale)	ta_hrs	Hours spent with teaching assistant
hrs_job	Hours spent at a paid job in the semester (8-point)	teach_mkt	Teach others principles from class (6-point scale)
hrs_serve	Hours serving in religious/spiritual/community (7-point scale)	tram_evt	Equals 1 if traumatic life event during semester
hrs_study_xm	# of hours/week studying during exam week (11-point scale)	transfer	Equals 1 if transfer student
hs_gpa	High School GPA on a 4.0 scale	tutor	Use of a tutor (7-point scale)

Table 2 reports the summary statistics of the data. We report the traditional OLS regression results in Table 3. Moved by the findings of Borg, Mason, and Shapiro (1989), we report quantile based regression results for the 10th and 90th percentile performers in Tables 4 and 5.

Table 2: Summary Statistics						Variable	Obs	Mean	Std. Dev	Min	Max
Variable	Obs	Mean	Std. Dev	Min	Max	interest_mkt	815	5.222	1.254	1	7
aca_schol	812	0.440	0.497	0	1	major_acc	835	0.159	0.366	0	1
act	818	26.178	8.119	1	36	major_busm	835	0.349	0.477	0	1
age	814	6.398	2.157	2	16	major_busmnr	835	0.101	0.301	0	1
any_ta	835	0.451	0.984	0	7	major_fin	835	0.157	0.364	0	1
any_tutor	835	0.195	0.714	0	7	major_is	835	0.072	0.258	0	1
ath	835	0.040	0.195	0	1	major_other	835	0.289	0.453	0	1
ath_schol	835	0.061	0.317	0	2	major_recm	835	0.059	0.235	0	1
ath_tut	835	0.086	0.543	0	6	male	816	0.662	0.473	0	1
attendance	831	5.403	1.254	0	6	no_mission	835	0.636	0.481	0	1
byu_gpa	792	3.535	0.444	0	4	not_married	835	0.836	0.371	0	1
child	835	0.022	0.145	0	1	num_in_group	835	0.362	0.834	0	6
credit_hrs	824	2.896	0.651	1	5	other_mkt	816	0.038	0.191	0	1
disability	831	0.052	0.222	0	1	parsib_mkt	833	0.200	0.401	0	1
english_2nd	835	0.922	0.268	0	1	percent_read_mkt	805	87.7	19.1	0	100
exam_daym	814	2.791	0.851	1	4	retake_mkt	835	0.057	0.233	0	1
extra_activ	814	2.455	1.376	1	7	sat	796	5.089	6.401	1	19
games_sem	835	0.049	0.257	0	2	selfrate_mkt	815	5.723	0.836	1	7
gradeperc	835	91.0	5.7	65.8	100.6	study_group	833	0.965	0.899	0	2
hr_awake	815	5.142	1.160	1	7	ta_hrs	813	1.268	0.631	1	7
hr_bed	815	5.550	0.990	3	7	teach_mkt	813	1.451	0.498	1	2
hrs_job	813	3.381	2.014	1	8	total_hrs_study	811	8.906	2.942	2	20
hrs_serve	813	3.156	0.801	1	7	tram_evt	814	0.946	0.916	0	2
hrs_study_xm	812	5.861	2.106	1	11	transfer	814	0.276	0.447	0	1
hs_gpa	814	3.755	0.292	2	4	tutor	812	1.119	0.478	1	7

We leave detailed inspection of Table 2 for the reader but make note of a few variables from the summary statistics. Since the survey was done at a Western school, more students are prone to take the ACT than the SAT. The ACT reports a mean score of 26, based on the traditional 36-point scale. The SAT on the other hand is a scaled response (i.e. a 20-point scale). The mean high school GPA is 3.75 and mean college GPA (represented by the name byu_gpa) is 3.53. We recognize that these means are fairly high, but the subset of students taking an intro to marketing class are competing with a large number of other students for admittance into a highly competitive limited enrollment undergraduate business program. Let us also make note that the intro to marketing class is a prerequisite class for the business school and the competition is very intense to earn an A or A-, as the cut-off prerequisite GPA for admission is typically 3.7 or above.

The empirical methods for this study begin with an ordinary least squares (OLS) regression using Hubler-White standard errors to correct for heteroscedasticity. We also create two control variables to give us more accurate information regarding tutor and teacher assistant use (i.e., free, qualified tutors provided by the university to work specifically with the instructor and his or her respective class for the entire semester). These variables help us measure the effect of using a tutor or teaching assistant. Subsequently, we run quantile regressions to see the effects of each factor on the high and low-performing students (i.e., 10^{th} percentile and 90^{th} percentile). Such regressions allow us to gain further insight to how students compare in performance and what influences their success. Each of these models examine the factors and variables in a multivariate setting.

EMPIRICAL RESULTS

Table 3 reports results of the grand regression, an OLS regression using Hubler-White standard errors of robustness that includes all factors previously mentioned. Again, we leave careful inspection of the table to the reader and highlight a few key results. The variables in Table 3 are listed in order of statistical significance. For flow of discussion, we cover the main findings out of order from the table in summary style. College GPA and SAT scores reported significant at the .05 level, whereas ACT was significant with a p-value of .079 and high school GPA had a p-value of .140. All of these variables have positive impact on course outcome. These results agree with Park and Kerr (1990). Following the results of Park and Kerr (1990), we also find that the number of hours spent working a job, the amount of time spent studying (during exam week), and number of credit hours currently enrolled are significant in generally determining student grades. In our study, students who study more during exam week will,

on average, obtain a higher grade. This makes sense. However, we find that the more time students spend studying during a non-exam week, the worse they perform (see Kara, Bagheri, & Tolin, 2009). Therefore, we conclude that the more time students spend studying overall for the course, the worse the outcome will be, but students who dedicate more time studying during exam week will result in better outcomes. This can potentially be explained by the general ability of a student who needs to spend more time studying throughout every week compared to students who do not (i.e. higher performing students). Through quantile regression analysis, we will be able to further explain this phenomenon as we compare the 10th percentile performers to the 90th percentile performers. This will be discussed in Tables 4 and 5.

Table 3: Ordinary Least Squares Regression with Course Grade as Dependent Variable. Variables defined in Table 1.

VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err
byu_gpa	4.254***	major_acc	1.074**	any_tutor	-1.434	games_sem	-6.186
	-0.755		-0.476		-1.221		-4.166
credit_hrs	0.924***	major_fin	1.004**	study_group	0.446	ath_tut	0.162
	-0.276		-0.42		-0.367		-0.928
attendance	0.610***	transfer	-0.922**	num_in_group	-0.241	ath_schol	-1.524
	-0.201		-0.44		-0.189		-1.751
hrs_study_xm	0.766***	act	0.0426*	not_married	-0.301	extra_activ	-0.223
	-0.218		-0.0242		-0.537		-0.136
total_hrs_study	-0.419***	hr_bed	-0.359*	child	-0.825	aca_schol	1.578
	-0.159		-0.208		-1.527		-0.981
selfrate_mkt	1.765***	hrs_job	-0.162*	hr_awake	0.164	major_is	-0.482
	-0.226		-0.0886		-0.198		-0.65
other_mkt	-3.734***	hrs_serve	-0.383*	disability	-0.363	major_recm	-0.0157
	-1.259		-0.211		-1.03		-0.773
age	0.324**	major_other	-1.026*	retake_mkt	0.769	major_busm	-0.104
	-0.155		-0.525		-0.651		-0.456
sat	0. 0583**	male	0.591	parsib_mkt	-0.448	major_busmnr	0.0112
	-0.0251		-0.446		-0.386		-0.585
percent_read_mkt	0.0250**	hs_gpa	0.983	teach_mkt	0.0336	tram_evt	-0.233
	-0.0104		-0.676		-0.341		-0.669
interest_mkt	-0.321**	ta_hrs	0.361	exam_daym	-0.0935	constant	56.88***
	-0.15		-0.57		-0.192		-4.223
english_2nd	-2.199**	any_ta	-0.0766	no_mission	0.39		
	-1.052		-0.802		-0.613	R-squared	0.461
ath	9.192**	tutor	-0.589		Robust standard errors below coefficients		
	-4.435		-0.725		*** p<0.01, ** p<0.05, * p<0.1		

We find gender is not a predictor of what the student outcome will be, counter to findings in previous studies of other courses (see Harris, 1940; Dale & Crawford, 1999; Kara, Bagheri, & Tolin, 2009; Cappellari, Lucifora, & Pozzoli, 2008; Brau et al. 2016). We find that age, however, does have a positive impact on student outcome. As students increase in age they tend to perform, on average, .33 points higher than younger students.

Neri and Meloche (2007) conclude, like others, that attendance does contribute to academic performance. In our analysis, we reach the same conclusion—students who attend class more attain a higher overall course grade. However, this comes with a caveat according to several previous studies (see Neri & Meloche, 2007; Marburger, 2006; Stanca, 2004). These studies show that while attendance is unanimously beneficial to course outcome, the effects of implementing a mandatory attendance policy adversely affects course outcome. Stanca (2004) describes this phenomenon stating that attendance should not be made compulsory:

> A compulsory attendance policy would distort the opportunity cost of absenteeism and impose a welfare loss on students. In addition, besides the fact that a captive audience is not a good learning environment, compulsory attendance would take away an important signal for lecturers on the quality of their teaching. The solution to the problem of high levels of academic absenteeism is not to make attendance compulsory, nor to design exams so as to make attendance necessary, but to

> improve the quality of our teaching, in terms of both content and format, to provide students with the right incentives and let them vote with their feet (Stanca, 2004 p. 17-18).

Such findings grant insight to the power of student personal accountability and agency, and how it is reflected in their collegiate performance.

We find another interesting variable that complements the work of Brau et al. (2016). On average, the percentage of reading completed by the student has a positive correlation with student grades. These findings do not seem out of the ordinary and align with our predictions.

One of the most interesting results we find is the difference in performance between native English speakers and non-native speakers. Our results show, counterintuitively, that native English speakers underperform compared to non-native speakers by approximately 2.20 percent. This result is statistically significant with a p-value of .037.

Next we direct attention to Table 4, which shows the results of the 10th percentile performers. Following Table 4 we discuss the results in Table 5, which displays the 90th percentile performers. Finally, we compare the significant findings of 90th percentile performers and the significant findings of the 10th percentile performers in Table 6. This comparison sheds light on the average findings relative to low and high achieving students.

Table 4: Quantile 10th Percentile Regression with Course Grade as Dependent Variable. Variables defined in Table 1.

VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err
hs_gpa	4.293***	sat	-0.0333	hrs_job	-0.0435	ath_tut	-1.199
	-1.511		-0.0628		-0.215		-1.62
byu_gpa	8.433***	percent_read_mkt	0.0148	hrs_serve	-0.287	extra_activ	-0.32
	-0.937		-0.0218		-0.486		-0.312
selfrate_mkt	2.034***	hrs_study_xm	0.438	disability	-1.932	aca_schol	-0.424
	-0.544		-0.512		-1.894		-2.087
credit_hrs	1.438**	total_hrs_study	-0.197	retake_mkt	2.219	major_acc	1.082
	-0.65		-0.378		-1.647		-1.267
attendance	0.920**	ta_hrs	0.745	interest_mkt	-0.215	major_is	0.0451
	-0.427		-1.398		-0.364		-1.625
ath	18.75**	any_ta	-1.614	parsib_mkt	-1.271	major_recm	0.554
	-8.853		-2.102		-0.967		-1.842
ath_schol	-8.742**	tutor	0.644	other_mkt	-1.759	major_busm	0.0853
	-4.388		-1.746		-2.152		-1.102
hr_awake	0.842*	any_tutor	-4.565	teach_mkt	-0.262	major_busmn	0.731
	-0.442		-2.883		-0.816		-1.329
major_fin	2.339*	study_group	0.171	exam_daym	-0.127	major_other	-1.713
	-1.211		-0.797		-0.48		-1.172
transfer	-2.003*	num_in_group	0.466	no_mission	0.676	tram_evt	0.285
	-1.051		-0.494		-1.255		-1.364
male	-0.454	not_married	-0.368	english_2nd	-1.397	constant	20.43**
	-1.05		-1.258		-2.046		-9
age	0.267	child	-1.45	games_sem	-4.027		
	-0.295		-2.91		-6.061	R-squared	0.388
act	-0.0117	hr_bed	-0.787		Robust standard errors below coefficients		
	-0.0557		-0.506		*** p<0.01, ** p<0.05, * p<0.1		

The 10th percentile performers render interesting results that vary slightly from the average. High school GPA and college GPA have significant positive impact on student performance. Interestingly, and almost counterintuitively, the more credit hours these students take, the better they tend to perform. This follows the findings of Zwick and Sklar (2005) that high school GPA is a stronger predictor in first year college GPA than SAT scores, as neither ACT nor SAT scores are found to be statistically significant variables for these students in an introductory, pre-requisite course.

Consistent with previous findings, voluntary attendance increases the likelihood of success for these lower performing students. One variable that strikes academic appeal is the result of their self-assessment of marketing skills. We find that the more confident students feel about their marketing abilities, the better their outcome. This finding fits with the statements made by Malcolm Gladwell (2013) that students' perceptions of their own abilities are reflected in how they perform (with a p-value of 0.000 and a coefficient of 2.07). This means that their confidence, on average for the lower performing students, can improve their overall outcome by roughly two percentage points. Lastly, transfer students and students who wake up later underperform.

90th percentile performers reveal a mixture of results as well. Consistent with our OLS regression, college GPA, SAT score, percentage of reading completed, and time spent studying during exam week render positive correlation with student performance, while total hours spent studying (including hours spent studying during non-exam week) has a negative correlation with student performance.

Table 5: Quantile 90th Percentile Regression with Course Grade as Dependent Variable. Variables defined in Table 1.

VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err
byu_gpa	2.955***	act	0.036	hrs_serve	0.0496	ath_schol	-1.884
	-0.462		-0.0275		-0.24		-2.166
percent_read_mkt	0.0301***	credit_hrs	0.363	disability	0.967	extra_activ	-0.0965
	-0.0108		-0.321		-0.935		-0.154
num_in_group	-0.636***	attendance	0.25	retake_mkt	0.51	major_acc	0.624
	-0.244		-0.211		-0.813		-0.625
selfrate_mkt	0.963***	ta_hrs	-0.148	interest_mkt	-0.0208	major_fin	-0.0847
	-0.268		-0.69		-0.18		-0.598
english_2nd	-2.624***	any_ta	1.046	parsib_mkt	-0.252	major_is	-0.711
	-1.01		-1.038		-0.477		-0.802
aca_schol	2.828***	tutor	-0.716	other_mkt	-0.0619	major_recm	0.667
	-1.03		-0.862		-1.062		-0.909
male	1.055**	any_tutor	0.736	teach_mkt	-0.107	major_busm	-0.368
	-0.518		-1.423		-0.403		-0.544
hrs_study_xm	0.630**	study_group	0.0125	exam_daym	0.0643	major_busmnr	0.346
	-0.253		-0.394		-0.237		-0.656
total_hrs_study	-0.402**	not_married	0.389	no_mission	-0.519	major_other	-0.387
	-0.187		-0.621		-0.62		-0.578
tram_evt	-1.385**	child	-0.0249	ath	5.38	transfer	-0.537
	-0.673		-1.437		-4.37		-0.519
sat	0.0588*	hr_bed	-0.239	games_sem	-1.064	constant	73.76***
	-0.031		-0.25		-2.992		-4.443
age	0.226	hr_awake	0.0825	ath_tut	-0.63		
	-0.146		-0.218		-0.799	R-squared	0.206
hs_gpa	0.635	hrs_job	-0.114		Robust standard errors below coefficients		
	-0.746		-0.106		*** p<0.01, ** p<0.05, * p<0.1		

An overall difference we find from the whole-sample OLS regression and the 10th percentile performers is that males outperform females by about 1.09 percent with a t-stat of 2.13 and a p-value of .033. This poses some interesting intuition regarding an intro to marketing course. It appears, according to our findings, that the only group of students affected by gender is the top 10 percent of students. Another very interesting result, consistent with our OLS regression, is that students who do not speak English as their first language perform better than native English speaking students by about 2.66 percentage points. Although it seems counterintuitive, especially in a marketing course where communication is so critical, with such a big difference in performance, the p-value ($p > .007$) is highly significant. Along with these findings we note that students who were on academic scholarship at the time they took the course outperformed those who were not by 2.37 percent, which is another intuitive result. Students who have earned an academic scholarship typically earn them because of their previous academic achievements, distinguishing them from other students. All groups have positive correlation in performance with their self-rated marketing abilities, which further confirms the power of positive thinking and confidence on achievement.

Table 6: Key Results Comparing 90th Percentile Performers with 10th Percentile Performers							
90th Percentile Performers				10th Percentile Performers			
VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err	VARIABLES	Coeff/Std Err
byu_gpa	2.955***	male	1.055**	hs_gpa	4.293***	ath	18.75**
	-0.462		-0.518		-1.511		-8.853
percent_read_mkt	0.0301***	hrs_study_xm	0.630**	byu_gpa	8.433***	ath_schol	-8.742**
	-0.0108		-0.253		-0.937		-4.388
num_in_group	-0.636***	total_hrs_study	-0.402**	selfrate_mkt	2.034***	hr_awake	0.842*
	-0.244		-0.187		-0.544		-0.442
selfrate_mkt	0.963***	tram_evt	-1.385**	credit_hrs	1.438**	major_fin	2.339*
	-0.268		-0.673		-0.65		-1.211
english_2nd	-2.624***	sat	0.0588*	attendance	0.920**	transfer	-2.003*
	-1.01		-0.031		-0.427		-1.051
aca_schol	2.828***			Robust standard errors below coefficients			
	-1.03			*** p<0.01, ** p<0.05, * p<0.1			

IMPLICATIONS FOR MARKETING EDUCATORS

Clearly a number of the determinants of student performance in the introductory marketing course are outside the control of the instructor (e.g., GPA, ACT score, age). For marketing educators, our research findings identify a number of student performance determinants that instructors may influence. The most obvious implications are that marketing educators should encourage students to prepare prior to class, attend class, and prepare for exams, especially during the exam week. These recommendations are not new or novel; however, our paper provides empirical evidence for these oft-given recommendations. We note as well that the determinants of success for students in the 90th percentile differ from those of students in the 10th percentile. That is, for top performers, the primary determinant influenced by the instructor is preparation for class. For students in the 10th percentile, the primary determinant influenced by the instructor is class attendance. Although this current paper is limited in scope to a university marketing class, readers are directed to Brau, et. al (2016) for an analysis of an introductory finance class.

CONCLUSION

In conclusion, our analysis yields results consistent with most previous studies performed, while revealing some new insights. We find that a student's academic performance can be influenced by a series of different factors. College GPA, class attendance, percent of reading completed, self-rated marketing ability, and hours spent studying during exam week all have a positive impact on grades. Other factors, such as the later a student wakes up, English as a native language, and weekly hours spent in employment have a negative impact on grades. To our surprise marital status, having children, and retaking the class returned inconclusive results. Proceeding with more in-depth analysis by conducting quantile regressions to measure the effects of the variables on the bottom and upper 10th percentiles, we identify the differences of various performing students. Overall, our paper adds to the discussion of business education and serves as a resource for instructors and students alike.

REFERENCES

Afzal, H., Ali, I., Khan, M. A., & Hamid, K. "A Study of University Students' Motivation and its Relationship with their Academic Performance," *International Journal of Business and Management, 5*(4), (2010), 80-88.

Arano, K. and C. Parker, "How Does Employment Affect Academic Performance among College Students?" *Journal of Economics*, 34 (2008), 65-82.

Borg, M. O., P. M. Mason and S. L. Shapiro. "The Case of Effort Variables in Student Performance," *Journal of Economic Education*, 20 (1989), 308-313.

Brau, J. C., R.I. Brau, T. Rowley, and M.J. Swenson, "An Empirical Analysis of Success Factors in an Introductory Financial Management Class," BYU Working Paper, (2016).

Brau, J. C. and S. Fawcett. "Initial Public Offerings: An Analysis of Theory and Practice," *Journal of Finance*, 61 (February 2006), 399-436.

Brau, J. C., A. L. Holmes, C. L. Israelsen. "Financial Literacy among College Students: An Empirical Analysis," *Journal of Financial Education*,(2016) forthcoming.

Brau, J. C., P. Ryan and I. Degraw. "Initial Public Offerings: CFO Perceptions," *Financial Review*, 41(4) (2006), 483-511.

Cappellari, L., Lucifora, C., and Pozzoli, D. "Determinants of Grades in Math for Students in Economics," *Education Economics*, (2012), 1, 20, 1-17.
Cohn, E. and E. Johnson. "Class Attendance and Performance in Principles of Economics," *Education Economics*, 142 (2006), 211-233.
Csikszentmihalyi, M. "Intrinsic motivation and effective teaching: A flow analysis," In J. L. Bess (Ed.), *Teaching Well and Liking It: Motivating Faculty to Teach Effectively* (Baltimore 1997), 72–89, The Johns Hopkins University Press.
Dale, L., and Crawford, J. "Student Performance Factors in Economics and Economic Education," *Allied Academies International Conference* (1999).
DeSimone, J. "The Impact of Employment during School on College Student Academic Performance," NBER Working Paper No. 14006. National Bureau of Economic Research, Cambridge, MA.
Didia, D. and B. Hasnat. "The Determinants of Performance in the University Introductory Finance Course," *Financial Practice and Education*, 8 (1998), 102-107.
Dills, A. and Hernandez-Julian, R. "*Transfer College Quality and Student Performance*," *Eastern Economic Journal*, (2008), 34, 172-189.
Foy, G. "Academic Standards and Basic Skills in Higher Education: Employment of the Student and the Teacher." *College Student Journal*, 28 (3), (1994), 275-279.
Gladwell, Malcolm. *David and Goliath* (New York, 2013), Little, Brown and Company.
Gloria, A. M., Robinson Kurpius, S. E., Hamilton, K. D., & Willson, M. S. "African American students' persistence at a predominately White university: Influences of Social Support, University Comfort, and Self-beliefs," *Journal of College Student Development*, 40, (1999), 257-268.
Graham, J. R. and C. R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, 30 (2001), 187-243.
Harris, D. "Factors Affecting College Grades: A Review of the Literature, 1930-1937," *Psychological Bulletin*, 37 (1940), 125-166.
Loo, C. W. and Choy, J. L. F. "Source of Self-Efficacy Influencing Academic Performance of Engineering Students," *American Journal of Educational Research*, 1(3) (2013), 86-92.
Kara, O., F. Bagheri and T. Tolin. "Factors Affecting Students' Grades in Principles of Economics," *American Journal of Business Education*, 2(7) (Oct 2009), 25-33.
Krigman, L., W. H. Shaw and K. Womack. "Why Do Firms Switch Underwriters?" *Journal of Financial Economics*, 60(2-3) (2001), 245-284.
Krohn, G. A. and C. M. O'Connor. "Student Effort and Performance Over the Semester," *Journal of Economic Education*, (2005), 3-28.
Lent, R. W., Brown, S. D., and Gore, P. "Discriminant and Predictive Validity of Academic Self-concept, Academic Self-efficacy, and Mathematics-specific Self-efficacy," *Journal of Counseling Psychology*, 44, (1997), 307-31
McKenzie, K., and Schweitzer, R. "Who Succeeds at University? Factors Predicting Academic Performance in First Year Australian University Students," *Higher Education Research & Development*, 20(1), (2001), 21–33.
Marburger, D. R. "Absenteeism and Undergraduate Exam Performance," *Journal of Economic Education*, 322 (2001), 99-109.
Munday, L. A. "Factors Influencing the Predictability of College Grades," *American Educational Research Journal*, 7 (1970), 99-107.
Murray, C., & Wren, C. T. "Cognitive, Academic, and Attitudinal Predictors of the Grade Point Averages of College Students with Learning Disabilities," *Journal of Learning Disabilities, 36*(5), (2003), 407-15.
Neri, F. and Meloche Y. "The Impact of Lecture Attendance on Academic Performance in a Large First Year Economics Course," Available at SSRN: http://ssrn.com/abstract=975573
Nonis, S. A., and Hudson, G. I. "Academic Performance of College Students: Influence of Time Spent Studying and Working," *Journal of Education for Business*, *81*(3), (2006), 151-159.
Park, K. H. and P. M. Kerr. "Determinants of Academic Performance: A Multinomial Logit Approach," *Journal of Economic Education*, 21 (1990), 101-111.
Phan, H. P. "Relations between Informational Sources, Self-Efficacy and Academic Achievement: A Developmental Approach Educational Psychology," 32(1) (2012), 81-105.
Robinson Kurpius, S. E. "Psychosocial Factors in the Lives of College Freshmen," Vice Presidential Address, *American Educational Research Association*, (April, 2002). Seattle.
Salem, N. "The Development of Peer Relationship in Children," M.A. Thesis. Gujranwala Govt. Postgraduate College for Women. (2001).
Schweinle, A., & Helming, L. M. "Success and Motivation Among College Students," *Social Psychology of Education: An International Journal, 14*(4), (2011), 529-546.
Stanca, L. "The Effects of Attendance on Academic Performance: Panel Data Evidence for Intro Microeconomics," *The Journal of Economic Education*, (2006).
Stricker, L. J., Rock, D. A., & Burton, N. W. "Using the SAT and High School Record in Academic Guidance," *Educational and Psychological Measurement, 56*(4), (1996), 626.
Talib, N. and Sansgiry, S. "Determinants of Academic Performance of University Students," *Pakistan Journal of Psychological Research*," (2012), 27, 2, 265-278.
Trahan, E. A. and J. G. Lawrence. "Bridging The Theory-Practice Gap In Corporate Finance: A Survey Of Chief Financial Officers," *Quarterly Review of Economics and Finance*, 35(1) (1995), 73-87.
Trine, J. A. and M. H. Schellenger. "Determinants of Student Performance in an Upper Level Finance Course," *Academy of Educational Leadership Journal*, 4(1) (1999), 91-99.
Vanthournout, G., Gijbels, D., Coertjens, L., Donche, V., & Peter, V. P. "Students' Persistence and Academic Success in a First-year Professional Bachelor Program: The Influence of Students' Learning Strategies and Academic Motivation," *Education Research International* (2012), 1-10.
Vygotsky, L. S. *Mind in society: The Development of Higher Psychological Processes* (Cambridge, 1978), Harvard University Press.
Wyatt, G., Saunders, D., & Zelmer, D. "Academic Preparation, Effort and Success: A Comparison of Student and Faculty Perceptions," *Educational Research Quarterly, 29*(2), (2005), 29-36.
Zwick, R., & Sklar, J. C. "Predicting College Grades and Degree Completion using High School Grades and SAT Scores: The role of student ethnicity and first language," *American Educational Research Journal, 42*(3), (2005), 439-46

James C. Brau, Ph.D., CFA, is the Joel C. Peterson Professor of Finance at Brigham Young University. His research interests include corporate finance, entrepreneurial finance, REITs, and learning.

Rebekah Inez Brau is a master's student in Instructional Psychology at Brigham Young University. Her research interests include learning and trust, positive organizational leadership and psychology, and philosophical and socio-psycho ethics in and among organizations.

Stephen R. Owen is a Ph.D. student of Finance at Pennsylvania State University. His research interests include corporate finance and market behavior.

Michael J. Swenson, Ph.D., is the Christensen Professor of Marketing at Brigham Young University. His research interests include salesperson performance, entrepreneurial marketing, and student performance.

