

## RESEARCH ARTICLES

### Factors That Affect Academic Performance Among Pharmacy Students

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**Objective.** The objective of this study was to examine factors such as academic competence, test competence, time management, strategic studying, and test anxiety, and identify whether these factors could distinguish differences among students, based on academic performance and enrollment in the experiential program.

**Methods.** A cross-sectional study design utilizing questionnaires measuring previously validated constructs was used to evaluate the effect of these factors on students with low and high cumulative grade point averages (GPAs). Pharmacy students (N = 198) enrolled at the University of Houston participated in the study.

**Results.** Academic performance was significantly associated with factors such as academic competence and test competence. Students with a cumulative GPA of 3.0 or greater significantly differed in their level of test competence than those with a GPA of less than 3.0. Students enrolled in their experiential year differed from students enrolled in their second year of curriculum on factors such as test anxiety, academic competence, test competence, and time management skills.

**Conclusion.** Test competence was an important factor to distinguish students with low vs. high academic performance. Factors such as academic competence, test competence, test anxiety and time management improve as students' progress in their experiential year.

**Keywords:** academic performance, academic competence, test competence, time management, strategic studying, test anxiety

## INTRODUCTION

Grade point average (GPA) is a commonly used indicator of academic performance. Many colleges of pharmacy set a minimum GPA that should be maintained in order to continue in the doctor of pharmacy (PharmD) degree program. At the University of Houston, the minimum GPA requirement for PharmD students is 2.0. Nonetheless, for any graduate program, a GPA of 3.0 or higher is considered an indicator of good academic performance.

A high GPA while in pharmacy school may not be the only factor associated with subsequent career success.<sup>1</sup> Qualities such as empathy and social skills, namely communication skills, conflict management, leadership, collaboration, cooperation, and team capabilities are also important in the pharmacy practice environment. Students who possess these skills are able to work effectively with other health care providers and manage patient care efficiently.<sup>2</sup> Although, survey instruments exist to mea-

sure such variables, they are not used consistently across all colleges of pharmacy. The GPA still remains the most common factor used by administrators to evaluate progression in an academic environment. Many factors could act as barriers to students attaining and maintaining a high GPA that reflects their overall academic performance during their tenure in college. These factors could be targeted by the college or school of pharmacy faculty members in developing strategies to improve student learning and improve their academic performance. Test anxiety, time management, test competence, academic competence, and study techniques are some of the factors that affect an individuals' academic performance<sup>1</sup> and are the topic of this report.

Academic competence is associated with students' ability to manage their study load and is used to assess if students are able to manage the study material in the curriculum.<sup>3</sup> It also provides an indication of whether the curriculum is interesting enough for students to enjoy their classes.<sup>3</sup> Academic competence has been shown to affect students' academic performance and a student with better academic competence would probably have better academic performance.<sup>3</sup> In this study academic competency is defined as the proficiency of students with respect

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to the content taught during courses over the past academic year and their ability to understand the course material.<sup>3</sup>

Another factor is associated with students' academic performance is test competence,<sup>3</sup> which reflects how students cope with the amount of study material for examinations.<sup>3,4</sup> It refers to difficulties associated with managing the amount of study material for an examination and in preparing for them. Test competency is operationally defined as student's ability to manage and cope with the amount of study material for examinations and/or tests.<sup>3</sup>

Strategic studying techniques may help students achieve a high GPA. Strategic studying is defined as the knowledge and application of effective study skills or techniques by students.<sup>3</sup> There are many efficient study techniques that could be used by students based on the learning environment.<sup>5,6</sup> These study strategies include Know-Want-Learn (K-W-L),<sup>7</sup> Survey-Question-Read-Recite-Review (SQ3R),<sup>8</sup> summarizing and note-taking,<sup>9,10</sup> using graphics,<sup>11</sup> and self-questioning.<sup>6</sup> Extensive course loads and the comprehensive information covered in today's pharmacy curricula necessitate the use of effective study strategies for academic success.<sup>12</sup>

Time management skills are also important to academic success. Time management has been defined as clusters of behavioral skill sets that are important in the organization of study/course load.<sup>13</sup> Time management skills include activities performed by students such as planning in advance, prioritizing work, test preparation, and following schedules.<sup>14</sup> Higher academic performance may be achieved by balancing time management and study techniques effectively.<sup>15,16</sup> In this study the time management domain was operationalized as the ability of students to juggle leisure and study time to prepare for their examinations.<sup>3</sup>

Test anxiety is negatively associated with academic performance.<sup>17-19</sup> Test anxiety is a set of responses like worry, depression, nervousness, task irrelevant cognitions, etc, to a class of stimuli arising from an individual's experience of assessment or testing.<sup>20</sup> Test anxiety in this study was defined as the reaction to stimuli that are associated with an individual's experience of testing or evaluative situations.<sup>21</sup> Various stress management programs help students to improve academic performance by reducing stress levels. Demographic variables such as students' age, gender, ethnicity, and marital and employment status may also influence students' anxiety levels.<sup>22</sup>

The primary objective of this study was to explore the effect of academic competence, test competence, time management, strategic studying skills, and test anx-

iety on pharmacy students' academic performance. Differences in the level of these factors among students with low and high GPAs were examined. Early detection and understanding reasons of academic failure may help certain students perform better if adequate guidance on improvement is provided efficiently. Students in their experiential years may have better study, analytical and critical thinking skills than students in their didactic years. They may also be more confident in their test-taking ability than students in their didactic years. This could be attributed to their experience in the program and lesser number of tests taken during their experiential year. Also, since the method of learning during the experiential year is different from that in the didactic years; the differences in these factors among students enrolled in their experiential year as compared to didactic years were evaluated.

## METHODS

This study utilized a cross-sectional survey design and was conducted by administering a questionnaire to students enrolled in all 4 years of the PharmD curriculum at the University of Houston (Texas). A non-probabilistic convenience sampling procedure was used. Participation in the study was voluntary and the protocol was approved by the institutional review board for the protection of human subjects. Subjects in the first 3 years of the didactic curriculum were recruited when they were taking classes, while subjects in the experiential year were recruited during an on-campus day which was between 2 rotations. Data collection was on multiple days for students in didactic curriculum due to accessibility, while data collection for the experiential students was conducted only on a single day.

The survey instrument consisted of a single page, back to-back, with 30 items and questions to obtain descriptive data. Students reported their cumulative grade point average (GPA) at the time they completed the questionnaire. Cumulative GPA was the primary indicator of academic performance (dependant variable) and was measured on a scale ranging from 0 to 4, using an open-ended question. A scale that measured test anxiety was adapted from a previously validated test-anxiety inventory.<sup>19</sup> Test anxiety was measured using 10 items on a 5-point scale to rate their emotionality (Appendix 1). Academic competence, test competence, time management, and strategic studying were measured using a previously reported valid scale.<sup>2,3</sup> These items were measured using a 5-point Likert scale where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree (Appendix 1). The survey instrument also included questions to obtain information on variables

Table 1. Descriptive Statistics by Year Enrolled

Variable	First Year N = 44	Second Year N = 45	Third Year N = 46	Fourth Year N = 63	Overall N = 198
Age, y	25.8 (4.4)				
Mean (SD)		25.5 (3.1)	26.2 (3.0)	27.4 (3.0)	26.3 (3.5)
Min	21	21	23	23	21
Max	39	39	36	38	39
Gender, %					
Male	15.9	34.8	22.7	33.9	27.5
Female	84.1	65.2	77.3	66.1	72.5
Marital status, %					
Single	75.0	78.2	70.4	72.1	73.8
Married	22.7	19.6	27.3	26.2	24.1
Not married but living with a partner	2.3	2.2	2.3	1.7	2.1
Ethnicity, %					
White	34.9	15.2	36.4	37.1	31.3
African American	4.7	10.9	11.4	0.0	6.1
Hispanic	13.9	4.4	2.3	8.1	7.2
Asian/Pacific Islander	41.9	63.0	47.7	50.0	50.8
Others	4.6	6.5	2.3	4.8	4.6
Dependants or children, %					
Yes	16.3	10.9	11.4	13.3	12.9
No	83.7	89.1	88.6	86.7	87.1
Concurrent employment, %					
Working	54.5	50.0	54.5	74.2	59.7
Primary support, %					
Self-coping	27.9	34.2	33.3	34.4	32.6
Family	44.3	29.5	42.2	37.7	38.4
Faculty	0.05	2.3	0.0	0.0	0.5
Counselor	0.0	0.0	0.0	1.7	0.5
Classmates	13.9	20.4	6.7	13.1	13.5
Friends outside pharmacy school	13.9	6.8	8.9	8.2	9.3
Boyfriend/girlfriend	0.0	2.3	6.7	0.0	2.1
Others	0.0	4.5	2.2	4.9	3.1
Number of student organizations involved, %					
None	2.6	24.5	11.4	10.0	12.2
One	25.6	22.2	6.8	25.0	20.2
Two	43.6	31.1	20.4	31.7	31.4
More than two	28.2	22.2	61.4	33.3	36.2
Cumulative GPA, mean (SD)	3.2 (0.5)	2.9 (0.5)	3.1 (0.5)	3.1 (0.5)	3.1 (0.5)

GPA = grade point average

such as year of enrollment, age, gender, race, employment, marital status, and number of dependents.

Data were collected during spring 2001. Data were coded and analyzed using the SAS statistical package (version 9.0, SAS Inc, Cary, NC) with a priori set alpha level of 0.05. Reliability analyses for the domains were

carried out by calculating Cronbach's coefficient alpha. A score of 0.7 and higher indicated acceptable reliability of the domains measured.<sup>23</sup> Descriptive analyses, Spearman correlation analysis, analysis of variance (ANOVA), and discriminant analyses were conducted to evaluate the study objectives.

Table 2. Pharmacy Students' Responses to Survey Questions to Determine Test Anxiety

Variable*	Not at all typical of me, %	Not very typical of me, %	Some what typical of me, %	Fairly typical of me, %	Very much typical of me, %	Mean (SD)
Failure to perform better	9.8	37.1	32.0	13.9	7.2	2.7 (1.1)
Nervousness	16.5	39.7	22.2	17.0	4.6	2.5 (1.1)
Perspiration	39.5	36.3	10.5	10.0	3.7	2.0 (1.1)
Task-irrelevant cognitions	20.2	43.5	22.8	9.3	4.2	2.3 (1.0)
Panicky	15.2	36.1	25.7	16.2	6.8	2.6 (1.1)
Upset stomach	26.4	38.3	18.2	15.5	1.6	2.3 (1.1)
Increased heartbeats	20.7	37.3	19.7	19.2	3.1	2.5 (1.1)
Depression	19.8	41.7	22.9	10.4	5.2	2.4 (1.1)
Worry	14.6	26.6	20.8	21.9	16.1	3.0 (1.3)
Anxious even when well-prepared	13.1	20.8	27.1	26.6	12.5	3.1 (1.2)

Test Anxiety = 2.6 (0.8; Cronbach alpha = 0.9)

\*Refer to Appendix 1

## RESULTS

One hundred ninety-eight students completed survey instruments (response rates P1 = 48%, P2 = 52%, P3 = 52%, P4 = 72%, overall = 56%). The mean cumulative GPA reported by students was  $3.1 \pm 0.5$ . Descriptive statistics with respondents' demographic characteristics by year enrolled can be viewed in Table 1. The overall mean age of respondents was  $26.3 \pm 3.5$  years with more females (72.5%). Half (50%) of the respondents were Asian/Pacific Islander followed by whites (31.3%). Most students were single (73.8%) and working (59.7%) an average of  $14.7 \pm 8.1$  hours per week. The number of students with concurrent employment was higher among fourth-year students (74.2%) as compared with students in other years. A one-way ANOVA revealed no effect of the year of enrollment on the students' self-reported cumulative GPA ( $p > 0.05$ ).

The overall reliability for the scores for each of the 4 subscales academic competence (AC), test competence (TC), strategic studying (SS), and time management (TM) were comparable to those previously reported in the lit-

erature.<sup>3</sup> The reliability scores for each domain along with mean scores for each item can be viewed in Tables 2, 3, 4, 5, and 6, respectively. The Cronbach's coefficient alpha values for scales measuring academic competence (0.7), test competence (0.8), strategic studying (0.7), time management (0.7), and test anxiety (0.9) indicated acceptable reliability.<sup>21</sup>

The mean test anxiety score was  $2.6 \pm 0.8$ . Some students (22%) indicated experiencing nervousness during examinations. More than two thirds of the respondents (69.3%) experienced some level of anxiety during examinations even though they thought they were well-prepared. The majority of students indicated that they did not have physical symptoms such as perspiration (75.8%), stomach upset (64.8%), and increased heart rate (58.0%) (Table 2). Students in their experiential year had the lowest test anxiety ( $2.3 \pm 0.8$ ) as compared to students in their didactic years, which may be due to the lower number of tests that students in the experiential year have to take as compared to other students, or it could be based on their experience in taking these tests over the years.

Table 3. Pharmacy Students' Responses to Survey Questions to Determine Academic Competence

Variable*	Strongly Agree, %	Agree, %	Neutral, %	Disagree, %	Strongly Disagree, %	Mean (SD)
Managing course load <sup>†</sup>	22.5	54.0	13.3	9.7	0.5	3.9 (0.9)
Comprehension <sup>†</sup>	8.7	46.4	27.1	15.8	2.0	3.4 (0.9)
Interest <sup>†</sup>	10.7	59.2	19.4	9.2	1.5	3.7 (0.8)
Enjoyment <sup>†</sup>	9.7	45.4	29.0	13.8	2.1	3.5 (0.9)
Efforts <sup>†</sup>	24.1	52.8	14.9	6.7	1.5	3.9 (0.9)

Academic competence = 3.7 (0.6; Cronbach alpha = 0.7)

\*Refer to Appendix 1

<sup>†</sup>Reverse coded during statistical analysis

Table 4. Pharmacy Students' Responses to Survey Questions to Determine Test Competence, %

Variable*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean (SD)
Easily manage study material <sup>†</sup>	6.1	33.2	29.1	29.1	2.5	3.1 (0.9)
Test preparation <sup>†</sup>	4.1	22.1	33.8	33.3	6.7	2.8 (0.9)
Coping with examination tension <sup>†</sup>	10.3	28.2	30.8	23.1	7.6	3.1 (1.1)
Difficulty in managing study material	3.6	22.6	27.2	38.9	7.7	3.3 (1.0)

Test Competence = 3.1 (0.8; Cronbach alpha = 0.8)

\*Refer to Appendix 1

<sup>†</sup>Reverse coded during statistical analysis

There was a significant difference ( $p < 0.05$ ) in the test anxiety levels between the fourth- (experiential) and the second-year students as well as between third- and second-year students (Table 7).

The mean ( $\pm$  SD) score for academic competence was  $3.7 \pm 0.6$  indicating that students were comfortable with the course content (Table 3). Over two thirds of the students (76.5%) indicated that they were able to manage their course material and that they found it interesting (69.8%). Students (55.0%) enjoyed their courses and the same percentage of students comprehended the material easily. Students in their experiential year showed the highest academic competence ( $3.9 \pm 0.6$ ) and there was a significant difference in academic competence ( $p < 0.05$ ) between the fourth- and the second-year students (Table 7).

The mean  $\pm$  SD test competence score was  $3.1 \pm 0.8$ . Some students (26.2%) indicated having difficulty in preparing for tests ( $2.8 \pm 0.9$ ) and others could not manage the amount of study material taught for an examination (31.6%; Table 4). Also there was a significant difference ( $p < 0.05$ ) in test competence among students in the first 2 years as compared to the last 2 years (Table 7).

Some students (33%) reported that they could manage their time properly with regard to studying their pharmacy coursework (Table 5). Many students (47.7%) indicated that they ended up "cramming" for examinations. Few (6.6%) students strongly agreed that they always started preparing for an examination well in advance (Table 5). Fourth-year students demonstrated better time management skills ( $3.1 \pm 0.8$ ) compared to skills of stu-

dents in other years. Also, there was a significant difference ( $p < 0.05$ ) in time management skills between fourth- and the second-year students (Table 7).

The mean score for the strategic studying domain was  $3.3 \pm 0.7$ , indicating that some students had used study strategies (Table 6). Students (62.8%) reported that they summarized course material while studying and that they planned in advance for handling a study subject (54.6%). Students in their first year significantly differed ( $p < 0.05$ ) in the strategic studying skills as compared to second- and third-year students (Table 7).

Academic performance (cumulative GPA) of students was significantly associated with test competence and academic competence although the correlation coefficient values were still fairly weak. The cumulative GPA was not significantly associated with time management, strategic studying, and test anxiety (Table 8). Although, it was not the aim of this study to test all associations, a correlation matrix is provided to view other associations of significance (Table 8). Results from ANOVA tests and correlation analyses indicated that variables such as age, gender, race, employment, marital status, and number of dependents were not significantly associated with cumulative GPA in this cohort of students.

A stepwise discriminant analysis was performed to understand the difference among low and high academic achievers with respect to variables measured. In this analysis, students with a cumulative GPA less than 3.0 were classified as low academic achievers ( $N = 43$ ) and those with cumulative GPA of 3.0 or more were

Table 5. Pharmacy Students' Responses to Survey Questions to Determine Time Management, %

Variable*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean (SD)
Difficulty in combining study and leisure time	14.3	28.6	20.8	28.1	8.2	2.9 (1.2)
Studying regularly	10.2	35.5	18.3	28.9	7.1	2.9 (1.2)
Cramming for examinations	13.3	34.4	21.0	23.6	7.7	2.8 (1.2)
Organization <sup>†</sup>	5.2	27.8	25.8	29.9	11.3	2.9 (1.1)
Test preparation <sup>†</sup>	6.6	29.1	25.5	31.1	7.7	2.9 (1.1)

Time Management = 2.9 (0.8; Cronbach alpha = 0.7)

\*Refer to Appendix 1

<sup>†</sup>Reverse coded during statistical analysis

Table 6. Pharmacy Students' Responses to Survey Questions to Identify Strategic Study Habits/Behaviors

Variable*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean (SD)
Judgment of test questions <sup>†</sup>	9.2	45.4	20.4	18.4	6.6	3.3 (1.1)
Advance planning <sup>†</sup>	3.6	31.1	31.1	27.6	6.6	2.9 (1.0)
Review <sup>†</sup>	9.2	43.6	21.0	18.5	7.7	3.3 (1.1)
Knowledge assessment <sup>†</sup>	15.2	45.2	18.8	14.2	6.6	3.5 (1.1)
Summarize <sup>†</sup>	12.2	50.5	17.9	16.8	2.6	3.5 (1.0)

Strategic Studying = 3.3 (0.7; Cronbach alpha = 0.7)

\*Refer to Appendix 1

<sup>†</sup>Reverse coded during statistical analysis

classified as high academic achievers (N = 155). Test competence (Wilk's Lambda = 0.90,  $p < 0.0001$ ) was the only factor that significantly discriminated among the 2 groups. This may be due to the correlation between all other variables with each other.

## DISCUSSION

Identifying the effect of various factors on students' academic performance is of great importance to educators and psychologists. Test competence was the single most important factor that may help distinguish students with academic performance. This means that students who have difficulty in coping and managing the study material for tests will have a lower GPA, irrespective of other factors. Additional results revealed some important findings that could be considered while preparing academic curricula and may help to enhance classroom teaching in pharmacy colleges.

Among students participating in this study, most could manage their academic course load in the pharmacy curriculum and could easily understand the assigned study material. Most students were enjoying their classes offered in the pharmacy curriculum. These are some variables that determine students' academic competence.<sup>2,3</sup> The average test competence score in these students was towards neutral, indicating that students may have per-

ceived that they could not cope with the examination due to the amount of study material assigned for examinations. Students experienced considerable difficulty in preparing for examinations and coping with the examination tension. Test competence was the only factor that could significantly discriminate among low and high academic achievers. Further, there was a positive association of academic and test competence with academic performance. These results highlight students' perception of pharmacy course material and examinations are important in improving academic performance. Based on these findings, it is recommended that faculty members evaluate the amount of study material addressed by specific examinations, which may help students to develop higher test competence and gain an adequate amount of knowledge through their curriculum. Faculty members should try to avoid providing excessive amount of material for each test as well as test students more on concepts rather than emphasize rote memorization. Also, the results of this study suggest that students in their experiential year have lower test anxiety, better time management skills, and demonstrate better academic and test competence compared to students in their didactic years. This may be due either to progression in the curriculum or the way the material is provided to students at each year. Another

Table 7. Test Anxiety, Academic Competence, Test Competence, Time Management, and Strategic Studying Across the Four Years

Variable	First Year, Mean (SD)	Second Year, Mean (SD)	Third Year, Mean (SD)	Final Year, Mean (SD)
Test anxiety <sup>†‡</sup>	2.6 (0.8)	3.1 (0.8)	2.3 (0.7)	2.3 (0.8)
Academic competence <sup>†</sup>	3.6 (0.6)	3.4 (0.6)	3.8 (0.6)	3.9 (0.6)
Test competence* <sup>†‡§</sup>	2.6 (0.7)	2.8 (0.7)	3.4 (0.7)	3.4 (0.7)
Time management <sup>†</sup>	2.9 (0.7)	2.5 (0.7)	2.9 (0.8)	3.1 (0.8)
Strategic studying <sup>§  </sup>	3.7 (0.5)	3.3 (0.7)	3.1 (0.7)	3.3 (0.8)

Scheffe post hoc analysis

\*Fourth and second year students are significantly different ( $p < 0.05$ )

<sup>†</sup>Third and second year students are significantly different ( $p < 0.05$ )

<sup>‡</sup>Fourth and first year students are significantly different ( $p < 0.05$ )

<sup>§</sup>Third and first year students are significantly different ( $p < 0.05$ )

<sup>||</sup>Second and first year students are significantly different ( $p < 0.05$ )

Table 8. Correlation Analysis to Predict Association Between the Variables

Variable	Spearman Correlation Coefficients ( <i>p</i> value)				
	Academic Competence	Test Competence	Time Management	Strategic Studying	Test Anxiety
Test competence	0.52* ( <i>p</i> < 0.0001)				
Time management	0.41* ( <i>p</i> < 0.0001)	0.49* ( <i>p</i> < 0.0001)			
Strategic studying	0.13 ( <i>p</i> = 0.0982)	0.01 ( <i>p</i> = 0.9120)	0.19* ( <i>p</i> = 0.0217)		
Test anxiety	-0.34* ( <i>p</i> < 0.0001)	-0.53* ( <i>p</i> < 0.0001)	-0.29* ( <i>p</i> = 0.0004)	0.06 ( <i>p</i> = 0.4476)	
Cumulative GPA	0.22* ( <i>p</i> = 0.0061)	0.22* ( <i>p</i> = 0.0065)	0.15 ( <i>p</i> = 0.0731)	0.11 ( <i>p</i> = 0.1745)	-0.15 ( <i>p</i> = 0.0694)

\*Significant at *p* < 0.05

GPA = cumulative grade point average

reason for these results could be the fact that students in their experiential year have to take fewer tests and are more experienced compared to students in didactic years. Introduction of experiential courses during the first or second year may help students get a head start on achieving academic and test competence early.

A few students indicated that they were using some techniques of strategic studying. These students used techniques such as planning and studying in advance, anticipating the content of the test questions and studying accordingly, reviewing the course material, and summarizing it for examinations. Students develop their own habits and practice them as they progress through the pharmacy curriculum. Extensive course load and comprehensive information in today's academic curricula necessitate effective study strategies for academic success.<sup>12</sup> Many students found it hard to combine and organize their study and leisure time, which could be attributed to their perceived course load and stress associated with examinations or because many were also working. Studying continuously for an average of 8-9 hours per day may create fatigue and overall exertion among students, which may lead to lower performance on examinations. A break time while studying is necessary for refreshing individuals mind and help them enhance their overall performance.<sup>24</sup> The current pharmacy curriculum that impedes student's time management skills emphasizes the importance of reassessing the amount of study material assigned for examinations. Further, faculty members could consider holding review sessions before examinations or assignments to assist students in understanding and appropriately applying their course material. Students who do not study well in certain subjects could be identified using similar survey instruments and special workshops could be con-

ducted to help facilitate learning in academically weak students. It may be equally important to counsel students who do not use time management and study strategies.

A statistically insignificant negative correlation between test anxiety and academic performance is somewhat contradictory to that reported in previous literature.<sup>25</sup> Although these students experienced moderate test anxiety due to their examinations, the correlation between test anxiety and academic performance was not significant. Most interestingly, test anxiety was not a significant discriminator among low and high academic achievers. Student reported cumulative GPA used in this study could limit the findings and may be a factor for the statistically insignificant results. Another plausible reason that could explain these results is the efficient counseling service at the University of Houston. At this University, students have access to 2 counselors: 1 on campus and 1 in-house at the College. The in-house counselor works with students on a one-on-one basis, to assist them in overcoming anxiety. Such programs may be efficient in helping to improve academic performance. The positive effects of such counseling services and stress management programs are reported in the literature.<sup>24</sup>

Generalizability of the results is one of the limitations of this study. Since the study was carried out at one University, differences in demographic variables, location, and student characteristics may affect results when applied to another university. Students in their experiential years do not have to take traditional tests, hence affecting some of the responses in specific items. Also, as indicated earlier, student-reported cumulative GPA may limit the results to a certain extent. Future, studies should use administrative student records with a larger sample size to validate these study results.

## CONCLUSIONS

Results of this study underlined the importance of evaluating factors such as academic competence, test competence, strategic studying, time management, and test anxiety in evaluating academic success. Specifically, test competence and academic competence were important factors associated with academic performance. Focusing efforts to understand these factors further would be helpful for students in enhancing their academic performance. Efficient counseling services regarding these techniques along with stress management programs could also assist students in achieving academic success.

## REFERENCES

1. Womble LP. Impact of stress factors on college students' academic performance. *Undergraduate Journal of Psychology*. 2003;16. Available at: <http://www.psych.uncc.edu/UJOP2003.pdf>. Accessed Nov 23, 2004.
2. Lust E, Moore F. Emotional intelligence instruction in a pharmacy communications course. *Am J Pharm Educ*. 2006;70:Article 06.
3. Kleijn W, Ploeg H, Topman R. Cognition, study habits, test anxiety, and academic performance. *Psycho Rep*. 1994;75:1219-26.
4. Topman RM, Klienj W, Ploeg H, Masset E. *Test Anxiety, Cognitions, Study Habits and Academic Performance: a Prospective Study*. *Advances in Test Anxiety Research*. Hillsdale 1992;7:221-41.
5. Alvermann DE, Moore DW. Secondary schools. In: Barr R, Kamil MI, Mosenthal PB, Pearson PD, eds. *Handbook of Reading Research*. New York: Longman; 1991;951-83.
6. Anderson TH, Armbruster BB. Studying. In: Pearson PD, ed. *Handbook of Reading Research*. New York: Longman; 1984;657-79.
7. Ogle DM. K-W-L: a teaching model that develops active reading of expository text. *The Reading Teacher*. 1986;39:564-70.
8. Robinson FP. *Effective Study*. 4th ed. Harper & Row, New York, NY; 1970.
9. Brown AL, Day JD. Macro rules for summarizing texts: the development of expertise. *J Verbal Learning Verbal Behav*. 1983;22:1-14.
10. Burke J. *Tools for Thought: Helping All Students Read, Write, Speak, & Think*. Heinemann, Burlingame High School. Calif; 2002.
11. Deshler DD, Schumaker JB, Lenz BK, Bulgren JA, Hock MF, Knight J, Ehren BJ. Ensuring content-area learning by secondary students with learning disabilities. *Learning Disabilities Res Prac*. 2001;16:96-108.
12. Lay C, Schouwenburg H. Trait procrastination, time management and academic behavior. *J Soc Behav Pers*. 1993;84:647-62.
13. Walker T, Siebert A. *Student Success: How to Succeed in College and Still Have Time for Your Friends*. Holt Rinehart & Winston, Fort Worth, Tx; 1980.
14. Kirschenbaum DS, Perri MG. Improving academic competence and adults: a review of recent research. *J Counseling Psychol*. 1982;29:76-94.
15. Entwistle N, Ramsden R. *Understanding Student Learning*. Croom Helm London; 1983.
16. Powell DH. Behavioral treatment of debilitating test anxiety among medical students. *J Clin Psychol*. 2004;60:853-65.
17. Hembree R. Correlates, causes, effects, and treatment of test anxiety. *Rev Educ Res*. 1988;58:47-77.
18. Seipp B. Anxiety and academic performance: a meta-analysis of findings. *Anxiety Res*. 1991;4:27-41.
19. Sarason IG. *Test Anxiety: Theory, Research, and Applications*. Hillsdale, NJ: Lawrence Erlbaum; 1980.
20. Rasor LT, Rasor RA. *Test Anxiety and Study Behavior of Community College Students in Relation to Ethnicity, Gender, and Age*. 1998; Research Report by Community Colleges. 1998. Available at: [http://eric.ed.gov/ERICDocs/data/ericdocs2/content\\_storage\\_01/0000000b/80/24/48/c4.pdf](http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/24/48/c4.pdf). Accessed June 11, 2005.
21. Sieber JE. Defining test anxiety: problems and approaches. In: Sarason IG, ed. *Test Anxiety: Research and Applications*. Hillsdale, N.J.: Lawrence Erlbaum and Associates. 1980;15-40.
22. Devine TG. Studying: skills, strategies, and systems. In: Flood J, Jensen JM, Lapp D, Squire JR, eds. *Handbook of Research on Teaching the English Language Arts*. New York, 1991;743-53.
23. Kerlinger FN, Lee HB. *Foundations of Behavioral Research*. 4th ed. USA: Wadsworth Thompson Learning; 2000.
24. Waterworth S. Time management strategies in nursing practice. *J Adv Nurs*. 2003;43:432-40.
25. Henning K, Sydney E, Shaw D. Perfectionism, the imposter phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ*. 1998;32:456-64.

## Appendix 1. Items used to measure cognitive domains on the questionnaire.

### Test Anxiety

For the following statements please rate yourself according to how well the statements describes you

1 = Not at all typical of me; 2 = Not very typical of me; 3 = Somewhat typical of me; 4 = Fairly typical of me; 5 = Very much typical of me

1. Thoughts of doing poorly interfere with my performance on examinations
2. During an examination I frequently get so nervous that I forget facts I really know
3. While taking an important exam, I perspire a great deal
4. During examinations, I find myself thinking of things unrelated to the actual study material
5. I feel very panicky when I have to take an exam
6. After important tests, I am frequently so tense that my stomach gets upset
7. I usually feel my heart beating very fast during an exam
8. I usually get very depressed after taking an exam
9. I wish examinations did not bother me so much



10. Even when I'm well prepared for a test, I feel very anxious about it  
Please indicate your agreement or disagreement regarding the statements below using the scale provided by circling the number that best represents your opinion.

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

***Academic Competence***

1. I am able to manage the academic course load in the pharmacy school so far\*
2. I can easily understand course material taught in the pharmacy school\*
3. I find the courses taught in the pharmacy school interesting\*
4. I am enjoying the classes offered in the pharmacy curriculum\*
5. I always do my best to understand the course material taught in the pharmacy School\*

***Test Competence***

1. I can easily manage the amount of study material taught for an exam\*
2. I do not find it difficult to prepare for examinations\*
3. I can easily cope with examination tension\*
4. I have great difficulty managing the amount of study material for examination

***Time Management***

1. I find it very difficult to combine my study and leisure time.
2. I find it difficult to study regularly
3. I usually end up "cramming" for examinations
4. I can organize my study and leisure time easily\*
5. I always start preparing for an examination well in advance\*

***Study Strategies***

1. While I am studying, I regularly try to find out what questions professors may ask and how they may ask examination questions\*
2. I plan well in advance for the best way of handling a study subject\*
3. I review course material with my classmates while studying for examinations\*
4. I test my knowledge before taking an examination by means of mock examinations, tests, asking questions, etc.\*
5. While studying I regularly summarize the course material in my own words\*\*

\*= reverse coded during statistical analysis to indicate that higher the score the better the outcome