Qualitative Determinants of Undergraduate Academic Performance: A Case Study

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Many studies have evaluated the impact of the quantity of hours college students work on academic performance. In addition, studies suggest that people who focus on improving their weaknesses over time can achieve expertise (Ross, 2006). However, there have been relatively few studies that examine the relationship between different qualitative aspects of study and academic performance. Using cross sectional data from Spring 2010 for a sample of undergraduate accounting, business, and economics students, this paper attempts to rectify this deficiency in the literature by examining the effects of deliberate study on the academic performance.

INTRODUCTION

Many Americans believe that effort and ability are independent of one another, or even negatively related (Nelson-Le Gall and Resnick, 1998). Parents often encourage their children to 'stick to the things you are good at' rather than spend time trying to improve areas of weakness: 'You're just not good at math.' However, deliberate practice studies have shown that spending time on activities designed to improve upon existing deficiencies does lead to improvement, especially when the activities are supported by parents and teachers (Ericsson, 2006). This paper investigates the effect of deliberate study on undergraduate student academic performance.

ACADEMIC PERFORMANCE LITERATURE REVIEW

Investigations of undergraduate student academic performance have tended to focus on hours of work and financial difficulties as factors that potentially lower grade point average (GPA) (Salamonson and Andrew, 2006; Hawkins, Smith, Hawkins, and Grant, 2005; Callendar, 2008; Baffoe-Bonnie and Golden, 2007). However, some studies have found benefits to working between 10-19 hours (Dundes and Marx, 2006-2007) and differences in how hours of work affect upperclassmen versus freshmen (Arano and Parker, 2008). The magnitude of actual debt does not directly impact student GPA, although the ability to pay bills on time does significantly increase GPA (Xiao, Tang, and Shim, 2009).

Evidence of the impact of hours of study on academic performance has been mixed. Stinebrickner and Stinebrickner (2008) found a non-linear and significant relationship between study time and cumulative GPA. However, other studies have found the amount of hours studied to be significant only

when the quality of study is also considered. Systematic and disciplined study improves academic performance (Rau and Durand, 2000). Students expecting relatively complex test questions use a deeper approach to study and receive higher grades (Ross, et al., 2003). In fact, one study found that students who studied in a quiet, focused environment actually studied for less time than those in other environments (Plant, Ericsson, Hill, and Asberg, 2005).

Deliberate study is differentiated by the amount of concentration that is focused on conscious improvement. Given the intensity of the effort, it has been found that no more than 4-5 hours per day of deliberate practice may be undertaken without the risk of burnout (Ericsson, 2006). Rest and sufficient sleep are important for recovery, which may drive the mixed evidence on hours worked and academic performance if work interferes with sleep despite concentrated study. In this study, we used the likelihood of assigned textbook utilization and the likelihood of focusing on improving weakest areas when studying as proxy variables for deliberate study.

METHODOLOGY

GPA Model

Deliberate study and individual student characteristics have an impact on academic performance. Based on a utility maximization model, the following production function explains a student's academic performance.

$CGPA_i = f(S_i, D_i, FB_i)$

$CGPA_i$ is the cumulative grade-point average; S_i is the use of deliberate study; D_i is a vector of student demographic variables; and FB_i is a vector of family education variables. Unlike many previous studies, the model is not based on time utilization, because deliberate study focuses on the quality, not quantity, of study.

The primary interest of the paper is whether deliberate study leads to higher or lower student academic performance. Deliberate study was measured by whether the student was highly likely to use the assigned textbook and whether the student was highly likely to focus on improving weakest areas when studying. A number of variables are included to control for differences among students that have been shown to impact GPA in earlier studies. Gender, childless status, and tutoring variables are in this group and are expected to be negatively related to academic performance. Concern with male academic performance is well-established even in the mainstream media. Students with children are generally more focused and motivated than childless students, although childcare responsibilities could also lead to greater distraction during study sessions. Students who self-select into tutoring services generally only do so after their academic performance has suffered, and there is a time lag before grades improve. A maternal education variable is included because family support has been anecdotally related to deliberate study, and the expected sign is positive. However, the opposite sign could occur if over-parenting prevented the students from developing their own coping mechanisms. Finally, whether the student's total loans and grants surpass $10,000 was included because of the relative stress and distraction that financial need may produce. A negative sign is expected on the loan and grant variable.

The empirical model for academic performance is specified as:

$$CGPA_i = \beta_0 + \beta_1 MALE_i + \beta_2 NOKIDSi + \beta_3 MGRAD_i + \beta_4 OVER10K_i + \beta_5 HIGHTEXT_i + \beta_6 TUTOR_i + \varepsilon_1 \quad (1)$$

All of the variables in (1) are defined in Table 1.

DATA

The data that are the basis for the study were collected with an in-class survey at a state university in the Midwest. The survey was administered to 239 students at the end of the spring 2010 semester. The questions inquired about student and family demographic information, student finances, and student employment. Ten students chose not to respond to the survey. Of the remaining 229 surveys, 15 were

incomplete because the entire back page was missing. Finally, 5 students did not report grade-point average information and 1 student did not respond to the gender question. The final sample was therefore 208 student survey responses.

Table 1 reports detailed variable descriptions and summary descriptive statistics for the final sample. Slightly more males (54%) than females took the survey. Approximately 10% of the students had at least one child. Slightly more than 10% of students' parents have a graduate degree. Almost a third (32%) of students had more than $10,000 in loans and grants. It was clear that not all students used a deliberate study approach, as only 36% were very likely to use the assigned text. Tutoring services were requested by 18% of the students.

Table 2 reports univariate correlations for the variables of interest. As expected, there are significant negative correlations between academic performance and male gender, childlessness, and tutoring usage. There is a significant positive correlation between GPA and textbook usage. In addition, childlessness is significantly negatively correlated with high amounts of student loans and grants and textbook usage, indicating traditional students may have less financial concerns, but also less motivation to undertake deliberate study. There is also a significantly negative correlation between maternal graduate education and high levels of loans and grants, demonstrating a lower level of financial need for students with highly educated parents.

RESULTS

Multivariate regression results for (1) are reported in Table 3. As expected, there is a significantly positive impact of deliberate study, represented by HIGHTEXT, on academic performance. The effect is still significant after controlling for gender, parental status, tutoring usage, and the amount of student loans and grants, which all are significantly negatively related to cumulative GPA as expected. The likelihood of focusing on improving areas of weakness when studying was not significant and was dropped from further analysis. Maternal education has an unexpected and significant negative correlation, which may be a sign that helicopter parenting has prevented the development of some important life skills. Furthermore, we did control for the effects of age of students and number of their children, but they were not significant due to minimal variations in them and thus are not reported here.

As a sensitivity test, weekly hours of work was also included as a regression variable. The coefficient on work hours was extremely insignificant, and the other coefficients were nearly identical to the original model. Similarly, the coefficient on weekly hours of study was also insignificant when it was included in the model. Given these results and the mixed results of other studies focusing on time utilization models, the amount of time spent on various activities does not seem to have a direct impact on academic performance. The quality of study is the crucial factor.

CONCLUSION

This paper documents the positive effect of deliberate study on the grade point averages of economics and accounting students. While many students eschew textbook use evidence continues to establish that academic performance can be improved through deliberate study as measured by the likelihood of textbook use when studying. Future research on this subject needs to address several limitations of our study. One of these limitations is that our cross-sectional data do not permit investigation of how deliberate study evolves and develops over time. Furthermore, our sample focused on students with majors in accounting, business and economics and did not consider students with majors in other areas such as humanities, fine arts, sciences and education, as such, it has a limited scope and one should not infer too much from our results that apply to population of undergraduate students in all majors. In addition, students' belief of whether or not they have an aptitude for the subject may influence the quality of their study and future studies in this area has to control for its effect.

TABLE 1
VARIABLE DEFINITIONS AND DESCRIPTIVE STATISTICS

Variable	Definition	N	Min	Max	Mean	Std. Dev.
CGPA	Cumulative grade-point average up to Spring 2010	208	2.000	4.000	3.193	.445
MGPA	Major grade-point average up to Spring 2010	208	2.000	4.000	3.211	.485
MALE	1 if respondent is male	208	0	1	.54	.500
NOKIDS	1 if respondent is childless	208	0	1	.90	.296
MGRAD	1 if student's mother's education is a graduate degree	208	0	1	.12	.320
OVER10K	1 if the student's loans and grants are over $10,000	208	0	1	.32	.467
HIGHTEXT	1 if the student was very likely to study the text	208	0	1	.36	.480
TUTOR	1 if the student ever requested a tutor	208	0	1	.18	.383

TABLE 2
CORRELATION MATRIX

N=208	CGPA	MALE	NOKIDS	MGRAD	OVER10K	HIGH TEXT	TUTOR
CGPA		**-.12*** **(.09)**	**-.17**** **(.01)**	**-.09** **(.18)**	**-.11** **(.12)**	**.15**** **(.03)**	**-.21***** **(.00)**
MALE	**-.13*** **(.07)**		**.09** **(.19)**	**.03** **(.64)**	**-.14*** **(.05)**	**-.10** **(.16)**	**-.02** **(.74)**
NOKIDS	**-.17**** **(.01)**	**.09** **(.19)**		**.07** **(.34)**	**-.16**** **(.02)**	**-.20***** **(.00)**	**.02** **(.73)**
MGRAD	**-.10** **(.16)**	**.03** **(.64)**	**.07** **(.34)**		**-.15**** **(.03)**	**.05** **(.51)**	**-.01** **(.88)**
OVER10K	**-.11** **(.10)**	**-.14*** **(.05)**	**-.16**** **(.02)**	**-.15**** **(.03)**		**.01** **(.87)**	**-.04** **(.50)**
HIGH TEXT	**.15**** **(.04)**	**-.10** **(.16)**	**-.20***** **(.00)**	**.05** **(.51)**	**.01** **(.87)**		**.05** **(.49)**
TUTOR	**-.22***** **(.00)**	**-.02** **(.74)**	**.02** **(.73)**	**-.01** **(.88)**	**-.05** **(.50)**	**.05** **(.49)**	

Pearson Correlations are reported above the diagonal. Spearman Correlations are reported below the diagonal.
* Correlation is significant at the .10 level (2-tailed)
** Correlation is significant at the .05 level (2-tailed)
*** Correlation is significant at the .01 level (2-tailed)

TABLE 3
PARAMETER ESTIMATES OF CUMULATIVE GPA MODEL

VARIABLES	Coefficient	p-value
CONSTANT	3.535***	.000
MALE	-.104*	.081
NOKIDS	-.230**	.025
MGRAD	-.158*	.088
OVER10K	-.170***	.009
HIGHTEXT	.117*	.063
TUTOR	-.265***	.001
	n=208	
	Adj. R^2=.12	

* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

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