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THRIVE STUDY: EFFECTS OF RESILIENCE AND GRIT ON MENTAL HEALTH  
OUTCOMES IN COLLEGE STUDENTS

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## ABSTRACT

The high prevalence of anxiety, depression, and stress in the college student population is a concerning national trend that may be due to the novel stressors the transition to college life presents. Growing research suggests that there may be protective coping resources against these mental health outcomes. Grit and resilience were explored in this study based on new research linking them to positive mental health and academic outcomes, respectively. Expected findings included positive correlations between grit and resilience, positive correlations between these traits and grade point average (GPA), and negative correlations between grit and resilience with anxiety, depression, and stress. The THRIVE Study surveyed 217 18-24 year-old students currently attending 4-year universities. Study findings showed that grit and resilience were significantly and positively correlated to each other [ $r = +0.45, p < 0.05$ ], while neither grit nor resilience was found to be positively correlated with GPA [Resilience:  $r = +0.07$ ; Grit:  $r = +0.05$ ]. Consistent with current trends, THRIVE participants reported clinically significant levels of anxiety and depression and elevated levels of stress. However, as expected, students with higher levels of resilience also reported significantly less anxiety [ $r = -0.54, p < 0.05$ ], depression [ $r = -0.47, p < 0.05$ ], and stress [ $r = -0.48, p < 0.05$ ]. Additionally, students with higher levels of grit had significantly less anxiety [ $r = -0.49, p < 0.05$ ], depression [ $r = -0.44, p < 0.05$ ], and stress [ $r = -0.39, p < 0.05$ ] as well. Analysis showed that students who had high levels of both grit and resilience displayed substantially, and clinically significantly, lower levels of anxiety, depression, and stress. This finding is new and suggests a deeper relationship between grit and resilience, especially relating to mental health outcomes, that requires future studies to elucidate.

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## Chapter 1

### INTRODUCTION

#### College as a Transitional Period

Attending a four-year college or university is something that has become the norm in the United States. Most first-year students are around 18 years old and are leaving home for the first time to live on their own in a community much unlike those found in the real world. Because of these and many other changes, the four years of college are a unique transitional period in the lives of young people. In this time period, new social support systems must be built in a novel environment. Studies have found that freshmen and sophomore students have higher stress reactions than more senior students, supporting the claim that the initial transition to college life itself creates a novel stressor that many students are not equipped to deal with properly (Mirsa & McKean, 2000). Among college students, females and non-athletes are particularly affected by the stresses of university life and they tend to become less likely to practice healthy behaviors (Hudd, Dumlao, Erdmann-Sager, Murray, Phan, et.al., 2000). These high levels of stress can lead to lower levels of self-esteem and a lower view of one's own health status (Mirsa & McKean, 2000).

Some of the main stressors faced by college students are academic and social factors. These stressors can stem from learning how to balance new demands of college on one's own while also maintaining academic standing, developing and sustaining new social networks, and figuring out how to select and reach a desired career goal (Hudd, Dumlao, Erdmann-Sager, Murray, Phan, et.al., 2000). Equally critical and demanding is learning how to adjust to the day-to-day responsibilities of independent adults, such as

cooking, cleaning, and doing laundry. These psychosocial and environmental changes can have vastly different impacts on different personality types while at university (Gladstone & Koenig, 1994).

The American Psychological Association (APA) conducted a study of 125,000 students from over 150 US colleges and universities and found that about a third of the sample had difficulty functioning due to depression, and almost half report overwhelming anxiety (Novotney, 2014). Additionally, over 30% of the students who have sought help from mental health services have considered suicide. The study reported a concerning upward trend and significant increase in these numbers over recent years (Novotney, 2014). Addressing stressors associated with college adjustment is critical and is becoming an urgent priority on many college campuses in the United States. Stress, anxiety, and depression levels are all positively correlated with illness incidence during these years as well (Harve, Bloomer & Kendall, 1994). Importantly, there also may be inherent factors that students possess to protect against these matters. These protective factors are the focus of emerging research on mental health outcomes in college students and of this thesis.

### Resilience

Resilience and grit are two potentially protective factors against mental health problems such as anxiety, depression, and stress. According to Connor and Davidson (2003), resilience, “may be viewed as a measure of stress coping ability and, as such, could be an important target of treatment in anxiety, depression, and stress reactions” (Connor & Davidson, 2003, pg. 76).



The literature regarding resilience covers a variety of related personal traits and health outcomes. Originally examined in children through longitudinal research, resilience was thought to be a phenomenon resulting from positive child adjustment to adversity (Wilmshurst, Peele & Wilmshurst, 2009). Research from the last twenty years has described resilience as a multidimensional trait that varies greatly within differing contexts. Essentially, resilience is associated with overcoming and adapting to internal and external stressors that disrupt regular life in a protective manner. Circumstances including trauma and post-traumatic stress disorder (PTSD) have been shown to be protected in individuals, to an extent, by this trait (Connor & Davidson, 2003). Developing research has broadened the scope of the subjects studied and the implications resilience has on health.

Individual and behavioral factors that contribute to resilience include risk and resulting positive adaptation, tenacity and persistence, emotional intelligence and stress tolerance, positive acceptance and self-control regarding change, and spirituality (Hartley 2011). More recent studies have linked resilience to positive mental health outcomes as well as academic performance. Viewing difficulties and stresses as challenges to overcome as well as staying committed to surmounting stressors are critical components of resilience that result in positive mental health outcomes, such as lower depression levels (Davidson, 2003). High levels of resilience are also correlated to positive academic outcomes, such as stronger undergraduate grade point averages (GPA's) as well.

### Grit

Angela Lee Duckworth, a pioneer in the grit and academic performance field, defines grit as trait-level perseverance and passion for long-term goals, things that seem

to be summed up by a combination of perseverance and consistency. Grit is, “not just resilience in the face of failure, but also having deep commitments that you remain loyal to over many years,” even with a lack of reward or positive reinforcement (Duckworth, Peterson, Matthews & Kelly, 2007, pg. 1087).

The Short Grit Scale (hereafter referred to as Grit-S) was developed in a series of six studies on West Point United States Military Academy cadets, Scripps National Spelling Bee finalists, and high-achieving grade school students as a more efficient version based on the original 12-item self-report measure of grit (known as Grit-O) (Duckworth & Quinn, 2009). The studies found that, of the original 12 traits, Consistency of Interest and Perseverance of Effort – sometimes just referred to as consistency and perseverance – are the most relevant first order factors of grit. Of all the Big Five personality traits, conscientiousness is also significantly associated with grit – the other four being extraversion, agreeableness, openness, and neuroticism (Duckworth & Quinn, 2009) (Weisskirch, 2016). There exists an inverse association between grit and the number of lifetime career changes a person makes, regardless of age. Grit-S scores were found to be better predictors of final round reached in the national spellings bee as well as retention to military programs when compared to traditional methods like measured traits and context-specific predictors such as intelligence, and personality traits (Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014). Grittier students had higher GPA’s and watched less television, whereas grittier adults progress further in their education and make fewer career changes. Of the Big Five traits, conscientiousness was consistently positively correlated the most strongly to Grit-S scores. The concordance of the six studies is indicative of convergent results and the compound-trait nature of grit. Despite

the connection between Grit-S and conscientiousness, grit is still thought to be distinct from achievement striving. Overall, the creation of Grit-S provided a more efficient and accurate scale compared to Grit-O when measuring grit in terms of perseverance and passion for long-term goals (Duckworth & Quinn, 2009).

The original grit literature mainly applies to academic success. For example, grittier students have higher GPA's and watch less television, whereas grittier adults progress further in their education and make fewer career changes compared to less "gritty" individuals. (Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014). Because of Duckworth's pioneering definition, grit is thought of as perseverance and consistency in achieving long term goals, but also is known to be related to the Big Five trait of conscientiousness. Grit also appears to be, and is heavily intertwined with, trait characteristics such as resilience and retention. Thus, grit is a complex, higher order trait that is yet to be concretely explained in scientific research outside of the academic domain. (Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014). Because of this niche that grit research has found, there is a dearth of information discrepancy, not much is known about the relationship between grit and health outcomes.

### Unanswered Questions

The purpose of this thesis was to examine the relationship between the personal factors of grit and resilience to the mental health outcomes of anxiety, depression, and stress in college students. These are all areas where there are gaps in the current literature, therefore, this these examined these associations to better understand new avenues for understanding personal strengths that can contribute to better mental health

outcomes in college students. By studying a college student demographic, novel information can be gained regarding transitional and stimulating life periods as well.

The obtained survey data will be used for future studies regarding other personal attributes including hardiness, mindfulness, and positive/negative affect. Through this research, the potential for discovery of intervention strategies becomes possible. As correlations to anxiety, depression, and stress are better understood in particularly affected populations, more can be ascribed about the biobehavioral mechanisms at play.

### Hypotheses

*Hypothesis 1.* Higher levels of self-reported grit will be positively associated with higher levels of self-reported resilience. **Rationale:** Grit and resilience are both deeply rooted personality traits that can affect the way individuals cope with adversity. Grit has to do with continued perseverance whereas resilience is more situational in response to setbacks (Duckworth, Peterson, Matthews, & Kelly, 2007; Connor & Davidson, 2003). However, both are conceptually intertwined in ways that may be reflected in the mental health outcomes of trait anxiety, depression, and perceived stress.

*Hypothesis 2.* Higher levels of self-reported grit and resilience will be positively correlated with grade point average (GPA). **Rationale:** Duckworth and colleagues report strong positive correlations between grit and GPA, but there currently no data comparing resilience to GPA (Duckworth, Peterson, Mathews, & Kelly, 2007). However, due to the predicted positive correlation between grit and resilience, resilience therefore should also be positively correlated with GPA.

*Hypothesis 3.* Higher levels of self-reported grit will be negatively correlated with self-reported levels of perceived stress, anxiety, and depressive symptoms.

**Rationale:** Camardese and colleagues found that significantly higher resilience scores in healthy people compared to those who had depression (Camardese, Leone, Serrani, Szczepanczyk, Walstra, et al., 2014). Additionally, Jonathan Davidson found lower levels of resilience in people with anxiety and higher levels of perceived stress (Davidson, 2003). Because of the hypothesized positive correlation between resilience and grit, grit therefore also should be negatively correlated with these outcomes.

## Chapter 2

### METHODS

#### Subjects

Individuals were included in the PSU THRIVE study if they were between 18 and 24 years of age, full time undergraduate students at 4-year colleges in the United States, and comfortable with the English language. Two hundred and twenty-seven individuals completed the THRIVE survey. Ten of these participants self-reported ages above 24 years old (range: 25-52 years), therefore, their responses were excluded from the study. The final PSU THRIVE study sample included 217 individuals between the ages of 18 and 24 years ( $20.46 \pm 0.10$  years). Recruitment occurred via email distribution, paper flyers on the Penn State campus, and boosted Facebook posts (see Appendix A for recruitment materials).

Participants who completed the THRIVE survey were given the option of entering their name and contact information into a lottery for a \$25 Amazon gift card. Those who chose to do this were also presented with a question of whether or not they had any interest in being contacted for future studies. This form was located at a separate link and, to conserve anonymity, has no ties to the original survey. Sixty-eight people out of the 217 who took the full survey chose to enter the drawing, and 3 of these were randomly chosen to win a gift card.

#### Survey Overview

The PSU THRIVE study was designed to examine the relationship on grit and resilience with anxiety and depression symptoms, as well as perceived stress in college aged students. Qualtrics web-based survey software was used to collect survey responses

from college responses from the desired demographic, 18-24-year-old full-time undergraduate students from the United States (Qualtrics, Provo, UT, USA). This thesis was reviewed and approved by the Penn State Institutional Review Board (IRB) (see Appendix B for IRB approval letter).

The THRIVE survey collected demographic data, health and well-being information (such as illness history, height, and body weight), and included measures of mood, depression, anxiety, perceived stress, grit, and resilience. The complete THRIVE survey can be found in Appendix C. For the purpose of this thesis, the following questionnaires were used to examine the relationship of resilience and grit on self-reported levels of stress and symptoms of depression and anxiety in college students.

### Grit

The Short Grit Scale (Grit-S) is an 9-item 5-point Likert scale (see Appendix D) developed by Angela Duckworth as a quantitative measure of grittiness. Grit is defined as “perseverance and passion for long term goals.” The scale ranges from 1 “not like me at all,” to 5 “very much like me.” Half of the questions are reverse coded. Responses to each of the eight questions in the scale are averaged to give a score with a maximum of 5 (highest level of grit) and a minimum score of 1 (very little grittiness) (Duckworth & Quinn, 2009).

### Resilience

The Connor Davidson Resilience Scale-10 (CD-RISC-10) is a ten-item 5-point Likert scale questionnaire that measures levels of resilience (see Appendix E). The scale ranges from 0, “not true at all,” to 4, “truly nearly all the time.” There are shorter and longer editions of the scale, but the ten-point version was the most suitable in the context

of this study. Participants rank the frequency at which they agree with the offered statements and these numbers are totaled in order to create a resilience score. The lowest possible score is 0, indicating little to no resiliency, and the highest possible score is a 40, indicating very high levels of resilience (Connor & Davidson, 2003).

### Anxiety

The Self-Evaluation TRAIT Questionnaire (STAI Form Y-2) consists of twenty items used to measure levels of anxiety (see Appendix F). The scale uses a 4-point, 20-item Likert scale with 1 being, “not at all,” and 4, “very much so.” Nine of the items are reverse coded. The higher the score, the higher the self-reported trait anxiety level. The lowest possible sum and anxiety score is a 20 and the highest is an 80 (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

### Depression

The Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10) is a ten-item, 4-point Likert scale to self-report measures of depressive symptoms (see Appendix G). Scores range from 0, “rarely or none of the time,” to 3, “all of the time.” Two items (questions 5 and 8) are reverse coded. If more than two of the items are left unanswered, the scale cannot be accurately scored. The lowest possible score is a 0 and the highest possible score is a 30, however anything greater than or equal to a 10 is indicative of an individual at risk for depression (Björgvinsson, Kertz, Bigda-Peyton, McCoy & Aderka, 2013).

### Stress

The Perceived Stress Scale (PSS) is a self-report of stress levels individuals have felt in the past month (see Appendix H). This 14-item questionnaire with response



options of 0, “never” to 4, “very often,” has 7 reverse coded items (questions 4, 5, 6, 7, 9, 10, and 13). The lowest possible score, indicating low stress levels, is 0, and the highest possible score is a 56 (Cohen, Kamarck & Mermelstein, 1983).

### Statistical Analyses

Statistical analysis of the data was performed using IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp). Pearson Product-Moment and Spearman Rho correlational analyses were conducted to test the hypotheses for this thesis. All tests were two-tailed and statistical significance determined at  $\alpha = 0.05$ .

### **Chapter 3**

#### **RESULTS**

Thirty men, 182 women, four non-binary, and one person who preferred not to provide their gender between the ages of 18 and 24 years completed the PSU THRIVE survey that was distributed via email, Facebook promotions, and paper flyers. A total of 217 participants completed the survey and answered all questions regarding the personality traits and mental health outcomes. Table 1 presents the survey sample demographics, including participant gender, ethnicity, and race. Additionally, Table 2 displays the educational aspects of the study sample, including the major, semester standing, and grade point average (GPA) of participants.

Table 3 presents the average grit (Grit-S), resilience (CD-RISC-10), depression (CESD), anxiety (STAI), and perceived stress (PSS) scores among study participants. For comparison and unless otherwise noted, Table 3 also presents published norm data (when available) of similar age and demographic as the PSU THRIVE study participant pool.

Pearson Product-Moment and Spearman Rho correlational analyses were conducted to test the hypotheses for this thesis using IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp). All tests were two-tailed and statistical significance determined at  $\alpha = 0.05$ .

As predicted for Hypothesis 1, grit scores were significantly and positively associated with resilience scores such that individuals who reported higher levels of grit also reported higher levels of resilience [ $r = +0.45$ ,  $n = 199$ ,  $p < 0.05$ ].

With regards to Hypothesis 2, GPA was treated as a categorical variable because participants were asked to select one of five available GPA categories (i.e., < 2.00, 2.00-2.49, 2.50-2.99, 3.00-3.49, 3.50-4.00) as opposed to self-reported GPA number. The rationale for this decision was because some schools may vary in their GPA weighting and to be consistent with published reports. The distribution of GPA across the sample revealed that almost half of the participants reported GPA of 3.50 and above (45%, see Table 2). Therefore, a new variable was created consisting of “HIGH” (GPA - 3.50-4.0, or 44.9% of the study population) and “AVERAGE (GPA <3.49, or 55.2% study population) GPA to examine the relationship between grit and resilience with academic performance.

Because GPA was a categorical variable, we then created HIGH and LOW grit and resilience groups, separately, based on median splits of participant scores on each measure. For resilience, 107 participants in the LOW group had mean resilience scores of  $22.91 \pm 0.47$  compared to 92 participants in the HIGH group who had mean resilience score of  $33.35 \pm 0.40$ . For grit, 91 participants in the LOW group reported a mean grit score of  $2.72 \pm 0.05$ , compared to 113 participants in the HIGH group who reported a mean grit score of  $3.80 \pm 0.04$ .

Spearman Rho correlations were conducted separately to determine the relationship between resilience and grit with academic performance, respectively. With regards to resilience, HIGH/LOW resilience was not correlated with HIGH/AVERAGE GPA scores [ $r = +0.07$ ,  $n = 199$ , n.s.]. In addition, HIGH/LOW grit was not correlated with HIGH/AVERAGE GPA [ $r = +0.05$ ,  $n = 204$ , n.s.]. Therefore, Hypothesis 2 was not confirmed.

As predicted for Hypothesis 3, resilience scores were significantly and negatively associated with the mental health outcomes of anxiety (STAI), depression (CESD-10), and perceived stress (PSS), such that individuals who reported higher levels of resilience also reported less anxiety [ $r = -0.54$ ,  $n = 181$ ,  $p < 0.05$ ], depression [ $r = -0.47$ ,  $n = 190$ ,  $p < 0.05$ ], and stress [ $r = -0.48$ ,  $n = 190$ ,  $p < 0.05$ ].

No specific hypotheses were proposed regarding grit and mental health outcomes because no literature has been published on the topic before. Consistent with the resilience and mental health outcomes, however, grit was significantly and negatively associated with anxiety (STAI) [ $r = -0.49$ ,  $n = 181$ ,  $p < 0.05$ ], depression (CESD-10) [ $r = -0.44$ ,  $n = 190$ ,  $p < 0.05$ ], and stress (PSS) [ $r = -0.39$ ,  $n = 190$ ,  $p < 0.05$ ].

#### Exploratory Analyses: THRIVE

As part of the GPA analyses, we compared the HIGH/LOW groups for grit and resilience to determine whether there was a normal and expected distribution of participants across all four groups. A Chi Square analysis of HIGH/LOW resilience and HIGH/LOW grit groups was statistically significant, with an unexpected number of participants in the HIGH resilience/LOW grit group ( $N=28$ ) and LOW resilience/HIGH grit group ( $N=47$ ) compared to the HIGH resilience/HIGH grit ( $N=64$ ) and LOW resilience/LOW grit groups ( $N=60$ ) [ $\chi^2 (2=1, N = 199) = 13.18$ ,  $p < .0001$ ].

This finding of four distinct and identifiable THRIVE groups suggested a more complex relationship between resilience and grit than has been presented in the literature. Specifically, there are some resilient individuals who are not gritty, and some gritty individuals who are not resilient. Based on the literature, we expect individuals high on both grit and resilience to thrive in the presence of adversity and those who score low on

both measures to have poorer mental health outcomes. This THRIVE conceptualization has not been reported in the literature. So, to further explore characteristics of these four groups, we created a new construct, THRIVE: and placed the four groups into LOW (low resilience/low grit), AVERAGE (low resilience/high grit), ABOVE AVERAGE (high resilience/low grit), and HIGH (high resilience/high grit). Table 4 presents grit, resilience, anxiety (STAI), depression (CESD-10), stress (PSS), and positive and negative affect (PANAS) scores for these four groups.

Separate one-way analyses of variance were conducted with THRIVE as the independent variable and anxiety, depression, stress, and positive and negative affect as the dependent measures. There were statistically significant differences among THRIVE groups on depression [ $F(3,189)=13.54, p<0.0001$ ], anxiety [ $F(3,180)=22.10, p<0.0001$ ], perceived stress [ $F(3,189)=17.50, p<0.0001$ ], positive affect [ $F(3,189)=7.46, p<0.0001$ ], and negative affect [ $F(3,189)=13.48, p<0.0001$ ] scores. Tukey's B post-hoc tests revealed that high THRIVE participants (high resilience/high grit) displayed significantly less depression (see Figure 1), anxiety, perceived stress and negative affect than did any other THRIVE group of participants ( $p's<0.05$ ) (see Table 4). In addition, high THRIVE participants displayed greater positive affect compared to average (low resilience/high grit) and low (low resilience/low grit) THRIVE participants ( $p<0.05$ ). High THRIVE and above average THRIVE participants (high resilience/low grit) reported similar levels of positive affect (see Table 4).

With regards to low grit/low resilience THRIVE participants, these individuals reported significantly higher levels of depression and negative affect compared to all other THRIVE groups ( $p's<0.05$ ) (see Table 4). These THRIVE participants also

reported higher levels of anxiety and perceived stress compared to high and above average THRIVE (high resilience/low grit) participants, but not compared to average THRIVE participants who score low on resilience and high on grit. Positive affect among low THRIVE participants was the lowest of all groups, and significantly lower compared to high and above average THRIVE participants ( $p's < 0.05$ ).

## **Chapter 4**

### **DISCUSSION**

Grit and resilience are personal characteristics that were projected to have protective effects against poor mental health outcomes in a college student population. Because of academic, social, and day-to-day stressors, this demographic tends to have elevated levels of anxiety, depression, and stress, as college is a very transitional and taxing time for many (Hudd, Dumlao, Erdmann-Sager, Murray, Phan, et al., 2000). Examining potential protective measures such as grit and resilience provides a window into potential intervention and prevention strategies to combat these negative mental health outcomes. Preserving mental health during young adulthood in the transition to college can lead to better physical and overall wellness outcomes across the lifespan. A growing literature suggests that resilience is associated with positive mental health outcomes and reduced levels of stress in adult populations. In addition, studies in college students associate grit with high levels of academic achievement. The extent to which resilience and grit are associated with each other, or with mental health outcomes in college students has not yet been reported.

Therefore, this study examined the impact of grit and resilience on mental health outcomes (i.e., depression, anxiety, stress) in a US sample of college students attending a 4-year university. Alarming trends show increased rates of poor mental health outcomes in college students, especially increased rates of depression anxiety, and suicide (Novotney, 2014). Results from the present THRIVE study confirm these trends with 46.8% of 18-24 year old college students reporting clinical levels of depressive symptoms (scores  $\geq 10$ , Björgvinsson, Kertz, Bigda-Peyton, McCoy, & Aderka, 2013).

This present study appears to be the first report of mean CESD-10, a revised and shorter version of the original CES-D depression inventory, scores among college students. Björgvinsson and colleagues (2013) reported CESD-10 scores of 8.4 (below clinical cutoff) with 20-26 year old women, compared to CESD-10 scores of 11.47 among the present study population. The difference in these scores suggest that college students displayed significantly higher levels of depression symptoms compared to a similar age group of participants who were not primarily college students. Whether the college experience is a significant contributor to the difference in reported mean CESD-10 scores is not known. Regardless, that the mean CESD-10 scores in THRIVE participants is above the clinical cutoff of depression is concerning and warrants further study.

Also consistent with the elevated depression scores in THRIVE participants, mean anxiety symptoms levels among THRIVE participants (47.35) were well above the suggested clinical cutoff for anxiety (scores above 39-40, Julian, 2011). In the study population, 66.3% of students reported clinically significant anxiety levels. THRIVE participants also reported elevated perceived stress levels compared to published norms (26.91 compared to 23.18, Cohen et al. 1983). Taken together, these results confirm that college students attending four-year universities in the US are stressed and are experiencing clinically significant symptoms of anxiety and depression. Despite a relatively small sample size, compared to national mental health outcome surveys, the mental health outcome trends reported by THRIVE participants are consistent with anxiety and depression trends among college students (Novotney, 2014). These confirmations are reassuring regarding the validity of the survey sample.



With regard to protective factors, THRIVE participants also reported resilience and grit levels consistent with published studies of college students (see Table 3) (Campbell-Sills & Stein, 2007; Duckworth et al., 2007). As hypothesized, grit and resilience were significantly, positively associated with one another in THRIVE participants. This finding is a novel contribution to the literature in that grit and resilience have not been examined together despite the apparent overlap in constructs. In addition, as predicted, resilience and grit independently were significantly negatively associated with mental health outcomes. Specifically, THRIVE participants who reported higher levels of resilience or grit reported lower levels of depression, anxiety and perceived stress. In contrast, participants who reported elevated levels of depression or anxiety also reported low levels of grit and resilience. These findings with college students are new and suggest that trait grit and resilience can be protective against negative mental health outcomes. Further, the results suggest potential points of intervention for college students and warrant further inquiry.

With regards to interventions, it is important to point out that development and implementation of resilience interventions are currently being debated in the psychology field (Helmreich et al., 2017). While it is beyond the scope of this thesis to delineate all the components of these debates, a ground-breaking Cochrane report by Helmreich and colleagues (2017) provides much promising evidence for successful resilience interventions that could be implemented at the college student level.

Grit-based interventions are controversial because the GRIT-S scale developed by Duckworth and colleagues (2007) appears to measure individual differences and may not be valid to measure change over time, as reported by Duckworth on her own research

page ([angeladuckworth.com/research](http://angeladuckworth.com/research)). This controversy of grit-based interventions is confirmed by a recent meta-analysis which indicates only a modest correlation between grit and academic performance and concludes that grit-based interventions are not necessary to improve school performance (Credé, Tynan, & Harms, 2017). What both Duckworth and the meta-analysis report (Credé et al., 2017) fail to consider, however, are mental health outcomes associated with grit. In fact, there are no reports of these associations in the literature. Therefore, it is not possible to make a firm conclusion about the validity of grit-based interventions for improving mental health outcomes in college students. Results from this thesis, however, do suggest further inquiry.

A third hypothesis tested in this thesis was that resilience and grit would be positively associated with GPA. This hypothesis was not supported. Duckworth and colleagues (2009) reported an association between grit and GPA in University of Pennsylvania students. Duckworth also reported an association between grit and academic performance in other populations. In their recent meta-analysis of the grit literature, however, Credé and colleagues (2017) report contradictory results in that grit is not a strong predictor of academic performance. Findings in the THRIVE study are consistent with Credé and colleagues (2017). The lack of a relationship between resilience and GPA is inconsistent with one available report (e.g., Hartley, 2011).

The focus of prior grit and resilience studies is on academic performance and do not include mental health measures. Mental health, however, is associated with academic performance in college students (Eisenberg, Golberstein, & Hunt, 2009). Therefore, mental health may be a missing moderator or mediator in the grit and resilience literatures. This study did not examine the relationship between mental health outcomes

and GPA, yet further investigation is needed to better understand how grit, resilience, mental health, and academic performance may be related. An additional THRIVE measure was created by combining the distribution of resilience and grit scores. Those low in both resilience and grit are the LOW group, those high in grit but low in resilience are AVERAGE, those high in resilience but low in grit are ABOVE AVERAGE, and those who were high in both resilience and grit are HIGH. The corresponding depression, anxiety, stress, and positive and negative affect scores of individuals in these groups displayed people higher on this scale had, on average, better mental health outcomes. For example, as THRIVE group level increased, average depression, anxiety, and stress scores decreased.

The relevance of grit as a protective personality characteristic has come into question because of its lack of correlation to academic performance outcomes (Credé et al., 2017). However, this thesis suggests that grit is important to consider when examining mental health outcomes. Comparing the clinical cutoffs for depression using CESD-10 and anxiety using the STAI tests to the quartiles of the THRIVE measure highlights this relevancy. Participants with HIGH levels of both components of the THRIVE measure (high grit and high resilience) were the only group with anxiety and depression levels below the clinical cutoffs. Participants who had AVERAGE or ABOVE AVERAGE levels of the THRIVE measure (high grit and low resilience, or low grit and high resilience, respectively) still had clinically significant levels of both anxiety and depression. These findings suggest a deeper relationship between the THRIVE traits that is vital to understanding their protective nature. More comprehensive studies are needed to further examine the highly intertwined relationship between grit and resilience.

## **TABLES**

Table 1  
*Gender, Race and Ethnicity Characteristics of Study Sample (Sample Size)*

---

Variable	Percent (n)
<b>Gender</b>	
Female	83.9% (182)
Male	13.8% (30)
Non-Binary	1.8% (4)
Prefer not to Answer	0.5% (1)
<b>Ethnicity</b>	
Not of Hispanic/Latino/ Spanish origin	90.7% (196)
Hispanic or Latino	6.9% (15)
Other Spanish origin	1.4% (3)
Prefer not to answer	0.9% (2)
<b>Race</b>	
White or Caucasian	76.5% (166)
Black or African American	8.8% (19)
Asian or Asian American	6.5% (14)
Other	6.5% (14)
Prefer not to answer	0.9% (2)
Native American or Alaska Native	0.5% (1)
Other Pacific Islander	0.5% (1)

---

Table 2

*Major, Semester Standing, and Grade Point Average (GPA) Characteristics of Study Sample (Number of Participants)*

---

Variable	Percent	(n)
<b>Major</b>		
Social Sciences	40.3%	(87)
Natural Sciences	31.5%	(68)
Humanities	13.0%	(28)
Business	5.1%	(11)
Computer Science or Math	2.8%	(6)
Nursing	2.8%	(6)
Education	2.8%	(6)
Engineering	1.9%	(4)
<b>Semester Standing</b>		
Freshman	8.3%	(18)
Sophomore	16.6%	(36)
Junior	37.3%	(81)
Senior	33.2%	(72)
Senior +	4.6%	(10)
<b>GPA</b>		
< 2.00	0.5%	(1)
2.00-2.49	7.5%	(16)
2.50-2.99	14.0%	(30)
3.00-3.49	33.2%	(71)
3.50-4.00	44.9%	(96)

---

Table 3

*Average Grit, Resilience, Trait Anxiety, Depression, Perceived Stress, and Positive and Negative Affect Scores*

Variable (Scale)	Average Score (n = 217)	Scale Range	Published Average
Grit (Grit-S)	3.32 ± 0.05	1 – 4	3.46 <sup>1,a</sup>
Resilience (CD-RISC-10)	27.73 ± 0.48	0 – 40	27.21 <sup>2,b</sup>
Trait Anxiety (STAI)	47.35 ± 0.94	20 – 80	37.47 <sup>3,c</sup>
Depression (CESD-10)	11.47 ± 0.45	0 – 30	8.4 <sup>4,d</sup>
Perceived Stress (PSS)	26.91 ± 0.81	0 – 56	23.18 <sup>3,e</sup>
Positive Affect (PANAS)	32.64 ± 0.57	10 – 50	35.73 <sup>3,f</sup>
Negative Affect (PANAS)	25.62 ± 0.62	10 – 50	20.14 <sup>3,f</sup>

<sup>1</sup>Ivy League college student population

<sup>2</sup>San Diego State University undergraduates

<sup>3</sup>Undergraduate college students

<sup>4</sup>Young adult women aged 20-26

<sup>a</sup>Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007)

<sup>b</sup>Campbell-Sills, L., & Stein, M. B. (2007)

<sup>c</sup>Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983)

<sup>d</sup>Björgvinsson, T., Kertz, S.J., Bigda-Peyton, J.S., McCoy, K.L., Aderka, I.M. (2013)

<sup>e</sup>Cohen, S., Kamarck, T., & Mermelstein, R. (1983)

<sup>f</sup>Renshaw & Bolognino (2016)

Table 4

*Levels of THRIVE Measures for Grit, Resilience, Trait Anxiety, Depression, Perceived Stress, and Positive and Negative Affect ( $\pm$  Standard Error of the Mean)*

Variable (Scale)	THRIVE			
	Low	Average	Above Average	High
Grit (Grit-S)	2.66 $\pm$ 0.06	3.71 $\pm$ 0.05	2.83 $\pm$ 0.06	3.86 $\pm$ 0.05
Resilience (CD-RISC-10)	21.45 $\pm$ 0.69	24.77 $\pm$ 0.51	32.5 $\pm$ 0.75	33.72 $\pm$ 0.46
Trait Anxiety* (STAI)	54.53 $\pm$ 1.42 <sup>4</sup>	50.02 $\pm$ 1.65	47.11 $\pm$ 2.09	38.21 $\pm$ 1.52 <sup>1</sup>
Depression* (CESD-10)	14.74 $\pm$ 0.76 <sup>3</sup>	11.91 $\pm$ 0.93	11.07 $\pm$ 1.05	8.23 $\pm$ 0.65 <sup>1</sup>
Perceived Stress* (PSS)	32.81 $\pm$ 1.25 <sup>4</sup>	29.00 $\pm$ 1.54	26.71 $\pm$ 1.86	19.92 $\pm$ 1.32 <sup>1</sup>
Positive Affect* (PANAS)	29.91 $\pm$ 0.88 <sup>4</sup>	30.79 $\pm$ 0.94	34.46 $\pm$ 1.18	35.69 $\pm$ 1.18 <sup>2</sup>
Negative Affect* (PANAS)	29.90 $\pm$ 0.10 <sup>3</sup>	26.19 $\pm$ 1.16	26.11 $\pm$ 1.39	20.92 $\pm$ 1.04 <sup>1</sup>

\*One-way analysis of variance, significant main effect for THRIVE ( $p < 0.0001$ )

<sup>1</sup>High THRIVE < Low, Average and Above Average THRIVE participants,  $p < 0.05$

<sup>2</sup>High THRIVE participants = Above Average THRIVE < Low and Average THRIVE participants,  $p < 0.05$

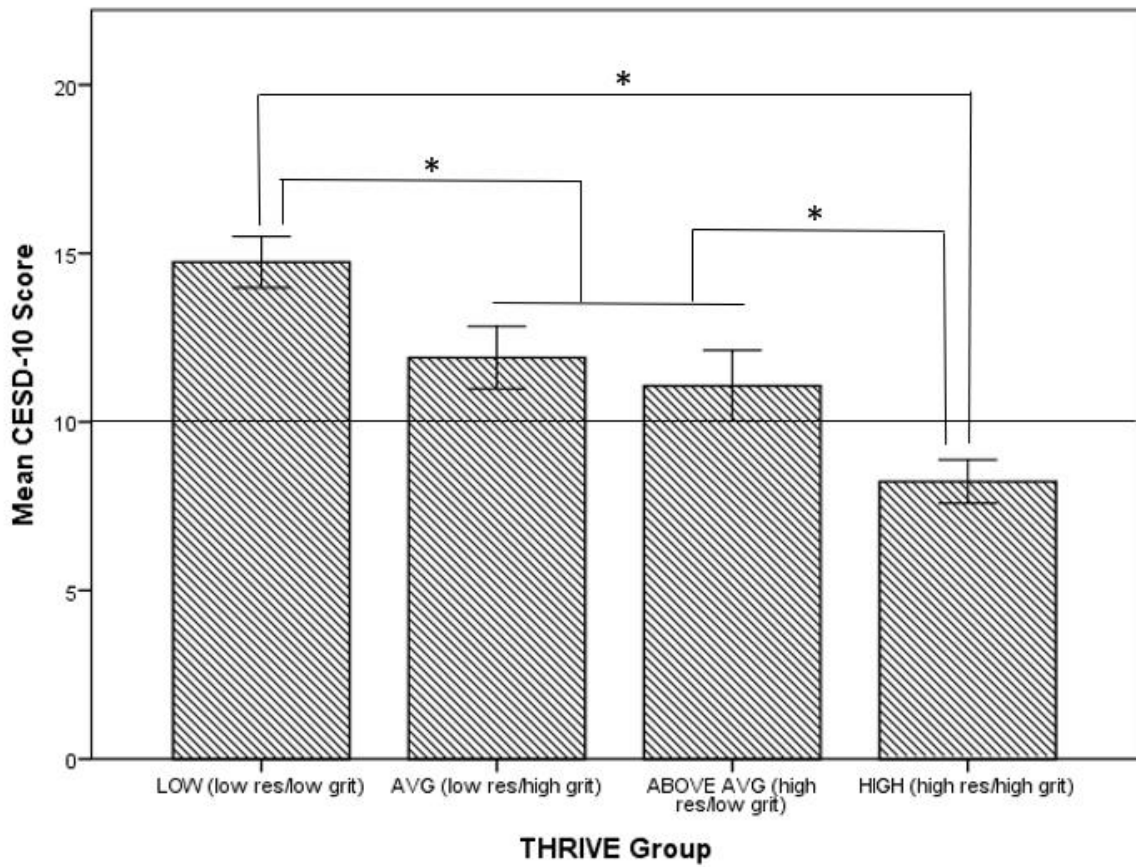
<sup>3</sup>Low THRIVE participants > Low, Average and Above Average THRIVE participants,  $p < 0.05$

<sup>4</sup>Low THRIVE = Average THRIVE > High and Above Average THRIVE participants,  $p < 0.05$



## FIGURES

**Figure 1:** Mean depression symptoms (CESD-10) among THRIVE participant groups based on resilience and grit scores (means  $\pm$  standard error of the mean). Scores  $>10$  indicate clinically significant depression levels (Björgvinsson, Kertz, Bigda-Peyton, McCoy, & Aderka, 2013).



## **APPENDIX A: THRIVE STUDY RECRUITMENT MATERIALS**

# PSU THRIVE Study

## RESEARCH VOLUNTEERS NEEDED!

### FULL-TIME UNDERGRADUATE COLLEGE STUDENT??

**Who:** Full-time undergraduate students, aged 18-24 yrs, comfortable with the English language

**What:** Anonymous online survey on health, well-being and college experiences

**Participants may enter drawing for one of several \$25 Amazon gift cards**

**For more information, contact  
The Biobehavioral Health Studies Lab at  
814.865.3319**

**Or take the survey at:  
<http://bit.ly/2wM2aMv>**

This study has been reviewed and approved by the Penn State IRB.  
PI: Dr. Laura C. Klein, Professor of Biobehavioral Health (lcklein@psu.edu);  
Ms. Sarah D'Souza, Project Coordinator (sed5332@psu.edu)

THRIVE Study – Biobehavioral Health Studies Lab  
<http://bit.ly/2wM2aMv>

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**APPENDIX B: INSTITUTIONAL REVIEW BOARD APPROVAL**



**EXEMPTION DETERMINATION**

**Date:** September 16, 2017  
**From:** Philip Frum, IRB Analyst  
**To:** Laura Klein

Type of Submission:	Initial Study
Title of Study:	Biobehavioral Health Risk and Resilience in College Students (PSU THRIVE Study)
Principal Investigator:	Laura Klein
Study ID:	STUDY00006962
Submission ID:	STUDY00006962
Funding:	Biobehavioral Health (UNIVERSITY PARK)
Documents Approved:	<ul style="list-style-type: none"> <li>• Qualtrics THRIVE Survey Participant Gift Card Drawing and Future Contact link (1), Category: Other</li> <li>• THRIVE Study Survey without consent form (2), Category: Data Collection Instrument</li> <li>• Updated THRIVE Study Protocol (2), Category: IRB Protocol</li> </ul>

The Office for Research Protections determined that the proposed activity, as described in the above-referenced submission, does not require formal IRB review because the research met the criteria for exempt research according to the policies of this institution and the provisions of applicable federal regulations.

Continuing Progress Reports are **not** required for exempt research. Record of this research determined to be exempt will be maintained for five years from the date of this notification. If your research will continue beyond five years, please contact the Office for Research Protections closer to the determination end date.

Changes to exempt research only need to be submitted to the Office for Research Protections in limited circumstances described in the below-referenced Investigator Manual. If changes are being considered and there are questions about whether IRB review is needed, please contact the Office for Research Protections.

Penn State researchers are required to follow the requirements listed in the Investigator Manual ([HRP-103](#)), which can be found by navigating to the IRB Library within CATS IRB (<http://irb.psu.edu>).

This correspondence should be maintained with your records.

**APPENDIX C:**

**PSU THRIVE STUDY CONSENT FORM AND SURVEY**

**Default Question Block**

Penn State THRIVE Study

Informed Consent Form

Principal Investigator: Dr. Laura Cousino Klein, Professor of Biobehavioral Health

Project Coordinator: Ms. Sarah D'Souza, Schreyer Honors College Undergraduate Scholar

You are being invited to participate in a study about mental and physical health and well-being in college students. You have been selected to participate because you are between the ages of 18 and 24 years and are enrolled as a full-time undergraduate student at a college or university. In addition, you are comfortable speaking and reading the English language.

This survey will take about 20 minutes to complete and will ask you questions about your health and your experiences in college. Although there are no immediate benefits to you for participating in this survey, you may feel good about contributing your experiences as a college student to help us better understand how college experiences influence health.

There are no risks associated with participating in this study. However, you may find that some questions make you feel uncomfortable. You may skip any questions that you do not want to answer. You may stop taking the survey at any time without penalty. Your answers



will be anonymous. This means that we will not be able to link your name with your answers in any way.

If you decide to complete the survey, you may choose to enter your name and contact information to win a \$25 gift certificate at Amazon.com. The opportunity to enter the drawing will come at the end of the survey and will not be connected to your survey responses. One out of every 50 participants will win a gift certificate. Winners will be chosen randomly from those participants who choose to enter their names at the end of the survey.

Questions about your participation in this survey can be directed to the Principal Investigator, Dr. Laura Klein (lcklein@psu.edu; 814-888-8813), the Project Coordinator, Ms. Sarah D'Souza (sed5332@psu.edu; 814-865-8813), or the Penn State Office of Research Protections (814-865-1775).

By submitting this survey, you are agreeing to participate. If you agree to participate, you may begin taking the survey by clicking the "I agree to participate" button below.

Thank you for your time!

Click below to continue:

I agree to participate

#### Default Question Block

How old are you?

What is your height, in inches?

What is your weight, in pounds?

Where do you attend University?

What field is your major in? (pick two or less)

- Humanities
- Social Sciences
- Natural Sciences
- Computer science/Math
- Engineering
- Business
- Nursing
- Other

What is your semester standing?

- Freshman
- Sophomore
- Junior
- Senior
- (Super) senior

What is your gender identity?

- Male
- Female
- Other:
- Prefer not to answer

What is your ethnicity?

- Hispanic/Latino

- Other Spanish origin
- Not of Hispanic/Latino/Spanish origin
- Prefer not to answer

What is your race?

- Native American or Alaska Native
- Black or African American
- Asian or Asian American
- Other Pacific Islander
- White or Caucasian
- Other
- Prefer not to answer

What is your GPA?

- Below 2.00
- 2.00-2.49
- 2.50-2.99
- 3.00-3.49
- 3.50-4.00

Do you work a job as a student?

- I do not
- 1-5 hours per week
- 5-10 hours per week
- More than 10 hours per week

How many hours do you spend per week on extracurricular activities?

- I do not
- 1-5 hours per week
- 5-10 hours per week

- More than 10 hours per week

Do you volunteer?

- I do not
- 1-5 hours per week
- 5-10 hours per week
- More than 10 hours per week

Do you receive need-based financial aid from your University?

- Yes
- No

How often do you worry about your personal finances while attending university?

- Daily
- Many times a week
- Weekly
- Monthly
- Once a semester
- Never

Do you have adequate transportation to the places you want to go to while on campus?

- Yes
- Maybe
- No
- Probably not

Have you ever utilized a local food bank, or benefited from a government funded food program?

- Yes

No

Has there been any time within the last 6 months that you have not had a permanent residence?

Yes

No

Do you use caffeine products?

No, never

Yes, I have once

Yes, occasionally

Yes, weekly

Yes, multiple times a week

Yes, daily

How often, on the average, do you usually drink alcohol? (e.g., beer, wine, liquor or spirits)

Every day

At least once a week but not every day

At least once a month but less than once a week

More than once a year but less than once a month

Once a year or less

If or when you drink alcohol, how much, on the average, do you usually drink at any one time? (e.g., cans of beer, glasses of wine, liquor drinks)

6 or more servings

5 or 6 servings

3 or 4 servings

1 or 2 servings

Less than 1 serving

In the last year, what is the maximum number of alcoholic beverages you have consumed in a 24-hour period?

- 0 servings
- 1-2 servings
- 3-5 servings
- 6-10 servings
- 11-15 servings
- More than 15 servings

How many times in the last year have you consumed your max number of alcoholic beverages in a 24-hour period?

Do you use tobacco products?

- No, never
- Yes, I have once
- Yes, occasionally
- Yes, weekly
- Yes, multiple times a week
- Yes, daily

Do you smoke marijuana?

- No, never
- Yes, I have once
- Yes, occasionally
- Yes, weekly
- Yes, multiple times a week
- Yes, daily

Do you vape or use other nicotine products, not related to tobacco? (e.g. hookah)

- No, never
- Yes, I have once
- Yes, occasionally
- Yes, weekly
- Yes, multiple times a week
- Yes, daily

Do you use any other recreational substances? (e.g. illegal drugs, study drugs, etc)

- No, never
- Yes, I have once
- Yes, occasionally
- Yes, weekly
- Yes, multiple times a week
- Yes, daily

Do you exercise?

- No, never
- Yes, I have once
- Yes, occasionally
- Yes, weekly
- Yes, multiple times a week
- Yes, daily

About how many hours of sleep do you typically get in a night?

- Less than 4 hours
- 4-6 hours
- 6-8 hours
- More than 8 hours

Have you used any of these professional services in the last year? Check all that apply.

- Your university's health services
- University counseling or psychological services
- Med Express, or a similar service
- Local hospital or emergency room
- Other:

Have you had any of these ailments in this academic year? Check all that apply.

- Type 2 Diabetes
- Chicken Pox/Shingles
- Measles/Mumps
- Bronchitis/Pneumonia
- Cold Sores
- Flu
- Mononucleosis (Mono)
- Strep Throat
- Other:

Did you get a flu vaccine in the last year?

- Yes
- No
- Not sure

Have you ever had a life-changing physical or mental health diagnosis?

- No
- Yes:
- Prefer not to answer

#### Default Question Block



Here are some questions about your college experience. Read each item and circle the best answer.

	Strongly Disagree	Disagree	Slightly Agree	Neutral	Slightly Agree	Agree	Strongly Agree
I have had a great academic experience at university	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a hard worker in my classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like a real part of my university	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am so thankful that I'm getting a college education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am happy with how I've done in my classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a diligent student	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People at this school are friendly to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am grateful to the professors and other students who have helped me in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my academic achievements since coming to university	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am an organized and effective student	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can really be myself at this school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel thankful for the opportunity to learn so many new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am pleased with how my college education is going so far	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I study well for my classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other students here like me the way I am	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am grateful for the people who have helped me succeed in college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Grit-S**

Please respond to the following 8 items. Be honest – there are no right or wrong answers.

New ideas and projects sometimes distract me from previous ones.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

Setbacks don't discourage me.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

I have been obsessed with a certain idea or project for a short time but later lost interest.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

I am a hard worker.

- Very much like me
- Mostly like me
- Somewhat like me

- Not much like me
- Not like me at all

I often set a goal but later choose to pursue a different one.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

I have difficulty maintaining my focus on project that take more than a few months to complete.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

I finish whatever I begin.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

I am diligent.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me

Not like me at all

### Default Question Block

Please indicate how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	Not true at all	Rarely true	Sometimes true	Often true	True nearly all the time
I am able to adapt when changes occur.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can deal with whatever comes my way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to see the humorous side of things when I am faced with problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having to cope with stress can make me stronger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to bounce back after illness, injury, or other hardships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe I can achieve my goals, even if there are obstacles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Under pressure I stay focused and think clearly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not easily discouraged by failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think of myself as a strong person when dealing with life's challenges and difficulties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### How I typically act towards myself in difficult times

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

	Almost Never - 1	2	3	4	Almost always - 5
When I fail at something important to me I become consumed by feelings of inadequacy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to be understanding and patient towards those aspects of my personality I don't like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When something painful happens I try to take a balanced view of the situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm feeling down, I tend to feel like most other people are probably happier than I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to see my failings as part of the human condition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm going through a very hard time, I give myself the caring and tenderness I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When something upsets me I try to keep my emotions in balance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I fail at something that's important to me, I tend to feel alone in my failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost Never - 1	2	3	4	Almost always - 5
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm disapproving and judgmental about my own flaws and inadequacies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm intolerant and impatient towards those aspects of my personality I don't like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Default Question Block

Please indicate to what extent you have shown these emotions in the past two weeks.

Answer using: "very slightly or not at all," "a little," "moderately," "quite a bit," or "extremely."

	1 - very slightly or not at all	2 - a little	3 - moderately	4 - quite a bit	5 - extremely
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disinterested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 - very slightly or not at all	2 - a little	3 - moderately	4 - quite a bit	5 - extremely
Determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Default Question Block

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week by checking the appropriate box for each question.

I was bothered by things that usually don't bother me.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I had trouble keeping my mind on what I was doing.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I felt depressed.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I felt that everything I did was an effort.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I felt hopeful about the future.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I felt fearful.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

My sleep was restless.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)
- All of the time (5-7 days)

I was happy.

- Rarely or none of the time (less than 1 day)
- Some or a little of the time (1-2 days)
- Occasionally or a moderate amount of time (3-4 days)



- All of the time (5-7 days)

I felt lonely.

- Rarely or none of the time (less than 1 day)  
 Some or a little of the time (1-2 days)  
 Occasionally or a moderate amount of time (3-4 days)  
 All of the time (5-7 days)

I could not "get going."

- Rarely or none of the time (less than 1 day)  
 Some or a little of the time (1-2 days)  
 Occasionally or a moderate amount of time (3-4 days)  
 All of the time (5-7 days)

### STAI

A number of statements which people have use to describe themselves are given below. Read each statement and then choose the appropriate number to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe how you generally feel.

	1 - Not at all	2 - Somewhat	3 - Moderately so	4 - Very much so
I feel pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel nervous and restless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel satisfied with myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I could be as happy as others seem to be	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like a failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel rested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am "calm, cool, and collected"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 - Not at all	2 - Somewhat	3 - Moderately so	4 - Very much so
I feel that difficulties are piling up so that I cannot overcome them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry too much over something that really doesn't matter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am happy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have disturbing thoughts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I lack self-confidence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I made decisions easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel inadequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some unimportant thought runs through my mind and bothers me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take disappointments so keenly that I can't put them out of my mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a steady person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get in a state of tension or turmoil as I think over my recent concerns and interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Default Question Block

In the last month, how often have you:

	0 - Never	1	2	3	4 - Very Often
Been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt nervous and "stressed"?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8/28/2017

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	0 - Never	1	2	3	4 - Very Often
Dealt successfully with irritating life hassles?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt that you were effectively coping with important changes that were occurring in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Found that you could not cope with all the things you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been angered because of things that happened that were outside of your control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Found yourself thinking about things you have to accomplish?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been able to control the way you spend your time?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please rank how much you agree to the following statements:**

Please rank how much you agree to the following statements:

1 - Strongly Disagree	2	3	4	5	6	7 - Strongly Agree
-----------------------------	---	---	---	---	---	--------------------------

I tend to get over it quickly when someone hurts my feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If someone wrongs me, I often think about it a lot afterward	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a tendency to harbor grudges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When people wrong me, my approach is just to forgive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that forgiveness is a moral virtue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Justice is more important than mercy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is admirable to be a forgiving person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have no problem at all with people staying mad at those who hurt them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forgiveness is a sign of weakness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People should work harder than they do to let go of the wrongs they have suffered	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Default Question Block

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

	1 - Almost Always	2 - Very Frequently	3 - Somewhat Frequently	4 - Somewhat Infrequently	5 - Very Infrequently	6 - Almost Never
I could be experiencing some emotion and not be conscious of it until some time later	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 - Almost Always	2 - Very Frequently	3 - Somewhat Frequently	4 - Somewhat Infrequently	5 - Very Infrequently	6 - Almost Never
I break or spill things because of carelessness, not paying attention, or thinking of something else	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it difficult to stay focused on what's happening in the present	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend not to notice feelings of physical tension or discomfort until they really grab my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I forget a person's name almost as soon as I've been told it for the first time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It seems I am "running on automatic," without much awareness of what I'm doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rush through activities without really being attentive to them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do jobs or tasks automatically, without being aware of what I'm doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself listening to someone with one ear, doing something else at the same time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 - Almost Always	2 - Very Frequently	3 - Somewhat Frequently	4 - Somewhat Infrequently	5 - Very Infrequently	6 - Almost Never
I drive places on "automatic pilot" and then wonder why I went there	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself preoccupied with the future or the past	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself doing things without paying attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I snack without being aware that I am eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Block 10**

**Thank you for participating in this survey! You are now finished.**

If you would like to enter your name in the drawing for a \$25 gift certificate from Amazon.com or to be contacted about further studies in the Biobehavioral Health Studies Lab at Penn State, click this link. Remember, *your name will in no way be connected to your survey responses.*

Survey compensation and future contact

link: [https://pennstate.qualtrics.com/jfe/form/SV\\_5oiJ2QI5RGCucyV](https://pennstate.qualtrics.com/jfe/form/SV_5oiJ2QI5RGCucyV)

If you do not want to enter you name for the drawing or to be contacted for future research projects, then click the arrows one last time to finish the survey and then you may close this browser.

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## **APPENDIX D: SHORT GRIT SCALE**

### Short Grit Scale

*Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!*

1. New ideas and projects sometimes distract me from previous ones.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
2. Setbacks don't discourage me.
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
3. I have been obsessed with a certain idea or project for a short time but later lost interest.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
4. I am a hard worker.
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
5. I often set a goal but later choose to pursue a different one.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
6. I have difficulty maintaining my focus on projects that take more than a few months to complete.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all



7. I finish whatever I begin.
- Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all

8. I am diligent.
- Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all

---

Scoring:

1. For questions 2, 4, 7 and 8 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 1, 3, 5 and 6 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 divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

---

**Grit Scale citation**

Duckworth, A.L., & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment, 91*, 166-174.  
<http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf>

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.  
<http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf>

**APPENDIX E: CONNOR DAVIDSON RESILIENCE SCALE-10**

## Connor-Davidson Resilience Scale 10 (CD-RISC-10) ©

initials   ID#       date   /   /    visit   age

Please indicate how much you agree with the following statements as they apply to you over the last **month**. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	not true at all (0)	rarely true (1)	sometimes true (2)	often true (3)	true nearly all the time (4)
1. I am able to adapt when changes occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I can deal with whatever comes my way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I try to see the humorous side of things when I am faced with problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Having to cope with stress can make me stronger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I tend to bounce back after illness, injury, or other hardships.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I believe I can achieve my goals, even if there are obstacles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Under pressure, I stay focused and think clearly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am not easily discouraged by failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I think of myself as a strong person when dealing with life's challenges and difficulties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Add up your score for each column**                      0   +      +      +      +     

**Add each of the column totals to obtain CD-RISC score**                      =                                     

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## **APPENDIX F: SELF-EVALUATION TRAIT QUESTIONNAIRE**

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DATE

□□ / □□ / □□

**Self-Evaluation TRAIT Questionnaire**

Developed by Charles D. Spielberger  
STAI Form Y-2

**Directions:** A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you *generally* feel.

	1 = NOT AT ALL	2 = SOMEWHAT	3 = MODERATELY SO	4 = VERY MUCH SO
1. I feel pleasant -----	1	2	3	4
2. I feel nervous and restless-----	1	2	3	4
3. I feel satisfied with myself-----	1	2	3	4
4. I wish I could be as happy as others seem to be-----	1	2	3	4
5. I feel like a failure-----	1	2	3	4
6. I feel rested-----	1	2	3	4
7. I am "calm, cool, and collected"-----	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them -----	1	2	3	4
9. I worry too much over something that really doesn't matter-----	1	2	3	4
10. I am happy -----	1	2	3	4
11. I have disturbing thoughts-----	1	2	3	4
12. I lack self-confidence -----	1	2	3	4
13. I feel secure -----	1	2	3	4
14. I make decisions easily -----	1	2	3	4
15. I feel inadequate -----	1	2	3	4
16. I am content -----	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me -----	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person-----	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests -----	1	2	3	4

**APPENDIX G:**

**CENTER FOR EPIDIMIOLOGIC STUDIES DEPRESSION SCALE REVISED-10**

**Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10)**

Below is a list of some of the ways you may have felt or behaved.

Please indicate how often you have felt this way during the past week by checking the appropriate box for each question.

	<b>Rarely or none of the time</b> (less than 1 day)	<b>Some or a little of the time</b> (1-2 days)	<b>Occasionally or a moderate amount of time</b> (3-4 days)	<b>All of the time</b> (5-7 days)
1. I was bothered by things that usually don't bother me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I felt that everything I did was an effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I felt hopeful about the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I felt fearful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I was happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt lonely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I could not "get going."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## **APPENDIX H: PERCEIVED STRESS SCALE**



**The Perceived Stress Scale (14 items) - Cohen et al, 1983**

*Recommended by The NIH Centers for Population Health and Health Disparities (CPHHD)-Measures and Methods Work Group (MMWG)*

**CPHHD Taxonomy- Health and Mental Health [Well-being]-stress & hypervigilance-Perceived Stress**

*Also recommended by MacArthur Foundation (see*

*<http://www.macses.ucsf.edu/research/psychosocial/stress.php#perceived>)*

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you dealt successfully with irritating life hassles?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

[0=never; 1=almost never; 2=sometimes; 3=fairly often; 4=very often]

*Note: Items 4, 5, 6, 7, 9, 10, and 13 are scored in reverse direction.*

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# ACADEMIC VITA

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## EDUCATION

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**The Pennsylvania State University** **University Park, PA**  
Bachelor of Science, Biobehavioral Health **May 2018**  
Schreyer Honors College Scholar

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## RESEARCH EXPERIENCE

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**Klein Laboratory, Pennsylvania State University** **University Park, PA**  
*Program Coordinator & Research Assistant* **May 2016–May 2018**

- Created THRIVE survey study by compiling scales and coding variables in Qualtrics
- Administered and distributed survey, collected and analyzed data for honors thesis

**Palmer-Wackerly Laboratory, University of Nebraska-Lincoln** **Lincoln, NE**  
*Summer Research Program Participant* **June 2017-August 2017**

- NSF funded REU in Minority Health Disparities Initiative program
- Learned social network analysis (SNA) and researched infertility healthcare communication

**Paulson Laboratory, Pennsylvania State University** **University Park, PA**  
*Undergraduate Research Assistant* **September 2015–May 2016**

- Research on the stress-erythroid process and pathways in response to acute anemic body conditions
- Sterile cell splitting and maintenance, gel electrophoresis, qRT-PCR gene amplification, mouse tagging

**Hanna-Rose Laboratory, Pennsylvania State University** **University Park, PA**  
*Undergraduate Research Assistant* **January 2015–May 2015**

- Funded: Women in Science and Engineering Research, NASA's Pennsylvania Space Grant Consortium
- Worked on Adenylosuccinate Lyase Deficiency and its effect on the movement and speed of *C. elegans*

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## PUBLICATIONS

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Palmer-Wackerly, A. L., Voorhees, H. L., D'Souza, S., & Weeks, E. (under review). Infertility patient-provider communication challenges and (dis)continuity of care: An exploration of illness identity transitions. Submitted to the Health Communication division of the annual meeting of the National Communication Association, Salt Lake City, UT.

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## POSTERS AND PRESENTATIONS

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D'Souza, S. E., Voorhees, H., & Palmer-Wackerly, A. L. (2017). Rethinking the patient-provider communication dynamic in infertility healthcare. Presented at the Summer Research Symposium at the University of Nebraska, Lincoln, NE.

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## HONORS AND AWARDS

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- Best "Peer-Selected Poster" in the Minority Health Disparities REU
- Schreyer Honors College Academic Excellence Scholarship, 2014-2018
- Pennsylvania State University Provost Award, 2014-2018
- Dean's List Academic Achievement Fall 2014, 2015, 2017, Spring 2016, 2017