Academic Performance of College Students: Influence of Time Spent Studying and Working

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ABSTRACT. Today’s college students are less prepared for college-level work than their predecessors. Once they get to college, they tend to spend fewer hours studying while spending more hours working, some even full time (D. T. Smart, C. A. Kelley, & J. S. Conant, 1999). In this study, the authors examined the effect of both time spent studying and time spent working on academic performance. The authors further evaluated the interaction of motivation and ability with study time and its effect on academic performance. The results suggested that nonability variables like motivation and study time significantly interact with ability to influence academic performance. Contrary to popular belief, the amount of time spent studying or at work had no direct influence on academic performance. The authors also addressed implications and direction for future research.

Today’s college students are spending less time studying. The fall 2003 survey conducted by the Higher Education Research Institute at UCLA’s Graduate School of Education and Information Studies found that only 34% of today’s entering freshmen have spent six or more hours per week outside of class on academic-related work (e.g., doing homework, studying) during their senior year in high school. The sample consisted of 276,449 students at 413 of the nation’s 4-year colleges and universities (over one fourth of entering freshmen in the United States), and the data were statistically adjusted to reflect responses of all first-time, full-time students entering all four-year colleges and universities as freshmen in 2003. In fact, in 1987 when this question was asked of entering freshmen, 47.0% claimed they spent 6 or more hours per week studying outside of class. Since then, the time spent studying outside of class has declined steadily each year (Higher Education Research Institute, 2003).

Another trend that is emerging is the increase in the number of college students who are employed either part time or full time. According to Gose (1998), 39% of college freshmen work 16 or more hours per week, an increase of 4% since 1993. Among all business majors, marketing students typically work even more hours per week than do other students (Smart, Tomkovick, Jones, & Menon, 1999). The 2002 survey conducted by the Higher Education Research Institute also found that 65.3% of entering freshmen have either “some concern” or “major concerns” about not having enough money to complete their college degrees (Higher Education Research Institute, 2002). This was an increase of almost 1% from 2001 and is likely to increase in the years ahead because of reduced funding for higher education by state legislatures. Although more women (70.9%) were concerned about whether they would have enough funds to complete college than were men (58.3%), all students seemed to be working out of the need to make up for rising tuition and fewer available grants. In summary, the proportion of college students who are employed either part or full time is likely to increase in the years to come, leaving greater numbers of students with less time for academic work.

Students spending less time studying and more time working are two trends that all colleges and universities will have to confront. Lowering academic standards by rewarding minimum effort and achievement (expecting less) is certainly a short-term strategy, but one that will have negative long-term consequences. A more productive way to handle these concerns is to conduct empirical research to determine to what extent these trends will...
negatively impact the academic performance of college students and use the findings from these studies to improve our academic programs.

The influence that personal variables, such as motivation and ability, have on academic success is well documented, but there is a paucity of research investigating the influence that time college students spend on various activities such as studying outside of class and working has on their academic success. One reason for a lack of research in this area may be the common belief among most students and academicians that more time spent studying outside of class positively influences academic performance and that more time spent working negatively influences academic performance. Another, more plausible reason for this lack of research may be the complex nature of these relationships when evaluated in the presence of other variables, such as student ability and motivation. For example, it is likely that time spent studying outside of class will have a differential impact on the academic performance of college students who vary in ability. That is, the relationship that ability has with student performance will be stronger for those students who spend more time outside of class studying than for students who spend less time studying.

With this study, we attempted to fill this void in the literature. First, we attempted to determine the direct relationship that time spent on academics outside of class and working had on academic performance among business students. Second, we attempted to determine whether the time spent on academics outside of class interacts with variables, such as student ability and motivation, in influencing the academic performance of business students.

**Hypotheses Tested**

It is commonly believed that students who spend more time on academic-related activities outside of class (e.g., reading the text, completing assignments, studying, and preparing reports) are better performers than students who spend less time on these activities. There is some empirical support for this belief. For example, Pascarella and Terenzini (1991) found that the study habits of freshmen relate significantly to their first year cumulative grade point average (GPA). In their investigation of 143 college students, McFadden and Dart (1992) reported that total study time influenced expected course grades. In contrast, Mouw and Khanna (1993) did not find study habits to significantly improve the explanatory power of the first year cumulative GPA of college students. Ackerman and Gross (2003) have found more recently that students with less free time have a significantly higher GPA than those with more free time. Because of this conflicting evidence, there is a need to reexamine this relationship. Thus, our first hypothesis was

\[ H_1: \text{There is a relationship between time spent studying outside of class and academic performance.} \]

Along with the present trend of students spending less time on academic-related activities, a growing number of college and university administrators are concerned that today’s postsecondary students are working more hours than their counterparts were years ago (Gose, 1998). It can be reasonably assumed that working more hours per week will leave students less time for studying outside of class and that this will negatively influence their academic performance. Although working more hours per week can be one key reason for a student to be in academic trouble, available research does not seem to support this hypothesis. Strauss and Volkwein (2002) reported that working more hours per week positively related to a student's GPA. Light (2001), who interviewed undergraduate students of all majors, found no significant relationship between paid work and grades. According to Light, “students who work a lot, a little, or not at all share a similar pattern of grades” (p. 29). Because empirical evidence to date has been counterintuitive, testing this hypothesis using different samples and different methodologies is important before generalizations can be made. This led us to our next hypothesis that

\[ H_2: \text{There is a relationship between time spent working and academic performance.} \]

According to Pinder (1984) and others (Chan, Schmitt, Sacco, & DeShon, 1998; Chatman, 1989; Dreher & Bretz, 1991; Nonis & Wright, 2003; Wright & Mischel, 1987), performance is a multiplicative function of both ability and motivation.

\[ \text{Performance} = \text{Ability} \times \text{Motivation} \]

For example, a student with very high ability but low motivation is unlikely to perform well, whereas a student with low ability but high motivation is likely to perform well. That is, the variability in motivation across students may dampen associations between ability and performance.

In the same vein, one can argue that it is simply the study behavior that ultimately brings about the desired performance and not students’ inner desires or motivations. This is supported by the widely held belief that it is hard work (i.e., time spent on academic activities outside of class by a student) that results in academic success and that laziness and procrastination ultimately result in academic failure (Paden & Stell, 1997). Therefore, similar to how motivation interacts with ability to influence academic performance, one can infer that behavior such as hard work interacts with ability to influence performance among college students. This led us to our third hypothesis to be tested in this study.

\[ H_3: \text{Behavior (time spent studying outside of class) will significantly interact with ability in that the influence that ability has on academic performance will be higher for students who spend more time studying outside of class than for students who spend less time studying.} \]

All indications are that today’s college freshmen are less prepared for college than their predecessors. American College Testing (ACT) Assessment reports that fewer than half of the students who take the ACT are prepared for college. According to the Legislative Analyst’s Office (2001), almost half of those students regularly admitted to the California State University System arrive unprepared in reading, writing, and mathematics. Although these statistics are common at most colleges and universities in the nation, how institutions handle these concerns varies. Strategies include attempting to develop methods to diagnose readiness for college-level work while students are still in high school or
requiring remedial courses of entering freshmen, thereby lowering academic standards.

There are others who believe that it is not only reading, writing, and mathematics abilities that influence academic performance, but also nonability variables, such as motivation (Barling & Charbonneau, 1992; Spence, Helmreich, & Pred, 1987), self-efficacy (Bandura & Schunk, 1981; Multon, Brown, & Lent, 1991; Zimmerman, 1989), and optimism (Nonis & Wright, 2003). Although a minimum level of ability is required, it is plausible that nonability variables will compensate for ability inadequacies to bring about the required level of performance. One question that interests all parties is whether hard work (i.e., more time spent studying) will influence the relationship between motivation and performance. That is, will the relationship between motivation and academic performance be stronger if a student puts more effort or time into studying outside of class compared with those who put in less time? This led to our final hypothesis, one that was speculative in nature, but nevertheless has implications for both students and academicians.

H4: Behavior (more time spent studying outside of class) will significantly interact with motivation in that the influence that motivation has on academic performance will be higher for students who spend more time studying outside of class compared with students who spend less time studying outside of class.

METHOD
Sample

We secured the data for this study from a sample of undergraduate students attending a medium-sized (10,000+), Association to Advance Collegiate Schools of Business (AACSB)-accredited, public university in the mid-south United States. To obtain a representative sample of all students, we selected classes from a variety of business courses (e.g., management, accounting, MIS, finance) offered at various levels (freshmen, sophomore, junior, and senior) and at different times (day or night) for the study. Data collection occurred during the 9th week of a 15-week semester. This timing was deliberate because data were being collected for the motivation variable, one that is likely to change among students during the early and late parts of a semester. In addition, information on such variables as time spent on academics or work-related activities is also likely to vary during the beginning, middle, and end of a semester.

We distributed surveys and explained them to those students who participated in the study. The survey consisted of two parts. The first part required students to maintain a journal during a 1-week period, documenting how much time they spent on various activities each day of the week (there were over 25 activities listed under three broad categories: academics, personal, and work related). For accuracy purposes, we asked students to complete their journal each morning, recording the previous day’s activities. The second part of the survey contained demographic information, such as gender, age, and race, as well as measures of several other constructs including motivation (only motivation was used in this study). Participants had to provide their social security numbers for documentation purposes. We assured them that their responses would be pooled with others and no effort would be made to evaluate how any one individual may have responded to the survey. We urged students to take the task seriously and to be accurate in their responses to each question. A cover letter signed by the dean of the college of business was included in each student’s journal. We administered 440 surveys, and 288 were returned. Two hundred and sixty-four of the returned surveys were usable, yielding an effective response rate of 60.0%.

Measures

We used the social security numbers provided by the respondents to collect university data for the variable grade point average for the semester (SGPA), semester course load, number of hours completed to date, and ACT composite score. As such, these variables were not self-reported and should provide more validity to the study’s findings. We used six items from a Spence et al. (1987) Likert-type 1–5-point scale, to measure students’ achievement striving, which we used as a surrogate for motivation. In several prior studies, researchers have used this variable as a measure of motivation (Barling & Charbonneau, 1992; Barling, Kelloway, & Cheung, 1996). The reported coefficient alpha for this scale is high (0.87), and this scale has been used in several other similar studies (Carlson, Bozeman, Kacmar, Wright, & McMahan, 2000; Nonis & Wright, 2003).

Demographic Variables

Students reported demographic information, such as gender, age, and racial or ethnic group membership, in their journals.

Behavior Variables

We also used student journal data to determine the time spent outside of class on academic activities like reading the text and lecture notes for class preparation, going over the text and lecture notes to prepare for exams, and completing assignments and homework. The researcher added these items for the week to derive the total amount of time students spent outside of class on academic activities during the week (TSA).

Students also reported the time they spent working, as well as the time it took for them to travel to and from work each day, during the given week. These two items were also added to derive the total amount of time students spent working during a given week (TSW).

Analysis

As Table 1 shows, sample characteristics were comparable to available demographic characteristics of college students in the United States (Statistical Abstract of the United States, 2002). Other pertinent demographic characteristics for the sample were as follows: average age = 23.8 years; majors = 16% accounting, 13.1% business administration, 12.3% finance, 13.5% management, 14.5% marketing, 14.5% MIS, and the remainder “other” business majors.
We coded gender and racial or ethnic group membership and used them as dummy variables consisting of two categories (coded 0 or 1), such as male or female and African American or other, because 97.5% of the sample was either Caucasian or African American. To determine the bivariate relationships that the plausible predictor (independent) variables had with the academic success (dependent) variables, we calculated Pearson’s product moment correlation coefficients. Table 2 shows both the descriptive statistics and the Pearson’s correlation coefficients. The achievement-striving measure demonstrated an acceptable reliability coefficient as per Nunnally (1978).

Prior to testing the hypotheses, it was important for us to control for variables that were likely to have an impact on academic performance other than the variables that we were testing. Studies have found that demographic variables, such as gender, age, and race (Cubeta, Travers, & Sheckley, 2001; Strauss & Volkwein, 2002), influence the academic performance of college students. Therefore, we tested H1 and H2 using partial correlation coefficients, controlling for the extraneous variables gender, age, and racial or ethnic group. Academic load was also included as a control variable because students who take more courses are likely to spend more time studying outside of class compared with students who take fewer courses. In addition, we treated TSA and TSW as independent variables, and we used SGPA as the dependent variable.

We tested moderator relationships proposed in H3 and H4 through moderated multiple regression analysis (Cohen & Cohen, 1983; Wise, Peters, & O’Conner, 1984). We performed three regressions: (a) We regressed the dependent variable (SGPA) on the control variables (gender, age, racial or ethnic group membership, and academic load); (b) we regressed the dependent variable on the control variables, plus the independent variable (i.e., ACT composite score as a surrogate for ability), plus the moderator variable (i.e., TSA as a surrogate for hard work or behavior); and (c) we regressed the dependent variable on the control variables, plus the independent variable, plus the moderator variable, plus the interaction (i.e., ACT composite score and TSA).

The process involved conducting three regression models for each moderator hypothesis. This process facilitated the investigation of a potential direct influence of the moderator variables (when they serve as predictors) and the extent to which the posited moderator influence actually exists. When both the independent and the moderator variable are continuous

### TABLE 1. Demographic Characteristics of the Sample Compared With the Population, in Percentages

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Population*</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>43.6</td>
<td>44.2</td>
</tr>
<tr>
<td>Female</td>
<td>56.3</td>
<td>55.8</td>
</tr>
<tr>
<td>Racial/Ethnic Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>77</td>
<td>85</td>
</tr>
<tr>
<td>African American</td>
<td>12.1</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>2.5</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not work</td>
<td>35.6</td>
<td>34</td>
</tr>
<tr>
<td>Work part time</td>
<td>30.3</td>
<td>28</td>
</tr>
<tr>
<td>Work full time</td>
<td>34.1</td>
<td>37</td>
</tr>
</tbody>
</table>

*Based on Statistical Abstract of the United States (2002).

### TABLE 2. Descriptive Statistics and Pearson Product–Moment Correlations for Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>23.76</td>
<td>6.29</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Race</td>
<td></td>
<td></td>
<td>0.04</td>
<td>-0.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ACT composite (ACT)</td>
<td>22.00</td>
<td>3.91</td>
<td>-0.01</td>
<td>-0.24*</td>
<td>0.31*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Achievement striving (AST)*</td>
<td>3.53</td>
<td>0.71</td>
<td>-0.17*</td>
<td>0.21*</td>
<td>-0.09</td>
<td>-0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Time spent outside of class on academic activities (TSA) vs. academic load</td>
<td>12.94</td>
<td>8.57</td>
<td>-0.07</td>
<td>0.34*</td>
<td>-0.16</td>
<td>-0.18*</td>
<td>0.29*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Time spent working (TSW) vs. academic load</td>
<td>16.84</td>
<td>14.55</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.06</td>
<td>-0.03</td>
<td>-0.16*</td>
<td>-0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Semester grade point average (SGPA)</td>
<td>2.97</td>
<td>0.76</td>
<td>-0.11</td>
<td>-0.09</td>
<td>0.27*</td>
<td>0.45*</td>
<td>0.35*</td>
<td>0.05</td>
<td>-0.10</td>
<td></td>
</tr>
</tbody>
</table>

*reliability coefficient = 0.77.
*p < .05 (one-tailed).
(ACT composite and TSA), as in this study, the appropriate statistical procedure to detect interaction is the moderated multiple regression analysis (Baron & Kenny, 1986).

Because the measurement units associated with the various scales used in this study were different, we standardized variables investigated in the analyses and used z scores when testing hypotheses.

**RESULTS**

The partial correlation coefficient between TSA and SGPA, controlling for the variables gender, age, race, and academic load \( r = .10, p = .19 \), was in the expected direction, but not significant. Therefore, H1 was not supported. The partial correlation coefficient between TSW and SGPA \( r = -.08, p = .28 \) was also statistically insignificant, failing to support H2.

Moderated Multiple Regression (MMR), controlling for gender, age, race, and academic load, provided the statistics required to test the remaining two hypotheses. For H3, the \( R^2 \) for the control variables was statistically significant \( (R^2 = .06, p < .05) \). In the second step, the increment to \( R^2 \) was statistically significant for the addition of the main effects of ACT composite and TSA \( (\Delta R^2 = .19, p < .05) \). In fact, the main effects of both ACT composite and TSA were also significant \( (p < .05) \). From Step 2 to Step 3, the increment of \( R^2 \) was also significant for the addition of the interaction term \( (\Delta R^2 = .03, p < .05) \); this supported H3, which stated that TSA would interact with ability (see Table 3). Predicted values generated from the regression equation that were one standard deviation above and below the mean for ACT composite score and TSA indicated that students who were high in ACT composite and TSA most likely had a very high semester GPA \( (\hat{y} = 3.95) \), relative to students high in ACT composite score with low TSA \( (\hat{y} = 3.1) \) and relative to students low in ACT composite with either high \( (\hat{y} = 2.5) \) or low \( (\hat{y} = 2.7) \) TSA. This is the appropriate technique to interpret interaction terms when moderated multiple regression is implemented (Cleary & Kessler, 1982; Cohen & Cohen, 1983). Results are shown in Figure 1.

For H4, the \( R^2 \) for the control variables was once again statistically significant \( (R^2 = .10, p < .05) \). In the second step, the increment to \( R^2 \) was statistically significant \( (\Delta R^2 = .14, p < .05) \) for the addition of the main effects of achievement striving and TSA. However, the main effect of TSA was not statistically significant. From Step 2 to Step 3, the increment of \( R^2 \) was also not statistically significant \( (\Delta R^2 = .01, p > .05) \) for the addition of the interaction term. These results did not provide support for H4, which stated that time spent studying outside of class would interact with motivation (see Table 4). Therefore, H4 was not supported.

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**TABLE 3. Results of Moderated Multiple Regression Analysis of Time Spent Outside of Class on Academic Activities (TSA), ACT Composite Score (ACT), and Semester Grade Point Average (SGPA)**

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Slope</th>
<th>SE</th>
<th>t</th>
<th>( p )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Step 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.12</td>
<td>0.13</td>
<td>-0.90</td>
<td>.36</td>
<td>.06*</td>
</tr>
<tr>
<td>Age</td>
<td>0.03</td>
<td>0.10</td>
<td>0.26</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>0.70</td>
<td>0.22</td>
<td>3.22</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Academic load</td>
<td>0.05</td>
<td>0.07</td>
<td>0.74</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td>Predictor (Step 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.25*</td>
</tr>
<tr>
<td>ACT composite (ACT)</td>
<td>0.43</td>
<td>0.07</td>
<td>6.60</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Time studying (TSA)</td>
<td>0.17</td>
<td>0.07</td>
<td>2.54</td>
<td>.01*</td>
<td></td>
</tr>
<tr>
<td>Moderator (Interaction) (Step 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.28*</td>
</tr>
<tr>
<td>ACT \times TSA</td>
<td>0.18</td>
<td>0.07</td>
<td>2.69</td>
<td>.01*</td>
<td></td>
</tr>
</tbody>
</table>

*\( p < .05 \).

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**FIGURE 1. Time spent studying (TSA) and ACT composite score (ACT) interaction on semester grade point average (SGPA).** Graph is based on predicted values \( (\hat{y}) \) generated from the regression equation for individuals 1 standard deviation above and below the mean for TSA and ACT.
TABLE 4. Results of Moderated Multiple Regression Analysis of Time Spent Outside of Class on Academic Activities (TSA), Achievement Striving (AST), and Semester Grade Point Average (SGPA)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Slope</th>
<th>SE</th>
<th>t</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Step 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.10*</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.23</td>
<td>0.13</td>
<td>-1.81</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.07</td>
<td>0.07</td>
<td>-1.08</td>
<td>.28</td>
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</tr>
<tr>
<td>Race</td>
<td>0.87</td>
<td>0.28</td>
<td>4.42</td>
<td>.00*</td>
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<tr>
<td>Academic load</td>
<td>0.06</td>
<td>0.06</td>
<td>0.98</td>
<td>.33</td>
<td></td>
</tr>
<tr>
<td>Predictor (Step 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.24*</td>
</tr>
<tr>
<td>Achievement striving (AST)</td>
<td>0.40</td>
<td>0.07</td>
<td>6.36</td>
<td>.00*</td>
<td></td>
</tr>
<tr>
<td>Time studying (TSA)</td>
<td>0.01</td>
<td>0.06</td>
<td>0.18</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Moderator (Interaction) (Step 3)</td>
<td>0.04</td>
<td>0.06</td>
<td>0.58</td>
<td>.57</td>
<td></td>
</tr>
</tbody>
</table>

*p = .05.

DISCUSSION

We drew the following conclusions from the analyses.

1. Contrary to popular belief, the findings suggest that TSW has no direct influence on SGPA.

2. Based on the partial correlation, findings suggest that TSA has no direct influence on academic performance (measured as SGPA).

3. The main effects of both ACT composite score and achievement striving are statistically significant.

4. In the presence of ACT composite score, the main effect of TSA also has a statistically significant relationship with SGPA. However, in the presence of achievement striving, the main effect of TSA does not have a significant interaction with SGPA.

5. The interaction between ACT composite score and TSA significantly influences SGPA.

6. The interaction between TSA and achievement striving did not significantly influence SGPA.

Based on partial correlation coefficients, neither of the hypotheses that tested direct relationships (H1 and H2) was supported. However, one of the hypotheses that investigated the moderator relationship was supported (H3). These results indicate that the relationships that college students’ abilities (ACT composite score), motivation (achievement striving), and behavior (TSA and TSW) have with academic performance are more complex than what individuals believe them to be.

One important finding of this study is the lack of evidence for a direct relationship between TSW and academic performance (H2). TSW did not directly affect academic performance. At a time when the percentage of college students who work is at an all-time high and administrators are concerned about its influence on academic performance, these results are encouraging. Although more empirical evidence may be required prior to making any definitive conclusions, these results did not contradict the findings of Strauss and Volkwein (2002) or Light (2001). Contrary to popular belief, both Strauss and Volkwein and Light found that working more hours was positively related to GPA and suggested that students apply the same work ethic to both their academic and paid work (i.e., those who earn higher grades are students who are more motivated, and work harder and longer than others). Perhaps academically strong students are better at balancing academic and job-related work, thereby reducing the negative effects that TSW may have on academic performance.

Based on the partial correlation ($r = .10, p > .05$), the expected influence that TSA has on academic performance (H1) was not supported. When we tested H4, the insignificant main effect between time spent outside of class on academic activities (TSA) and academic performance (see Table 4) also supports the above conclusion. However, when we tested H3, the significant main effect between TSA and academic performance (see Table 4) was not consistent with the previous findings in H1 and H4. That is, when ACT composite score was used as a predictor (in the absence of achievement striving), TSA had an impact on academic performance (see Table 3). Also, when achievement striving was used as a predictor (in the absence of ACT composite), TSA did not impact academic performance (see Table 4). In summary, when ACT and TSA were used as predictors, TSA was able to explain variation in academic success that was not explained by ACT (Table 3). However, when achievement striving and TSA were used as predictors, TSA was unable to explain any variation in academic performance that was not explained by achieving striving.

Results from H3 show that TSA was a predictor and a moderator in the presence of ACT composite (a quasimoderator). Results suggest the importance of both ability (i.e., ACT composite score) and behavior (TSA) measures in determining academic performance (H3). As indicated by the significant and positive slope coefficient for the interaction term between ability and behavior (slope = 0.18), it is simply not ability alone that brings about positive performance outcomes. Variables such as TSA strengthen the influence that ability has on student performance. At a time when most efforts by administrators and instructors are focused on curriculum and pedagogical issues, this study’s results show the need to also give attention to the composition of today’s college student populations in terms of what they bring to class (i.e., study habits).

H4, which stated that the influence that behavior (i.e., TSA) has on academic performance would be higher for students with high levels of motivation than for students with low levels of motivation, was not supported. In this instance, it is clear that, in the absence of ability as a predictor, high levels of motivation or behavior will not bring about the desired academic performance or outcome.
Implications

At a time when students spend less time studying and more time working, our results provide food for thought, although it may be premature to derive implications from the findings of this study. Should subsequent researchers using different samples validate findings of this study, there are implications for both students and administrators.

Students

Results from studies such as this can be passed on to students. This can be easily done at a student orientation, in student newsletters, on the Web, or in the classroom. It should be clearly communicated to them 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 performances will be significantly lower. Once students have a better understanding of how ability, motivation, study time, and work patterns influence academic performance, they may be more likely to understand their own situations and take corrective action. More important, they may be less likely to have unreasonable expectations about their academic performance and take more individual responsibility for its outcome rather than conveniently putting the blame on the instructor. For example, it is not uncommon for intelligent students to believe that ability will result in high levels of academic performance regardless of their level of motivation or effort. The results of this study show the impact of ability on academic performance to be much higher for students who spend more time studying than for those who spend less.

Also, the results did not show a direct link between TSW and academic performance. Although this can be an encouraging finding at a time when a large percentage of college students are working longer hours while attending college (Curtis & Lucus, 2001), more research is needed prior to making generalizations. For example, it is plausible that the direct relationship between TSW and academic performance can be moderated by several personal (i.e., ability, motivation, study habits) and situational (i.e., level of stress, course load) variables, and, as such, the impact that TSW has on academic performance may be different for different student populations under different situations or circumstances. We did not investigate those relationships in this study.

Administration

Study results also have implications for both the recruitment and retention of students. According to ACT, only 22% of the 1.2 million high school graduates who took the ACT assessment in 2004 achieved scores that would make them ready for college in all three academic areas: English, math, and science (ACT News Release, 2004a). First, university administrators as well as faculty should realize the importance of recruiting students who are academically prepared for college as indicated by ACT composite or SAT scores. Having the motivation or a strong work ethic may not bring about desired performance outcomes in the absence of ability, as evidenced by H4. This can be a potential concern for colleges and universities that have low admission standards (i.e., low ACT or SAT score requirements and lower acceptable high school GPAs) or open admission policies. Due to low admission requirements, these institutions are more likely to have a larger percentage of students who lack the minimum ability needed to succeed in college compared with a smaller percentage of such students in colleges and universities that have high admission standards. Therefore, colleges and universities that have relatively low admission standards need to have a process in place to identify those students who lack the necessary abilities (e.g., quantitative skills, verbal skills) to succeed in college and provide them with ample opportunities to develop those abilities while in college by offering remedial courses. Failure to develop those abilities prior to taking college-level courses can be a recipe for poor academic performance and low retention rates. Data compiled by ACT show a strong inverse relationship between admission selectivity and dropout rates: Highly selective = 8.7%, selective = 18.6%, traditional = 27.7%, liberal = 35.5%, and open = 45.4% (ACT Institutional Data File, 2003).

Also, on the basis of the results from H3, students with high ability who also spend more time studying are the ones who are most likely to excel in college as indicated by their GPA (Figure 1). These are the type of students who are most likely to perform well academically and bring universities as well as individual programs a high-quality academic reputation, and, as such, a process should be in place to recruit and retain them.

In addition to recruiting, retaining the students and helping them to achieve their goals is an important issue for institutes of higher education. Research results indicate that just over half of students (63%) who began at a 4-year institution with the goal of a bachelor’s degree have completed that degree within 6 years at either their initial institution or at another institution (U.S. Department of Education, 2002). Unfortunately, an alarming number of schools have no specific plan or goals in place to improve student retention and degree completion (ACT News Release, 2004b). This shows the need for institutes of higher education to have their own models to precisely predict and track the academic performance of their prospective students to ultimately monitor and control student retention and dropout rates. Although measures of ability such as ACT and SAT scores and high school GPA are widely used for college admission and GPA at college is used to evaluate the progress of the student, the results of this study show that, if included, nonability variables such as motivation and TSA may significantly improve these prediction models. This information, if collected and monitored, would be useful in terms of decision making for university administrators as well as faculty.

Limitations and Direction for Future Research

We made significant efforts to minimize measurement error in variables that are normally self-reported, such as ACT composite scores and academic performance (GPA), as well as those variables that rely on memory of past events, such as TSA and TSW (i.e., a question such as time spent studying in a given week or time spent studying...
the previous week). By using university data for variables such as ACT composite scores and academic performance as well as collecting the time data based on a diary maintained by participants during a 1-week period, we minimized measurement error. Nevertheless, although results can be generalized to the university where we collected the data, additional evidence will be required prior to generalizing statements to all university settings. In this respect, a national sample that investigates these relationships can either support or refute this study’s findings.

The study did not include a variable that measured the effectiveness level or quality of the time students spent studying, which may be one reason why H1 was not supported. It is very likely that both the time that students spend studying as well as how this time is spent should be measured. That was certainly a limitation of this study. Results of future studies in which researchers include this variable (i.e., time management perceptions and behaviors measured by Macan, 1994; Macan, Shahani, Dipboye, & Phillips, 1990) will provide more insight into this issue.

If TSA moderates the relationship between ACT composite and academic performance, it is plausible for TSW also to moderate the relationship between ACT composite and academic performance. Therefore, in a future study, researchers might investigate whether the relationship between ACT composite score and academic performance is stronger for students who spend less time working compared with the students who spend more time working. We did not investigate these relationships because they were outside the scope of this study.

We limited the personality variable under investigation to achievement striving. Other variables such as optimism and self-efficacy are likely to influence academic performance, and future studies will be able to address these issues in more depth. However, in this study, we addressed an important concern of the academic community at a time when such empirical research is not widely available, and, as a result, we have contributed to the higher education literature.

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