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Grit and Perceived Stressors as Predictors of Academic Success in First and Second Year Doctor of Physical Therapy Students

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GRIT AND PERCEIVED STRESSORS AS PREDICTORS OF ACADEMIC SUCCESS IN
FIRST AND SECOND YEAR DOCTOR OF PHYSICAL THERAPY STUDENTS

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A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

University of North Dakota

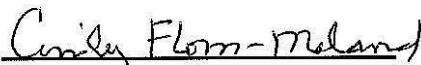
in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

Grand Forks, North Dakota

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This Scholarly Project, submitted by Abigail Thomas and Jamal Ibnelhaj in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.


(Graduate) School Advisor


(Chairperson, Physical Therapy)

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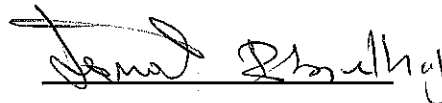
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ABSTRACT

Background and Purpose: The purpose of this longitudinal study was to identify any correlations between grit scores, perceived stress levels, academic success (GPA), and demographics (age) among doctor of physical therapy (DPT) students at the University of North Dakota (UND). Grit was assessed using the 12 item Grit scale (Grit-O) from Angela Duckworth. Perceived stress was assessed using the 10 item perceived stress scale (PSS).

Methods: The Grit-O and PSS scales were distributed to first year DPT students at UND by the primary investigator. 154 students consented to participate in the study, 102 first year students and 52 second year students. A non-blinded faculty member pulled and coded demographic data, Grit-O and PSS scales for each student. The data was put into a spreadsheet that student researchers used to score the scales.

Results: Following SPSS data analysis, there were no significant findings when comparing overall grit score, age, and various GPA scores of year-one and year-two DPT students. Significant correlation was found between first year students' overall stress score and cumulative GPA after their first year of being in the DPT program.

Discussion: There was a significant relationship between stress and academic success but due to the overall low PSS scores of PT students and conflicting results in other studies, the meaning of the relationship is unclear. There was no significant relationship between grit and academic success. There were limitations with using the Grit-O scale and PSS and concerns about using Duckworth's grit scale as a predictor of academic success

CHAPTER ONE

BACKGROUND AND PURPOSE

Grit and Perceived Stress as Predictors of Academic Success in First and Second Year Doctor of Physical Therapy Students

Health care professionals are drawn to their professions because of a desire to help and care for people. In a graduate setting, students striving to be medical doctors, physical therapists, physician's assistants, or occupational therapists may be driven by their desire to help people but that alone is not enough to be successful. There are characteristics students must possess to be accepted into their programs and to excel in their chosen profession. During the admission process, there are many tangible requirements that students must meet including a science and cumulative grade point average (GPA), standardized testing such as the Graduate Record Examinations (GRE) or Medical College Admission Test (MCAT), a minimum number of observation hours in their field, essays, and other variable requirements. These requirements are put in place so faculty can determine which individuals will be good candidates to not only perform well in their program but pass a national licensure examination following graduation.¹ However, there are intangible factors that play a role in students' success including stress levels and grit which are more difficult to quantify but may be significant predictors.

As health care in America has continued to evolve and disciplines such as physical therapy (PT) have increased their responsibilities, universities have had to adapt and expand their curriculum. These changes have included increasing the amount of knowledge and speed at which students must learn the material along with emphasizing clinical reasoning skills,

interpersonal communication, and commitment to lifelong learning.² As a result, research has found that students pursuing degrees in healthcare professions have a high level of perceived stress.² There is a relationship between stress levels and academic performance that indicates that stress may be a motivating factor for students to improve their academic performance up to a certain point. A moderate level of stress can lead to an increased level of academic performance but a high level of stress has been associated with a decrease in academic performance.² A common method of evaluating stress in students is through the use of the Perceived Stress Scale (PSS).³ This self-report scale includes ten questions that assess how stressful people perceive their current life situation along with their current ability to cope with their life stressors. The 10 item PSS has been shown to have high internal consistency and good convergent and divergent validity when used with students.⁴ In a study that looked at perceived stress levels in a PT master's program, researchers found PT students had higher stress levels than other college students.⁵ There has been limited research conducted on PT students and their perceived levels of stress since then, particularly as the profession has shifted from a master's degree to a doctorate degree.

A characteristic that has gained attention in recent years as a potential predictor of success is grit. Grit has been defined as "a combination of passion and perseverance" for long term goals".^{6 p.8} Although the body of evidence within healthcare professions is relatively weak and with conflicting results, grit has been shown to correlate with academic success.⁷ In a study done on grit and the performance of medical students, the authors found that grit scores were not correlated with the assessment of basic medical knowledge, but instead they were related to

assessments of the clinical application of the basic knowledge.⁸ These findings can be relevant to the current researchers due to the similarities between physical therapy programs and medical programs. An important similarity is that students in both programs may be able to learn and memorize information easily, which may not need the same level of grit. However, a high level of perseverance may be needed when working directly with clinical scenarios because the students need to apply their knowledge which is often more challenging and requires more practice than memorizing information. Furthermore, other studies done among medical residents found that those with lower levels of grit were more likely to consider leaving their residency program, report burnout during residency, and had lower levels of psychological well-being.⁹ Thus, it would be worth looking into personality factors such as grit as a predictor of who will be more successful among PT students when taking the licensure exam and when providing direct patient care.

In the previous year, research was done to identify if there are any correlations between grit, academic success, and demographics within the first and second year students of the Doctor of Physical Therapy (DPT) program at the University of North Dakota (UND). To measure grit among this population, researchers used the 12-Item Grit Scale Survey (Grit-O) developed by Angela Duckworth.¹⁰ Researchers found no correlation between grit score, age, and GPA scores of first and second year physical therapy students.¹⁰ Researchers speculated that other factors of mental health status including stress, anxiety and depression may have a possible effect on grit scores. Furthermore, researchers determined that the instrument used to measure grit could be shortened and improved upon.¹⁰ They indicated that the new 8-item Grit scale (Grit-S) has been

shown by Duckworth and Quinn to be psychometrically stronger than the 12 item Grit-O scale, along with the efficiency noted with the Grit-S scale since it contains four less questions.¹⁰

Current researchers chose to continue to use the 12 item Grit-O scale to allow for comparison between previous results and the data collected in the current study.

In this study, the Grit-O scale will be used to measure grit among current first year DPT students at UND. In addition, an aspect of mental health that may affect academic success includes perceived stress levels which will be measured in the DPT student population using the PSS. The purpose of the study is to identify any correlations between grit scores, perceived stress levels, academic success (GPA), and demographics (age) among DPT students at UND. This pilot study will be used to inform a later longitudinal study, on an informed volunteer basis, with incoming DPT and doctor of occupational therapy students to the two respective programs. This study was designed to study the relationship of grit to the student physical therapist and academic achievement, the possible effects on retention, and to determine whether the Grit-O scale is a valid and reliable way to help students and programs identify issues with mental health and grit within DPT students.

CHAPTER TWO

METHODS

Participants

The grit survey was completed by 49 first year PT students at UND whose ages ranged from 21 years to 30 years old. The first year class was comprised of 11 male students and 38 female students. Inclusion criteria included informed consent and enrollment in the DPT program as a first or second year student at UND during 2019.

Study Design

The current study is a continuation of a longitudinal study at UND looking at a relationship between grit scores and academic success in first and second year PT students. In total, 154 PT students at UND completed the grit survey including 52 second year PT students and 102 first year students. The perceived stress scale was added to determine if there is a relationship between academic success, grit, and perceived stress. Since the PSS was an addition to the longitudinal study on grit and academic success, it was only completed by the 49 first year PT students surveyed this year. The 12 item Grit-O scale developed by Angela Duckworth was administered along with the 10 item PSS scale developed by Sheldon Cohen (See APPENDIX A).^{11, 12} Prior to beginning the study, the Institutional Review Board (IRB) at UND reviewed and approved the study design proposed by investigators (APPENDIX B).

Procedure

The surveys were given to current first year students at the University of North Dakota by a UND physical therapy faculty member, who was the primary investigator (PI), and two student researchers. Along with the two surveys, all first year participants were given a document that explained how their results were going to be used and which factors would be reviewed by the researchers. The participants were able to review the document and gave consent to participate in the study by completing and returning their surveys to the UND physical therapy faculty member. By consenting to participate in the study, first year students gave permission to have their GPA and demographics collected from a database by the primary investigator, who was not blinded. All forms were collected by the UND physical therapy faculty member who coded the surveys numerically to protect personal information and ensure confidentiality and anonymity while student researchers performed data collection. Data from the current second year students' Grit-O scale had been collected in 2018 following the same procedure and was approved to use in the current study.

After the surveys were coded, student researchers entered Grit-O and PSS scores into an Excel spreadsheet. The spreadsheet contained the numerically coded numbers for the first year students along with their year in the DPT program, gender, birthdate, and GPA data. The 12 items on the Grit-O scale and the 10 items on the PSS were scored independently by each student researcher and reviewed by the other student researcher for accuracy. Upon completion of scoring the two surveys, each item on the Grit-O scale and PSS were entered into the spreadsheet

on the coded row that correlated with the students' identities and checked for accuracy by another researcher.

Data Analysis

Grit-O and PSS scores from completed surveys were then used to compile information on physical therapy students' ability to manage stress and have passion and perseverance for their long term goals. Comparison of this compiled information to demographics and student performance, as well as predicting students' academic outcomes followed. This process was completed using IBM SPSS Statistics for Windows, version 25.0 software.¹³

CHAPTER THREE

RESULTS

Data was collected from current first year students and was analyzed using both parametric and nonparametric measures. For this group of students (n=49), there were no significant correlations found between grit scores, age, science GPA and cumulative GPA prior to admission in the DPT program at UND, or cumulative first year graduate GPA. Seventy-three percent of the students' overall grit score was at or above 3.66. The mean overall grit score for this group was 3.85 +/- .393, with a minimum score of 1 meaning not gritty at all and a maximum score of 5 meaning extremely gritty. The median grit score was 3.91 (interquartile range is from 2.58- 4.50) as shown in Figure 1 below. This year, an addition to the current longitudinal study was the PSS. Data analysis tools were also used to compare stress scores with grit scores, age, and GPAs. The mean overall stress score for this group was 15.76 +/- 6.62, with a score of 0 indicating no perceived stress and a score of 40 being the highest level of perceived stress. The median score for the current first year PT students was 16.00 (interquartile range is from 6-30) as depicted in Figure 2 below.

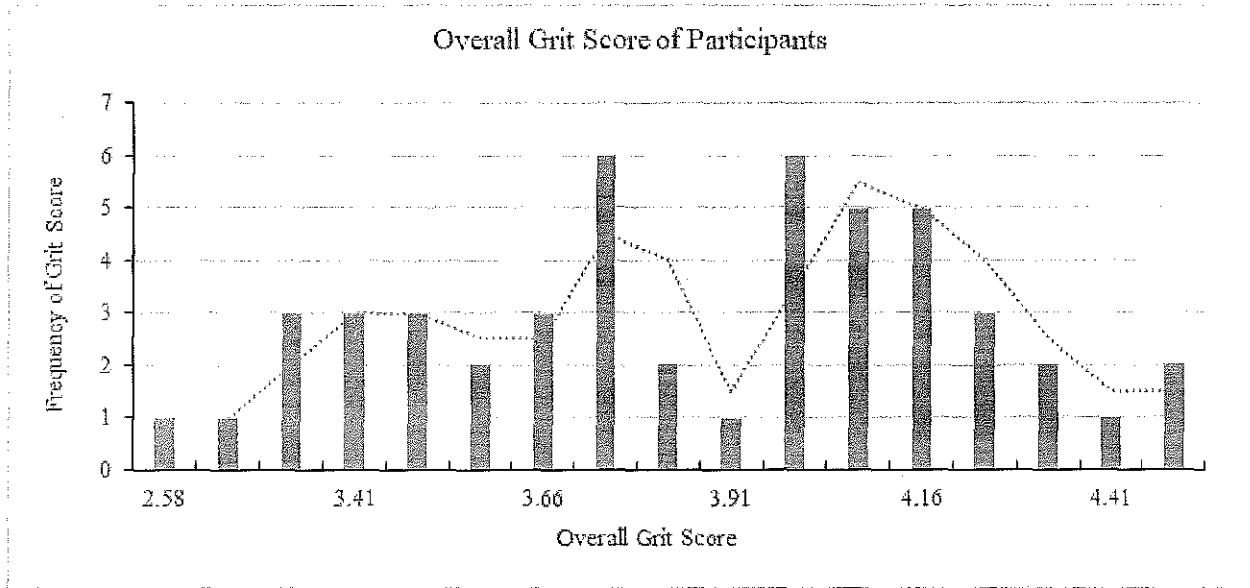


Figure 1. Frequency of overall grit scores of current first year students (n=49)

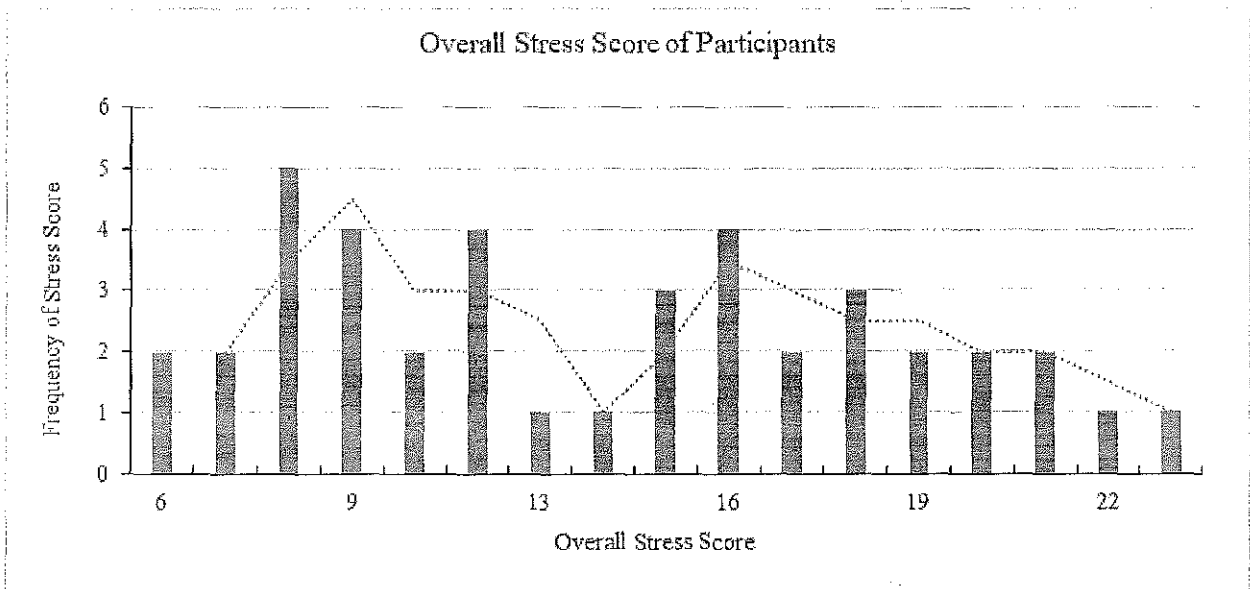


Figure 2. Frequency of overall stress scores of current first year students (n=49)

For analysis of any correlation between grit scores, age, and GPAs, data collected from current first year students of DPT program was added to data collected in the previous study.¹⁰ All three groups of DPT students were combined in one cohort (n=154) and overall data was analyzed using Pearson Correlation and Spearman's Rho testing. The results from analyzing all three groups, using the variables of overall Grit scores, age, and GPAs are depicted on Table 1. An alpha level of .05 was used. Neither the Pearson correlation nor Spearman Rho techniques found significant correlation between grit scores and the other factors when combining all three groups.

In Table 2, Pearson correlation and Spearman Rho techniques were used to compare overall stress scores to GPA and grit scores among current first year students only (n=49). No correlation was found between stress score, age, grit score, or GPA at admission into the program. However, significant correlation was found with both Pearson Correlation and Spearman's Rho testing when comparing stress scores and cumulative GPA after year one of the DPT program for this group.

Table 1. Correlations between Overall Grit Score and Age, Science & Cumulative GPAs at Admission, Year 1 & 2 Cumulative GPAs of DPT Program for all Students

Test			Age in yrs	SGPA Admit	CGPA Admit	CGPA Yr 1	CGPA Yr 2
Pearson Correlation	Overall Grit Score	r	.038	.041	.009	.129	.026
		n	154	154	154	154	52
		p	.644	.610	.916	.111	.857
Spearman rho	Overall Grit Score	r	-.011	.044	-.003	.115	.061
		n	154	154	154	154	52
		p	.889	.589	.975	.157	.668

Table 2. Correlations between Overall Stress Scores and Age, Science & Cumulative GPAs at Admission, Year 1 Cumulative GPA of DPT Program, and Overall Grit Scores for Current First Year Students (n=49)

Test			Age in yrs	SGPA Admit	CGPA Admit	CGPA Yr 1	Overall Grit Score
Pearson Correlation	Overall <u>Stress</u> Score	r	-0.002	-0.196	.044	-0.472	-0.259
		n	49	49	49	49	49
		p	.988	.177	.762	.001	.073
Spearman rho	Overall <u>Stress</u> Score	r	.171	-0.189	-0.053	-0.447	-0.162
		n	49	49	49	49	49
		p	.240	.193	.715	.001	.266

CHAPTER FOUR

DISCUSSION AND CONCLUSION

The goal of this longitudinal study was to identify any relationship between grit scores, perceived stress levels, and academic performance (GPA) among DPT students at UND.

Academic success, comprising of undergraduate science GPA, cumulative GPA at the time of admittance into the program, and cumulative year-one and year-two GPAs, was compared to grit scores. We had anticipated that first year PT students would have grit scores of 4.0 or higher due to the rigorous academic requirements needed to apply to a DPT program which would correlate with their undergraduate science and cumulative GPAs. Instead, the results indicated there were no statistically significant correlations between academic success and grit scores as indicated by varying levels of grit among first year PT students ranging from 2.58 to 4.50 with a median of 3.91.

Other studies that assessed grit in students entering a healthcare profession found varied results, similar to this study. One study conducted on medical students indicated that those with lower grit scores were more likely to consider leaving their residency, reported more residency burnout and had lower levels of psychological well-being.⁹ A different study looked at grit and performance of medical students and found no correlation between grit and basic medical knowledge.⁸ The researchers hypothesized that perhaps the lack of correlation was because the characteristics of learning basic medical knowledge were different from applying medical knowledge in a clinical setting.⁸ During the first year of the UND PT program, there is more emphasis on learning foundational knowledge including anatomy, neuroscience, and basic tenets

of PT practice like manual muscle testing, goniometric measurements, and special tests. First year PT students begin to apply their newly acquired knowledge later in their first year through case studies and practical examinations with community patients. However, the application of students' knowledge is not consistently tested until they begin to see patients five days a week during their nine week clinical experiences in inpatient care (i.e acute care, long term care) and outpatient orthopedics. These experiences take place during the second year of the UND PT program. Since the grit surveys were given to PT students at the beginning of their year one summer semester, they may not have had their grit tested while learning the foundational knowledge of the DPT program. Perhaps, in future studies, the parameters should be changed to look at PT student performance on their clinical experiences and see if there is a correlation between clinical performance and grit scores.

Prior researchers found no correlation between academic success and grit in first and second year PT students. In the current study, the PSS was added to determine if there was any relationship between stress, grit, and academic success. The current first year PT students at UND were the only students to complete the stress scale since it was a recent addition to the study. The data indicated that there was no relationship between perceived stress scores and grit scores or between perceived stress scores and academic success prior to admittance into the UND PT program. There was statistical significance between stress scores and cumulative GPA after completion of the first year of the DPT program. Although there was a relationship between stress and academic success during the first year of the PT program, stress scores were proportional to what would be expected in the general population. The majority of PT students

had moderate stress scores (median = 15.46) and a few students had very low scores of 6/40 or high scores of 30/40. Although it was speculated that mental health factors such as stress and anxiety may have an effect on grit and academic success for physical therapy students, the current findings did not reveal a clear relationship.

Other studies completed with PT students have not found a relationship between stress and academic success. In a study completed on undergraduate PT students in Israel, researchers looked at the relationship between academic performance, perceived stress, demographics, and contributors to stress. The purpose of the study was to determine if admission criteria for PT programs needed to be updated. There were 118 physical therapy students who participated in this study and completed a variety of questionnaires including the 10 item PSS.¹⁴ The researchers discovered there was no correlation between perceived stress and academic performance for the PT students in the study.¹⁴ The results of that study conflict with the results of the current study and make it difficult to discern if there is a relationship between perceived stress and academic performance. There is an ongoing discussion in the physical therapy education realm about whether current admission criteria provide an accurate picture of students who will succeed in a rigorous program. The data from these two studies indicates that although mental health should be addressed in some way, further research on perceived stress levels must be completed to determine if it is an appropriate predictor of academic success.

In an interdisciplinary study, researchers looked at perceived stress levels in physical therapy, nutrition sciences, and communication disorder students by using the 10 item PSS. The results of that study indicated that perceived stress levels were similar among the three

disciplines.² Similar results from multiple health care disciplines illustrate that students believe they are under significant stress but that it is not a unique experience. There is ample evidence that students' mental health is challenged while pursuing degrees in health care but since it is pervasive, it cannot be assumed that it is originating solely from challenging academic material. When looking at the debate about admission criteria in physical therapy education related to addressing mental health factors, it is clear that further research needs to be conducted to provide satisfactory answers.

There were limitations that may have affected the results of this study including the validity of the 10 item perceived stress scale. The 10 item PSS has shown validity in multiple populations but has been criticized for its global nature.² It is possible that the PT students in this study had sources of stress that were not specifically addressed by the 10 item PSS. In future studies, using multiple questionnaires may provide a more accurate representation of how stress affects PT students.

Another limitation is the 12 item grit scale developed by Angela Duckworth. As noted at the beginning of this study, the 8-item Grit scale (Grit-S) has been shown by Duckworth and Quinn to be psychometrically stronger than the 12 item Grit-O scale. For the purpose of comparison, the 12 item Grit-O scale was used but the 8 item Grit scale has better reliability and validity.¹⁰

A concern with this study was the predictive value of grit. In recent years, literature has produced mixed results about the impact of grit as a predictor of performance and retention. Duckworth defines grit as “a combination of passion and perseverance for long term goals.”^{6 p.8}

In a meta-analysis looking at grit studies, multiple limitations associated with the grit scales developed by Duckworth were mentioned. Researchers found that grit was only moderately related to performance and retention in the 88 studies they looked at with over 66,000 participants.¹⁵ While reviewing the literature related to grit, they noted that “high levels of grit may be most useful when the task is difficult but well defined”.^{15 p.493} When relating to the DPT curriculum, grit may be an accurate predictor of performance when learning foundational knowledge like anatomy but not when applying knowledge to topics that are ambiguous such as deciding appropriate treatment progression for patients. Researchers hypothesized that grit may not predict performance in novel or complex situations where multiple attempts and creativity are needed to reach a solution.¹⁶ In those cases, the perseverance component of grit may prove to be counterproductive and prevent students from pursuing different solutions when struggling with a concept or assignment.

The variability of grit scores in UND PT students may be more predictive of their willingness to problem solve and find creative solutions to problems than their academic success. As indicated by an average cumulative GPA of 3.71 at the end of the first year, students were academically successful despite the variety of grit scores. An important aspect of becoming a successful PT is the ability to be flexible and find creative solutions while working with patients. This study found no significant relationship between grit and academic performance in DPT students which indicates that grit may not be the most appropriate variable to assess academic performance. Literature has indicated that variables such as cognitive ability, academic adjustment, and study habits and skills are better predictors of academic performance and

retention.¹⁵ Future research studies looking at predictors of academic performance in PT students may choose to explore relationships between those variables instead of grit.

Recommendations for future studies are to include multiple stress scales and to reconsider if the grit scale is an appropriate predictor of academic performance and if so, how it should be utilized. Current literature regarding students pursuing degrees in health care professions has produced mixed results about what areas of academic success may be predicted by grit. Grit may provide insight into aspects of the DPT curriculum like academic success while on clinical experiences or while learning foundational knowledge. Further research needs to be conducted about grit in relation to PT students' academic success but based on the results of this study and other research conducted about grit, it may not be a reliable predictor of overall academic performance.

There was no relationship between grit scores and academic success for first or second year PT students at UND. Research completed with medical students produced varied results with researchers finding no relationship between grit scores and learning foundational knowledge in medical school. However, there was a relationship between grit scores and applying medical knowledge in a clinical setting. Future studies looking at grit in PT students should consider examining the relationship between PT students' performance on their clinical experiences and grit as this may provide more insight into the relationship of grit and academic success in PT students. The PSS was an addition to the current study and found statistical significance between PT students' perceived stress and the cumulative year one GPAs for first year PT students. The PSS scores were proportional to what would be expected in the general

population indicating that although there was statistical significance, the extent of the relationship was unclear. Other studies that used the PSS with PT students did not find statistical significance illustrating that further research must be completed to determine if the PSS is an appropriate predictor of academic success. A concern with this study was the predictive nature of the 12 item grit scale created by Duckworth since literature has found it to be only a moderate predictor of academic performance and retention. Limitations of this study were the global nature of the PSS and the psychometric properties of the 12 item Grit-O scale. Future studies should consider including multiple stress scales and reconsider if the grit scale is an appropriate predictor of academic performance and if so, how it should be utilized.

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APPENDIX A

12- Item Grit Scale

Directions for taking the Grit Scale: Here are a number of statements that may or may not apply to you. For the most accurate score, when responding, think of how you compare to most people –not just the people you know well, but most people in the world. There are no right or wrong answer, so just answer honestly!

1. I have overcome setbacks to conquer an important challenge.
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
2. New ideas and projects sometimes distract me from previous ones.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
3. My interests change from year to year.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
4. Setbacks don't discourage me.
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
5. I have been obsessed with a certain idea or project for a short time but later lost interest.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all

6. I am a hard worker.
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
7. I often set a goal but later choose to pursue a different one.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
8. I have difficulty maintaining my focus on projects that take more than a few months to complete.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
9. I finish whatever I begin.
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
10. I have achieved a goal that took years of work.
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all
11. I become interested in new pursuits every few months.*
 1. Very much like me
 2. Mostly like me
 3. Somewhat like me
 4. Not much like me
 5. Not like me at all

12. I am diligent.

1. Very much like me
2. Mostly like me
3. Somewhat like me
4. Not much like me
5. Not like me at all

Scoring:

1. For questions 1, 4, 6, 9, 10 and 12 assign the following points:

5 = Very much like me

4 = Mostly like me

3 = Somewhat like me

2 = Not much like me

1 = Not like me at all

2. For questions 2, 3, 5, 7, 8 and 11 assign the following points:

1 = Very much like me

2 = Mostly like me

3 = Somewhat like me

4 = Not much like me

5 = Not like me at all

Add up all the points and divided by 12. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 9, 1087-1101.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (Circle): M F Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

- | | | | | | |
|--|---|---|---|---|---|
| 1. In the last month, how often have you been upset because of something that happened unexpectedly?..... | 0 | 1 | 2 | 3 | 4 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life?..... | 0 | 1 | 2 | 3 | 4 |
| 3. In the last month, how often have you felt nervous and “stressed”? | 0 | 1 | 2 | 3 | 4 |
| 4. In the last month, how often have you felt confident about your ability to handle your personal problems? | 0 | 1 | 2 | 3 | 4 |
| 5. In the last month, how often have you felt that things were going your way?..... | 0 | 1 | 2 | 3 | 4 |
| 6. In the last month, how often have you found that you could not cope with all the things that you had to do? | 0 | 1 | 2 | 3 | 4 |
| 7. In the last month, how often have you been able to control irritations in your life?..... | 0 | 1 | 2 | 3 | 4 |
| 8. In the last month, how often have you felt that you were on top of things? | 0 | 1 | 2 | 3 | 4 |
| 9. In the last month, how often have you been angered because of things that were outside of your control?..... | 0 | 1 | 2 | 3 | 4 |
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | 0 | 1 | 2 | 3 | 4 |

Scoring:

PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items.

The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396.

Cohen, S. and Williamson, G. Perceived Stress in a Probability Sample of the United States. Spacapan, S. and Oskamp, S. (Eds.) *The Social Psychology of Health*. Newbury Park, CA: Sage, 1988.

APPENDIX B

Flom-Meland, Cindy

From: Bowles, Michelle
Sent: Thursday, April 18, 2019 4:27 PM
To: Flom-Meland, Cindy
Subject: UND IRB protocol change approval with stamped consent
Attachments: 2182_001.pdf



UND.edu

Institutional Review Board

Tech Accelerator, Suite 2050
4201 James Ray Drive Stop 7134
Grand Forks, ND 58202-7134
Phone: 701.777.4279
Fax: 701.777.2193
UND.irm@UND.edu

April 18, 2019

Principal Investigator:	Cindy Flom-Meland, PT, PhD, NCS
Project Title:	GRIT of 1st and 2nd Year Physical Therapy Students - A Pilot Study
IRB Project Number:	IRB-201805-310
Project Review Level:	Exempt 2
Date of IRB Approval:	April 18, 2019
Expiration Date of This Approval:	May 13, 2021

The Protocol Change Form and all included documentation for the above-referenced project have been reviewed and approved via the procedures of the University of North Dakota Institutional Review Board.

Attached is your original informed consent statement that has been stamped with the UND IRB approval and expiration dates. Please maintain this original on file. You must use this original, stamped consent form to make copies for participants. No other consent form should be used, and no signatures should be obtained from participants. Each participant must be given a copy of the informed consent statement to keep for their records.

You have approval for this project through the above-listed expiration date. When this research is completed, please submit a termination form to the IRB.

The forms to assist you in filing your project termination, adverse event/unanticipated problem, protocol change, etc. may be accessed on the IRB website: <http://und.edu/research/resources/human-subjects/>

Sincerely,

Michelle L. Bowles, M.P.A., CIP
IRB Manager

Michelle L. Bowles, M.P.A., CIP
Manager, Institutional Review Board

University of North Dakota

Tech Accelerator, Suite 2050
4201 James Ray Drive Stop 7134
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F: 701.777.2193

Michelle.Bowles@UND.edu

UND.edu/research/resources/human-subjects/

The preceding e-mail message (including any attachments) contains information that may be confidential or constitute non-public information. It is intended to be conveyed only to the designated recipient(s). If you are not an intended recipient of this message, please notify the sender by replying to this message and then deleting it from your system. Use, dissemination, distribution, or reproduction of this message by unintended recipients is not authorized and may be unlawful.

PROTOCOL CHANGE FORM
UNIVERSITY OF NORTH DAKOTA INSTITUTIONAL REVIEW BOARD

Please complete this form and attach revised research documents for any proposed change to your protocol, consent forms, or any supportive materials (such as advertisements, questionnaires, surveys, etc.). All changes must be highlighted. Any proposed change in protocol affecting human participants must be reviewed and approved by the IRB prior to implementation, except where an immediate change is necessary to eliminate a hazard to the participant.

Principal Investigator: Cindy Flom-Meland

Telephone: 777-4130

E-mail Address: cindy.flom.meland@und.edu

Complete Mailing Address: SMHS 1301 No. Columbia Rd stop 9037, Depart of PT suite 321, Grand Forks, ND 58202-9037

School/College: SMHS

Department: PT

Project Title: GRIT of 1st and 2nd Year Physical Therapy Students – A Pilot Study

Proposal Number: IRB-201805-310

Approval Date: 5-14-2018

THE CURRENT STATUS OF THE PROJECT IS (Check one)

Project currently in progress. Number of subjects enrolled is: 105 have completed; adding up to 50 more

Project not yet started. No subjects enrolled.

Project closed to subject entry.

1. Briefly describe and explain the reason for the revision or amendment and the justification for the change. Include a copy of affected protocol pages and consent form with specific changes highlighted.

We would like to survey one additional cohort of students to add to our sample size. We would also like to add one additional survey, The Perceived Stress Scale. This scale is a 10-item questionnaire intended to measure stress. We would like to see if there is a relationship between the GRIT scale and the Perceived Stress Scale with this last cohort of students.

2. Does the change affect the study or subject participation (procedures, risks, costs, etc.)? Yes No

Please explain: There is no change in risk with the protocol change beyond those experienced in everyday life.

3. Does the change affect the consent document? Yes No

If yes, include the revised consent form(s) with the changes highlighted, and a clean copy of the revised consent form(s).

By signing below, you are verifying that the information provided in the Human Subjects Review Form and attached information is accurate and that the project will be completed as indicated.

Signatures:

Cindy Flom-Meland
Principal Investigator

4-16-19
Date:

Student Adviser (if applicable)

Date:

GRIT of 1st and 2nd Year Physical Therapy Students – a Pilot Study

5. In non-technical language, describe the purpose of the study and state the rationale for this research.

The purpose of this pilot study is to investigate whether or not there is a relationship between a grit score and academic success in a professional physical therapy program. The results of this study will inform a larger longitudinal study that will look at the same items, in addition to other information, over the course of health science students as they complete their professional programs.

Mental health challenges have become a topic of focus for universities and society in general as adolescent mental health has declined significantly since the 1980s.¹ According to the American College Health Association-National College Health Assessment data report, a high number of graduate and professional students live with a variety of mental health conditions.² Graduate programs have more students with mental health conditions than ever before. Healthcare professionals work in high stake situations that will be stressful. A mechanism to nurture and measure resiliency is an important consideration for physical therapy programs to consider. Grit is a non-cognitive trait that has been defined as “perseverance and passion for long-term goals”^{3p.1087} In 2007, Duckworth et al,³ developed a scale to measure *grit* and has found evidence that suggests that grit may be as essential to high achievement as intelligence. The results of this pilot study and later expanded study, may inform professional programs in regard to the potential need to foster the development of resiliency.

6. In non-technical language, describe the study procedures.

This study will be a survey distributed to first and second year students currently enrolled in the physical therapy program at UND. There are 105 students that will be invited to participate in the study. The surveys will be made available to each co-hort of students the first day of our summer session. In the spring of 2019, a new cohort of first year students will be invited to participate in the study. The surveys will be made available at the end of the spring semester. The survey will be scored and data will be analyzed using an SPSS output.

The results of the survey will be utilized to inform a longitudinal study of GRIT of incoming physical therapy students this fall and potentially other health science students from other programs at UND. The results may also be used for a poster and/or platform presentation. No compensation for participation will be provided. We will provide a summary of abbreviated results of our study to participating students upon their request. The expected participation time will be 5-7 minutes.

7. Where will the research be conducted?

The research will be conducted in the SMHS within the Department of Physical Therapy.

8. Describe what data will be recorded.

We will request the participants give age, gender, and year in school. We will obtain GPA from the Chair of the Department. The participants will be asked to answer questions related to grit (see survey) and perceived stress (see survey).

9. How will data be recorded and stored (that is will it be coded, anonymous, etc.)?

The surveys will be coded with a number and only the PI will have the list of which student each individual number belongs to; this information will not be available to student researchers. Participant GPA will be requested from the Chair of the department and will be coded to the correct student as per the survey coding. Individual GPAs will only be available to the PI; student researchers will not have access to this individual information. We will be reporting the results in aggregate. The only people with access to the data will be the faculty and students conducting the research and a hard copy of the responses will be stored in a locked cabinet separate from the demographics in the UND Physical Therapy department. There will also be an electronic copy of the results stored on several password-protected computers. Access to these computers will be limited to the students and faculty conducting this research.

10. Describe procedures you will implement to protect confidentiality of data collected from participants and privacy of participants when participating in research activities.

The surveys will be coded with a number and only the PI will have the list of which student each individual number belongs to. The GPA data will also be coded to the individual student; this information will only be available to the PI; student researchers will not have access to this information. We will be reporting the responses in aggregate with no ability to discern individual responses. We will be storing the hard copies of the data in locked file cabinets, and the electronic data on password protected computers with access only granted to students and faculty leading the research.

11. Describe the nature of the subject population and the estimated number of subjects.

For the pilot study, the current first and second year UND physical therapy students will be recruited to participate in the study. The estimated number of subjects is 105. One additional cohort of first year UND physical therapy students will be recruited spring 2019 with an additional 50 students.

References:

1. Twenge JM, Gentile B, DeWall CN, Ma D, Lacefield K & Schurtz DR (2010). Birth cohort increases in psychopathology among young Americans, 1938-2007: a cross-temporal meta-analysis of the MMPI. *Clinical Psychology Review*, 30(2), 145-154.
2. American College Health Association National College Health Assessment: http://www.acha-ncha.org/docs/NCHA-II_SPRING_2017_GRADUATE_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf
3. Duckworth AL, Peterson C, Matthews MD, & Kelly DR (2007). Grit: Perseverance and Passion for Long-Term Goals. *J Personality & Soc Psych*, 92(6), 1087-1101.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (Circle): **M** **F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

- | | | | | | |
|--|---|---|---|---|---|
| 1. In the last month, how often have you been upset because of something that happened unexpectedly? | 0 | 1 | 2 | 3 | 4 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life? | 0 | 1 | 2 | 3 | 4 |
| 3. In the last month, how often have you felt nervous and "stressed"? | 0 | 1 | 2 | 3 | 4 |
| 4. In the last month, how often have you felt confident about your ability to handle your personal problems? | 0 | 1 | 2 | 3 | 4 |
| 5. In the last month, how often have you felt that things were going your way? | 0 | 1 | 2 | 3 | 4 |
| 6. In the last month, how often have you found that you could not cope with all the things that you had to do? | 0 | 1 | 2 | 3 | 4 |
| 7. In the last month, how often have you been able to control irritations in your life? | 0 | 1 | 2 | 3 | 4 |
| 8. In the last month, how often have you felt that you were on top of things? .. | 0 | 1 | 2 | 3 | 4 |
| 9. In the last month, how often have you been angered because of things that were outside of your control? | 0 | 1 | 2 | 3 | 4 |
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | 0 | 1 | 2 | 3 | 4 |

Please feel free to use the *Perceived Stress Scale* for your research.

Mind Garden, Inc.

info@mindgarden.com

www.mindgarden.com

References

The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396.

Cohen, S. and Williamson, G. Perceived Stress in a Probability Sample of the United States. Spacapan, S. and Oskamp, S. (Eds.) *The Social Psychology of Health*. Newbury Park, CA: Sage, 1988.

**UNIVERSITY OF NORTH DAKOTA
Institutional Review Board
Informed Consent Statement**

Title of Project: GRIT of 1st and 2nd Year Physical Therapy Students – a Pilot Study

Principal Investigator: Cindy Flom-Meland, 777-4130, cindy.flom.meland@und.edu

Co-Investigator(s): NA

Advisor: NA

Purpose of the Study:

The purpose of this research study is to explore whether or not there is a relationship between the level of GRIT and academic retention and success.

Procedures to be followed:

You will be asked to complete a 12-question GRIT survey and a 10-question perceived stress survey.

Risks:

There are no risks in participating in this research beyond those experienced in everyday life.

Benefits:

- *This research might provide a better understanding of how GRIT affects college students and you may learn something about yourself.*

Duration:

It will take about 5 minutes to complete the questions.

Statement of Confidentiality:

The survey does not ask for any information that would identify who the responses belong to. The surveys will be coded with a number and only the Principal Investigator (PI) will know whom the code belongs to. This will allow the PI to obtain GPA information and record demographic data. The demographic data will be pulled from our database and GPA information will be obtained from the Chair of the department. Therefore, your responses are recorded anonymously. If this research is published, no information that would identify you will be included since your name is in no way linked to your responses.

Right to Ask Questions:

The researchers conducting this study are *Cindy Flom-Meland, PI, Jamal Ibnelhaj and Abigail Thomas*. You may ask any questions you have now. If you later have questions, concerns, or complaints about the research please contact Cindy Flom-Meland at 701-777-4130.

If you have questions regarding your rights as a research subject, you may contact The University of North Dakota Institutional Review Board at (701) 777-4279. You may also call this number with problems,

complaints, or concerns about the research. Please call this number if you cannot reach research staff, or you wish to talk with someone who is an informed individual who is independent of the research team.

General information about being a research subject can be found on the Institutional Review Board website “Information for Research Participants” <http://und.edu/research/resources/human-subjects/research-participants.cfm>

Compensation:

You will not receive compensation for your participation.

Voluntary Participation:

You do not have to participate in this research. You can stop your participation at any time. You may refuse to participate or choose to discontinue participation at any time without losing any benefits to which you are otherwise entitled.

You do not have to answer any questions you do not want to answer.

You must be 18 years of age older to consent to participate in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to participate in the research.

Please keep this form for your records or future reference.

**UNIVERSITY OF NORTH DAKOTA
Institutional Review Board
Informed Consent Statement**

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**UNIVERSITY OF NORTH DAKOTA
INSTITUTIONAL REVIEW BOARD
KEY PERSONNEL LISTING**

	Names of Research Personnel		Position (select from drop-down menu)	Highest Academic Degree (High School, B.S., M.A., Ph.D., M.D., etc.)	Responsibilities (check all that apply)				
	First Name	Last Name			Consent Subjects	Recruit Subjects	Research Design	Intervention	Data Analysis
1	Cindy	Flom-Meland	Faculty	PhD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Jamal	Ibnelhaj	Graduate student	B.S.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Abigail	Thomas	Graduate student	B.S.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* *Attach proof of education in human subjects research for all non-UND personnel*

Revised 03/15/2017

abi**STUDENT RESEARCHERS:** As of June 4, 1997 (based on the recommendation of UND Legal Counsel) the University of North Dakota IRB is unable to approve your project unless the following "Student Consent to Release of Educational Record" is signed and included with your IRB application.

STUDENT CONSENT TO RELEASE OF EDUCATIONAL RECORD¹

Pursuant to the Family Educational Rights and Privacy Act of 1974, I hereby consent to the Institutional Review Board's access to those portions of my educational record which involve research that I wish to conduct under the Board's auspices. I understand that the Board may need to review my study data based on a question from a participant or under a random audit. The title of the study to which this release pertains is GRIT of
1st and 2nd Year Physical Therapy Students - A Pilot Study

I understand that such information concerning my educational record will not be released except on the condition that the Institutional Review Board will not permit any other party to have access to such information without my written consent. I also understand that this policy will be explained to those persons requesting any educational information and that this release will be kept with the study documentation.

0999840
ID #

Abigail Thomas
Printed Name

4/17/19
Date

Abigail Thomas
Signature of Student Researcher

¹Consent required by 20 U.S.C. 1232g.

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1203802
ID #

Jamal Ibnelhaj
Printed Name

4/17/19
Date

Jamal Ibnelhaj
Signature of Student Researcher

¹Consent required by 20 U.S.C. 1232g.