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RESEARCH

Relationship Between Grit with Academic Performance and Attainment of Postgraduate Training in Pharmacy Students

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Objective. To determine if Grit-S scores correlate with academic success in a doctor of pharmacy (PharmD) program, as well as the pursuit and attainment of pharmacy postgraduate (residency or fellowship) training.

Methods. A 28-item survey was administered to third- and fourth-year (P3 and P4) pharmacy students. Variables queried included Grit-S score, demographics, pharmacy experience prior to the PharmD program, and factors that may affect academic performance during didactic coursework. Didactic coursework GPA was used as a surrogate for academic success. Information about pursuit and attainment of a postgraduate training position was also documented and used in the analyses.

Results. There was no significant correlation between Grit-S scores and variables related to academic success. However, students were more likely to pursue postgraduate training with higher academic success and higher Grit-S. Lastly, students with higher Grit-S were also more likely to obtain a postgraduate training position.

Conclusion. Grit-S scores correlated with the pursuit and successful attainment of postgraduate training, but not with academic success during the didactic years of a PharmD program.

Keywords: grit, GPA, residency, pharmacy, non-cognitive

INTRODUCTION

Various cognitive factors have been correlated with academic success in pharmacy schools. Academic success in a doctor of pharmacy (PharmD) program has been defined as a minimum 3.0 cumulative grade point average (GPA) without failure of any courses.^{1,2} A bachelor of science degree, completion of advanced biology courses, or higher scores on the Pharmacy College Admission Test (PCAT) have been positively correlated with academic success in pharmacy school.^{3,4,5} In addition, stronger academic competence (ie, ability to manage study load) and test competence (ie, how students cope with the amount of study material for examinations) have been associated with higher GPAs in pharmacy school.⁶

While the above cognitive factors have been correlated with academic performance, there has been an increased interest in investigating the influence of non-cognitive factors on academic performance. Arthur Poropat concluded that conscientiousness (dependability

and will to achieve) added as much to the prediction of academic performance as did intelligence.⁷ In regards to academic success in pharmacy school, Stolte and colleagues found that motivation, communication skills, interpersonal skills, social awareness, and critical thinking abilities were correlated with higher didactic GPA and overall GPA among pharmacy students.⁸ Empathy, citizenship, and ethical behavior also may increase pharmacy school didactic and clinical performance.⁹ The potential relationship between academic success and grit, a non-cognitive trait defined as the perseverance and passion for long-term goals, has yet to be reported in pharmacy students.¹⁰

Grit entails working strenuously through challenges, and maintaining effort and interest over the years despite failure, adversity, and plateaus in progress.¹⁰ Duckworth and colleagues developed the Grit-O, a validated 12-item scale to measure whether grit correlates with achievement.¹⁰ The scale addresses scenarios related to “Consistency of Interests” and “Perseverance of Effort.” Items are rated on a 5-point scale ranging from 1=not at all like me to 5=very much like me. A higher Grit-O score correlated with various challenges including retention in the West Point Academy program, success in the final round of the Scripps National Spelling

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Bee, and higher GPA attainment in an Ivy League school.¹⁰

In 2009, Duckworth developed the Grit-S, an 8-item scale that is more reliable and valid compared to the longer Grit-O survey.¹¹ Since its development, diverse institutions have demonstrated correlations between Grit-S scores and successful completion of an Army Special Operations Forces selection course, retention of sales representatives, graduation from high school in a disadvantaged school district, and teacher effectiveness.^{12,13} Moreover, Reed and colleagues have reported that physicians with higher Grit-S scores were more likely to pursue a specialty (eg, cardiology, endocrinology) than primary care practice.¹⁴ This raises the possibility that grit also may be a predictor for PharmD students pursuing additional specialized training, such as postgraduate residencies or fellowships. Given the relationship between grit and achievement in a variety of non-pharmacy sectors, the purpose of this study was to determine if Grit-S scores correlate with academic didactic success in a PharmD program as well as the pursuit and attainment of postgraduate (residency or fellowship) training.

METHODS

Only researchers identified in the institutional review board proposal had access to the data, and all researchers previously had completed a National Institutes of Health (NIH) or Collaborative Institutional Training Initiative (CITI) human subjects training program. This study was deemed exempt by the Touro University California Institutional Review Board as a single institution cross-sectional survey.

The 28-item Internet-based survey was administered to P3 and P4 students (Class of 2015 and Class of 2014) at Touro University California using Qualtrics (Provo, UT). This study utilized the more reliable and valid 8-item Grit-S survey. In addition to the Grit-S survey, other specific variables queried included demographics (age, gender, ethnicity, and marital status), English language status (ie, primary vs secondary language), pharmacy experience prior to the program, work experience during didactic coursework, commute time during didactic coursework, hours of sleep during didactic coursework, minutes of exercise per week during didactic coursework, extracurricular involvement during didactic coursework, procrastination, academic competence (ability to manage study load), and test competence (how students cope with the amount of study material for examinations). These variables were used because they were reported in earlier studies or hypothesized to contribute to academic success.³⁻⁶ Additionally, didactic GPA and

information on postgraduate training outcomes (pursuit and attainment) were obtained for each subject. Three subjects did not complete the survey to its entirety, and were excluded from the analytic cohort. Lastly, a separate analysis was conducted to compare baseline demographics (age, gender, ethnicity, and didactic GPA) with those who did not complete the survey to ensure a reasonable representation of the entire class in our sample.

The Internet-based survey was distributed to the university e-mail addresses of eligible students on October 15, 2013. A follow-up reminder was sent on November 15, 2013, and the collection process ended on November 30, 2013. Upon completion of the survey, students were eligible to be entered into a \$20 gift certificate raffle as an incentive for participating in the study. The e-mail addresses were used to cross-reference students for didactic coursework GPA and postgraduate (residency and fellowship) outcomes. By August 2015, students in the Class of 2014 and Class of 2015 had graduated, and their postgraduate training status was known to the researchers. Because the response rate was below the desired 50% to 75%,¹⁵⁻¹⁷ demographic data (eg, age, gender, ethnicity) and didactic GPA were collected for students who did not complete the survey for comparison to those who completed the survey to evaluate whether the sample was a reasonable representation of the entire class. The subjects were then de-identified for data analysis.

Demographic characteristics were evaluated using descriptive statistics. Characteristics associated with academic success, applying for a residency, and attaining a residency were compared using Student's *t*-tests (for continuous variables) and Fisher's exact tests (for categorical variables). In our curriculum, grades are distributed so that a 2.0 cumulative GPA corresponds to acceptable competency levels. However, for consistency with the published literature, academic success was defined as a minimum 3.0 cumulative GPA without failure of one or more courses.^{1,2} This was the definition used in the analysis. Spearman correlation analysis was used to determine which variables correlate with academic success (continuous variable). Because of the dichotomous nature of either pursuing postgraduate training and attaining a postgraduate training position, Fisher's exact tests were used to evaluate the categorical data. Additionally, logistic regression and multivariate analyses were utilized to determine which variables correlate with and best predict the pursuit and attainment of postgraduate training (categorical variables). A *p*-value of less than .05 was considered statistically significant. Data analyses were conducted using STATA 12.0 (College Station, TX).

RESULTS

Of the 203 P3 and P4 students, 101 took the survey, and three did not complete it, leaving a final analytic cohort of 98 students (48.3%). Because the response rate was less than the desired 50% to 75%, a separate analysis was conducted to compare baseline demographics (age, gender, ethnicity, didactic GPA) with those who did not complete the survey to ensure a reasonable representation of the entire class in our sample. As shown in Table 1, there were no significant differences in the baseline demographics (age, gender, and ethnicity) or didactic GPA when comparing students who did vs did not complete the survey.

The demographic characteristics of the 98 students in the final analytical cohort are summarized in Table 2. The majority of the pharmacy students surveyed were 21-25 years old (61.2%), female (73.5%), Asian (61.2%), and single (73.5%). The average GPA was 3.1 (.3) on a 4.0 scale; and the average Grit-S score was 3.8 (.5) on a 5-point scale. A majority of students (63.3%) at the time of the survey indicated that they planned to apply for postgraduate training, with 48 (49.0%) actually applying and 33 (33.7%) attaining a postgraduate residency or fellowship.

Of the total 98 students, 65 (66.3%) met the criteria for academic success (defined as a minimum 3.0 cumulative GPA without failure of one or more courses), while

33 (33.7%) did not. The comparison and association of variables with academic success in a PharmD program are summarized in Table 3.

There was no significant linear correlation between Grit-S score and academic success ($r=.19$, $p=.057$). As expected, there was a strong correlation with GPA and academic success ($r=.82$, $p<.001$). Similarly, students who “can easily understand course material taught during didactic coursework” were significantly associated with academic success ($r=.32$, $p=.001$).

The association of variables with actual pursuit of postgraduate training is summarized in Table 4. Forty-eight students applied to postgraduate training. One student pursued a fellowship, while the other 47 applied for postgraduate residencies. The variables associated with pursuing postgraduate training included academic success ($p=.002$), Grit-S ($t=3.3$, $p=.001$), GPA ($t=3.4$, $p=.001$), and students “that do not find it difficult to prepare for an exam” ($p=.006$).

A multivariate logistic regression was conducted to determine which characteristics predicted pursuit of postgraduate training. Those with academic success (OR 3.4, $p=.013$) and higher Grit-S (OR 4.2, $p<.005$) were more likely to pursue postgraduate training (Table 5).

The variables associated with attaining a postgraduate training position are described in Table 6. Of the 48

Table 1. Comparison of Baseline Demographics for Students Completing (n=98) vs Not Completing (n=105) the Survey

Variable	Class of 2014 (4 th year at time of survey) (n=48 completed, n=53 did not complete the survey)		
	Number (%) or Mean (SD) ^a	Test Value ^b	p-Value
Age		Fisher's exact	.84
Gender	Male 11 (22.9) ^c Male 21 (39.6) ^d	$\chi^2 = 3.25$.07
Ethnicity		Fisher's exact	.99
Average didactic coursework GPA (on 4.0 scale)	3.15 (0.3) (3.1-3.2) ^c 3.12 (0.3) (3.1-3.2) ^d	$t=1.56$.12
Variable	Class of 2015 (P3 at time of survey) (n=50 completed, n=52 did not complete the survey)		
	Number (%) or Mean (SD) ^a	Test Value ^b	p-Value
Age		Fisher's exact	1.00
Gender	Male 15 (30.0) ^c Male 18 (34.6) ^d	$\chi^2 = 0.25$.62
Ethnicity		Fisher's exact	.93
Average didactic coursework GPA (on 4.0 scale)	3.2 (0.3) (3.1-3.3) ^c 3.2 (_0.3) (3.1-3.3) ^d	$t=0.28$.78

Statistically significant results are indicated by bold font

^aSD=Standard Deviation

^bStudents' t -tests were conducted for continuous variables and Fisher's exact tests (probability, but no test values associated with this statistic) were conducted for categorical variables

^cStudents who completed the survey

^dStudents who did not complete the survey

Table 2. Demographic Characteristics of Pharmacy Students (n=98)

Variable	Number (%) or Mean (SD) ^a
Age	
21-25	60 (61.2)
26-29	30 (30.6)
30-35	6 (6.0)
36-40	2 (2.0)
>40	0 (0.0)
Gender	
Female	72 (73.5)
Male	26 (26.5)
Ethnicity	
Caucasian	19 (19.4)
African American/Black	5 (5.1)
Asian	60 (61.2)
Hispanic/Latino	0 (0.0)
Pacific Islander	4 (4.1)
American Indian/Alaskan Native	0 (0.0)
Other	10 (10.2)
Marital Status	
Single	72 (73.5)
Married	12 (12.2)
Not married, living with partner	12 (12.2)
Divorced	2 (2.0)
Widowed	0 (0)
Average didactic coursework GPA (on 4.0 scale)	3.1 (0.3)
Average Grit-S score (5 point scale)	3.8 (0.5)
Pharmacy experience during didactics (hrs)	6.2 (1.4)
Commute time to school during didactics	
0-30 min	82 (83.7)
30-60 min	10 (10.2)
60-90 min	3 (3.1)
Not Answered	3 (3.1)
Hours of sleep per night during didactics	6.6 (1.5)
Planning to apply to postgraduate training (Yes)	62 (63.3)

^aSD=Standard Deviation

students who applied to postgraduate training, 33 attained a postgraduate training position. Of the 33 students who attained a postgraduate position, 32 (97.0%) obtained a residency and one (3.0%) student obtained a fellowship. The variables associated with attaining a postgraduate training position included higher Grit-S scores ($t=3.4$, $p=.001$).

A multiple logistic regression analysis was conducted to determine which characteristic most pre-

dicted attainment of a postgraduate training position (Table 7). Those with higher Grit-S scores (OR 34.6, $p=.008$) were more likely to obtain a postgraduate training position.

DISCUSSION

This is the first study to explore grit with academic success and postgraduate training in a doctor of pharmacy degree program. Although the 48.3% sample size fell short of the desired >50% to 75% of the target population,¹⁵⁻¹⁷ the respondent group appears representative of all students, as shown by no significant differences in baseline demographics or didactic GPA among individuals who took the survey compared to individuals who did not.

Within the analytic cohort, academic success did not correlate with Grit-S, but it did correlate with both GPA and students who “can easily understand course material taught during didactic coursework.” This latter finding is consistent with earlier reports of a strong correlation between academic success and cognitive factors, including undergraduate degrees, pre-pharmacy coursework, PCAT scores, GPA, and academic competence.¹⁻⁵ One reason that Grit-S scores may not have correlated with academic success in pharmacy students was the relatively high Grit-S score average of 3.82, which falls into the 70th percentile when compared with the national average.¹¹ In previous non-pharmacy related grit studies, only the highest achievers fell into this category.^{10,11,13,14} Thus, it would be reasonably expected to have “grittier” pharmacy students possessing greater aspirations and longer-term goals.

The pursuit of postgraduate training, which requires commitment toward long-term goals, was correlated with higher Grit-S scores and academic success in pharmacy students. Higher Grit-S scores also were strongly associated with attaining a postgraduate training position. These findings affirm a previous study in which applicants with a higher GPA were more likely to be invited for a pharmacy residency interview, and none of the potential candidates had a GPA of less than 3.0.¹⁸ Moreover, in the medical field, physicians who pursued specialized training had higher Grit-S scores than general practitioners.¹⁴ The Grit-S questionnaire thus may be a useful assessment tool for identifying students who are well-suited for pursuing postgraduate training.

The current study represents an important step in identifying predictors of pursuing and attaining postgraduate training in pharmacy. Among the variables evaluated, Grit-S was the best predictor of pursuing and attaining a postgraduate position. This supports the body of literature demonstrating that when evaluating prospective

Table 3. Variables Influencing and Correlating with Academic Success (n=98)

Academic Success Variable	Yes = 65 Number (%)	No = 33 Number (%)	r ^a	p Value
Average Grit-S (5 point scale)	3.9 ± 0.5	3.7 ± 0.5	0.19	.057
Average didactic coursework GPA (4.0 scale) ^b	3.4 ± 0.02	2.7 ± 0.04	0.82	<.001 ^c
Pharmacy work or volunteer experience prior to attending pharmacy school (hrs)	51 (79.7)	28 (84.6)	-0.06	.54
Yes	51 (79.7)	28 (84.6)		
No	13 (20.3)	5 (15.2)		
Pharmacy experience during didactics (hrs)	6.1 (7.2)	6.2 (5.9)	-0.04	.67
Commute time to school during didactics			0.09	.41
0-30 min	53 (84.1)	29 (90.6)		
30-60 min	8 (12.7)	2 (6.3)		
60-90 min	2 (3.2)	1 (3.1)		
Hours of sleep per night during didactics	6.7 (1.7)	6.4 (1.0)	0.06	.59
Exercise during didactics			0.1	.33
0-30 min	26 (40.0)	16 (48.5)		
30-60 min	14 (21.5)	7 (21.2)		
60-90 min	7 (10.8)	4 (12.1)		
90-120 min	8 (12.3)	3 (9.1)		
120-150 min	5 (7.7)	1 (3.0)		
>150 min	5 (7.7)	2 (6.1)		
Participation in pharmacy-related extracurricular activities			-0.08	.41
0-5 hrs	16 (24.6)	6 (18.2)		
5-10 hrs	12 (18.5)	6 (18.2)		
10-15 hrs	5 (7.6)	5 (15.2)		
15-20 hrs	10 (15.4)	2 (6.1)		
20-25 hrs	7 (10.8)	3 (9.1)		
25-30 hrs	3 (4.6)	2 (6.1)		
>30 hrs	12 (18.5)	9 (27.3)		
Ability to understand course material taught during didactic coursework			0.32	.001 ^c
Strongly Agree	9 (13.9)	2 (6.1)		
Agree	34 (52.3)	9 (27.4)		
Neutral	18 (27.7)	15 (45.5)		
Disagree	4 (6.2)	7 (21.2)		
Strongly Disagree	0 (0)	0 (0)		

^aSpearman correlation analysis was used to determine which variables correlate with academic success. An r-value approaching 1 = stronger correlation

^bDidactics is during 1st and 2nd year pharmacy school

^cStatistically significant result

candidates for residency programs, academics are an important criteria for initially sorting candidates,²⁰ but non-cognitive qualities weigh heavily in the final selection for offering an interview^{18,20} and evaluating candidates.²¹ Grit, which is characterized by perseverance and passion for long-term goals, appears to be important in gauging a pharmacy student's desire to seek and attain a postgraduate training position.¹⁰

Several study strengths are of note, including utilization of the Grit-S, a validated survey questionnaire, for the novel examination of grit with academic success in a PharmD program and postgraduate training pursuit

and attainment. Other new variables investigated include commute time to the university, extracurricular activity involvement, exercise, and pharmacy work experience, albeit not significant. With regard to study limitations, several require consideration. First, the survey was conducted at a single institution, making generalizability challenging; future research should extend data collection to students from multiple PharmD programs. Second, baseline comparisons were only made on demographics and, because of the voluntary nature of the study, we were not able to compare cohorts on a more in-depth level by Grit-S score or objective

Table 4. Variables Associated with Pursuing Postgraduate Training (n=98)

Pursued a postgraduate training position:				
Pharmacy Practice Residency^a		Yes = 48 (49.0%)	No = 50 (51.0%)	
Fellowship^a		47 (97.9%)	1 (2.1%)	
Variable	Number (%) or Mean (SD)	Number (%) or Mean (SD)	Test Value	P Value^b
Academic success			Fisher's exact	.003 ^d
Yes	39 (81.3)	26 (52.0)		
No	9 (18.75)	24 (48.0)		
Average Grit-S (5 point scale)	4.0 ± 0.4	3.7 ± 0.5	<i>t</i> =3.31	.001 ^d
Average didactic coursework GPA (4.0 scale) ^c	3.3 ± 0.3	3.0 ± 0.4	<i>t</i> =3.39	.001 ^d
Pharmacy work or volunteer experience prior to attending pharmacy school			Fisher's exact	1.00
Yes	38 (80.9)	41 (82.0)		
No	9 (19.2)	9 (18.0)		
Pharmacy experience during didactics (hrs)	6.6 ± 6.4	5.7 ± 7.1	<i>t</i> =0.65	.52
Commute time to school during didactics			Fisher's exact	.39
0-30 min	38 (82.6)	44 (89.8)		
30-60 min	7 (15.2)	3 (6.1)		
60-90 min	1 (2.2)	2 (4.1)		
Hours of sleep per night during didactics	6.8 ± 1.8	6.4 ± 1.1	<i>t</i> =1.22	.23
Exercise during didactics			Fisher's exact	.69
0-30 min	19 (39.6)	23 (46.0)		
30-60 min	13 (27.1)	8 (16.0)		
60-90 min	6 (12.5)	5 (10.0)		
90-120 min	4 (8.3)	7 (14.0)		
120-150 min	2 (4.2)	4 (8.0)		
>150 min	4 (8.3)	3 (6.0)		
Participation in pharmacy-related extracurricular activities			Fisher's exact	.40
0-5 hrs	11 (22.9)	11 (22.0)		
5-10 hrs	8 (16.7)	10 (20.0)		
10-15 hrs	6 (6.3)	7 (14.0)		
15-20 hrs	7 (14.5)	5 (10.0)		
20-25 hrs	8 (16.7)	2 (4.0)		
25-30 hrs	2 (4.2)	3 (6.0)		
>30 hrs	9 (18.8)	12 (24.0)		
Tendency to procrastinate studying for exams			Fisher's exact	.38
Strongly Agree	6 (12.5)	4 (8.0)		
Agree	8 (16.7)	16 (32.0)		
Neutral	17 (35.4)	18 (36.0)		
Disagree	14 (29.2)	11 (22.0)		
Strongly Disagree	3 (6.3)	1 (2.0)		
I do not find it difficult to prepare for a block exam			Fisher's exact	.006 ^d
Strongly Agree	2 (4.2)	0 (0)		
Agree	10 (20.8)	17 (34.0)		
Neutral	11 (22.9)	21 (42.0)		
Disagree	23 (47.9)	9 (18.0)		
Strongly Disagree	2 (4.2)	3 (6.0)		

^aFrom a total of 48 students pursuing postgraduate training

^bStudent's *t*-tests were conducted for continuous variables and Fisher's exact tests (probability, but no test values associated with this statistic) were conducted for categorical variables

^cDidactics is during 1st and 2nd year pharmacy school

^dStatistically significant result

Table 5. Logistic Regression Analysis of Characteristics for Pursuing Postgraduate Training

R²=0.1337	OR (SE)^a	95% CI^b	P Value
Gender (male)	1.1 (0.6)	0.4, 3.2	.806
Academic success	3.4 ± 1.7	1.3, 8.9	.013 ^d
Pharmacy work or volunteer experience prior to attending pharmacy school	0.8 ± 0.5	0.3, 2.6	.749
Pharmacy experience during didactics ^c	1.0 ± 0.0	1.0, 1.1	.474
Participation in pharmacy-related extracurricular activities	1.0 ± 0.1	0.8, 1.2	.927
Average Grit-S (5 point scale)	4.2 ± 2.1	1.5, 11.4	<.005 ^d

^aOdds Ratio ± Standard Error

^bConfidence Interval

^cDidactics is during the 1st and 2nd year of pharmacy school

^dStatistically significant results

postgraduate data that did not rely at least in part on self-report. In addition, surveys also are known to lend themselves to recall bias, and the Grit-S may possess

a social desirability bias.^{10,11} Moreover, this study focused on academic success during didactic coursework, and it is possible that grit may be a non-cognitive factor related to success during clinical experiences (eg, Advanced Pharmacy Practice Experiences), that requires a combination of strong academic foundation and well-rounded interpersonal traits. Additional studies can further build upon the analysis conducted by Ensor and colleagues by investigating grit along with professional association involvement, presentations, and rotation experiences as other predictors for pursuing and attaining a postgraduate training position.¹⁸

CONCLUSION

Although Grit-S scores did not correlate with academic success in a PharmD didactic setting, Grit-S scores positively correlated with pursuit and successful attainment of postgraduate residency or fellowship training. This confirms that both non-cognitive as well as cognitive factors are essential components to successful pursuit and attainment of postgraduate pharmacy training.

Table 6. Variables Associated with Attaining a Postgraduate Training Position (n = 48)

Attained a postgraduate training position	Yes = 33 (68.8%)	No = 15 (31.3%)		
Residency	32 (97.0%)			
Fellowship	1 (3.0%)			
Variable	Number (%) or Mean (SD)	Number (%) or Mean (SD)	Test Value	P Value^a
Academic success			Fisher's exact	.12
Yes	29 (87.9)	10 (66.7)		
No	4 (12.1)	5 (33.3)		
Average Grit-S (5 point scale)	4.1 ± 0.4	3.7 ± 0.5	t=3.449	.001 ^c
Pharmacy work or volunteer experience prior to attending pharmacy school			Fisher's exact	
Yes	27 (84.4)	11 (73.3)		
No	5 (15.6)	4 (26.7)		
Pharmacy experience during didactics (hrs) ^b	6.6 ± 6.1	6.8 ± 7.2	t=0.157	0.88
Participation in pharmacy-related extracurricular activities			Fisher's exact	0.42
0-5 hrs	5 (15.2)	6 (40.0)		
5-10 hrs	6 (18.2)	2 (13.3)		
10-15 hrs	3 (9.1)	0 (0)		
15-20 hrs	6 (18.2)	1 (6.7)		
20-25 hrs	6 (18.2)	2 (13.3)		
25-30 hrs	2 (6.1)	0 (0)		
>30 hrs	5 (15.2)	4 (26.7)		

^aStudent's t-tests were conducted for continuous variables and Fisher's exact tests (probability, but no test values associated with this statistic) were conducted for categorical variables

^bDidactics is during the 1st and 2nd year of pharmacy school

^cStatistically significant results

Table 7. Logistic Regression Analysis of Characteristics for Attaining a Postgraduate Training Position

R²=0.2466	OR ± SE^a	95% CI^b	P Value
Gender (male)	2.0 ± 1.9	0.3, 13.2	.48
Academic success	1.2 ± 1.3	0.1, 9.6	.88
Pharmacy work or volunteer experience prior to attending pharmacy school	3.8 ± 3.5	0.6, 23.2	.15
Pharmacy experience during didactics ^c	1.0 ± 0.1	0.9, 1.2	.80
Participation in pharmacy-related extracurricular activities	1.0 ± 0.2	0.7, 1.4	.81
Average Grit-S (5 point scale)	34.6 ± 46.6	2.5, 482.8	.008 ^d

^aOdds Ratio ± Standard Error

^bConfidence Interval

^cDidactics is during 1st and 2nd year pharmacy school

^dStatistically significant results

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Appendix. Survey to be Distributed

Demographics

How old were you when you started at Touro University?

21-25, 26-30, 30-35, 36-40, >40

What is your expected year of graduation?

2014, 2015, 2016, 2017

What is your gender?

Male Female

Please mark all that apply

Caucasian, African American,/Black Asian, Hispanic/Latino, Pacific Islander, American Indian/Alaskan Native, Other

Please mark your marital status

Single, Married, Not married but living with a partner, Divorced, Widowed

How many Dependents/Children do you live with

0, 1, 2, 3, 4, 5

Grit-O

1. I have overcome setbacks to conquer an important challenge
2. *New ideas and projects sometimes distract me from previous ones*
3. My interests change from year to year
4. *Setbacks don't discourage me*
5. *I have been obsessed with a certain idea or project for a short time but later lost interest*
6. *I am a hard worker*
7. *I often set a goal but later choose to pursue a different one*
8. *I have difficulty maintaining my focus on projects that take more than a few months to complete*
9. *I finish whatever I begin*
10. I have achieved a goal that took years of work
11. I become interested in new pursuits every few months
12. *I am diligent*

(Author's note: all 12 items of the Grit-O were queried, but the data were ultimately analyzed for the italicized items that comprise the Grit-S)

Variables that may influence academic success

Is English your primary language?

Yes, No

Have you ever been diagnosed with any of the following by a physician or other healthcare professional?

Yes, No (If yes, please select all that apply)

An anxiety disorder (generalized anxiety disorder, panic disorder, post-traumatic stress disorder, obsessive-compulsive disorder, social phobia)

A major depressive disorder (typical MDD, atypical MDD, psychotic MDD, melancholic MDD, or dysthymia)

Substance dependence

Schizophrenia

Body dysmorphic disorder

Anorexia nervosa

Bulimia nervosa

Bipolar disorder

attention-deficit-hyperactivity disorder (AHDH)

Narcolepsy

Insomnia

Chronic pain/fibromyalgia

Headache (migraine, tension, cluster, etc.)

Other _____

Did you have any pharmacy work or volunteer experience prior to attending pharmacy school?

Yes, No

American Journal of Pharmaceutical Education 2017; 81 (4) Article 67.

On average, how many hours of pharmacy experience per week did you have during P1/P2 years

Drop down for #1-40 hours

On average, what is/was your commute time to Touro University during P1/P2 years?

0-30 min, 30-60 min, 60-90 min, >90 min

On average, how many hours of sleep do you get per night during P1/P2 years?

Drop down as 0.5 hour increments up to 15 hours

On average, how many minutes of exercise do get per week during P1/P2 years?

0-30, 30-60, 60-90, 90, 90-120, 120-150, >150

How often do you procrastinate studying for block exams?

Always, very often, sometimes, rarely

During didactic coursework, how many hours per semester do you participate in pharmacy-related extracurricular activities

(i.e. health fairs, professional organizations, club leadership/officer)

0-5, 5-10, 10-15, 15-20, 20-25, 25-30, >30

I am able to manage the academic course load during didactic coursework.

Strongly agree, agree, neutral, disagree, strongly disagree

I can easily understand course material taught during didactic coursework.

Strongly agree, agree, neutral, disagree, strongly disagree

I can easily manage the amount of study material taught for a block exam.

Strongly agree, agree, neutral, disagree, strongly disagree

I do not find it difficult to prepare for a block exam.

Strongly agree, agree, neutral, disagree, strongly disagree

Do you plan to pursue postgraduate training (ie, residency, fellowship, or graduate school)

Yes, No