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Luke E. Faust

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A STUDY OF GRIT AND SELF-EFFICACY IN STUDENTS
IN DEVELOPMENTAL PLACEMENTS

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Education

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Title: A Study of Grit and Self-Efficacy in Students in Developmental Placements

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This mixed methods study examines the impact of grit and self-efficacy and the factors of these constructs on the performance of students at-risk. Grit was explored as a person's passion and perseverance toward a long term goal. Past research on this construct determined it to be predictive of success in many different contexts, not limited to student performance (Duckworth, 2016). Self-efficacy was evaluated using Vuong, Brown-Welty, and Tracz's adaptation of the College Self-efficacy Instrument to measure the impact personal belief in one's ability had on student performance.

First, 184 first year students were surveyed before midterm of their first semester. The survey consisted of five demographic questions, 12 grit questions, and 28 self-efficacy questions. Demographic information including gender, race, socioeconomic status, and first generation status was also statistically evaluated. The data were analyzed as it related to first semester grade point average. Following the quantitative portion, six upperclassmen who had started their careers in the developmental placement category, were interviewed. Three of the interviewees had above a 3.5 GPA and three of the interviewees had below a 2.5 GPA.

The research questions explored were: Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels of grit? Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy than those who have lower levels of academic self-efficacy? How do grit and academic self-efficacy

relate as performance predictors for students in developmental placement categories? How does gender, race, socioeconomic status, and first generation status influence the grit and self-efficacy in students at-risk?

Findings uncovered a relationship between grit and performance, self-efficacy and performance, grit and self-efficacy and performance, and demographic information and performance. Through independent sample t-tests, ANOVAs, bivariate correlations, stepwise regression modeling, and coding interview responses, the researcher was able to evaluate the impact on performance. This study determined that grit and self-efficacy have an impact on student performance for students at-risk.

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CHAPTER 1

THE PROBLEM

For years colleges and universities have used cognitive measures, including standardized tests and high school grades, to determine student applicants' admission status. According to recent research, however, cognitive ability does not fully predict academic performance (Micceri, 2010; Nichols & Clinedinst, 2013). With such a low ability to predict which students will be successful, college has become an expense for the government and families alike. Low ability to predict performance, along with recent college completion statistics, suggest that the students who are underprepared are more likely to fail out than complete college (Charles A. Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). Compounding the problem, the college student has changed in terms of preparedness and cognitive ability. When examining students at-risk, little is known about which student will succeed and which student will fail. It is necessary to gain a deeper understanding of which of these students can and will succeed.

The changes in the college-going population are partially due to K-12 education failing to prepare students to enter college and succeed, further contributing to degree completion problems (Calcagno & Long, 2008; Fulton, 2012; Bettinger, & Long, 2005; Mangan, 2012). As underprepared students are entering college through developmental education programs, little is known about which students will and will not be successful. The purpose of this mixed-methods study was to examine the impact grit and self-efficacy have on the performance of students at-risk and enrolled in a developmental first-year program.

Background of the Problem

The core of American higher education is changing (Doyle, 2010). College "is no longer a pathway to opportunity for a talented few; rather, it is a prerequisite for the growing jobs of the new economy" (Obama, 2009). On a national level, President Obama has placed opportunity for all at the forefront of his push for higher education (Obama, 2009). Focusing on the education of minority students and other students at-risk, he has approved billions of dollars in spending on these initiatives (Bustillos, 2012). The president began his higher education reform agenda by attempting to make college affordable for all; and, from there, he has shifted focus from lessening the financial burden to opening the door for even more Americans to attend college (Carey, 2013). In order for America to grow opportunity through education, open access is the first step (Rutschow & Schneider, 2011). Providing education for all will require resources to support the changing needs of the college population and to provide faculty with a better understanding of the modern student (Melzer & Grant, 2016; Rutschow & Schneider, 2011).

The misalignment of the government's goals and reality is evident when the national six-year graduation rate was under 60 percent at public four year institutions in 2014 (U.S. Department of Education, 2016). While students continue to be less prepared, college and university placement and admissions revolve around the same types of aptitude test scores that were used 100 years ago (Beale, 2012). Aptitude tests provide an inaccurate depiction of student capability; these scores do not predict student performance in college (Boylan, Bonham, & White, 1999; Micceri, 2010; Schuh, 1999; Sparkman, 2012). With this understanding, it becomes necessary to better recognize students and those factors leading to educational performance.

Beyond the unchanged placement methodology lies a much larger issue. Many college students are underprepared (Charles A. Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012; Doyle, 2010). In the community college setting, nearly 50 percent of students are placed into remedial courses, while 27 percent of students at four-year institutions are placed into similar courses and programs (Butrymowicz, 2011). It is estimated that over 700,000 students took some remedial coursework in 2013 (Moss, Kelcey, & Showers, 2014). Those students who place into remedial programming in the community college setting have a 25 percent chance of completing a two-year degree in eight years. When this population is enrolled at a four-year institution, the students have a 30 percent chance of ever completing the degree (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012 & Moss, Kelcey, & Showers, 2014). Incoming college students who are at-risk have low ACT/ SAT scores and are a costly investment for all stakeholders (Brock, 2010; Melzer, & Grant, 2016).

The state and federal cost of such programming exceeds millions of dollars annually, in addition to the time and money spent by students and families (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012; Rothschild, 2012). While these programs focus on developing student skillsets to handle college workloads, they often involve more focused one-on-one attention for individual students. When remedial education is offered in line with best practices, graduation rates nearly double (Boylan, Saxon, & McLeod, 2006). Best practices involve remediation alongside regular coursework, completion of remedial coursework in the first year, and holistic advising along the way (Stuart, 2009). For some students, study skills training (learning applicable reading and note-taking skills, as well as test taking and writing skills) and general student development (addressing

issues like time management, personal/ academic balance, and goal setting) are also needed (Boylan, Saxon, & McLeod, 2006, & Boylan, Saxon, & White, 1994). All of the above assist in raising completion rates, but programs like these described are very costly.

In 2011, colleges, families, and the government spent nearly 3 billion dollars on remedial education (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). In 2013, the government spent over 2 billion dollars on such initiatives (Moss, Kelcey, & Showers, 2014). Nearly 55 million Americans enroll in college each year, while nearly 70 percent of these students need at least one remedial course (King et. al, 2011; Snyder & Dillow, 2012). Understanding students and the factors that contribute to success will allow colleges and universities to nurture those skills and spend resources wisely. It is important to understand why students are labeled *developmental* upon admission to college.

Some public institutions admit students with lower placement scores (based on cognitive measures) and label this category of student as *developmental*, *at-risk*, or *remedial* (Boylan, Bonham, & White, 1999). Students placed into developmental programs generally have lower SAT and/or ACT scores than general admits (Boylan, Saxon, & White, 1994; Moss, Kelcey, & Showers, 2014). It is often assumed that this population does not perform strongly academically, and past research notes a strong correlation between academic performance and retention (Kirby & Sharpe, 2001; Pritchard & Wilson, 2003). Rationales for admitting such students include values of equal access, the development of social and human capital, and the financial stability of institutions (Becker, 1964; Bustillos, 2012; Kinser & Levy, 2006). For such reasons, this population is important to colleges and universities, therefore, it is necessary to raise the completion rates.

With such low completion rates, less prepared students, and high costs of appropriate programming for these students, it is necessary to understand as much about the students as possible. Developing a deeper understanding for students at-risk could contribute to solutions with enrollment issues. It is important to understand what sets apart students at-risk who are successful from those students who are unsuccessful.

Statement of the Problem

The problem is that little is known about which student at-risk will perform well enough to succeed and which student at-risk will not perform well enough to succeed. This research was designed to explore issues involved with students at-risk by contributing to a deeper understanding of those who are successful. For the general population, current placement criteria do not predict college performance (Beale, 2012). Studies that tried to connect SAT and ACT scores to college success were incorrect two out of three times in their predictions (Beale, 2012). Within the population of students at-risk, the scores on such tests are lower, yet some students still succeed (Bustillos, 2012). College is an investment that requires much more background knowledge. Investing in the education of a student at-risk involves expensive programming. Parents, states, and the federal government invest millions of dollars annually in programming to achieve success in this population (King et. al, 2011; Moss, Kelcey, & Showers, 2014; Snyder & Dillow, 2012). Cognitive predictability and spending aside, colleges want and need students to graduate. With all of the issues mentioned, developing a deeper understanding of the noncognitive constructs that contribute to student performance could assist in supporting students at-risk in higher education.

The attrition rate may not be the problem; instead, it may be a result of the fact that cognitive testing is so heavily relied upon for college admission and does not capture the

noncognitive traits that enable students to succeed. Noncognitive traits include, but are not limited to, constructs of self-efficacy, goal commitment, grit or perseverance, and locus of control which have been found in recent research to be attributes of successful college students (Adams, 2012; Pritchard & Wilson, 2003; Tross, Harper, Osher, Kneidinger, 2000). This mixed-methods study examined the possible impact of these traits on students who were deemed underprepared by standard admissions criteria. Understanding the impacts of these traits on students at-risk may assist in solving the problem. Building from related theories, a theoretical framework was designed to support this study.

Theoretical Framework

In developing a deeper understanding for how noncognitive constructs can assist in student success, retention statistics may potentially be impacted. Studies of noncognitive predictors of success and retention are growing in educational psychology (Adams, 2012, Hannon, 2014, Silles, 2011, & Song, & Kwon, 2012). Studies of grit and academic self-efficacy have produced data that assist in understanding student success. Some of this research is new to the field of education, while the foundation can be found in Albert Bandura's social learning theory from almost 50 years ago (Gore, 2006).

Data have been collected on the importance of noncognitive factors in the development of children (Ahmetoglu, Monsen, & Furnham, 2009; Bethune, 2012; Duckworth, 2016; Duckworth & Quinn, 2009; Hannon, 2014; Parviz & Sharifi 2011; Silles, 2011). Duckworth discovered that spelling bee contestants who possess grit are more likely to practice deliberately and work until their goal is met (Duckworth, 2016). Parviz and Sharifi (2011) discovered a relationship between cognitive ability and the noncognitive traits in high school students. Ahmetoglu, Monsen, and Furnham (2009) established that intellectual engagement and approach

to learning serve as predictors of performance in high school students. All of this research suggests that the noncognitive traits play a role in the development of cognition. Using these theories, Paul Tough and Angela Duckworth have both published books to describe how to nurture such traits.

Paul Tough (2012) published a book for parents to assist them in nurturing these noncognitive abilities, suggesting that if these qualities are developed, improved cognition will follow. In higher education, the goal of facilitating development is similar. Duckworth's book (2016) describes how some of the most successful people in many different realms used grit to build their success. If the connection of the noncognitive abilities to success holds true, then there may be a relationship between these noncognitive traits as they exist within students at-risk and the levels of success each finds in college.

To address noncognitive constructs that predict college performance in students at-risk, this study focused on two constructs as independent variables, academic self-efficacy and grit. These two constructs were chosen based on prior research findings that suggest the correlation of each to academic performance (Duckworth, 2016; Duckworth & Quinn, 2009; Vuong, Brown-Welty, & Tracz, 2010). In all of Duckworth's studies, she was able to determine that grit positively correlated with success, retention, and ability (Duckworth, 2016). Vuong, Brown-Welty, and Tracz (2010) had similar findings with self-efficacy in college students. Academic self-efficacy involves the student's degree of confidence when it comes to completing academic tasks (Gore, 2006). Grit, on the other hand, is defined as "one's ability to stick with something over a long period of time until they have mastered it" (Hanford, 2013). Each concept offers a potential explanation for traits needed in order to be successful in college.

The term grit stems from the work of Angela Duckworth from the University of Pennsylvania. Duckworth created and validated a scale to measure long-term goal commitment in many populations. Grit is defined as one's ability to stick with a task for a long period of time until it is mastered (Hanford, 2013). Duckworth has refined her original grit scale to an 8-12 item "Short Grit Scale" which she has used to predict grade point average for adolescents, retention of West Point cadets enrolled in "beast barracks," and success rates of spelling bee competitors (Duckworth & Quinn, 2009). Her work has also predicted retention for new teachers and is now being used as part of a Gates Foundation grant with a population of charter school children (Shechtman, DeBurger, Dornsife, Rosier, & Yarnall, 2013).

Duckworth's study with the West Point Cadets is of particular interest because she studied an elite population prior to their entering a program known as "beast barracks." These cadets arrive with very high scores for cognitive and physical ability. Cadets attend this program the summer before admission, and the attrition rate is extremely high. Duckworth administered the grit scale, along with the other admissions tests. Her scale provided a more accurate predictor of success than the whole candidate score which is comprised of information including high school rank, GPA and SAT scores, and physical exams (Duckworth & Quinn, 2009). This finding suggests that predetermined levels of grit can predict retention and attrition more accurately than other formative measures.

Another study of interest studied the relationship of Grit score with cumulative grade point average of 139 psychology students at the University of Pennsylvania (Duckworth, 2016; Duckworth et. al, 2007). The proposed study explored this same relationship only using students enrolled in a developmental program. Duckworth and her team tested grit scores in this study to see if they could explain variance of GPA. This study determined that higher GPA's were

associated with higher grit scores ($r=.25$, $p<.01$). When SAT scores were constant, the relationship was stronger ($r=.34$, $p<.001$). This finding also established that grit was associated with lower SAT scores which suggests that those with lower SAT scores are grittier than their peers (Duckworth, et. al, 2007). The researchers interpreted this finding by suggesting that, in an elite university, students with lower SAT scores compensate by possessing higher levels of grit (Duckworth, et. al, 2007). In order to stick with goals until they are met, a person must first believe in themselves enough to set the goal; this is where self-efficacy is worth exploring.

Since 1977, when Albert Bandura's social learning theory was introduced, self-efficacy has been a factor in many studies focused on predicting human behavior (Gore, 2006). Researchers have explored the relationship between self-efficacy and academic success for three decades. Valid self-efficacy tools exist and have been adjusted and reproduced to measure the trait across a wide variety of disciplines. Vuong, Brown-Welty, and Tracz (2010) used an online inventory to demonstrate the relationship between self-efficacy and success for sophomore first-generation college students. The findings of this study suggested a strong relationship between self-efficacy and student persistence (Vuong, Brown-Welty, Tracz, 2010). Combining the constructs of grit and self-efficacy this research will explore the relationships of each to success in students at-risk.

This mixed-methods study explored the impact of grit and academic self-efficacy on student performance (measured by grade point average). If noncognitive factors contribute to student performance, it becomes important to use them as a gauge before students with high attrition statistics enter college (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

The developmental program at the focus of this mixed-methods study was able to retain

79 percent of its freshmen in 2012, a rate well above the national average. Since the admissions criteria for this population suggest low ability in cognitive measure based on SAT, understanding any justification for variance in grade point average would be helpful to practitioners.

Duckworth's studies suggest grit may be responsible for student perseverance and success (Duckworth, & Quinn, 2009). Other researchers have discovered that self-efficacy is predictive of success in students (Voung, Brown-Welty, & Tracz, 2010). Combining these theories and exploring their impact on students in developmental programs may be an addition to the literature on predicting success in these populations.

Purpose of the Study

The purpose of this mixed-methods study was to examine the constructs of academic self-efficacy and grit as possessed by students enrolled in developmental first year programs and the impact of the constructs on performance measured by grade point average. Success of students enrolled in developmental programs is often determined by how well they perform in their first year as measured by grade point average (Boylan, Bonham, & White, 1999; Saxon, & Boylan, 2010). Examining these two variables, as they relate to first semester performance, may provide a holistic view of the traits students need in order to experience success.

This study evaluated how well grit and academic self-efficacy can predict variance in grade point average in students within developmental programs. The study was designed as a mixed-methods study so that the qualitative data can assist in explaining confounding variables that may also contribute to variance in grade point average. Analyzing the findings from this study assisted in a deeper understanding for what is necessary for this population to succeed in college.

Research Questions

1. Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels of grit?
2. Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy those who have lower levels of academic self-efficacy?
3. How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?
4. How does gender, race, socioeconomic status, and first generation status influence the grit and self-efficacy in students at-risk?

Hypotheses

Through this mixed-methods study and based on the research, the following hypotheses are identified:

1. Students at-risk who possess high levels of grit will academically outperform those students who possess lower levels of grit.
2. Grit and self-efficacy are largely responsible for the performance of students at-risk.
3. Grit predicts college performance in students at-risk because of the adversity they have faced before being admitted to college. Such experiences contribute to the grit these students possess.
4. Background factors such as gender, race, socioeconomic status, and first generation status play are role in grit, self-efficacy, and the performance of students at-risk.

Significance of the Study

Higher education placement and admissions are changing and beginning to include noncognitive constructs that aid in the prediction of student success (Adams, 2012). With college admission less selective than it was 50 years ago, colleges and universities have even less of an understanding for which students will be successful (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). Recent studies have provided evidence and findings suggesting a correlation between student success and the constructs of grit and self-efficacy (Bustillos, 2012, Duckworth, 2016, Duckworth et. al, 2007, & Vuong, Brown-Welty, Tracz, 2010). While self-efficacy studies have been done on students identified as being at-risk, there is limited research on understanding grit with populations of students at-risk (Vuong, Brown-Welty, & Tracz, 2010). Research on these two variables with this population will contribute to a deeper understanding of today's college student. These findings may provide colleges and universities insight on how to identify, nurture, and develop skills that contribute to student success as measured by grade point average (Tough, 2012).

While developing a deeper understanding for these noncognitive constructs is beneficial to educators, the benefits to student development and growth can contribute to changing the retention picture. The findings of this study can also assist in more closely aligning reality with our nation's goal of improving graduation rates (Obama, 2009). With so many students falling into the underprepared category, it is important to develop a deeper understanding of them (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

Aside from the benefits for students, the field of higher education will be able to use the findings of this study to know what skills are truly essential for student success. Developmental educators may find the data useful in knowing how to help their students thrive. Aligned closely with research in educational psychology, this study is one of the first to use the grit scale with students placed in developmental education programs and to examine grit measure alongside self-efficacy.

Definition of Terms

Academic Self-Efficacy - One's belief in their personal ability to accomplish an academic task (Pajares & Schunk, 2001). Academic self-efficacy was measured using Vuong, Brown-Welty, and Tracz (2010) College Self-efficacy Inventory. This survey, after being administered, gave each subject a self-efficacy score.

Grit - One's ability to set a goal and stick with it over a long period of time (Duckworth, 2007, Hanford, 2013). After completing Duckworth's 12 point grit scale, each participant will be assigned a grit score between one and five.

Student At-risk -These students are usually identified by any of the following: Low socioeconomic status, low SAT/ACT Score, single-parent homes, grade point average from 6th grade and up 2.5 or less, and first generation college students (Bustillos, 2012, Spann & McCrimmon, 1998). These students are often referred to as underprepared due to low ability levels in at least one of the following; reading, writing, and/ or math (Boylan, 2002). For the purpose of this study, students at risk will be defined as students having below an 890 on the reading and math portions of the SAT and/ or, under a 2.5 high school grade point average.

Limitations and Delimitations

Limitations of this study involved the self-reporting nature in which students answer the questions on the quantitative instrument. Since students rated their own self-efficacy and grit, their honesty becomes an assumption of this study. Students had the opportunity to quickly complete their answers and perhaps sway the data. Such limitations were taken into account when considering the validity and reliability of the instruments. Another limitation was brought to light by Duckworth herself. She believes that grit alone cannot be a sole predictor of student success; students may have too many confounding variables in their lives that contribute to success or a lack of it (Duckworth & Quinn, 2009). The researcher used both the grit scale and an academic self-efficacy instrument.

As far as the delimitations of this study, each delimitation was made to narrow the scope of the study. First, students under the age of 18 were not included. Second, students who did not meet the criteria of the developmental placement category were not included; only those with under an 890 combined reading and math SAT score and/ or under a 2.5 high school grade point average were examined. The study is not focused on students in the general college population.

Assumptions

A few assumptions were made in order to conduct this study. It was an assumption of this study that students would be truthful in answering the survey questions. This assumption was based on the fact that they were given no incentive for answering one way or another. Participants also had the option to opt out of the study at any time. It was also to be assumed that all students in the sample are at-risk or developmental. This assumption is based on the definition of a student considered at-risk or developmental. One of the criteria is low SAT score and all of the students admitted through the program to be studied have below an 890 combined

math and verbal SAT score.

Summary

Without successful students, the university ceases to exist. If system stakeholders are to fully understand today's students, sound admissions criteria must be adapted to the current populations. Most universities are still using the same criteria established almost a century ago — a time when students were children of the elite, when girls wore long skirts to class, and boys wore suits (Beale, 2012). This mixed-methods study was designed to identify and explore a new set of predictors of college performance that fit the current student better than the suits and skirts of yesterday.

Students at-risk and enrolled in developmental programs have unique and diverse needs, but their success starts with their desire to be in college. When students are committed to that goal, they merge with the general population without a problem (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). If the student does not possess grit or a belief in his own ability, he may become less successful, a problem deeply affecting today's universities and the futures of tomorrow.

In chapter 2, literature relevant to the study will be addressed. The review of the literature will further explain the topics in chapter one, as well as address where this study fits with current research. While, existing literature explores ideas that parallel those explored in this study, few studies have examined the impact of grit and academic self-efficacy on students at-risk and enrolled in developmental programs.

CHAPTER 2

A REVIEW OF THE LITERATURE

The following chapter will examine closely the related literature. Beginning with a background of developmental education in the United States, this chapter will explore the changing college student population. Following the historical context, the literature on the rationale and the cost for admitting students who are at-risk will be examined. Next, this chapter will discuss the study of cognitive and noncognitive predictors of student success in order to support the theoretical framework. This chapter will conclude with the theoretical framework supported by both academic self-efficacy and grit theories.

Historical Account of College Admission and Developmental Education

When the early colonial colleges first enrolled students, college bound participants were the sons of wealthy business owners who filled the classrooms (Thelin, p. 24). When building the original colleges and universities in the early colonies of the United States, replicating Oxford and Cambridge were the expensive goals that were set in the minds of the colonists (Thelin, p.16). This movement led to enrollment being driven by Christian, upper-class gentlemen coming from wealthy families with strong financial and religious ties (Thelin, p. 17). In the late 19th century, college officials worked together to develop a test that would measure college readiness (Shaw, 2015). In 1901, the Scholastic Aptitude Test (SAT) was first introduced as a standard measure of student ability at the college level (Shaw, 2015). At this point, the SAT became a benchmark for entry into college and students who did not meet predetermined scores were not accepted into colleges.

Controlling admission practices upheld the academic standard of students attending universities in America for most of the 1900s. While developmental education formalized in the

1960s, remediation and student development predates the SAT. Some of the earliest colleges in America began as remedial reading institutes to provide tutoring and training for those studying to work in the ministry (Boylan, Saxon, & White, 1994). Much of the reading was in Latin, and therefore, required preparatory work for many. The need to assist students in Latin became necessary for Harvard as early as 1643 (Boylan, & White, 1987). In the late 1800s, colleges and universities started providing college preparatory programs before students were admitted. By the time the SAT was introduced, nearly 80 percent of American colleges and universities had some sort of pre-admission preparatory program (Boylan, Saxon, & White, 1994). Actual “Developmental Education” programs for providing assistance and remediation to admitted students did not occur until the 1960s.

In the late 1960s, many colleges began paying attention to the way in which students received support (Boylan, Saxon, & White, 1994). By 1976, the National Center for Developmental Education was founded at Appalachian State University (Boylan & Bonham, 2007). This monumental step at Appalachian State started the formal growth of developmental education programs. These original programs provided support for students who were underprepared or underperforming. The support was in content-specific coursework areas, such as reading or mathematics, or in the form of seminars for this population of students (Boylan & Bonham, 2007). These programs offered support in the form of advising, counseling, tutoring, and test preparation for undergraduates, as well as those preparing to take the Graduate Record Examination (Boylan & Bonham, 2007). Many students who received this support tested into such programs or their admission was based on lower SAT scores and their high school GPAs (National Center for Education Statistics, 2003). For over 50 years, placement tests, high school

grade point average, and SAT scores have been used to determine a student's need for support in college (Boylan & Bonham, 2007).

The literature indicates that a student who is developmental is underprepared for the transition from high school to college and is, therefore, enrolled in developmental education programs in the first year (Parker, 2012; Rutschow & Schneider, 2012). Recently, it has become more evident that such programs are needed as the lack of preparation is common in the majority of students (Parker, 2012). The label "developmental student" and the defining characteristics and criteria of this population vary greatly by university and institution. Some consider high school rank, SAT/ American College Test (ACT) scores, parents' education, socioeconomic status, and number of parents in the home as reason for the label "developmental" (Allen, 2009; Bustillos, 2012). Many institutions avoid saying they want to focus on, for example, African-American students who were brought up in single-parent homes; instead, they return to using cognitive predictors found in aptitude and placement tests, as well as high school grade point averages (Bustillos, 2012; Parker, 2012; Camara & Echternacht, 2000). With these criteria, the developmental population tends to be at the low end with high school grade point averages and SAT scores that are below average (Bettinger & Long, 2005). Higher college enrollments have translated into some of the highest attrition rates of all time (Devonport & Lane, 2006; Tinto, 1997). Widely-gathered retention data suggest that students who drop out of college have difficulties adjusting to college but, with resources in place, the students have a better chance to succeed (Lee, Kang, & Yum, 2005; Tinto, 1997).

Over the past six decades, researchers concluded that a strong developmental education program consists of developmental course work in acclimation to the university, learning strategies, and major and career exploration (Boylan & White, 1994). These courses, along with

academic advisement and course specific tutoring, are the pillars defined by Rutschow and Schneider (2012) as necessary in developmental education. These practices are interventions used early in the educational experience, contextualized basic skills classes, and other supports, such as advising and tutoring (Rutschow & Schneider, 2012). As developmental education became a growing part of many institutions of higher education, it became possible to knowingly admit students who were at-risk or developmental.

The More Recent College Student

Retention research on students in developmental education is relatively scarce, which can be attributed to the tendency of higher education scholars to focus on mainstream students (Paulsen & St. John, 2002). In the past two decades, however, the mainstream student has dramatically changed (Parker, 2012). Attewell, Lavin, Domina, and Levey (2006) determined that over 25 percent of new students need at least one developmental course at a four-year institution. When looking deeper into the makeup of developmental populations, this same study found that 52 percent of students from urban high schools, 40 percent of students from rural schools, and 38 percent of students from suburban schools needed some developmental coursework in college (Attewell, Lavin, Domina, & Levey, 2006). In terms of race, 43 percent of African-American students and 27 percent of white students needed developmental courses. In the same study, socioeconomic background also played a role, as 52 percent of students from low SES backgrounds and 24 percent from high SES needed developmental courses (Attewell, Lavin, Domina, & Levey, 2006). Once universities understand the risk associated with admitting such students, it becomes necessary to examine the costs of supporting them.

Admitting Students as Developmental

College admissions and placement criteria are heavily weighted by cognitive measures, such as test scores and grade point averages. These same criteria are partially responsible for the fact that in 2014 over one-third of high school graduates did not attend college (Bureau of Labor Statistics, 2015). Some of those students may have wanted to attend college, but cognitive measurements could have assisted in swaying them against applying; the SAT has had this impact for decades (McClelland, 1973; Parker, 2012). McClelland also studied the idea that admissions labels, based on cognitive predictors, limited college access in general and also specifically to minority populations (McClelland, 1973). This research took place at a time when college access was expanding beyond the children of elite and economically privileged families (McClelland, 1973). Open admissions policies began in the 1960s and, “inadequate academic preparation was no longer a barrier to college access” (Markus & Zeitlin, 1993, p. 17). Institutions are admitting more students who are underprepared and developmental (Boylan, & Trawick, 2015). As this trend continues, cognitive performance measures are lower and institutions are admitting students with a lower chance of success (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

Higher education’s answer to admitting these types of students is Developmental Education programming (Boylan, & Trawick, 2015). Most of the literature on developmental education focuses on community colleges. Characteristics of the community college population and students at a rural four-year public institution are very similar when speaking in terms of first-year student need (Strauss, & Volkwein, 2004). Students in both settings are likely from one of the following criteria: single parent homes, low socioeconomic class, low SAT or ACT scores, low high school GPA, and/or first generation college students (Strauss & Volkwein,

2004; Quint, Jaggars, Byndloss, & Magazinnik, 2013). Retaining this category of student requires a more one-on-one approach to advising, while offering additional coursework to make up for low reading and math ability levels (Boylan, & Trawick, 2015).

In order to improve retention, institutions offer developmental education, programs and courses designed to enhance student retention and success of an underprepared population (Boylan & Bonham, 2007). While these programs continue to grow, cost of supporting underprepared students grows as well. Next, the cost of developmental education will be explored, not only for the institutions, but also for families and tax payers as well. As an understanding for cost is presented, it furthers the rationale for deepening the understanding of what traits exist within a successful student.

Cost of Developmental Education Programs

Providing services to better support low-performing populations is expensive to families, institutions, and the government (Boylan, & Trawick, 2015). Students and families spend more money on coursework that may be considered remedial and not count toward graduation (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). Institutions spend more money on courses and programming with low student to faculty ratios (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). Taxpayers are spending money when the government at the state and federal level are supporting these initiatives (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

State funding is often used to offset these costs. One example is the Pennsylvania ACT 101 grant. In the past 41 years, the ACT 101 grant has spent upwards of 100 million dollars on

initiatives to assist students at-risk in the attainment of a college degree, 2.5 million dollars were spent in 2015. This number has been significantly reduced in the past decade (Pennsylvania Higher Education Assistance Agency, 2015). Funding for admitting populations at-risk has been reduced nationally and locally, but the numbers of underprepared students continue to grow (Parker, 2012). When this happens, the institution is left with to pay for it, and in turn, much of the cost then becomes the student responsibility (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

Debates about who should pay for the underprepared student are growing more frequently than in the early years of developmental education (Boylan, & Trawick, 2015). State and federal spending is being stretched in higher education, and the area of developmental education continues to be reduced (Calcagno & Long, 2008; Fulton, 2012; Long, 2005; Mangan, 2012).

Although funding for developmental education, similar to funding for higher education in general, has declined over the past generation (PHEAA, 2015), there has been some movement for supporting developmental education in recent years. President Obama's initiative to make America the most educated nation in the world led to the pledge of at least two billion dollars to community colleges (Maranto, & McShane, 2012). This spending accounted for community college grants to offer college educations to more Americans than ever. Over 50 percent of community college students take at least one developmental course (Quint, Jaggars, Byndloss, & Magazinnik, 2013). In order to continue receiving funding support, it is important for institutions to understand student academic needs and potential for retention and graduation in order to protect the investment of so many entities.

With climbing education costs and the increasing number of underprepared students, institutions are left with climbing bills which are shared with the student and taxpayer alike (Bettinger & Long, 2005; Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012; Engle, Yeado, Brusi & Cruz, 2012). College is no longer exclusively for the elite populations that have dominated the landscape of higher education throughout history, and, instead, is to be an opportunity for all (King, et al, 2011; Lederman, 2013). Developmental education allows institutions to promote opportunity, which parallels the very goals and recent initiatives of the president of the United States (Obama, 2009). The cost associated with admitting the underprepared student affects institutional abilities to achieve graduation goals (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012).

The Need to Invest in Students Who are Developmental

Becker's human capital theory posited that there is a method to the way both governments and individuals view investments in education (Becker, 1964). This theory utilized cost-benefit analysis to determine the worth of investing in a college education (Becker, 1964). Many modern leaders in government and education agree with this theory and feel the benefit still outweighs the cost (Bettinger & Long, 2005; Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012; Obama, 2009). According to an analysis of the competition to become the most educated, Douglass found that Americans continue to buy in to the idea of human capital. The percentage of Americans who see a value in higher education continues to rise (Douglass, 2009; Obama, 2009; PHEEA, 2015).

Douglass (2010) also published a report of California's efforts to increase the number of degrees obtained by its residents. This report was in response to Obama's goal to increase the

number of college graduates in our country by eight million by year 2050 (Douglass, 2010). Douglass examined the impact of the increase of college graduates in the state of California. He discovered that in keeping with their share of the population being one eighth of the United States, they were responsible for one million of these degrees. In order to restructure California's higher education system, they began looking at the industries of which the demands were not being met in terms of applicants with qualifying degrees (Douglass, 2010). The researcher discovered that the college graduates in California would not be able to keep pace with the growing job market (Douglass, 2010). Douglass also noted that as the economy rebounded from the recession, industries requiring college degrees rebound faster than industries that do not require college degrees. The response and suggestion from this review of California's higher education practices was to provide broader access to higher education in order to meet the demand of the workforce (Douglass, 2010). This research highlights the parallels between the employment market and higher education, furthering the argument that higher education for all leads to a more productive workforce and society.

The belief that there is value in an educated nation deepens the rationale for students at-risk and enrolling in developmental programs. Current initiatives to raise college completion lead to a need for a deeper understanding of the modern student (Obama, 2009). With a deeper understanding of students and noncognitive traits that correlate with performance, colleges and universities continue to increase the economic value of the United States through the development of human capital. For years, colleges have admitted students based on cognitive ability, but as the college student changes, a deeper understanding for which students can be successful is necessary (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). For years, the understanding of student

success has focused on precollege cognitive ability, so the following will examine the literature on cognitive predictors of student success.

Cognitive Predictors

The standard placement criteria in American colleges and universities include SAT/ ACT scores and high school grade point averages (Hannon, 2014; Kobrin, Patterson, Barbuti, Mattern, & Shaw, 2008). Schools with a more selective admissions process look at other factors such as interscholastic activities, interviews, and community service. Aptitude test scores and high school GPA are the two most common factors in determining college admission (Kobrin, Patterson, Barbuti, Mattern, & Shaw, 2008). Aptitude test scores are referred to as *cognitive predictors* since they produce numerical values based on one's cognitive abilities. As mentioned previously, the college student is changing, but in most cases the standard placement criteria have not evolved. The SAT has been used for nearly 100 years (Beale, 2012). *Developmental students* are those who are admitted to universities in spite of standardized testing that indicates below average cognitive ability (Parker, 2012). If cognitive ability as measured on standardized tests is used to predict student performance, it is necessary to evaluate how accurate these predictions are.

Many studies have been conducted to evaluate the predictability of standard placement criteria; some have done so with success. Shaw and Mattern (2013) developed a way to predict college attrition based on high school grade point average and SAT scores. Conclusions from this study determined that those students with the largest variance between pre-admissions measures based on grade point average and SAT scores and first year grade point average would likely drop out or leave institutions later in the college career (Shaw, & Mattern, 2013). This

finding revealed that these two variables, test scores and high school grade point average, are, at best, marginally predictive of student performance.

When examining aptitude tests as college predictors, two separate studies found that high school grade point average and SAT/ ACT scores are accurate in predicting college success no more than 25 percent of the time (Schuh, 1999; Sparkman, Maulding, & Roberts, 2012). These findings suggest that a standard placement criterion is wrong three times more often than it is right. The SAT exam has been used since 1926 as a means to college entrance (Beale, 2012). While exam scores are most frequently used, high school grade point average has been found to predict college freshman year performance (Camara & Echternacht, 2000). Other studies have produced data suggesting that these predictors did little to predict higher first-year achievement levels in college students, and suggested that GPA is more accurate because it includes effort, attendance, motivation, and conformity (Noble & Sawyer, 2002) – in other words, noncognitive predictors. The cognitive predictors alone have proven to be less predictive with the changing college student. This conclusion suggests the importance of such noncognitive predictors in student performance.

Noncognitive Predictors

Traits that are not associated with cognition are referred to as noncognitive or soft-skills (Adams, 2012). Noncognitive traits include but are not limited to, emotional intelligence, self-regulation, self-efficacy, and grit. Two popular measures of noncognitive predictors are the “Big Five” personality traits and self-regulation (Kitsantas, Winslerm & Huie, 2008; Sparkman, Maulding & Roberts, 2012). Data have been collected and studies have been done on the importance of such noncognitive factors for children (Ahmetoglu, Monsen, & Furnham, 2009; Bethune, 2012; Duckworth & Quinn, 2009; Parviz & Sharifi 2011; Silles, 2011). In his parenting

book, Tough (2012) suggested that if some of these qualities are developed, the cognitive growth will follow. If this suggestion holds true, those possessing noncognitive traits can be successfully retained in college and outperform those who do not possess the same traits.

When speaking of retention and attrition numbers, it cannot be overlooked that students need noncognitive skills (Adams, 2012; Tough, 2012). These traits can be personality traits, measures of self-worth and ability, and/or measures of conscientiousness (Adams, 2012; Tough 2012). It has been observed that these soft skills are not prevalent in American youth. In a recent publication in *Education Week*, Adams argues that the lack of soft skills helps explain the reason America is ninth in the world in college enrollment, while last in completion (2012). Similar to the ideas of Paul Tough, Adams sees the answer as parents giving children more responsibility and nurturing leadership qualities within children (Adams, 2012; Tough, 2012). One of the soft skills necessary to examine deeper is emotional intelligence.

Research on emotional intelligence, one's ability to harness emotions and use them for emotional and intellectual growth, as a predictor of college success, has become more popular in the past few decades. Tinto (1993) and Barefoot (2004) both suggest that variables in dropout rates stretch from difficulties in areas such as connecting to others to learning to study and deal with independence. A study using the Bar-On 125 EQ-I, an instrument to measure emotional intelligence, was conducted to explore this construct. In this study, Sparkman, Maulding, and Roberts (2012) discovered that measures of social responsibility, flexibility, and impulse control were all factors of emotional intelligence that influenced college performance and retention. They concluded that impulse control and social responsibility were the factors most predictive of college success (Sparkman, Maulding, & Roberts, 2012).

Self-regulation is another widely researched noncognitive predictor of college student performance. The researchers concluded that while college requires the presence of some intelligence measures, these measures do not differentiate between high and low achieving students (Kitsantas, Winsler, & Huie, 2008). In one particular study (Kitsantas, Winsler, & Huie, 2008), researchers examined student self-regulation and self-efficacy. Self-efficacy was found to be a stronger predictor of student retention and success into the sophomore year. Another finding suggested that self-regulation offered little insight into explaining levels of student performance (Kitsantas, Winsler, & Huie, 2008). This study surveyed 43 freshman participants who answered Likert style questions at different points of the school year. The sample had a higher average SAT than the national average. Of the non-cognitive predictors this group studied, self-efficacy scores had the strongest correlation with first semester GPA ($r=.44$) (Kitsantas, Winsler, & Huie, 2008). When evaluating self-regulation in terms of time and environment management, the correlation was a little lower ($r=.35$). As the retained group was surveyed again in year three, the noncognitive variables combined to explain 47 percent of the variance in grade point average. Throughout the study and after running multiple regressions, self-efficacy provided the most significant result ($p<.001$) (Kitsantas, Winsler, & Huie, 2008).

Noncognitive factors in academic success have been explored via the frequently cited “Big 5” personality traits. These traits include openness, conscientiousness, extraversion, agreeableness, and neuroticism. Each of these traits has been examined for effects on college success and performance (Komarraju, Kara, Schmeck, & Avdic, 2011). In some studies, the findings have been similar (Komarraju, Kara, Schmeck, & Avdic, 2011; Pang, 2008; Song & Kwon, 2012). American university students show a significant correlation between academic success and conscientiousness and extraversion (Pang, 2008; Song & Kwon, 2012). Pang (2008)

examined the impact of parental involvement and the big five personality traits had on high school and college grade point average. The findings from this study were that conscientiousness was the most powerful predictor of grade point average (Pang, 2008). From these five predictors, it has been established that intellectual curiosity can influence academic achievement (Komarraju, Kara, Schmeck, & Avdic, 2011). This curiosity also has been shown to encourage student motivation (Song & Kwon, 2012).

Adrian Furnham (2012) produced a study at the University of London that involved students taking a battery of personality, intelligence, and learning style inventories before the beginning of their first semester of college. One of the inventories assessed the “Big Five” personality traits. This study produced evidence that the most predictive factors of student success were conscientiousness and intelligence. These findings suggest that current admissions criteria should not be removed, as it is still valid to an extent since these criteria can demonstrate intelligence. Data from this same study showed correlations between conscientiousness and intelligence measures (Furnham, 2012). This study demonstrated that the cognitive and noncognitive traits together provide a more accurate prediction of college success.

In 2004 Ridgell and Lounsbury published a study which used the “Big Five” intelligence measures and measures of work drive, a trait similar to work ethic. These measures were part of an attempt to predict college student success in a first-year psychology class and on overall GPA. Work drive, as measured by Lounsbury’s 11-point scale, was found to be valid in predicting student performance (Ridgell, & Lounsbury, 2004). The “Big Five” was seen as less predictive of student academic success but still accounted for some of the variance in final grades. This research implies that the majority of the students were freshmen who could have experienced other variables affecting their individualized success (Ridgell, & Lounsbury, 2004.)

Lounsbury (2004) introduced an instrument to be considered for the proposed study. This instrument, a measure of work drive, validated through multiple studies of over 20,000 individuals, measures a person's disposition to work long hours and extend effort for purpose of one's job (Lounsbury, 2004). While the ability to adapt the scale exists, much of the questioning involved is workplace specific, allowing for misinterpretation by student participants.

In another study, published in 2013, researchers examined the predictability of psychosocial factors on the freshmen year grade point average. Standard placement criteria provided justification for the reasons some of the psychosocial predictors were in place; the study was able to predict first and second-semester grade point averages of nearly 500 students (Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013). Of all of the predictors examined, self-efficacy was the most predictive for the first semester GPA ($r=.36$) and second semester GPA ($r=.34$). Another trait they measured and found to be predictive was attention to study (Krumrei-Mancuso, et. al, 2013). A portion of this study also examined overall life satisfaction, which connects strongly with the work of Tinto and suggests that students must connect with their campus and goals to experience success (Krumrei-Mancuso et. al., 2013; Tinto, 1997). For example, the student who becomes involved in academic and social opportunities will perform at higher levels as measured by grade point average.

Through much of the existing research on soft-skills and noncognitive traits that have predicted success common threads emerge. One of these threads is that there is some level of grade point average variance that can be explained by these traits (Krumrei-Mancuso et. al., 2013; Ridgell, & Lounsbury, 2004; Tinto, 1997; Tough, 2012). Second, self-efficacy tends to have a high impact on a student's performance (Kitsantas, Winsler, & Huie, 2008; Krumrei-Mancuso et. al., 2013). Third, work drive, and deliberate focus on study is also predictive of

student performance (Krumrei-Mancuso, et. al, 2013; Ridgell, & Lounsbury, 2004). Continuing the evaluation of literature on soft-skills or noncognitive predictors, self-efficacy and grit are two current traits which will be explored next.

Grit and Self-Efficacy

Self-efficacy and grit have both been used in prior research suggesting the correlation of each to academic performance (Chemers, Hu, & Gracia, 2001; Duckworth, 2016; Duckworth, & Quinn, 2009; Vuong, Brown-Welty, & Tracz, 2010). Self-efficacy in relation to a college student is the student's belief or degree of confidence when it comes to completing college tasks (Gore, 2006). Grit, on the other hand, has been defined as "one's ability to stick with something over a long period of time until they have mastered it" (Hanford, 2013). Academic self-efficacy, is defined by applying Bandura's definition of self-efficacy to any academic goal. (Duckworth, & Quinn 2009; Bandura, 1997). Each of these factors offers a potential explanation for what "else" is needed in order to have a higher grade point average in college.

Grit is a newer construct. Similar to work-drive, grit has been able to explain variance of performance (Duckworth, 2016; Lounsbury, 2004). The basic make up of grit, includes goal commitment and perseverance (Duckworth, 2016). Self-efficacy has more history in educational research than grit. Parallels between self-efficacy and the foundational theories behind grit have been explored (Bong, 2001; Duckworth 2016). Other research suggests the two are unrelated but individually play a role in student performance (Anderman & Midgley, 1997).

One study on the relationship of a student's goal orientation and self-efficacy on academic performance was published in 2007 by Hsieh, Sullivan, and Guerra. A portion of the student sample was students with low performance levels as measured by grade point average. Each student completed the Achievement Goal Orientation Inventory and the Patterns of

Adaptive Learning Survey. The study's findings supported the idea that a student's approach and self-image played a role in academic success. The researchers in this particular study took the early ideas of Bandura's definition of self-efficacy and found a relationship with students' adoption of mastery goals. Of the 112 participants, 60 were on academic probation (failing to meet standard grade point average set by the institution). The subjects who exuded higher levels of goal orientation and self-efficacy outperformed those with lower measures in terms of grade point average. Results from this study found that GPA positively correlated with self-efficacy ($r=.36$) and with goal orientation ($r=.40$). One observation that linked goal orientation to the study was that the students who were on academic probation tended to set performance-avoidance goals more commonly than those in academic good standing (Hseih, Sullivan, & Guerra, 2007).

Overall, this study is one of very few studies directly examining both grit and self-efficacy. Perhaps the contrasting ability or lack of ability to draw a conclusive link may be why such studies have not been done. In context with Bandura's definition, it was established that self-efficacy contributes to motivation, while also contributing to belief in one's ability to accomplish goals (Bandura, 1997). One strong connection between grit and self-efficacy has to do with goal setting and goal orientation. The early research in self-efficacy determined that those with higher self-efficacy set and stuck to goals (Bandura, & Cervone, 1983). Grit has been discussed by Duckworth as one's ability to stick with something, meaning gritty students are less likely to give up on their goals (Duckworth, 2007). If the constructs of grit and self-efficacy hold true in theory, then students with high measures of each will likely have higher grade point averages than those with lower measures of grit and academic self-efficacy. Next, the literature on grit as an individual construct will be examined.

The term “grit” has been popularized by Angela Duckworth (2009). She created and validated a scale to measure long-term goal commitment in many different populations. Grit is defined as one’s ability to stick with something for a long period of time until it is mastered (Hanford, 2013). Grit, as defined by Duckworth, specifically speaks to persistence and passion toward achieving one’s goals (Duckworth, 2016; Duckworth, Peterson, Matthews, & Kelly, 2007). In six studies combined, grit accounted for four percent of average variance in differing success outcomes as measured by grade point average. Duckworth set the foundation by arguing that “The importance of intellectual talent to achievement in all professional domains is well established, but less is known about other individual difference that predict success” (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1).

The research on grit can be seen as one that may someday fit in the “Big Five” framework, and it can be argued to hold the same predictive validity as IQ when speaking in terms of high achievement (Duckworth, 2016; Duckworth, Peterson, Matthews, & Kelly, 2007). Duckworth’s pilot studies revealed preliminary findings suggesting adults are grittier than children, with post-college graduates ranking highest in grit. It suggests that the original grit scale was very similar to the other “Big Five” traits in terms of predictive validity. Grit related most strongly to conscientiousness ($r=.77$), which of the five most strongly correlated with career longevity in the previously mentioned study of the predictive validity of the “Big Five” (Duckworth & Peterson, 2007; Song & Kwon, 2012). This study ($n=706$) used both the grit scale and the “Big Five Conscientiousness” scale to find relationships and predictive validity of each. The results discovered the strong relationship between grit and conscientiousness as well as a relationship of each to the amount of career changes in adults (Duckworth, et. al, 2007).

Duckworth's third study focused more on a student population. She studied the predictive validity of the grit scale for student grade point average of students at an elite university. Duckworth then examined the relationship of grit and SAT score as a measure of intellectual ability in order to see if grit could explain any variance above and beyond the normal GPA variance (Duckworth, Peterson, Matthews, & Kelly, 2007). This study showed gritty students outperforming their peers ($r=.25$), and this correlation was even stronger when SAT scores were constant ($r=.34$). This correlation is consistent with the findings of a study by Moutafi, Furnham, and Paltiel in 2005 in which the authors concluded that less intelligent people use work ethic and determination to compensate.

Another study led Duckworth to West Point Military Academy where she administered her grit scale to 1,200 cadets right before they entered what is known as Beast Barracks (Duckworth, & Quinn, 2009). After comparing the grit score to the rest of the whole candidate score, it proved to be unrelated to academic GPA, military performance score, and physical aptitude exam. Grit related to self-control and was more predictive of completion of Beast Barracks than any of the other scores (Duckworth, Peterson, Matthews, & Kelly, 2007). Her next study was in the same setting with a similar sample, only this time evaluating how its predictive validity measured up to the Big Five Conscientiousness. The whole candidate score was related to conscientiousness but not grit. The grit scale again showed its ability to outdo other predictors (Duckworth, Peterson, Matthews, & Kelly, 2007).

Following all of these studies, grit was also used to show the predictability of spelling bee contestant success and the retention of teachers. The major difference between the grit studies to date and the proposed use of the grit scale is that the grit scale so far has not been used on anything other than elite populations. Another issue is that the grit scale is self-reporting and

transparent, so it is subject to participant bias due to its self-reporting nature (Duckworth, Peterson, Matthews, & Kelly, 2007).

Duckworth has refined her grit scale to an 8-12 item “Short Grit scale,” which she has used to predict grade point average among adolescents, retention of West Point cadets enrolled in “beast barracks,” and spelling bee competitors (Duckworth, & Quinn, 2009). Her work has also predicted retention in new teachers and is now being used as part of a Gates Foundation grant with a population of charter school children.

In a recent study at Ohio State University, researchers assessed the predictive validity of grit on African-American male student success at a predominantly white institution. In this particular study, grit accounted for 24 percent of GPA variance among the participants (Strayhorn, 2013). Strayhorn also reviewed students’ cognitive measures after administering the grit scale, only to recognize that those with higher levels of grit performed higher on both the college boards and in regards to high school GPA (Strayhorn, 2013).

The United States Department of Education recently used the research of Duckworth and others to suggest a shift in their aims within the public school system. They have begun to research student grit and perseverance, as well as the importance of nurturing such traits for twenty-first century learners (U.S. Department of Education, 2013). This change will promote the same character education Tough (2005) discusses in his parenting book by using the very tools created by Duckworth. In terms of developmental students and their measures, the government’s study is measuring noncognitive traits as part of school readiness programs and including interventions of student mindset when needed (U.S. Department of Education, 2013). Another noncognitive trait that will assist in understanding student performance is self-efficacy.

Since 1977, when Bandura's social learning theory was introduced, self-efficacy has been used in many studies to predict human behavior (Gore, 2006). Researchers have explored the relationship between self-efficacy and academic success for four decades. Although the measurement instruments differed, the findings were often the same. Gore published a predictive validity study in 2006 of two different scales to measure self-efficacy. In this study Gore denotes the importance of the nature of criteria and the type of self-efficacy measured (Gore, 2006). While this shows self-efficacy is a predictive trait or construct, the literature on academic self-efficacy is more critical.

In an earlier study, researchers used several self-efficacy instruments to draw relationships between grades and persistence in scientific majors (Lent, Brown, & Larkin, 1984). This study was based on the theoretical framework of Bandura (1977, 1982), which suggested that student belief in their ability would translate into sustainable effort towards their goals. The study by Lent, Brown, and Larkin (1984) recorded data that showed a strong correlation between self-efficacy, which they labeled as a cognitive trait, and academic persistence.

Many of the past studies found that students with higher levels of self-efficacy perform at a higher academic level (Chemers, Hu, & Garcia, 2001). Researchers defined academic self-efficacy as "students' confidence in mastering academic subjects." Valid self-efficacy tools have been adjusted and reproduced to measure the trait across a wide variety of disciplines. Vuong, Brown-Welty, and Tracz (2010) used an online inventory to demonstrate the relationship of self-efficacy in sophomore first-generation college students and their successes. The findings of this study suggest a strong relationship between self-efficacy and student persistence, as well as grade point average (Vuong, Brown-Welty, Tracz, 2010). Through many multiple regressions, the study examined both first-generation college sophomores and the regular sophomore

population. Conclusions of the study were that first generation sophomores were less persistent and produced lower GPAs than second generation sophomore students. The study also noted that self-efficacy measures were a variable predictive of GPA in all sophomore students.

Using measures of self-efficacy and grit of students in developmental education programs will help in assessing whether noncognitive factors play a role in predicting student performance. Evaluating high performing developmental college students on these two factors in will assist in predicting which constructs are necessary for success. These two measures will provide the primary focus of this study based on the validity found in the instruments used and the predictability of what the results have shown in past studies. Aside from noncognitive predictors including grit and academic self-efficacy, there are other variables that can contribute to student performance. These variables can be background traits such as socioeconomic class, parents' educational background, and so on. The following literature will assist in explaining the impact of such factors.

Other Variables Impacting Student Performance

While grit and self-efficacy can be indicative of student performance, there are several other factors that have impacted performance of students at-risk. Specifically, four factors are examined as they impact performance. These include gender, race, socioeconomic status, and first generation status. Gender has been found to impact performance and levels of self-efficacy in past studies (D'Lima, Winsler, & Kitsantas, 2014). Another factor impacting retention and performance is race. Minority students, particularly African American and Hispanic students, are twice as likely to not be successful as freshmen (Matthews, 2010). Also performing at lower levels are students from low socioeconomic backgrounds. While the United States is opening access, retention numbers for those from low socioeconomic status are low (Golnick & Chinn,

2012; Knaggs, 2012). Students considered first generation did not have a parent who completed college. Students who are first generation perform at lower levels (Chen, & Carroll, 2005; DeFreitas & Rinn, 2013). Most students at-risk fit at least one of these criteria, therefore, the impact must be explored.

The Impact of Gender on Performance

Gender has been explored in relation to performance in college for decades (D'lima, Winsler, & Kitsantis, 2014; Keiser, Sackett, Kuncel, & Brothen, 2016). Research has explored the trend that female students have higher grade point averages from grade school on (Carvalho, 2016; U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2009). Studies on gender have also noted many personality differences including a difference in self-efficacy based on gender (D'lima, Winsler, & Kitsantis, 2014; Keiser, Sackett, Kuncel, & Brothen, 2016.) Since 1990, females have had college grade point averages that are .2 higher than their male counterparts (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2009.) Exploring the rationales developed for the difference in performance is of value.

Performance levels of male and female students are attributed to many constructs within the existing research. D'lima, Winsler, & Kitsantis (2014) examined the impact of gender on college student self-efficacy and goal orientation. Using the College Self-Efficacy Inventory as a pre and post-test, they discovered that male students reported higher levels on self-efficacy on both tests. These researchers also explored goal orientation and found that female students tend to give up on mastery goals faster than male students. When examining motivation, the findings were very different. They discovered female students have higher levels of extrinsic motivation while males have higher levels of intrinsic motivation (D'lima, Winsler, & Kitsantis (2014).

Expanding on the performance of male and female students in higher education, differences were found in the discipline of males and females to stay in school.

Male students are not only less likely to go to college, they are 10 percent more likely to drop out than female students (Almås, Cappelen, Salvanes, & Tungodden, 2016). The researchers who discovered this determined that the discipline issue to stay in school is not explained by family background and personal issues and instead can be attributed to less focus and guidance for younger males to select the proper paths for their futures (Almås, Cappelen, Salvanes, & Tungodden, 2016). This may be due in part to the fact that male students have long outperformed females on college placement tests and SATs (Spinath, Eckert, & Steinmayr, 2013).

While male students perform better on standardized tests, the research helps outline why there may be differences between gender groups in college. Spinath, Eckert, & Steinmayr (2013) established that the difference in college performance was not due to general intelligence and instead can be attributed to female students being better adapted to school environments. This is in part due to better verbal intelligence of those surveyed along with higher, agreeableness, as well as stronger self-discipline (Spinath, Eckert, & Steinmayr, 2013). Beyond gender, race has also been determined to impact college student performance.

The Impact of Race on Performance

Race has been an underlying predictor of success in college. Whether examining admissions data or completion data, Asian students have the highest percentage of degree completion in the United States (Ryan & Bauman, 2016). Students who are Black or Latino do not get admitted at the same rate, have lower success rates, and much higher dropout rates compared to students whose ethnic background is White or Asian (Espinosa, Gaertner, &

Orfield, 2015). By examining the literature further and analyzing census data, an understanding for the size of this problem can be understood.

Census data outlines the completion problem. In 2015, the Census Bureau revealed that nearly 47 percent of white adults over 25 reported having an Associate's degree and 36 percent have Bachelor's degrees. For the same group of black individuals, the numbers fall to 32 percent for Associate's degrees and just 22 percent having Bachelor's degrees. Even lower is the degree attainment for Hispanic or Latino students - just 22 percent have Associate's degrees and 15 percent have completed Bachelor's degrees (Ryan & Bauman, 2016). By looking deeper in the literature, different reasons for the problem surface.

With completion data highlighting such large differences by race, suggestions explaining the reasons are widely spread. From the admissions process, literature suggests Latinos and Black students perform lower on standardized tests (National Bureau of Economic Research, 2015). Another issue stems from having a lack of influence from highly educated people of the same race (Ryan & Bauman, 2016; Espinosa, Gaertner, & Orfield, 2015). Much of the problem stems from class systems and what educational experiences are attained before college (Espinosa, Gaertner, & Orfield, 2015). This issue connects directly with SAT performance because white students have a tendency to come from class backgrounds that can afford SAT prep classes (Park, & Beck, 2015). This relationship between SAT performance and socioeconomic status gives reason to explore the literature on the impact of socioeconomic status on college completion and performance.

The Impact of Socioeconomic Status on Performance

Socioeconomic class has an underlying impact on admission into colleges and extends even into the success of those who are admitted (Espinosa, Gaertner, & Orfield, 2015; Jerrim,

Chmielewski, & Parker, 2015; Stephens, Brannon, Markus, & Nelson, 2015). Representation of the middle class and below in highly selective institutions is lower than that of the higher class (Jerrim, Chmielewski, & Parker, 2015). In the past few years, this same issue has been observed at public institutions, as well (Espinosa, Gaertner, & Orfield, 2015; Stephens, et. al, 2015). Students with working/ middle class parents perform at lower levels than the children of the elite (Stephens, et. al, 2015). Next, the basis for the reasons this is true in higher education will be examined.

Justifying the reason for disparities in performance in higher education between different socioeconomic classes comes down to two factors. These two factors are individual functions (i.e. study skills, & college readiness) and structural functions (i.e. experiences, & financial difficulties) (Stephens, et. al, 2015). Students from the working middle class do not have the same educational experiences as those from the higher class. Even worse are the negative educational experiences those in the lowest socioeconomic class experience (i.e. failing school systems, underfunded educational experiences) (Jerrim, Chmielski, & Parker, 2015; Stephens, et. al, 2015). These exposures not only limit students ability to get admitted, but also impact them negatively once admitted as individualized issues the student will experience (Stephens, et. al, 2015). Many students of the middle and lower class also experience greater financial strain, whether the stress leads to underperformance in college or the cost becomes reason the student does not complete, the impact of the strain adversely affects the student (Stephens, et. al, 2015). Also related to race and socioeconomic status is the fourth and final predetermined variable to be discussed, first generation college students.

The Impact of First Generation Student Status on Performance

The majority of students enrolled in community college settings are from working middle class families. In a four-year institution, the majority of students have parents with bachelor's degrees (Stephens, et. al, 2015). Only 13.3 percent of students whose parents do not have degrees will obtain bachelors' degrees, while nearly 50 percent of students whose parents have a degree will obtain a bachelors' degree (Stephens, et. al, 2015). Many studies have been conducted to explore the low graduation rates for students who are first generation (Allen, 1999; Hartley, 2009; Garriott, Hudyma, Keene, & Santiago, 2015; Phillips, Stephens, & Townsend, 2016; Stephens, et. al, 2015).

First-generation college students have similar issues as those from different racial and class background (Stephens, et. al, 2015). First generation college students are more likely to drop out than those whose parents attended college (Chen, & Carroll, 2005; DeFreitas, & Rinn, 2013; Martinez, Sher, Krull, & Wood, 2009). DeFreitas and Rinn (2013) hypothesized that first generation college students had a lower belief in themselves or a lower self-efficacy than non-first generation college students. These researchers discovered that was in fact the case through an analysis of variance which concluded that first generation college students are more likely to perform at lower levels and are more likely to drop out based on their grade point average (DeFreitas & Rinn, 2013). Expanding on this notion, Garriot, Hudyma, Keene, and Santiago (2015) determined that first generation college students had lower self-efficacy. The process of a student who is first generation trying to adapt to college has been described as a cultural mismatch with many obstacles that interfere with success (Phillips, Stephens, & Townsend, 2016).

First generation college students have a higher likelihood to change major and also a higher likelihood to experience a feeling that they would rather be in the workforce (Hartley, 2009). Such feelings add to the cultural mismatch and pose as even more obstacles faced by first generation college students. Hartley (2009) also established that first generation students were more likely to experience negative career thoughts and, therefore, had an increasing likelihood to drop out of school. Whether first generation, low socioeconomic background, or minority status, each of these variables are explored due to their impact on student performance (Bustillos, 2012; Fletcher & Tienda, 2015; Golnick, & Chinn, 2012; Knaggs, 2012).

One study that combined many of these variables was done by Allen in 1999. Allen's (1999) publication outlined a study of 581 first-year students who completed the surveys. Academic performance was measured by GPA and persistence by those who enrolled in a second semester (Allen, 1999). Motivation in this instance had no significant impact on grade point average. Rather, it found that other background variables (pre-college ability, parent's education, and financial aid) accounted for 46 percent of variance in first year grade point average (Allen, 1999). These findings suggested that student background supported student academic performance.

While racial background, socioeconomic status, and first generation status all intertwine, they also help establish a model of student success to test. These predetermined variables were explored to further support the framework for this study. Next, that framework will be explained and established through a review of the literature surrounding academic self-efficacy, grit, student success, as well as the variables mentioned above.

Theoretical Framework

The theoretical framework for this study is based on the impact of grit, self-efficacy, and other preexisting factors that may influence success of students at-risk. This framework consists of the foundational research on academic self-efficacy and grit, grounded in Bandura's (1977) social learning theory and Duckworth's (2007) more recent grit theory. Research on developmental education students has relied on cognitive predictors; however, each of the previously mentioned constructs have predicted success and retention equal to or better than cognitive measures. Self-efficacy has been found to have predictive value in the past, while grit is more recent; both have shown predictive values beyond cognitive measures. In order to better understand students at-risk, an additional scaffold was built into the framework exploring the impact of gender, race, socioeconomic status, and first-generation status. By combining the theories supporting each of these variables a model of a high performing student was explored.

Background Traits

Student background plays a large part in college performance (Allen, 1999; DeFreitas & Rinn, 2013; Duckworth, 2016). There is a long list of factors that support Duckworth's hypothesis that there are too many confounding variables to suggest grit alone can predict college performance (Duckworth, 2016; Duckworth, et. al, 2007). Four variables that have been studied to directly impact student performance are gender, race, socioeconomic status, and first generation status (Bustillos, 2012; Fletcher & Tienda, 2015; Golnick, & Chinn, 2012; Knaggs, 2012). Theories suggest students from these four categories will not perform as well as their peers in college (Fletcher & Tienda, 2015). While each of these pre-existing traits impact performance, if the theories hold true, both academic self-efficacy and grit may further assist in explaining the variance in first semester grade point average of at-risk students.

Academic Self-Efficacy Theory

Bandura's definition of self-efficacy includes a belief in one's self which translates into goal attainment, motivation, and, in turn, success (Bandura, 1997). Measures of high self-efficacy lead to a person setting higher goals (Bandura & Cervone, 1983). Academic self-efficacy translates into higher educational goals (Hsieh, et. al, 2007). Self-efficacy has been found to be predictive of grade point averages in college (Chemers, Hu, & Garcia, 2001). Measuring success of students with higher academic self-efficacy will likely have a predictive ability on which students can achieve higher grade point averages.

Self-efficacy theory has been explored in many academic disciplines and has demonstrated that belief in ability can impact direction, effort, and persistence (Bandura, 1986, Schunk, 1991). Bandura's original hypothesis (1977) was that self-efficacy affects a person's choices of activity, persistence, and effort. While past performance affects a person's self-efficacy, once a strong sense of self-efficacy is developed, failure can be overcome (Bandura, 1986; Schunk, 1991). Applying this construct directly to learning, the construct becomes academic self-efficacy (Hsieh, et. al, 2007; Schunk, 1989).

Bandura's original theory on personal control and social learning involved self-efficacy and outcome expectancy (Bandura, 1986). Schunk (1989) discovered that there is a great variance in academic self-efficacy based on past experience, which influences outcome expectancy. Students who have higher levels of academic self-efficacy hypothetically work harder and stick with tasks even in adverse situations (Schunk, 1989; Schunk, 1991). A student's history and past experience in education will then assist in explaining academic self-efficacy measures. Understanding academic self-efficacy and the above-mentioned theories is an important part of the framework for this study. While academic self-efficacy has been linked to

goal commitment, so too has grit (Duckworth, 2016). Grit theory is the next part of the framework to be explored.

Grit Theory

Duckworth's many studies on grit suggest a valid predictability of success that may outdo IQ measures (Duckworth, & Seligman, 2005). Grit is a person's ability to set and stick to a goal until it is met (Duckworth, 2016). Much of the research on grit has been based on observable qualities that can predict retention and success (Duckworth, 2016; Duckworth, & Quinn, 2009). Grit has been used to predict retention and success in vocational, avocational, and academic settings (Duckworth, 2016; Duckworth et. al, 2007). The grit construct is built on many other theories that are relevant to understanding its importance in developmental student success. These theories include goal commitment, perseverance, and retention theories.

Grit was developed as a way to measure why some people work harder and utilize more of their resources than others, as well as to examine why those with the highest IQ often are not the most accomplished (Duckworth, et. al, 2007). This theory was first examined by comparing the success of those with equal ability and unequal performance. When first exploring grit, the researchers inquired about accomplished investment bankers, academics, medical and law professionals. Just as frequently as talent was used as a descriptive, grit or a close synonym was used to describe why the person was successful (Duckworth, et. al, 2007). Applying this theory to students placed into college developmental programs, all of whom had low cognitive predictors, may explain the variance in grade point average and even retention. Grade point average is viewed as the primary predictor of college retention (Gershenfeld, Hood, & Zhan, 2016).

Grit has been studied along with motivational traits that, similar to personality traits, have enduring stability over time (Duckworth, 2016; Von Culin, Tsukayama, & Duckworth, 2014). For grit, this stability comes from deeper motivation based on values, goals, desires, and preferences rather than instant satisfaction (Duckworth, 2016; Von Culin, et. al, 2014). While cognitive predictors like the SAT and high school grade point average are accurate, the predictive validity decreases for students in developmental education admission categories (Duckworth, et. al, 2007). Assisting in the recognition of these factors which impact college performance will allow focus to shift to fostering such beliefs in students at-risk to better their chances of completing college (Alfassi, 2003). By assessing the noncognitive factors of student success through qualitative and quantitative data, interventions can be created to encourage students in such beliefs during college (Chemers, Hu, & Garcia, 2001; Alfassi, 2003).

Applying the Framework

The framework is built on six variables that have all impacted performance: grit, academic self-efficacy, gender, race, socioeconomic status, and first-generation status. By measuring grit and academic self-efficacy, as they pre-exist in students with developmental education placements, an explanation for grade point average variance may be possible. Grit theory supports that those with grit will have higher grade point averages, and academic self-efficacy theory has been used to establish the same conclusion. Exploring the grade point average variance between those with higher measures of academic self-efficacy and grit is of great value to the research on successful students in developmental placement categories. The other four variables, gender, race, socioeconomic status, and first generation status, also impacted the first semester grade point average of the population.

Conclusion

The changing college going population provides reason to evaluate the understanding of how such students succeed at the college level. Self-efficacy, or one's belief in one's own ability to succeed, connects with the "Big Five" personality traits in terms of conscientiousness and motivation (De Feyter, Caers, Vigna, & Berings, 2012). Duckworth's grit studies have drawn initial comparisons with the "Big Five," but when the two inventories were given, participant scores were unrelated. Overall, grit, which deals substantively with motivational factors, was more predictive of success than the "Big Five" (Duckworth, et. al, 2007). By combining the existing research on developmental college student populations, and best practices therein, with the frameworks of self-efficacy and grit, this study contributes to the existing research on college admissions processes and best practices when working with such populations.

In chapter three, the methodology will be discussed. This chapter will describe the research methods used to attempt to answer the research questions. Chapter three will also introduce the analysis methods used. After reading the following chapter an understanding for how the study was done will be established.

CHAPTER 3

METHODOLOGY

There are two types of research: qualitative and quantitative. Quantitative research focuses on statistical analysis of data in order to form conclusions. Qualitative research focuses on answering “why,” often adding depth of understanding to the result (Creswell, 2013). Modern research practices allow for combining the two methods, known as mixed-methods research (Creswell, 2013). This style is also referred to as intra-method mixing and can be used for a variety of purposes (Johnson & Turner, 2003). By combining these two methods, both breadth and depth were obtained in reference to the research questions. The quantitative data, after analysis, determined whether grit and academic self-efficacy predicted performance. The qualitative data assisted in understanding the development of grit and academic self-efficacy, as well as the degree to which each construct impacted the success of the subject. Since this study examined the impact of variables on student performance, a topic requiring depth of understanding, a mixed-methods approach was determined to be most appropriate.

In order to add depth to the understanding of student performance, this research explored impacts of noncognitive predictors of college performance – specifically grit and academic self-efficacy in a population of students labeled developmental. Aside from the two main variables (grit and academic self-efficacy), demographic data including gender, race, socioeconomic class, and if parents attended college were also reported by participants. While this study used specific instruments and targeted a specific population, student success from a noncognitive standpoint was explored. The purpose of this study was to explore grit and academic self-efficacy, as they impacted grade point average of students at-risk enrolled in developmental placement category at

a large public university in Pennsylvania. This study was a quest to answer the following research questions.

Research Questions

1. Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels of grit?
2. Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy those who have lower levels of academic self-efficacy?
3. How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?
4. How do gender, race, socioeconomic status, and first generation status influence the grit and self-efficacy in students at-risk?

Hypotheses

1. Students at-risk who possess high levels of grit will academically outperform those students who possess lower levels of grit.
2. Grit and self-efficacy are largely responsible for the performance of students at-risk.
3. Grit predicts college performance in students at-risk because of the adversity they have faced before being admitted to college. Such experiences contribute to the grit these students possess.
4. Background factors such as gender, race, socioeconomic status, and first generation status play are role in grit, self-efficacy, and the performance of students at-risk.

Sample

The sample for this study consisted of first-time college students who placed into developmental education at a large public university in Pennsylvania. This placement was based on high school grade point average and/ or SAT scores. While this placement can be based on many criteria which differ from university to university, students were included if their high school grade point averages were below 2.5 and/or their combined reading and math SAT scores were below 890. These descriptors are the criteria for developmental studies placement at a large public university in Pennsylvania where this study took place. This placement category consists of approximately 400 first-year students annually. For the incoming class surveyed in this study, there were 183 participants. This sample was accessed during the sixth week of their first semester of college. Week six was chosen with the intent being by then students may have a better understanding of the demands of college, yet have not yet received their midterm grades. Administering the surveys took involved visiting fourteen classes over a period of seven days. After gathering demographic data, grit and academic self-efficacy scores, and grade point average, the interviews for the qualitative portion started.

For the qualitative portion of this study, the sample consisted of students who began their college careers in the developmental placement. This sample was a stratified sample of students who were above 90 credits (senior standing), three of whom had 2.5 or below grade point average, and three of whom had a 3.0 or above grade point average. Subjects in this sample were interviewed to assist in understanding the impact of grit and self-efficacy on their individual academic careers. The conclusions from the interviews assisted in explaining the model discovered in the quantitative portion of the study. Gathering every element of this data required the use of existing instruments as well as an interview protocol.

Instruments Used in this Study

Research on noncognitive predictors of college success is growing in popularity; therefore, instruments were available to be adapted for this study (Adams, 2012, Allen, 1999, Bong, 2004, Bustillos, 2012, Chemers, Hu, & Garcia, 2001, Duckworth, & Quinn, 2009, Song, & Kwon, 2012, Sparkman, Maulding, & Roberts, 2012, Strayhorn, 2013 & Vuong, Brown-Welty, & Tracz, 2010). This study used two noncognitive measures: grit and academic self-efficacy, as well as demographic data. Both constructs have been studied separately and extensively. As the findings for grit and academic self-efficacy studies have been predictive of success, researchers developed scales to measure aspects of both (Adams, 2012).

The instruments used in this study were adapted from past studies. At the beginning of the survey, participants answered questions on gender, socioeconomic background, racial background, and if their parents attended college or not. There are many existing tools to measure self-efficacy, but the College Self-efficacy Inventory was selected. Vuong, Brown-Welty, and Tracz adapted a self-efficacy instrument to design the College Self-efficacy Inventory and it was completed by first-generation sophomores (Vuong, Brown-Welty, Tracz, 2010). Of all of the existing scales, this measure was used and validated on the most similar population. The instrument has already been adapted to measure academic self-efficacy and was reliable with students fitting one criterion used to label a student at-risk; first-generation (Vuong, Brown-Welty, & Tracz, 2010). The self-efficacy instrument assisted in answering research questions two, three, and four. This instrument also provided a measure of one of the variables, academic self-efficacy, for each participant. Permission to use and adapt this instrument was granted by Dr. Brown-Welty in December of 2015. The instrument has been adapted and

combined with the grit scale for this study (See Appendix A, questions 8-35 for College Self-efficacy Inventory).

In addition to self-efficacy, grit was the second noncognitive trait to be measured in this study. Grit has been defined as perseverance and passion for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Over the past decade, Duckworth has developed and used her 12-point grit scale to measure this trait in different populations, with a reliability averaging $\alpha=.80$ (Duckworth & Quinn, 2009). For this study, the grit scale was identified as one instrument to be adapted for use. Permission to use the grit scale has been granted by Dr. Duckworth. Use of this scale will provide a grit score for each participant, as the second independent variable. The scale is included in Appendix A, questions 36-47.

One of the purposes of this study was to recreate Duckworth's grit studies, except for the first time, this study used a population of students who were at-risk. With a reliability of .80 in predicting retention and/or success in other populations, grit has shown potential to explain variance in grade point average in these students (Duckworth, et. al, 2007, Duckworth & Quinn, 2009, & Strayhorn, 2013). Similarly, self-efficacy has been accurate in multiple studies which have demonstrated students with higher levels of self-efficacy perform at higher levels in college (Bong, 2004, Chemers, Hu, & Garcia, 2001, & Vuong, Brown-Welty, & Tracz, 2010). While the construct of grit has been used on different populations, academic self-efficacy has been used on similar populations. In order to add a deeper understanding to the quantitative data, a third instrument was designed for this study.

The last instrument used was the interview protocol developed specifically for this study. Once transcribed, the qualitative findings were coded and used to support the quantitative findings. Coding procedures are described later in this chapter, but followed the qualitative

research analysis described by Saldana (2009). While the numbers attempted to show the degree to which grit and academic self-efficacy impacted student performance, the interviews were conducted to explain how a student developed high levels of each and how the student applied these to their college career (Dilley, 2000; Ivankova, Creswell, & Stick, 2006). The questions were derived from aspects of the grit scale and from the research on academic self-efficacy (Duckworth, & Quinn, 2009, & Vuong, Brown-Welty, & Tracz, 2010). As the protocol was developed, the need to identify other pre-existing variables was considered and questions were designed accordingly.

In order to illustrate the purpose of each instrument and step in this study the following matrix was designed in Table 1.

Table 1

Matrix of Which Instrument Answers Which Research Question(s)

Research Question	Demographic Information (Appendix A <u>Questions 1-5</u>)	College Self-Efficacy Inventory (Appendix A <u>Questions 6-33</u>)	Grit Scale (Appendix A <u>Questions 34-45</u>)	Interview Protocol (Appendix B)
1.			X	X
2.		X		X
3.		X	X	X
4.	X	X	X	X

Piloting Procedures

The instruments described above were piloted to students in the same population. The pilot study included students in the developmental population attending classes at a satellite campus of the institution where the study took place. Two sessions were held with approximately 30 students in each section in order to pilot the quantitative instrument. At the conclusion of the pilot session, the researcher asked clarification questions (i.e. “Were there any questions you didn’t understand?”) in writing or recorded conversation to make sure the instrument would provide the needed information from the target population. While reviewing the results, two important changes needed to be made before the actual study took place. First, students from the pilot sessions were leaving some questions blank. After establishing that there was no trend in any one or two question being left blank by multiple participants, it was determined that this outcome could be changed through instructions. Second, the last page of the paper survey had one question on the back and some students did not complete it. Both of these issues were minor and could be corrected by instruction at the beginning of the survey. Actual participants would be told “make sure you fill in an answer to each question to the best of your ability, do not leave any blank.” Another instruction would be given to “double check to make sure you did not leave anything blank including the one question on the back of the survey packet.”

Next, the qualitative instrument was piloted to a qualitative researcher and two students. All of the questions from the protocol prompted strong discussion from the interviewee. The one question that needed refined was question five. Originally the question read, how committed to your goals are you and why. The answers were really spread. In order to establish a more comparable result the researcher rephrased the question to read, On a scale of 1-10, 10 being the highest, how committed to your goals are and why do you believe that. After confirming with

the qualitative researcher, this question it was decided that composed this way, the question would offer a more comparable result.

Research Procedures

Students who placed into the developmental program at a large public university in Pennsylvania were asked to participate in this study in the sixth week of their developmental studies course. The researcher administered the surveys in 14 sections of the first-year seminar class with approximately 20 students enrolled in each. This group consisted of the majority of the developmental studies student population. Week six was chosen because it was believed that by this point students would understand more about themselves as college students; yet, they will not have seen the first indicator of performance which is a midterm grade. The instructor of the course was asked to leave at this time to avoid implied coercion. At that point, consent forms were distributed to each student and the study was explained by the researcher. Students then received the paper copy of the survey to complete. Each survey was coded based on student name to insure data were attached to their preassigned codes in order to link their responses to their grade point average at the end of the semester. The researcher assigned a seven digit code to each participant name and then the names were not used moving forward. The survey took between 15 and 20 minutes to complete and consisted of demographic information, as well as the grit questionnaire and the college self-efficacy instrument (See Appendix A). The nature of the questions surround the idea of personal work ethic and ability to stick with tasks.

The last portion of quantitative data was first-semester grade point average which was connected to each student's grit and academic self-efficacy scores. This information was available from the institution once students consented as study participants. Once the grade

point averages were collected, the data used for this study included self-efficacy scores and grit scores paired with grade point average and interview data to add a deeper understanding.

After the data were analyzed, the researcher identified six students to interview. Three of these students were identified as students who were in the developmental studies placement category as freshmen with a 3.0 or above grade point average and 90 or more credits and three had a 2.5 or below grade point average and 90 or more credits. The interview questions were piloted to three students. The office of institutional research provided lists of email addresses for students matching the criteria. Once students fitting the criteria were identified, an email was sent from the researcher requesting an interview. The first six subjects who responded, fit the criteria, and consented were interviewed. The interviews took about 45 minutes and students were asked questions involving subjects' belief in themselves and how they handled adversity through their college experience. Interviewing students assisted in determining the degree to which, if any, grit and academic self-efficacy contributed to their success. Additionally, the interview process explored the development of grit and self-efficacy within the subject. Next, the analysis of data will be explained.

Analysis of Data

In order to gain a better understanding of where higher levels of grit and academic self-efficacy exist, demographic data were gathered. This data set included gender, race, socioeconomic status and first generation status. With this information, relationships were evaluated between the aforementioned independent variables from scores on the grit and academic self-efficacy instruments. Combining this demographic data with the qualitative data assisted in drawing conclusions about where grit and academic self-efficacy were most

prominent in specific subsets of the population. For each individual research question, the data were analyzed differently.

Data analysis for research questions one *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels of grit?* and two *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy those who have lower levels of academic self-efficacy?* included the use of bivariate Pearson correlations to establish relationships between grit and GPA and self-efficacy and GPA. Once correlations to overall scores were found, then independent factor analysis was used to examine which individual grit and self-efficacy questions correlated with GPA. The self-efficacy questions were also regressed through a stepwise regression to identify a model to describe the impact of factors on variance in GPA.

The data analysis for research question three, *how do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?* involved evaluating how overall grit scores and factor scores related to each other in the prediction of GPA. This analysis included bivariate Pearson correlations, factor analysis, and a stepwise regression model. Each part of this analysis assisted in building a model which could explain as much of the GPA variance as possible.

Research question four asked, *how do gender, race, socioeconomic status, and first generation status influence the grit and self-efficacy in students at-risk?* Analysis methods included independent sample t-tests, ANOVA tests, and a stepwise regression model. Independent sample t-tests were used to evaluate the variables of gender, socioeconomic status, and first generation student status. An ANOVA was run to examine the impact of race as a

variable. The two-factor variables of gender, socioeconomic status, and first generation student status were then added to a stepwise regression and examined as they contribute to the variance in GPA. Once this analysis was performed, interviews were conducted on upperclass students who began their careers in the same placement to explore whether their experience supported the performance predicting model found in the quantitative study.

The last phase of this study included a semi-structured interview process. Semi-structured interviewing allowed for flexibility and permitted the researcher to work from an outline of questions (Mason, 2004). This method is common in attempting to uncover life experiences, while the loose structure often allows open dialogue and personal revelations (Mason, 2004). Once the statistical models were tested, six participants were interviewed. These interviews were coded to further support the statistical findings.

The coding process was designed based on “The Coding Manual for Qualitative Researchers” (Saldana, 2015). Each interview response was transcribed first, then decoded. After this process, codes were assigned to different categories of information. Saldana (2015) described this process as “codifying,” when gathered information is categorized to be analyzed (p. 8). Once categorized, themes were developed and used to support the theories of self-efficacy and grit. The coded data assisted specifically in answering research questions three and four. The interviews added to the explanatory data within the findings (Ivankova, Creswell, & Stick, 2006).

The details mentioned above provided valuable information, especially pertaining to the developmental student population. Past studies have had limitations in producing data that identified a relationship between grit and academic self-efficacy, but both constructs have been shown to be predictive of success (Bong, 2001). By examining the effects of grit and academic

self-efficacy on grade point average at the end of the first year, along with scores on both instruments, the relationship became clearer. The coded data assisted specifically in discussing students' perception of the statistical findings. Interviewing students added depth to the model developed from the statistical analysis.

Summary

Research leads to discovery, and this study attempted to uncover findings about pre-existing traits that are necessary for an underprepared student to succeed. Through the mixed methods approach summarized above, the findings of this study answered the research questions and provided insight to the hypothesis mentioned in chapter one. By exploring more about noncognitive predictors of student performance, a deeper understanding of the population was developed.

Chapter four of this study will describe the findings of the study. This chapter will describe both the quantitative and qualitative findings of this study. Included will be an analysis of the data gathered in order to answer the research questions and support the hypotheses. The following chapter will also describe conclusions that were formed from the data and assisted in determining whether or not academic self-efficacy and grit were predictive of the performance of students in the population.

CHAPTER 4

ANALYSIS OF DATA

The purpose of this study was to examine potential influences of academic self-efficacy and grit on the first semester performance of college students who are labeled at-risk. This mixed methods study included a first semester survey of 184 students enrolled in a developmental program, as well as interviews of six senior students who started their academic careers in the same program. The research questions examined the impact of academic self-efficacy and grit on grade point average (GPA) as well as other demographic information (i.e., gender, race, socioeconomic status, and first generation student status) that could lead to the development of a model for which students would perform at higher levels.

Question one examined if there *was a significant difference in the GPA of students in developmental placement categories who have higher levels of grit than those who have lower levels of grit*. Question two asked, *Is there a significant difference in GPA of students in developmental placement categories who have higher levels of academic self-efficacy than those who have lower levels of academic self-efficacy?* Question three asked, *How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?* Lastly, question four asked *How do gender, race, socioeconomic status, and first generation status influence grit and self-efficacy in students at-risk?*

This chapter will begin with an overview of the demographics of the students involved in this study and a description of the instruments that were used. A table was designed to present each research question, the instrument used for data collection, and the analysis of the data that was performed. The data and results are organized by research question and presented in the results portion of this chapter.

Student Demographics

For the quantitative portion of this study, 237 potential participants were identified by their placement in a developmental category as determined by placement exams and high school grade point average. Of this group, 186 students consented and completed the survey instrument. Two students were removed from the study based on the answer to the first demographic question, which labeled them under the age of 18. The final number of participants was 184. Those who did not participate either did not consent or were not present during the class session in which the survey was conducted.

Student demographic information included gender, race, socioeconomic status, and first generation student status. Of the 184 participants, 47.8 percent were male and 52.2 percent were female. This is consistent with the population of the institution where the study was conducted, at which 53 percent of the student population is female. In terms of race, 51.6 percent of participants were White/ Caucasian, 33.7 percent were Black/ African American, 4.9 percent were Hispanic, 1.1 percent were Asian/ Pacific Islander, and 8.7 percent reported other.

The socioeconomic data gathered were based on students reporting whether they were upper class, upper middle class, lower middle class, or lower class. Only 1.2 percent of students surveyed reported as upper class. Upper middle class was the larger portion of the sample with 52.2 percent. Lower middle class accounted for 38 percent of the students surveyed, while 8.2 percent were lower class. Because of the small number of students reporting to be from the upper class, the groups were combined into two groups of upper and lower class. The percentage of students in the upper class of those studied was 53.4 percent, yielding 46.6 percent in the lower class category. Finally, first generation college student status was established by whether the participant had a parent who attended college. Of the 184 students, 34.2 percent were first

generation status and 65.8 percent were not. Next, the second group of students who participated in the qualitative portion of the study, one-on-one interviews, will be discussed.

Potential interviewees included students identified by the university as having completed 90 or more credits, who were currently enrolled, and who started in the developmental placement category. From there this group was separated into high achieving (3.5 GPA and above) and lower achieving (2.5 GPA or below) groups. Aside from these criteria, the group was randomly sampled based on consent and response to the request for participation. It must be noted that the high-achieving participants were quick to respond and to participate, while the lower achieving students required multiple requests for participation. Within one day of the emails being sent, five high achieving students responded to participate while only one low achieving student responded. After three emails to the low achieving group, there were three participants. One missed three meetings before finally showing up.

Interview participants one through three were the high-achieving students, and four through six were the low achieving students. Interviewee one was a female Caucasian student, from the lower middle class, who was not first generation, with a 3.7 GPA. Interviewee two was a male Caucasian student, from the lower class, who was first generation, with a 3.8 GPA. Interviewee three was a Hispanic female student, from the lower class, who was first generation, with a 3.6 GPA.

The participants labeled as lower achieving students included two males and a female. Interviewee number four was an African American male, from the lower class, who was first generation and had a 2.2 GPA. Interviewee five was also an African American male, from the lower class, who was first generation, with a 2.4 GPA. Finally, interviewee number six was a Caucasian female, from the upper middle class, who was not first generation, with a 2.4 GPA.

The surveys were administered during classes held in the seventh week of the first semester (Fall 2016) and this information was paired with the participants' GPAs from the end of the semester. The interviews were conducted in January and February of 2017. At the end of the study, 184 students participated in the quantitative portion of the study and six participated in the qualitative portion. The following section will describe the research tools used in this study.

Research Tools Used

Participants in the quantitative portion of this study completed a survey consisting of demographic questions, *The College Self-efficacy Inventory* (CSEI), and the *12-Item Grit Scale*. Demographic questions were analyzed using the Pearson correlation coefficient, independent sample t-tests, and Analysis of Variance (ANOVA) tests. Scores on the CSEI were analyzed by using a mean score out of ten for the 28 item questionnaire. The mean scores were analyzed using the Pearson correlation coefficient and through multivariate analysis. Similarly, grit scores were developed based on responses to the *12-Item Grit Scale* and analyzed using the Pearson correlation coefficient and through multivariate analysis. All of the questions from the survey that demonstrated impact on GPA through multivariate analysis were also analyzed using a stepwise regression.

For the first research question, *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels?*, the grit scores were paired with GPA and then evaluated using the Pearson correlation coefficient. The second research question, *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy those who have lower levels?* was examined using the same tests with CSEI scores instead of grit.

Research question three, *How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?* was answered by using a multivariate analysis to determine significance of each individual question. From there, the Pearson correlation coefficients were used as well as a stepwise regression. After this data were gathered, the sample of six interviewees were asked questions about their belief in themselves academically and their academic goals. The answers to the questions were coded and themes were developed to support the answer to research question three.

The final research question, *How do gender, race, socioeconomic status, and first generation status influence the grit and self-efficacy in students at-risk?* was explored through themes that emerged from the interviews as well as from independent sample T-tests, ANOVAs, and regression statistics.

This chapter will include a comprehensive description of the data, which were gathered and analyzed to accept or reject each of the four null hypotheses (See Table 2: Overview of Research Questions, Hypotheses, Data Collection, and Analysis Method.) The results and explanation of the study are described in order of research question in order to demonstrate how each hypothesis was tested. Table 2 lists each research question, with its corresponding hypothesis and the instrument used as well as the statistical test used.

Table 2

Overview of Research Questions, Hypotheses, Data Collection, and Analysis Method

Research Question	Hypothesis	Data Collection	Analysis Method
1.	Students at-risk who possess high levels of grit will academically outperform those students who possess lower levels of grit.	<i>12 Item Grit Scale</i> First semester GPA	Pearson Correlation Bivariate Correlation Interview Responses
2.	Students at-risk who possess high levels of academic self-efficacy will academically outperform those students who possess lower levels of self-efficacy.	<i>The College Self-Efficacy Instrument</i> First Semester GPA	Pearson Correlation Bivariate Correlation Interview Responses
3.	Grit and self-efficacy are partially responsible for the performance of students at-risk.	<i>12 Item Grit Scale</i> <i>The College Self-Efficacy Instrument</i>	Pearson Correlation Multivariate Statistics Step-wise Regression Coded Interview Responses
4.	Background factors such as gender, race, socioeconomic status, and first generation status play a role in grit, self-efficacy, and the performance of students at-risk.	Interview Protocol <i>12 Item Grit Scale</i> <i>The College Self-Efficacy Instrument</i> Interview Protocol First Semester GPA	Multivariate Statistics Descriptive Statistics ANOVA Independent Sample t-tests Step-wise Regression Coded Interview Responses

Results and Analysis

Research Question One

The researcher asked, *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of grit than those who have lower levels of grit?* In week seven of the first semester of college, participants completed the 12 Item Grit Scale. Figure 1 below shows the spread of scores.

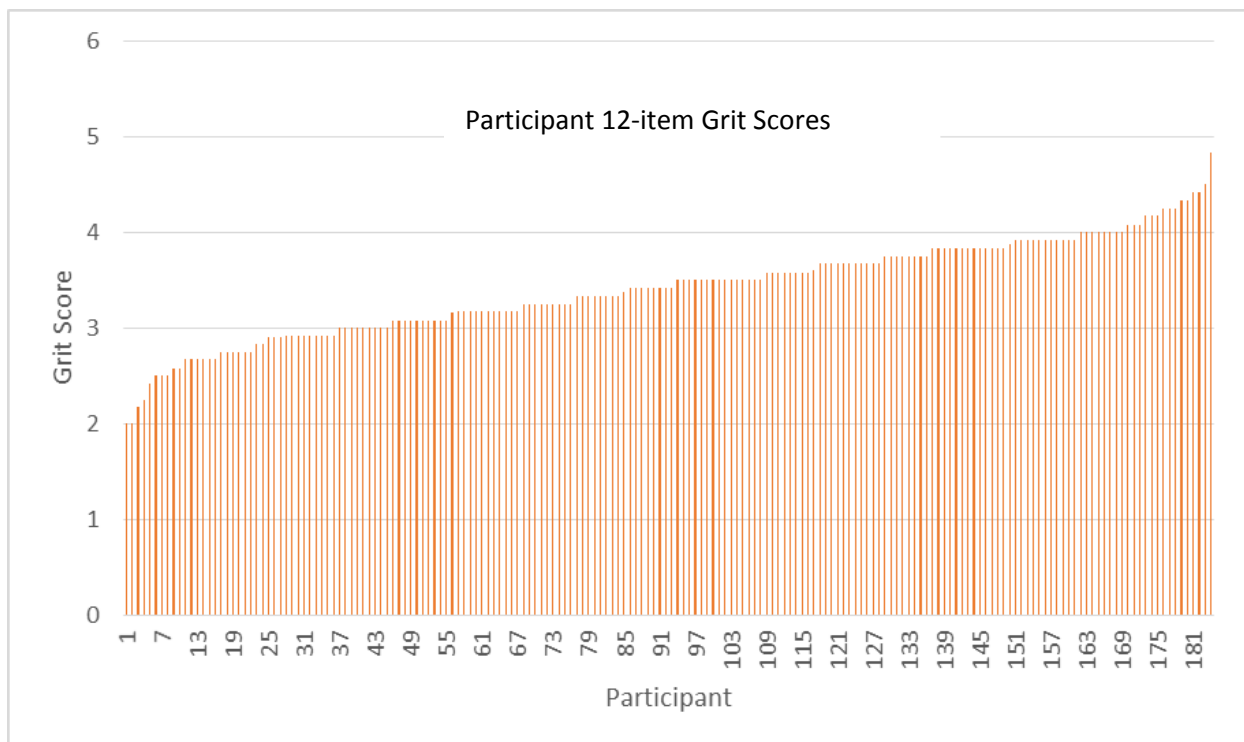


Figure 1. Participant 12-item grit scores.

As shown in Figure One, grit scores ranged from 2.0 to 4.83. The possible score range of the instrument is 1.0 to 5.0. For this table participant number is from lowest to highest grit score and not an assigned number for the study. The results from the 184 students yielded a mean score of 3.4 out of 5 with a standard deviation of .51.

Student GPA is the next data set to be examined. Figure 2 shows the GPAs of participants. As shown in Figure 2, the mean GPA was 2.4 with a standard deviation of 1.04. The university where this study takes place uses a standard 4.0 scale, and GPAs of participants ranged from 0.0 to 4.0. Similar to Figure One, in Figure Two participants are numbered from lowest to highest grade point average and not specific to individual. Figure Three shows GPA in as the dependent variable and Grit score as the independent in a scatterplot.

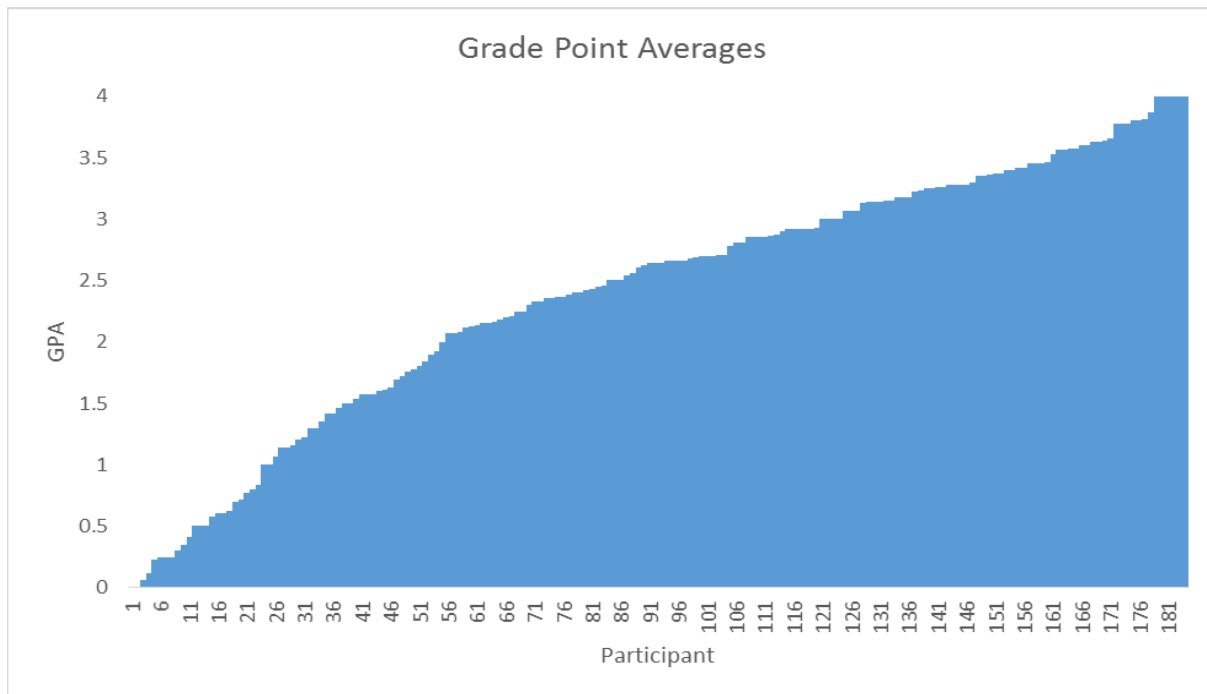


Figure 2. Grade point averages.

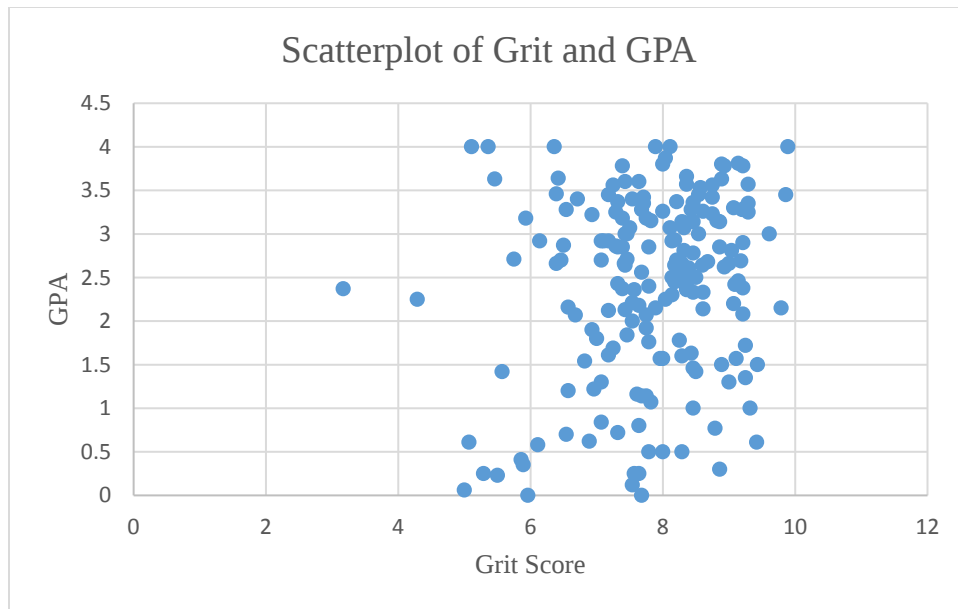


Figure 3. Scatterplot of grit scores and gpa.

Table 3 shows the Pearson Correlation Coefficient between grit scores and GPAs.

Table 3

Bivariate Correlation of Grit and Grade Point Average

	GPA	Raw grit score
GPA	1	.07
Raw grit score	.07	1

$p=.32$ (2-tailed), $N=184$

As seen in Table 3, a significant relationship between GPA and raw grit score $r(184)=.07$, $p=.32$ was not found. The researcher then conducted a bivariate correlation analysis to determine if any individual questions from the *12 Item Grit Scale* correlated with GPA. Only two questions correlated with student GPA. The first one to produce a significant finding was, *I am diligent*. The mean score of this question was 3.78, and the standard deviation was .80. There is a significant relationship between GPA and the way *I am diligent* was answered, $r(184)=.15$, $P=.04$. The second and final statement from the *12 Item Grit Scale* that correlated with GPA was

I am a hard worker. The mean score on this question was 4.20 and the standard deviation was .77. There is a significant relationship between GPA and the degree to which students responded to the statement *I am a hard worker*, $r(184)=.15$, $P=.04$. Students who claimed to be hard working and diligent to higher degrees than others had higher first semester GPAs. This relationship is demonstrated in Table 4 below.

Table 4

Bivariate Correlation of Significantly Correlating Grit Questions

	GPA	I am a hard worker	I am diligent
GPA	1		
I am a hard worker	.15*	1	
I am diligent	.15*	.43**	1

N=184

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

While a relationship was found for two questions on the *12 Item Grit Scale*, the findings comparing overall grit scores to first semester GPA demonstrated no significant impact. Subset factors of grit did demonstrate a significant impact on grade point average. The qualitative portion offered different insight partially because the interviews were conducted with seniors as participants instead of first semester freshman.

The interview protocol was designed to establish a connection between themes of grit and self-efficacy. Three of the participants had over 3.5 GPAs and three had below 2.5 GPAs. Responses to question four of the protocol (*How committed are you to your goals? Why?*) revealed a connection to goal commitment, part of the grit construct, and GPA. There was a discrepancy in answers between the high-achieving upperclass students and the low achieving

upperclass students. Of the high-achieving group, all three ranked their goal commitment with the maximum score of 10 out of 10. One student used the term “hell-bent” in discussing her relentless pursuit of a degree. Interviewee number three stated, “I would not accept anything other than the degree that I want.” These answers all illustrate the meaning of grit and the tenacity that comes along with it. Another high-achieving student, when asked to give a time when something was impossible, replied, “Never, you can accomplish anything.” This definitive answer is the exact attitude Duckworth describes when discussing grit (Duckworth, 2016).

The lower achieving students answered much differently. When asked to rank their goal commitment on a scale of 10, with 10 being the highest, one student answered 6, another said 8, and the third reported a 9. Instead of using language with tenacious undertones, the students made statements like “6 out of 10 because it depends on the situation. The world is going to impact that and the situation changes. (The) Goal might never be reached because the world got other plans.” This quote demonstrates that the student may not be gritty because he or she allows for the impact of the world to control the outcome of his or her goals.

Another student replied, “8 out of 10 because sometimes you can try and try and still not get it.” This is the opposite of gritty because a gritty person is not ready to accept failure. The student also followed with “sometimes the world distracts you, some distractions are good.” This statement also demonstrated a lack of grit because the most gritty people will not allow for distractions. The different themes generated from responses of the two groups suggest that there is a difference in grit between the high-achieving and the low-achieving students.

Interview question number three (*Give an example of a time when you thought something was impossible? How did you proceed?*) also yielded different results between the two groups. The high-achieving group responded that it was a class that they thought was impossible, and

then each of the interviewees said they promptly found help from a tutor or the professor. Responses from the high-achieving group all involved particular classes. The lower achieving group claimed much larger goals were impossible, with one student saying multiple times over the past three years he/ she thought “school was impossible.” The students who were looking at larger goals were those with lower GPAs. The higher achieving students were more apt to break down larger goals into smaller, more accomplishable tasks. They then demonstrated grit by finding the help and sticking with it, another key trait within the construct of grit.

While the quantitative portion of this study demonstrated the overall construct of grit does not significantly impact GPA, two specific subsets did show a significant impact. The above analysis leads the researcher to reject the first null hypothesis. Next, the data and analysis for research question two will be presented.

Research Question Two

The researcher asked, *Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of self-efficacy than those who have lower levels of self-efficacy?* Along with completing the previously mentioned 12 Item Grit Scale, the students completed The College Self-Efficacy Inventory (CSEI) in week seven of the semester. The instrument included 28 questions on a 10 point interval scale. Each student was assigned a raw self-efficacy score based on the sum of all response divided by 28 to get a score out of ten. Figure Four below shows the raw scores.

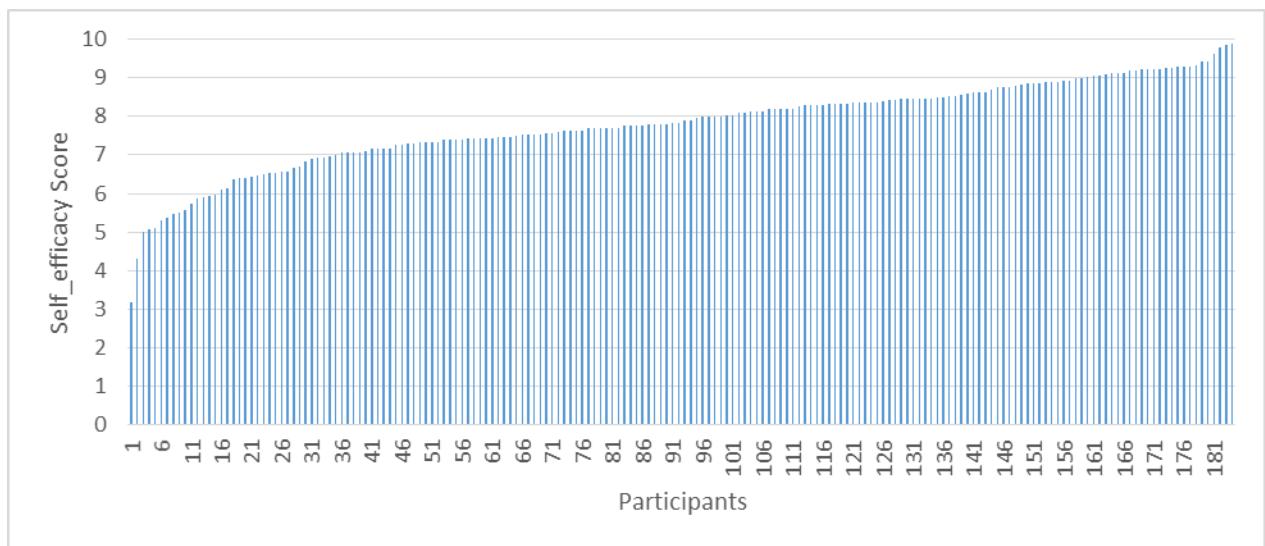


Figure 4. Participant self-efficacy scores.

As shown in Figure Four, self-efficacy scores ranged from 3.17 to 9.89. The possible score range of the instrument is from 1 to 10. Participant numbers were assigned for Figure Four based on lowest to highest self-efficacy score. The mean score of the 184 students surveyed was 7.79 with a standard deviation of 1.13. This information was correlated with GPA and can be viewed in Figure Five below. The mean GPA of the group was 2.40 with a standard deviation of 1.04.

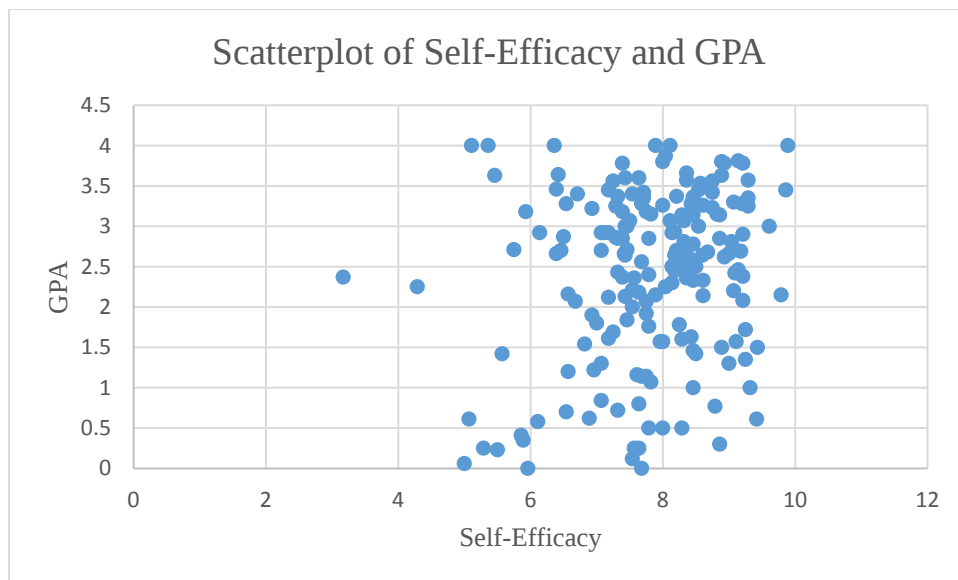


Figure 5. Scatterplot of self-efficacy score and gpa.

The results were first analyzed using the Pearson Correlation coefficient. Table Five below depicts the statistical finding of this correlation.

Table 5

Bivariate Correlation of Self-Efficacy and GPA

	GPA	Raw Self-Efficacy Score
GPA	1	
Raw Self-Efficacy Score	.192**	1

N=184

** Correlation is significant at the 0.01 level (2-tailed)

As demonstrated by the table above, there is a significant positive relationship between self-efficacy score and GPA, $r(184)=.19$, $p<.01$. This finding shows that students with higher levels of self-efficacy have higher GPAs. Although the relationship is small, it is significant. After examining the impact of raw self-efficacy scores, the researcher examined individual

questions from the 28 questions of the CSEI. Table six below shows the individual questions which correlated with GPA.

Table 6

Correlations of Individual CSEI Questions with GPA

	GPA	Keeping	Writing	Meeting parents	Getting papers done	Passing	Managing school and work	Preparing for exams	Managing time efficiently	Getting the grades	Finding time to study
GPA	1										
Keeping up with required readings	.226**	1									
Writing term papers	.158*	.505**	1								
Meeting my parents' expectation	.261**	.495**	.534**	1							
Getting papers done on time	.334**	.352**	.494**	.305**	1						
Passing more than one exam in the same week	.153*	.459**	.487**	.481**	.287**	1					
Managing both school and work	.161*	.366**	.410**	.453**	.210**	.369**	1				
Preparing for exams	.190**	.495**	.510**	.477**	.280**	.559**	.454**	1			
Managing time efficiently	.196**	.598**	.505**	.534**	.387**	.430**	.439**	.588**	1		
Getting the grades I want	.240**	.503**	.463**	.572**	.280**	.580**	.417**	.575**	.608**	1	
Finding time to study	.248**	.401**	.425**	.375**	.464**	.356**	.392**	.514**	.517**	.453**	1

N=184

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

All of the statements in Table 6 positively correlated with GPA. The strongest correlation is between GPA and *Getting papers done on time*, $r(184)=.33$, $p<.000$. All of the statements in Table 6 positively correlated with GPA. Other significant correlations included

Keeping up with require readings, $r(184)=.23$, $p<.01$, *Writing term papers*, $r(184)=.16$, $p<.05$, and *Meeting my parents' expectations*, $r(184)=.261$, $p<.01$. *Finding time to study*, $r(184)=.25$, $p<.01$, *Getting the grades I want*, $r(184)=.24$, $p<.01$, *Managing time efficiently*, $r(184)=.20$, $p<.01$, *Preparing for exams* $r(184)=.19$, $p<.01$, and *Managing both school and work*, $r(184)=.161$, $p<.05$, also had significant correlations with GPA. The weakest significant correlation was between GPA and *Passing more than one exam in the same week*, $r(184)=.15$, $p<.05$. The researcher then used a stepwise regression to determine if there was a model of answers that could align with student GPA. The results of the regression are below in Table 7.

Table 7

Model Summary of Stepwise Regression of Self-Efficacy Questions

Model	R	RSquare	Adjusted R Square	Std. Error of Estimate	Change Statistics				
					R Sq. Change	F Change	df1	df2	Sig. F Change
1	.334	.111	.106	.98629	.111	22.789	1	182	.000
2	.373	.139	.130	.97325	.028	5.91	1	183	.016

Model 1 (Independent variable) *Getting papers done on time*

Model 2 (Independent variable) *Getting papers done on time, meeting my parents' expectations of grades*

The stepwise regression of the responses to the questions correlated in Table 6 were regressed, and Table 7 demonstrates how a model was able to predict 13 percent of variance in GPA. The first independent variable in Model One of the regression, which was able to explain 10.6 percent of the variance, was *getting papers done on time* ($\beta=.18$). The second question in the model, *Meeting my parents' expectations*, was able to explain 2.4 percent of the variance ($\beta=.10$). Whether examining this hypothesis using the Pearson Correlation Coefficient or a stepwise regression, both statistical tests produced a significant finding for the relationship

between self-efficacy and GPA. Next, the qualitative data will be examined to support or reject the null hypothesis.

Four of the interview questions were designed to examine student self-efficacy and to understand the impact self-efficacy had on the student's performance. Differences in responses to these questions revealed some themes among the high-achieving group of respondents and the low-achieving group. The first difference emerged in the response to the question, *When did you start believing in yourself academically?*

Responses to this question ranged from early in elementary school to "I believe in myself, but not the system." Those who were interviewed from the group with a 2.5 or lower GPA were the ones to give more vague answers like the statement above. One low-achieving student said, "Sophomore year of college, once I had something to focus on it became a lot easier." The "focus" seemed to be a lot clearer for the high-achieving students, and from a much younger age.

The high-achieving group spoke of key experiences, one in grade school, where he or she met a particular teacher who "saw something" in him/her. This focus and belief from an early age let this particular student push for their entire academic career, and that push was evident in his/her college GPA. Another student from the high-achieving group said, "I always knew"; her/his focus was clear and her/his ability matched that focus the entire way through college.

The next question that yielded significantly different responses was *Give an example of a time when you stopped believing in yourself academically? How did you get through this?* Once again the main difference in responses was the definitive way in which the interviewees answered the question. One of the low-achieving student replied, "Uh, everyday, but I still keep going." Another low-achieving student responded that he or she "still has moments" that he/she

doesn't believe he is going to finish college. Both of these responses showed lower levels of academic self-efficacy. The high-achieving group answered this question much differently. One student responded with, "Never, I always knew I could do it." The other two high-achieving students both identified a person they rely on to help them believe when they cannot. These answers were given without hesitation, while the low-achieving group was slower to respond and hesitant to give their answers.

When asked about past support for academic goals, a difference was also apparent. The high-achieving group would name a person (past teacher or parent). The interviewer followed up by asking if the person went to college, and the response was yes in all three cases. The low-achieving group all said someone in their family, but in all three cases the family members they referenced had not gone to college.

The hypothesis for the second research question was *Students at-risk who possess high levels of academic self-efficacy will academically outperform those students who possess lower levels of self-efficacy*. This hypothesis was supported by both the quantitative data findings and the qualitative findings. Whether first semester GPA or a cumulative GPA over at-least three years of college, a relationship exists between self-efficacy and GPA.

Research Question Three

The third research question was *How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories?* In order to examine this question, the researcher used all survey answers to establish a model for predicting GPA. To accomplish this, first a bivariate correlation was run on all of the survey questions. Once the correlating variables were found to be significant, a stepwise regression was run with GPA to establish impact on performance. Following this test, scores on the grit and self-efficacy

instruments were divided into high and low, and the performance of each group (i.e., Low self-efficacy/ High grit, High self-efficacy/ High grit, etc.) were examined. Also, qualitative data were examined to add information to the statistical findings.

In order to establish which questions from the 12 Item Grit Scale and the CSEI yielded significant findings, a bivariate correlation was conducted. In Table Eight below, the data for each question with a significant correlation statistic are displayed.

Table 8 *Correlations of Grit and Self-Efficacy Questions*

	GPA	I am diligent	I am a hard worker	Keeping up with readings	Writing term papers	Meeting my parents' expectations	Getting papers done on time	Passing more...t est in a week	Managing school and work	Preparing for exams	Managing time efficiently	Getting along with family members	Getting the grades I want	Finding time to study
GPA	1													
Diligent	.15*	1												
Hard worker	.15*	.43*	1											
Readings	.23*	.31**	.18*	1										
Term papers	.16*	.39**	.17*	.51**	1									
Parents' expectation	.26*	.33**	.26*	.50*	.53*	1								
Papers done on time	.33*	.33*	.25**	.35**	.49**	.38**	1							
More than one test in a week	.15*	.29**	.11	.46**	.49**	.48**	.29**	1						
Managing school and work	.16*	.28**	.16*	.37**	.41**	.45**	.21**	.37**	1					
Preparing for exams	.19*	.39**	.20**	.50**	.51**	.48**	.28**	.56**	.45**	1				
Managing time efficiently	.19*	.38**	.20**	.30**	.51**	.53**	.39**	.43**			1			
Getting along with family members	.17*	.24**	.20**	.10	.22**	.15*	.32**	.20**	.14	.11	.25**	1		
Getting the grades I want	.24*	.38**	.26**	.50**	.46**	.37**	.28**	.58**	.42**	.58**	.61**	.14	1	
Finding time to study	.25*	.45**	.31**	.40**	.43**	.38**	.46**	.36**	.39**	.51**	.51**	.35**	.45**	1

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

N=184

As seen in the above table, 14 of the 40 survey items correlated with GPA. Raw self-efficacy scores, as noted in the previous section, also had a significant positive relationship with GPA, $r(184) = .19, p < .01$. *Keeping up with required readings* showed a significant positive relationship with GPA $r(184) = .23, p < .01$. *Writing term papers* also showed a significant relationship $r(184) = .16, p < .05$. *Meeting parents' expectations* demonstrated a relationship with GPA as well, $r(184) = .26, p < .01$. *Getting papers done on time* also had a positive correlation, $r(184) = .33, p < .01$. Next, *Passing more than one test in a week* had a significant relationship with GPA, $r(184) = .15, p < .05$. *Managing school and work*, $r(184) = .16, p < .05$, *Preparing for exams*, $r(184) = .19, p < .01$, and *Managing time efficiently*, $r(184) = .20, p < .01$, all positively correlated with GPA. *Getting along with family members*, $r(184) = .17, p < .01$, *Getting the grades I want*, $r(184) = .24, p < .01$, and *Finding time to study*, $r(184) = .25, p < .01$, were the last three items from the CSEI to demonstrate positive relationships with GPA.

Raw grit scores did not have a significant relationship with GPA, while responses to two individual questions from the 12 Item Grit Scale did correlate. Both *I am diligent* and *I am a hard worker* had the same r value, $r(184) = .15, p < .05$. These two questions are the first in Table Eight, while the remainder of the questions are the self-efficacy questions, which also had a significant correlation with performance (GPA). The questions from the above table were then used in a stepwise regression to determine if a model could be constructed to predict performance of the students. When statements from the 12 Item Grit Scale and the CSEI were added to the regression, the model is identical to the regression of the questions under the last research question. The correlations of the grit instrument were not strong enough and were eliminated from the regression model as were many of the CSEI questions. Table 7 from the

above section is also referenced below to demonstrate the regression even when two grit questions were included.

When significant correlating variables of self-efficacy and grit to GPA are regressed through a stepwise regression, Model Two is still able to predict 13 percent of variance. The strongest predictor, as seen in model one, is *Getting papers done on time*, predicting 10.6% of variance in GPA ($\beta=.18$). The second question in the model, *Meeting my parents' expectations*, was able to explain 2.4 percent of the variance ($\beta=.10$). While the regression demonstrates that grit and self-efficacy scores and questions do not relate to form a model, a Pearson Correlation does show a relationship between them. Table Nine below displays the findings of grit and self-efficacy scores as they relate to each other and GPA.

Table 9

Correlation of Raw Grit Score, Raw Self-efficacy score, and GPA

	GPA	Raw Grit Score	Raw Self-Efficacy
GPA	1		
Raw Grit Score	.19**	1	
Raw Self-Efficacy Score	.074	.521**	1

N=184

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

While the data have previously demonstrated the significant relationship ($r(184)=.19$, $p<.01$) of self-efficacy score and GPA and the lack of relationship ($r(184)=.07$, $p=.32$) of grit score to GPA, the third hypothesis is reason to explore the relationship between the two. As seen in Table Nine, there is a significant positive relationship between raw grit score and raw self-efficacy score, $r(184)=.521$, $p<.001$. The researcher used this information to establish the following model.

The findings suggest students with higher levels of grit will have higher levels of self-efficacy $r(184)=.521, p<.001$). Students with higher levels of self-efficacy will have higher GPAs $r(184)=.19, p<.01$. In order to explore these findings further, the researcher established new variables for self-efficacy scores and grit scores. The mean raw self-efficacy score was 3.40. Students were coded as high self-efficacy if their scores met the mean or above; anything below the mean score was coded as low. The raw grit scores were recoded in the same way to establish an ordinal variable. Table Ten below demonstrates the mean GPAs of four groups based on high and low self-efficacy and grit.

Table 10

GPAs Based on Categorical Grit and Self-Efficacy Scores

	Low Grit Score	High Grit Score
Mean GPA=2.4 SD=1.04 N=184	Mean GPA=2.36 SD=1.11 N=85	Mean GPA=2.44 SD=.99 N=99
Low Self-Efficacy Score	Quadrant 1	Quadrant 2
Mean GPA=2.20 SD=1.13 N=90	Mean GPA=2.18 SD=1.19 N=59	Mean GPA=2.24 SD=1.06 N=31
High Self-Efficacy Score	Quadrant 3	Quadrant 4
Mean GPA=2.6 SD=.90 N=94	Mean GPA=2.80 SD=.76 N=26	Mean GPA=2.53 SD=.94 N=68

The findings displayed in Table Ten demonstrate that participants with raw self-efficacy scores below the mean of 7.79 ($SD=1.12$) and raw grit scores below the mean score of 3.40 ($SD=.51$) had a mean first semester GPA of 2.18. For this group, $n=59$ and the standard

deviation is 1.19. Of the four subsets of the sample, this group had the lowest raw grit scores, the lowest self-efficacy scores, and the lowest GPA.

The next quadrant on Table Ten includes students with raw self-efficacy scores below 7.79 and raw grit scores equal to or above 3.40. This quadrant includes 31 of the participants in the study; the standard deviation for this group's GPA is 1.06. The GPA for this group is slightly higher than those who were low in both self-efficacy score and grit. The mean GPA for this group was 2.24.

The lower left quadrant of Table Ten shows the mean GPA for participants with raw grit scores under the mean score and raw self-efficacy scores above the mean of 7.79. The group is made up of 26 of the 184 participants. The mean GPA of 2.80, standard deviation is .76 demonstrates the relationship of self-efficacy to GPA. This GPA is higher than all students with low self-efficacy.

The last quadrant includes data on participants with high self-efficacy scores and high grit scores. There were 68 participants in this group. The mean GPA was 2.53 ($SD=.94$). This mean GPA is lower than the previously mentioned group. Table Ten demonstrates that high and low self-efficacy have a stronger impact on GPA than grit. The GPA difference between high and low self-efficacy is .4. The GPA difference between high and low grit scores is .08. Next the researcher will present the data gathered from the qualitative portion of the study.

Examining the differences in the above quadrants considering the mean GPA of all students surveyed ($M=2.4$, $SD=1.04$), regardless of level of grit, with low levels of self-efficacy, performed below the mean GPA of participants. Those with high self-efficacy, regardless of grit level, had grade point averages above the mean GPA. This conclusion establishes that grit is not a predictor of first semester grade point average in this population. It also establishes that self-

efficacy is a predictor. Next, the researcher will provide evidence from the qualitative portion of the study.

In analyzing the interviews, the relationship between grit and self-efficacy was demonstrated by a common thread of themes. All interviewees expressed detailed goals, timeframes, people, and events that molded their grit and academic self-efficacy. The difference in responses was apparent when it came to timeframes and people, as well as with specific examples and events the high-achieving students could recall and the low-achieving students could not. The theme of people believing in an interviewee emerged powerfully from the results, and these people often influenced student grit and self-efficacy.

When discussing goals, many of the interviewees said graduation was a goal. Discussion of timeframe was a notable difference in the interviews. The three high-achieving students were all going to finish college in four years. Two of the three students in the low-achieving group stated that they were likely three semesters away from graduating; one was unsure and actually expressed that it could be four semesters away depending on financial support. The third low-achieving student planned to finish in four years and stated that he/she “just took a little longer figuring it all out. Once I did, I did really well. Before I figured it out, my grades were not good, I was having too much fun.” This statement suggests that his/her college career was divided into two parts, one before she had strong goals, and one after she developed goals. Pairing this with the information from the high-achieving group, it can be noted that college graduation was a goal long before they started college.

One interviewee from the high-achieving group stated, “I knew I was going to be a teacher from when I was really little, used to play school all the time. That was the goal since before high school. My mom was a teacher and she knew it was for me.” Another high-

achieving student explained, “My mom and grandma knew my goals from when I was young, they didn’t let me forget them, but didn’t push me too hard. Because of this I pushed myself harder, knowing they were always behind me.” The third low-achieving student mentioned above also said, “I wasn’t going to let my father down. I had to figure it out.” All three of these statements support the importance of students’ answers to *meeting my parents’ expectations of grades*.

The first two low-achieving students were less concerned with parents and more concerned with how they fit into a much larger scheme. One of these students said, “No one from my block goes to college, they know it is my way out, but they don’t even know what it is.” The other student in this category said, “I am doing this for my grandmother and my little brother, it ain’t about me.” It is important to note that these two students talked less about their family than the other four students interviewed. These students were not supported in the same way as those from the high-achieving group. The third high-achieving student drove this point home by saying “My parents didn’t have this opportunity and while they are proud, they will not let me forget the sacrifices they have made. I cannot forget that and them, even when something gets hard.”

All of the students interviewed gave evidence that there is a connection between the constructs of grit and self-efficacy. When their GPAs are considered, those with the highest GPAs were quick to answer definitively when speaking in terms of impossible tasks and not meeting goals. This thinking was not within the scope of their mission as college students. The high-achieving group was also more connected to family and who believed in them and were even able to give names and days of classes when they started to believe in their ability. The lower achieving group did not set high goals immediately and were hesitant to attach timeframes

to their goals. This group also spoke of family in much broader terms and had trouble identifying when they started to believe in their abilities academically. The following section will discuss how all of the information gathered and analyzed relates to the third hypothesis of this study.

In establishing a means to accept or reject the third hypothesis, *Grit and self-efficacy are partially responsible for the performance of students at-risk*, a great deal of data and analysis were considered. Based on the fact that grit correlates with self-efficacy, $r(184) = .521, p < .001$, and self-efficacy correlates with GPA $r(184) = .192, p < .01$, a positive relationship exists between these three factors. Digging deeper, the researcher was able to identify which factors of the self-efficacy and grit constructs can be used to develop a model that predicts 13% percent of variance in GPA. While grit did not directly relate to GPA, the positive relationship grit has with self-efficacy is notable. Interviews with students yielded the same result, that those with stronger grit and stronger self-efficacy, in the small group of interviewees, were likely to have the higher GPAs. All of this data lead the researcher to reject the null hypothesis and accept that there is a relationship among grit, self-efficacy, and GPA. Next, the researcher will present the data and analysis for the fourth research question of this study.

Research Question Four

The fourth and final research question, *How does gender, race, socioeconomic status, and first-generation status influence the grit and self-efficacy in students at-risk?*, requires in-depth analysis of demographic differences of different subsets of the sample population. In order to address this research question, the researcher will begin by explaining the different demographics and determining the n for each group.

Gender. The first demographic question was about gender. Of the participants, 96 were female and 88 were male. The second demographic question was about race. With six options, 95 participants were White or Caucasian, 62 were Black or African American, nine were Hispanic or Latino, two reported as Asian or Pacific Islander, and 16 selected other. Next, participants were asked to identify their socioeconomic class based on four choices: Upper Class, Upper Middle Class, Lower Middle Class, and Lower Class. Only three students reported to be Upper Class, 96 reported to be from the Upper Middle Class, 70 from the Lower Middle Class, and 15 from the Lower Class. Because of the low number of students reporting to be from the Upper Class, the groups were combined into Upper Class, and Lower Class. This left a split of 99 students in the upper class and 85 in the lower class.

The final demographic category included first-generation status. Sixty-three participants identified as first-generation college students and 121 as non-first-generation college students. Each of these demographic factors was analyzed for its impact on grit, self-efficacy, and GPA. The researcher then analyzed the impact each category had on the answers to survey questions and scores by using independent sample t-tests and ANOVAs.

Gender was the first variable to be explored. Below in Table 11, the mean distributions are displayed. Following Table 11, Table 12 displays the Independent Sample T-test statistics for the gender as a variable.

Table 11

Mean Distribution of Gender and Significant Differences

	Asking questions in class	Keeping up with required readings	Taking effective class notes	Likelihood to stay enrolled next semester
Male	$M=6.82$ $SD=1.99$	$M=6.94$ $SD=2.13$	$M=7.75$ $SD=1.79$	$M=9.56$ $SD=.93$
Female	$M=5.64$ $SD=2.14$	$M=7.54$ $SD=1.75$	$M=8.56$ $SD=1.59$	$M=8.98$ $SD=2.34$
Total	$M=6.21$ $SD=2.15$	$M=7.26$ $SD=1.96$	$M=8.17$ $SD=1.73$	$M=9.26$ $SD=1.83$

Male N=88
 Female N=96
 N=184

Table 12

Independent Sample T-test from SPSS

		Levene's test for Equality of Variances		t	df	Sig. (2- tailed)
		F	sig.			
Likelihood to stay enrolled next semester	Equal variances assumed	17.75	.000	2.21	182	.029
	Equal variances not assumed			2.28	126.61	.024
Asking questions in class	Equal variances assumed	.93	.336	3.84	182	.000
	Equal variances not assumed			3.85	181.93	.000
Keeping up with required readings	Equal variances assumed	4.99	.027	-2.09	182	.038
	Equal variances not assumed			-2.07	168.63	.040
Taking effective class notes	Equal variances assumed	1.56	.214	-3.26	182	.001
	Equal variances not assumed			-3.25	174.633	.001

As seen in Table 12 above, Levene's Test for Equality of Variance determined that *Likelihood to stay enrolled next semester* and *Keeping up with required readings* are significant, but there is an issue with the degrees of freedom when equal variances are not assumed. The remaining two variables with significant findings based on gender were *Asking questions in class* and *Taking effective class notes*.

As displayed in Table 11, there is a significant difference based on gender and *Asking questions in class*. Males ($M=6.81$, $SD=2.0$) have higher self-efficacy in this category than

females ($M=5.65$, $SD=2.14$), $t(182)=3.84$, $p<.001$. There is also a significant difference based on gender and *Taking effective class notes*. Females ($M=8.56$, $SD=1.59$) have higher self-efficacy in their note-taking ability than males ($M=7.75$, $SD=1.80$), $t(182)=-3.26$, $p<.005$. *Keeping up with required readings* demonstrated that males ($M=6.94$, $SD=2.13$) scored significantly lower than females ($M=7.54$, $SD=1.75$), $t(169)=2.07$. Another gender difference was discovered in *Likelihood to stay enrolled next semester*, $t(127)=2.28$. For this particular question males ($M=9.56$, $SD=.93$) had higher self-efficacy than females ($M=8.98$, $SD=2.34$). While there was no significant difference in overall grit and self-efficacy scores, there was a significant difference in the answers to these two questions based on gender. It must also be noted that there was no significant difference in GPA based on gender. The interview findings were limited for gender but did produce some significant findings.

The interviews included three males and three females in the sample. The researcher did uncover one theme supporting that males are more comfortable asking questions in class. All of the students interviewed spoke at some point about finding help in college. The male students all said they got help from professors and advisors. One stated, "I stuck around and worked with the teacher until I got it." Another said "I was in a sociology class having a hard time, I met with Dr. X weekly and before long was changing my major."

All three female interviewees also found help. Each female said they attended tutoring when it was needed, but only one female said anything about working with and meeting with a professor. Two of them said they worked with friends through many of their tougher courses. One of the females revealed, "If it wasn't for two of my friends having all of the same classes, I never would have passed." This anecdotal information supports the finding from data analysis

that females are less likely to believe in their ability to ask questions in class and speak with professors.

All of the data above suggests that gender does play a role in self-efficacy, which does relate to student performance. The data also determines that females and males differ as to which group has higher self-efficacy dependent on the context. Gender does not have a significant relationship with grit or any of the individual items on the *12-Item Grit Scale*. The next demographic to be examined for impact on grit and self-efficacy is race.

Race. When examining the impact of race on grit, self-efficacy, and GPA it must be noted that participants were given five different categories to choose from: White/ Caucasian, Black/African American, Hispanic/Latino, Asian/ Pacific Islander, and Other. A bivariate analysis was conducted to establish which questions and components of the data set show a significant relationship with race. This correlation determined that there is no significant relationship between race and raw grit score, $r(184) = .138$, $p = .06$. The finding was similar with race and raw self-efficacy score; no significant relationship exists, $r(184) = .04$, $p = .62$.

Variables that did show significant relationships were then run through an ANOVA analysis to determine the impact of race on each. The variables identified were *GPA*, *Getting along with family members*, and *New ideas and projects sometimes distract me from previous ones*. The mean distributions are shown in Table 13 below.

Table 13

Mean Distribution of Possible ANOVA Factors Based on Race

		GPA	Getting along with family members	New ideas and projects sometimes distract me from previous ones
White/ Caucasian	Mean	2.67	8.43	3.51
	SD	.99	2.04	.94
	N	95	95	95
Black/ African American	Mean	2.10	8.37	3.12
	SD	1.00	2.03	.97
	N	62	62	62
Hispanic/ Latino	Mean	2.57	7.56	2.89
	SD	1.00	2.03	.97
	N	9	9	9
Asian/ Pacific Islander	Mean	2.81	3.50	4.00
	SD	2.82	3.54	1.41
	N	2	2	2
Other	Mean	1.83	9.25	2.94
	SD	1.10	1.34	1.12
	N	16	16	16
Total	Mean	2.40	8.39	3.30
	SD	1.04	2.06	.98
	N	184	184	184

Table 14 shows the Homogeneity of Difference test, which determined the three variables to be ANOVA statistics.

Table 14

Homogeneity of Difference for Race ANOVA

	Levene Statistic	df1	Df2	Sig.
Grade Point Average	.52	4	179	.72
Getting along with family members	1.41	4	179	.23
**New ideas and projects sometimes distract me from previous ones	1.37	4	179	.25

Since the difference test in Table 14 determined all three variables to have a significance above .05, all three were determined to be ANOVA factors. This ANOVA is displayed in Table 15 below.

Table 15

ANOVA Based on Race

		Sum of Squares	Df	Mean Square	F	Sig.
GPA	Between Groups	18.25	4	4.56	4.51	.002**
	Within Groups	180.96	179	1.01		
	Total	199.21	183			
Getting Along with Family Members	Between Groups	66.11	4	16.53	4.15	.003**
	Within Groups	713.50	179	3.99		
	Total	779.60	183			
New Ideas and projects sometimes distract me from previous ones	Between Groups	10.42	4	2.60	2.83	.026*
	Within Groups	164.54	179	.92		
	Total	174.96	183			

*Significant at the .05 level

**Significant at the .01 level

Table 15 demonstrates the significant difference based on race and GPA. A Bonferroni Post Hoc test was used to determine whether differences based on race were significant or not. The factor, *new ideas and projects sometimes distract me from previous ones*, was determined to not show a significant difference between any racial groups. The significant differences among groups as determined by the Bonferroni Post hoc are displayed below in Table 16.

Table 16

Bonferroni Post hoc of Significant Differences Based on Race

Dependent Variable	Race (I)	Race (J)	Mean Diff. (I-J)	Sig
GPA	White/ Caucasian	Black/ African American	.57*	.007
		Other	.84*	.023
	Black/ African American	White/ Caucasian	-.57*	.007
		Other	-.84*	.023
Getting along with family members	Asian/ Pacific Islander	White/ Caucasian	-4.93*	.007
		Black/ African American	-4.87*	.008
		Other	-5.75*	.002

* The mean difference is significant at the .05 level

The difference in GPA based on race was determined to be significant in the Bonferroni test. Table 17 below summarizes the difference in GPA based on race.

Table 17

Mean GPA Based on Race

	Mean GPA	N	SD
White/Caucasian	2.67	95	.99
Black/ African American	2.10	62	1
Hispanic/ Latino	2.57	9	1.15
Asian/ Pacific Islander	2.81	2	1.01
Other	1.83	16	1.04

When examining the variance in GPA based on race, white students ($M=2.67$, $SD=.99$) have a significantly higher GPA than black students ($M=2.10$, $SD=1.0$) and other students ($M=1.83$, $SD=1.10$). Black students had a significantly higher GPA over other students, $F(4, 179)=4.51$, $P<.01$. A significant difference was also observed in response to the statement *Getting along with family members* based on race.

Students in the Asian/ Pacific Islander category for race demonstrated a significant difference for how they answered *Getting along with family members*. Table 18 below shows the mean scores of responses based on race.

Table 18

Getting Along With Family Members Mean Scores Based on Race

	Mean Score	N	SD
White/ Caucasian	8.43	95	2.04
Black/ African American	8.37	62	2.03
Hispanic/ Latino	7.56	9	2.01
Asian/ Pacific Islander	3.5	2	3.53
Other	9.25	16	1.34

Students who identify as Asian/Pacific Islander ($M=3.5$, $SD=3.53$) have a significant difference in answers to the statement *getting along with family members* compared with White/ Caucasian students ($M=8.43$, $SD=2.04$), Black/ African American Students ($M=8.37$, $SD=2.03$), and other students ($M=9.25$, $SD=1.34$), $F(4, 179)=4.15$, $p<.01$. It is to be noted that the group Asian/ Pacific Islander had the smallest representation in the sample, $n=2$. The ANOVA also determined the grit question *New ideas and projects sometimes distract me from previous ones* to be a factor based on race. While the difference in responses was not found to be significant on the Bonferroni post hoc test, the difference is outlined below in Table 19.

Table 19

Responses to “New Ideas and Projects...” Based on Race

	Mean Score	N	SD
White/ Caucasian	3.51	95	.94
Black/ African American	3.13	62	.97
Hispanic/ Latino	2.89	9	.60
Asian/ Pacific Islander	4.0	2	1.41
Other	2.94	16	1.12

The difference in grit here is determined by the higher score being less gritty in this instance due to the design of the instrument. None of the differences are found to be significant based on race on a multiple comparisons test; however, the ANOVA table determined that there is a significance in the variance of this question, $F(4, 179)=2.83$, $p<.05$. It can be noted that this is the smallest F value based on the three in the ANOVA. The impact of race is most strongly seen in GPA. Due to the small sample, the interviews only produced one theme that supported the analysis above.

Interviewees all said something about the support of family, which was important to all of them. Interviewee number two said, “This is all for my mom, I have seen her struggle to support me and my brother. I need to make her proud.”

Interviewee number one also said, “My mom was a teacher, she will be thrilled to see me graduate... I also want to be an example for my sister who is in a tough place.” This student also

explained periods of fighting with her sister and mom while in college, which made it tougher on her to be away.

Interviewee number three revealed, “My parents are really proud, just gotta make sure I finish.” Number three also said, “My parents struggle to put me here, I need to make the most of it.” This interviewee also described times when money had to be sent home to help out with tough times.

Another interviewee explained, “My dad worries about me...I put him through it. He is happy with me now, that is not always the case.” This was similar to the conversations with the last two interviewees about their families. One mentioned a grandmother who raised him/her, and the other mentioned his/ her sister who watches out for him. Family proved to be important in the college careers of all of the interviewed students.

The most significant race finding was based on GPA. Through the data mentioned above, race plays a role in student performance in the first semester of college. White students at-risk had significantly higher GPAs than all other groups. The findings did not support a correlation between race and grit and/or self-efficacy. Next, the findings and analysis of the impact of socioeconomic status will be presented.

Socioeconomic Status. The next demographic to be explored is socioeconomic status. The socioeconomic status category originally included four choices: Upper Class, Upper Middle Class, Lower Middle Class, and Lower Class. This group was merged into High or Low based on the small number of responses representing the Upper class. In order to analyze the differences based on socioeconomic class, a bivariate correlation was conducted followed by an independent sample t-test.

When examining the difference in responses based on whether students were in the upper or lower class, there was a significant positive relationship in raw self-efficacy score and socioeconomic status $r(184)=-.17, p<.05$. The researcher must note that the justification for the negative correlation is due to coding; and upper class was coded as a 1 value and lower class was 2. A negative relationship here actually demonstrates the relationship of upper class correlates with higher raw self-efficacy scores. That difference is highlighted in Table 20 below. Also displayed in that table is the correlation information for grit, which did not demonstrate a significant relationship with socioeconomic status $r(184)=-.25, p=.75$.

Table 20

Correlations of Socioeconomic Status to Raw Self-Efficacy and Grit Scores

	Socioeconomic Status	Raw Grit Score	Raw Self-efficacy Score
Socioeconomic Status	1		
Raw Grit Score	-.03	1	
Raw Self-efficacy Score	-.17*	.52**	1

N=184

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

The researcher then examined all of the instrument questions as impacted by socioeconomic status. Of the 40 items, 12 showed a significant impact. An Independent Sample T-test was used to examine the difference in mean scores. Once this test was run, six of the items were dropped because of significant changes in the degrees of freedom when variances are not assumed. A total of six items were evaluated in the Independent Sample T-test and the mean distributions can be seen in Table 21 below.

Table 21

Mean Distribution of Socioeconomic Impacted Variables

	Raw Self-Efficacy	Writing term papers	Finding a major	Getting the grades I want	Understanding college regulations	Studying effectively
Upper Class	<i>M</i> =7.97 <i>SD</i> =1.08	<i>M</i> =8.46 <i>SD</i> =1.80	<i>M</i> =8.88 <i>SD</i> =1.72	<i>M</i> =7.57 <i>SD</i> =1.57	<i>M</i> =8.62 <i>SD</i> =1.50	<i>M</i> =7.63 <i>SD</i> =1.61
Lower Class	<i>M</i> =7.59 <i>SD</i> =1.14	<i>M</i> =7.78 <i>SD</i> =1.97	<i>M</i> =8.28 <i>SD</i> =1.82	<i>M</i> =7.05 <i>SD</i> =1.70	<i>M</i> =8.05 <i>SD</i> =1.65	<i>M</i> =6.76 <i>SD</i> =1.80
Total	<i>M</i> =7.80 <i>SD</i> =1.13	<i>M</i> =8.15 <i>SD</i> =1.91	<i>M</i> =8.60 <i>SD</i> =1.78	<i>M</i> =7.33 <i>SD</i> =1.65	<i>M</i> =8.35 <i>SD</i> =1.59	<i>M</i> =7.23 <i>SD</i> =1.75

Upper Class N=99

Lower Class N=85

N=184

While all of the items correlate negatively, again this means lower socioeconomic class has a negative relationship with the variable. Also, the strongest relationships are between socioeconomic status and *getting along with family* $r(184)=-.258$, $p<.001$, *studying effectively* $r(184)=-.246$, $p<.01$, and *managing time effectively* $r(184)=-.198$, $p<.01$. Next, each of these variables was run through an independent sample t-test. The statistical analysis is displayed Table 22 below.

Table 22

Independent Sample T-test of Socioeconomic Status

		Levene's test for Equality of Variances		T	df	Sig. (2- tailed)
		F	sig.			
Raw self- efficacy	Equal variances assumed	.677	.412	2.32	182	.021
	Equal variances not assumed			2.312	174.926	.022
Writing term papers	Equal variances assumed	.949	.331	2.475	182	.014
	Equal variances not assumed			2.459	172.163	.015
Finding a major	Equal variances assumed	4.968	.027	2.284	182	.024
	Equal variances not assumed			2.274	174.546	.024
Getting the grades I want	Equal variances assumed		.497	2.150	182	.033
	Equal variances not assumed			2.137	172.38	.034
Understanding college regulations	Equal variances assumed		.495	2.45	182	.015
	Equal variances not assumed			2.433	171.8	.016
Studying effectively	Equal variances assumed		.121	3.419	182	.001
	Equal variances not assumed			3.390	170.28	.001

As seen in Table 22, the number of variables reported in the independent sample t-test is smaller. Any variable with degrees of freedom under 170 when equal variances are not assumed was dropped from the table. Table 22 displays the most significant differences based on

socioeconomic status. The grouped statistics are displayed in Table 23, which will help understand the differences based on socioeconomic status.

Table 23

Significant Differences Based on Socioeconomic Status

		Mean	N	Standard Dev.
Raw self-efficacy	Upper Class	7.97	99	1.09
	Lower Class	7.59	85	1.14
Writing term papers	Upper Class	8.46	99	1.80
	Lower Class	7.78	85	1.97
Finding a major	Upper Class	8.88	99	1.72
	Lower Class	8.28	85	1.82
Getting the grades I want	Upper Class	7.57	99	1.57
	Lower Class	7.05	85	1.70
Understanding college regulations	Upper Class	8.61	99	1.50
	Lower Class	8.04	85	1.65
Studying effectively	Upper Class	7.63	99	1.61
	Lower Class	6.76	85	1.80

There is a significant difference in raw self-efficacy score based on socioeconomic class. Students from the upper and upper middle class ($m=7.97$, $SD=1.09$) scored higher on the self-efficacy instrument than those from the lower and lower middle class ($m=7.59$, $SD=1.14$), $t(182)=2.32$, $p<.05$. The remainder of the significant differences were from individual questions on the self-efficacy instrument.

Upper and upper middle class students ($m=8.46$, $SD=1.80$) had higher self-efficacy in their ability regarding *writing term papers* than lower and lower middle class students ($m=7.78$, $SD=1.97$), $t(182)=2.48$, $p<.05$. Another difference was observed was in the self-efficacy one had to *find a major*. Upper and upper middle class students ($m=8.88$, $SD=1.72$) demonstrated higher self-efficacy in their ability to *find a major* than lower and lower middle class students ($m=8.28$, $SD=1.82$), $t(182)=2.28$, $p<.05$. Students from the upper and upper middle class ($m=7.57$, $SD=1.57$) also had higher self-efficacy in *getting the grades I want* than those from the lower and lower middle class ($m=7.05$, $SD=1.7$), $t(182)=2.15$, $p<.05$. The next significant difference was in belief in their ability to *understand college regulations*. Upper and upper middle class students ($m=8.61$, $SD=1.50$) outscored the lower and lower middle class students ($m=8.04$, $SD=1.65$) in self-efficacy on ability to *understand college regulations*, $t(182)=2.45$, $p<.05$.

The last difference based on socioeconomic class was belief in their ability to *study effectively*. Upper and upper middle class students ($m=7.63$, $SD=1.61$) had more self-efficacy when it came to *studying effectively* compared to the lower and lower middle class students ($m=6.76$, $SD=1.80$), $t(182)=3.41$, $p<.01$. The data analyzed above demonstrates that there is a significant difference in the self-efficacy of students based on socioeconomic status. The next analysis will involve how the interview portion of the study developed themes that support or reject the data analysis above.

In order to avoid making interviewees uncomfortable, the researcher did not ask the interviewees about socioeconomic status. Without that knowledge, themes emerged related to the statistical analysis. First, the variables involving writing papers and studying effectively were explored. This was a theme that the researcher labeled “Student Adjustment.” Five of the six interviewees described a period of their college career in terms of needing to adjust to the

demands of college. All five of these students described learning to study as a process that took awhile. Two said they never studied in high school. One said, “High school didn’t prepare me for this.” Learning to study and to perform in a college classroom created a learning curve for five of the six students interviewed. For interviewee number four, “The work was hard until I found a major.” This was another significant finding from the data previously mentioned. The higher achieving students all knew their majors, or had a good idea when they started college. Some of the high-achieving group had decided on their majors long before attending college.

Another comparison from the qualitative portion of the study was the importance of *understanding college regulations*. Two of the low-achieving group mentioned conduct violations derailing portions of their college careers. One participant had multiple violations in one year. While a difference wasn’t observed in socioeconomic status, the importance of *understanding college regulations* was established in terms of impact on performance based on GPA.

As a whole, socioeconomic status does play a role in self-efficacy. There were significant relationships found with raw self-efficacy score and twelve individual items from the self-efficacy instrument. Those in the upper and upper middle class demonstrated significantly higher scores in six of those twelve areas. Of those areas, the interviews supported the importance of some of those differences, furthering the importance of socioeconomic status within this sample. Next, the data for the demographic of first-generation college student versus non-first-generation college student will be presented.

First-Generation Status. The analysis for the demographic of generation status was next to be explored. In order to determine significant relationships, the researcher conducted Independent Sample t-test on first-generation status and all of the variables. Below, in Table 24,

the means and standard deviations are displayed for factors which related to first generation status.

Table 24

Mean Distributions from Significant Difference Based on First Generation Status

		Mean	SD	N
Meeting my parents' expectations	First generation	8.08	1.66	63
	Not first generation	7.52	1.78	121
Finding a major	First generation	8.22	1.87	63
	Not first generation	8.80	1.71	121

Only two of the variables demonstrated significant relationships with first-generation status. There was no significant relationship between first-generation status class and raw grit score or raw self-efficacy score. Both of the relationships were from items on the CSEI. There was a significant negative relationship between non-first-generation students and the response to *Meeting my parents' expectations* $r(184)=-.151, p<.05$. A small but significant relationship was also established between non-first-generation students and the response to *Finding a major*, $r(184)=.154, p<.05$. In order to explore this difference further, the researcher then conducted an independent sample t-test. The results are displayed in Table 25 below.

Table 25

Independent Sample T-Test for First Generation Status

		Levene's test for Equality of Variances		t	df	Sig. (2- tailed)
		F	sig.			
Meeting my parents' expectations	Equal variances assumed	.85	.358	2.039	181	.043
	Equal variances not assumed			2.089	134.84	.039
Finding a major	Equal variances assumed	3.59	.059	-2.092	181	.038
	Equal variances not assumed			-2.039	117.42	.044

Due to the differences in degrees of freedom when equal variances are assumed and when equal variances are not assumed, the researcher established that the differences demonstrated in the t-test were not significant. The change in degrees of freedom for *meeting my parents' expectations* is 46.16, and the change for *finding a major* is 63.6. This is too large of a discrepancy to determine the finding to be significant. There is a relationship between first-generation status and these two questions, but the difference in scores is not significant. Important anecdotal information on the relationship of first-generation status was established through analysis of the interview responses.

First-generation status versus non-first-generation status was revealed to have an impact on all of the students interviewed. Interviewees one, four, and six were determined to be non-first-generation status, while two, three, and five were first-generation. The only high-achieving interviewee to have a parent who attended college was interviewee one. The rest of those who were not first generation were in the low-achieving group. The researcher coded much of this as pressure versus support.

First-generation status led to students feeling more support than pressure. Interviewees who were not first-generation used pressure-oriented language when discussing family and home. Interviewee number six was most revealing on this topic in his/her statement, “My dad worries about me but expects me to do well. My mom is waiting for me to screw up, she just stays out of it.” This statement demonstrated the pressure this student had because siblings and parents were college graduates. He/ she finished with, “Yeah, it’s a lot of pressure from them, my brother got great grades.”

The high-achieving non-first-generation student also expressed the pressure on him/her from home. “My mom pushes and expects good grades, anything under a B gets questioned in my house.” This student was given support from home but was afraid to know what would happen if he/she failed.

For the first-generation college students, the pressure was more internal. As interviewee two put it, “I don’t want to let them down.” Interviewee three echoed this self-created pressure when discussing his/her family. Interviewees two and five both described the support from home as unwavering, even when they failed to perform. Interviewee five elaborated on this theme: “My mother and grandma are proud no matter what, and they would do anything they could to help me out. My grandmother even financed a 5,000 dollar trombone to help me do better in one of my recitations. She doesn’t have that kind of money.”

The support when college was unknown was evident in the responses from interviewee three, describing his/her family as “my biggest fan club.” The pressure each of the first-generation students felt was never from family and was instead from themselves. This pressure was still there because they wanted to make those at home proud, even though two of the

interviewees noted support being there regardless. From home, support was the theme for the first-generation college students.

Whether the relationship between first-generation status and grades, self-efficacy, or grit, is statistically significant or not, the impact of wanting to please those at home is significant. The quantitative data found parent expectations and finding a major to be the significant relationships to first-generation status. Family was an important theme in the interviews even though the types of support and pressure were different. The expectation from parents was different for those who were first generation and those who were not. First-generation students were just expected to do their best; non-first generation students were expected to succeed.

In summary, the fourth hypothesis of this study was *background factors such as gender, race, socioeconomic status, and first generation status play a role in grit, self-efficacy, and the performance of students at-risk*. Examining this hypothesis required many different types of data analysis to be conducted based on the four factors of gender, race, socioeconomic class, and first-generation student status. The findings described reject the null hypothesis since all four of these factors demonstrated some level of finding for impact on grit, self-efficacy, and/ or performance. Gender and socioeconomic status demonstrated relationships to self-efficacy. Race had a stronger relationship with performance than any of the other variables, while also demonstrating small but significant relationships with some measures of self-efficacy. First-generation status revealed the least significant impact. One last statistical test was conducted to determine the impact of the demographic variables on GPA.

The last quantitative test that the researcher used was a stepwise regression. This regression was conducted to include the significant grit and self-efficacy factors as well as the demographic information. In order to be regressed the variable has to be an interval scale or

binary. This allowed for gender, socioeconomic status, and first generation status to be included. The results were the same exact finding as the earlier conducted stepwise regression. Table 7 is on page 76 for reference.

If gender, socioeconomic status, or first generation status had a significant impact on the variance and GPA, these variables would not have been dropped from the stepwise regression model. The stepwise regression determined that they did not have a significant impact on variance of GPA. Together, the previous analysis rejects the null hypothesis.

Summary of Data and Analysis

The findings mentioned in this chapter assist in determining whether to accept or reject each of the four null hypotheses of this study. For the first hypothesis, examining the relationship of grit to performance, the researcher accepted the null based on the data and the performance measure of first semester GPA. The interviews led to the null being rejected when the impact of grit is studied longitudinally for impact on performance in students who are in or going into their senior year. Investigating the second hypothesis, examining the relationship between self-efficacy and performance, the researcher rejected the null and determined that self-efficacy does demonstrate an impact on college performance.

The data gathered and examined for the third hypothesis, exploring the relationship of grit and self-efficacy with GPA, an impact was observed and a model developed. This leads the researcher to reject the third hypothesis as well. The fourth and final hypothesis examined the impact of gender, race, socioeconomic status, and first-generation status on grit, self-efficacy, and performance, and demonstrated that there is a significant relationship among these factors. The data demonstrated a strong enough relationship to reject the fourth null hypothesis. Next, Chapter 5 will discuss these findings as they relate to the literature reviewed in Chapter 2.

Chapter 5 will also discuss the data as it relates to the research questions and conclude with recommended future study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Grit and self-efficacy have been examined as variables that impact many facets of success. Research has demonstrated that the construct of grit, one's passion and perseverance toward a long term goal, can contribute to a person's success. Similarly, self-efficacy, or belief in one's personal ability to accomplish a task, has demonstrated an impact on the success of various populations. This research examined the impact of the two constructs on the performance of college students at-risk. In addition, this study evaluated the impact of gender, race, socioeconomic status, and first-generation status as they contribute to the model of college student performance. This chapter will describe the findings from this study, the implications of this project on existing research, and recommendations for future study.

Overview of the Study

This mixed-methods study examined the impact of grit and self-efficacy on college students who are considered "at risk" of attrition. The goal was to add to the literature on what it takes for college students at-risk to succeed in college. The non-cognitive traits of grit and self-efficacy were found to be impactful on college students with low SAT scores and high school grade point averages. While colleges and universities begin to admit more and more students at-risk, this study examined other factors that can increase the understanding of which students are most likely to succeed. Both grit and self-efficacy demonstrated a connection to college performance as measured by grade point average (GPA).

Unlike GPA and test scores, non-cognitive traits are more complex to measure. Grit is a much more recent construct than self-efficacy, but a Grit-Scale has been validated and proven to be reliable in many populations (Duckworth, Peterson, & Matthews, 2007). Self-efficacy, in

contrast, has been studied for decades and offers many reliable and valid measures. For this study, an instrument used on first-generation college sophomores was chosen because the sample of students was similar to those used in this study. This instrument was designed by Vuong, Brown-Welty, and Tracz in 2010. Both instruments were combined with five demographic questions. The 45-point instrument was then completed by 184 students identified as at-risk in a large public four-year institution in Pennsylvania.

Due to college enrollment declines and government initiatives to increase college completion (e.g., Compete to Complete), universities are searching for ways to identify which students will be successful in college (Charles A Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future, 2012). As some schools shift their attention from standard placement criteria by placing less importance on SAT scores in order to capture a wider audience, understanding which students will succeed becomes even more important. Examining non-cognitive traits such as grit and self-efficacy as factors in student performance may help in gaining the understanding necessary to enroll students with lower placement criteria. The rising cost of college and the financial investments at the federal, state, local, and family levels also provides support for the relevance of non-cognitive predictors on performance.

While colleges and universities need to understand their students in order to increase enrollment and retention, grit and self-efficacy have both demonstrated a connection to performance in other aspects of life (Bandura, 1997; Duckworth, 2016; Gore, 2006; Vuong, Brown-Welty, & Tracz, 2010). These non-cognitive constructs have also been determined to be teachable traits that parents can instill in their children, and teachers can instill in their students (Ahmetoglu, Monsen, & Furnham, 2009; Bethune, 2012; Duckworth, 2016; Duckworth &

Quinn, 2009; Hannon, 2014; Parviz & Sharifi 2011; Silles, 2011). Student success does not end with intelligence and cognitive ability measurements, and can be gained if non-cognitive skills are nurtured. Findings from this study also show the impact of individual factors from these traits to give parents, teachers, and researchers other values to explore.

Major Findings

The following will present the findings of this study in order of research question. For organizational purposes, each research question will be given, and the findings and implications will be discussed in relation to the research question.

Research Question One

Is there significant difference in the GPA of students in developmental placement categories who have higher levels of grit than those who have lower levels of grit?

The findings for this research question were not expected based on the framework of the study, which was built from Duckworth's theory of grit. There was an expectation to discover that GPAs of gritty students to be higher than the GPAs of those with less grit. Examining the grit construct as it pertains to long-term goals, performance within the first semester of college was not likely to demonstrate a relationship with grit. One semester would not be a long enough term to see an explicit relationship between grit score and GPA.

In comparing overall grit score to GPA, no significant relationship was found for the quantitative portion of this study. Two individual grit factors did demonstrate a small but significant correlation with GPA. *I am a hard worker* and *I am diligent* both demonstrated a small but significant relationship to GPA, $r(184)=.15$, $p<.05$. This finding would support the literature findings that indicate that one semester is not long enough to see an impact on the overall grit score. One study also examined grit as it predicted GPA, and the finding was a small

significant correlation ($r=.25$, $p<.01$); this study utilized a much more controlled sample of students at an elite university (Duckworth, et al., 2007). This same study also found grit as a predictor correlated with GPA even stronger when SAT was consistent ($r=.34$, $p<.001$) (Duckworth, et. al, 2007). This finding could be another factor behind the quantitative finding of the present study. SAT scores of the sample were low, under 890 on the reading and mathematics portions, but information was not gathered on the range of scores.

The interview portion of the study revealed a snapshot of the longitudinal impact of grit on students who began college in a developmental placement. The interviews were conducted with three high-achieving senior students and three low-achieving senior students. Themes supporting the impact of grit on GPA emerged quickly. First, the high-achieving students were much easier to reach for consent forms; these students had a sense of pride. This sense of pride is described in Duckworth's (2016) book: *Gritty people have a certainty about their approach to most tasks*. The lower achieving individuals had multiple emails, many missed meetings, and tardiness to scheduled meetings for the study.

The tones in student responses were notable. The high-achieving group was confident in their answers, confident in their quest. The most telling grit result appeared in responses to the question, *When asked on a scale of 1-10 how committed to your goals are you?* The high-achieving group was quick to respond, all three stating *ten*, furthering solidifying Duckworth's belief in gritty people's levels of commitment (Duckworth, 2016). This finding was even more notable in contrast to the lower achieving group, whose answers were all 8 or below. The lower achieving group all were slow to give a number but much quicker to establish a reason or excuse. Their goals were not the only things on their minds; they also had reasons for not meeting their

goals. They failed to accept full responsibility for meeting their goals, suggesting that, according to Duckworth's definition, they were not that gritty.

Duckworth (2016) also described the "deliberate practice" that gritty people engage in and how such people learn from failures. The lower achieving group all mentioned dropping classes, changing majors, and giving up on certain tasks. Interviewees with higher GPAs mentioned experiences that led them to "deliberate practice" until they achieved what they wanted to achieve. These answers suggest that the commitment level of the high-achieving group was less likely to be diminished by tougher academic experiences or failure. Those who did not give up, who worked through the tougher experiences, who demonstrated the most grit through the interview, were those with the higher GPAs.

While the findings from the qualitative portion of the study did not support the exact expectation, they do align with prior research on the construct of grit. The findings for research question one did establish a relationship between grit and the college GPA of students at-risk. Grit is a non-cognitive trait that can assist in the success of a college student at-risk.

Research Question Two

Is there a significant difference in the GPA of students in developmental college placement categories who have higher levels of academic self-efficacy than those who have lower levels of academic self-efficacy?

The overall mean self-efficacy score of the sample was 7.79, with a standard deviation of 1.13. Self-efficacy did correlate as an overall construct with GPA, $r(184) = .192$, $p < .01$. This correlation and impact on GPA was demonstrated within the data. Beyond the correlation of the overall self-efficacy score, individual self-efficacy factors also correlated with GPA. All of the elements from the self-efficacy instrument predicted 13 percent of the GPA variance when a

stepwise regression was conducted. All of the quantitative findings of this study support the framework, which was also supported in the qualitative findings.

The mean GPA of the sample was 2.40 with a standard deviation of 1.04. Those with self-efficacy scores above the mean (7.79, SD 1.13) achieved higher than average mean GPA (M=2.80, SD=.76). Those with self-efficacy scores below the mean score received a GPA (M=2.18, SD=1.19) that was lower than the average for the entire sample by .22. This analysis supports the framework of the study, that the self-efficacy construct is a predictor of student success as measured by GPA (Gore, 2006). Between those with self-efficacy scores below the average and those with self-efficacy scores above the average, there was a significant difference in GPA of .62. As the instrument is broken down, individual factors are also seen to have significant correlations with GPA.

The correlating factors were divided into three areas. The first area was academic tasks. Of the eleven items of the CSEI that correlated with GPA, the questions that had to do with academic tasks were *keeping up with required readings* ($r=.23$, $p<.01$), *passing more than one test in one week* ($r=.15$, $p<.05$), *getting papers done on time* ($r=.33$, $p<.01$), *preparing for exams* ($r=.19$, $p<.01$), *getting the grades I want* ($r=.24$, $p<.01$), and *finding time to study* ($r=.25$, $p<.01$). Over half of the correlating items were academic-task specific; this group had the highest correlations with student GPA.

The second area was categorized as family. Two of the correlating variables fell into this group. *Meeting my parents' expectations* ($r=.26$, $p<.01$) and *getting along with family members* ($r=.17$, $p<.05$) both fell into this category. This finding demonstrated the value of parental impact on GPA.

The third area, and the one with the lowest significant correlating factors, was time. Two of the factors from the first category involved time, but directly dealt with time spent on academics. This area consisted of two factors, *managing both school and work* ($r=.16$, $p<.05$) and *managing time efficiently* ($r=.19$, $p<.01$). Belief in one's own ability to manage time does impact GPA in the sample. This finding is consistent with the researcher's experience in working with students in developmental college placements.

When these items were regressed through a stepwise model, a two-factor stepwise regression found a model to predict 13 percent of the variance in grade point average in the sample. This model held *getting papers done on time* and *meeting my parents' expectations* as independent variables. Examining the three areas of correlating variables and these two independent variables, it is observed that there is an academic task, a time factor, and a family factor involved in the model.

These three areas were also found in the interview portion to be significant. Interviewees with higher GPAs spoke of finding tutors immediately when asked about tough academic tasks. The higher achieving group also spoke more frequently of family believing in their ability. When asked about who may have helped them believe in themselves, they all mentioned family and/or a past teacher. All of the low-achieving group also mentioned family, but in all cases the family member mentioned did not attempt a college degree. Time also was a theme developed through the interview process, in which many of the low-achieving students spoke of having more distractions that took their time away from academics.

All of the results for research question two assisted in determining that self-efficacy does impact the performance of at-risk students. This finding supports the literature on self-efficacy (Gore, 2006; Hsieh, Sullivan, and Guerra, 2007). Hsieh, Sullivan, and Guerra found similar

correlations with GPA in students at-risk and self-efficacy and were able to connect their research to Bandura's definition of self-efficacy and a student's adoption of mastery goals. At this point, the framework connects the two variables of grit and self-efficacy, which were examined under research question three.

Research Question Three

How do grit and academic self-efficacy relate as performance predictors for students in developmental placement categories? While the answers to research questions one and two suggest how well each of these variables predict success, there was also a need to examine the connection between the two. Duckworth (2016) references both mastery goals and deliberate practice as being engrained in a gritty person. She also discusses the importance of reinforcement and how gritty people know they will receive gratification even if it is delayed. The relationship between the grit instrument and the self-efficacy instrument were tested to assist in constructing how the variables interact with each other and with student success. This process was done by using bivariate statistics, mean comparisons, a step-wise regression, and evaluating interview responses. The findings for this research question are below.

First, self-efficacy scores did correlate with student GPA and grit did not. When examining the relationship between the two constructs, a strong correlation between grit and self-efficacy scores ($r=.52$, $p<.01$) was discovered. This relationship was explored further to determine that those surveyed with higher than average grit scores ($M=3.4$, $SD=.51$) achieved a mean GPA slightly above the 2.4 average ($M=2.44$, $SD=.99$). Those with lower than average grit scores had GPAs slightly below the 2.4 average ($M=2.36$, $SD=1.11$). This finding demonstrates that grit has a very small impact on GPA. Self-efficacy, as noted under the discussion of research question two, had a stronger impact than grit on performance. In

evaluating the numbers of students falling into each category of high and low grit and high and low self-efficacy, the research begins to demonstrate the relationships of the constructs.

Since there was a significant correlation between grit and self-efficacy ($r=.52$, $p<.01$), those with higher than average grit scores should have higher than average self-efficacy scores. Of the sample, the two largest subgroups are high grit, high self-efficacy, $N=68$, and low grit, low self-efficacy, $N=59$. Over two thirds of the participants fit into these categories, while those with high grit and low self-efficacy, $N=31$, and low grit and high self-efficacy, $N=26$, fail to make up one third of the population. It should also be noted that the smallest group is students with low grit and high self-efficacy, $N=26$. These findings suggest that a student with low levels of grit is two times more likely to have low levels of self-efficacy than high levels of self-efficacy.

This difference also stands out in the number of factors that correlate with GPA within each instrument. Only two grit factors correlated with success: *I am a hard worker* ($r=.15$, $p<.05$) and *I am diligent* ($r=.15$, $p<.05$). Both of these factors produced the same Pearson correlation coefficient and but the factors did not produce a one-to-one correlation ($r=.43$, $p<.01$). The self-efficacy factors that correlated with GPA were *keeping up with required readings* ($r=.23$, $p<.01$), *passing more than one test in one week* ($r=.15$, $p<.05$), *getting papers done on time* ($r=.33$, $p<.01$), *preparing for exams* ($r=.19$, $p<.01$), *getting the grades I want* ($r=.24$, $p<.01$), *finding time to study* ($r=.25$, $p<.01$), *managing both school and work* ($r=.16$, $p<.05$), *managing time efficiently* ($r=.19$, $p<.01$), *meeting my parents' expectations* ($r=.26$, $p<.01$), and *getting along with family members* ($r=.17$, $p<.05$). All of these factors with significant correlations with GPA were regressed, and the findings were as expected.

When grit items were added to the stepwise regression, the same model described under research question two was the result. The stepwise regression excluded the grit factors and set the same model, which explained 13 percent of the variance using *getting papers done on time* and *meeting my parents' expectations*. The grit factor *I am diligent* correlated with every significant self-efficacy factor at the .01 significance level. *I am a hard worker* significantly correlated with all of the significant self-efficacy factors except *passing more than one test in one week*. This relationship helps explain why these grit factors impact GPA. Those who believe they are hard workers and are diligent are likely to have high self-efficacy on the individual factors that correlated with GPA. In summary, for research question three grit and self-efficacy do relate, and self-efficacy relates to performance. Next, the findings for the last research question will be discussed.

Research Question Four

How does gender, race, socioeconomic status, and/or first-generation status influence the grit and self-efficacy in students at-risk? Analyzing this data required individual tests to be run on specific subsets of the sample. The existing research on the factors of gender, race, socioeconomic status, and first-generation status gives mixed input on which were likely to correlate with student success. The impact gender has on grit and self-efficacy differed based on task orientation. The findings for race aligned with the literature. Socioeconomic status and first-generation status were determined to have less of an impact than was expected. The following will explain the findings for individual demographic categories as they relate to the literature.

The first category under consideration is gender, which is said to impact test taking and study skills (D'lima, Winsler, & Kitsantis, 2014; Spinath, Eckert, & Steinmayr, 2013). In this

study, females ($M=7.54$, $SD=1.75$) indicated more self-efficacy on certain tasks such as *keeping up with required readings* and *taking effective class notes* ($M=8.56$, $SD=1.59$). On the task of keeping up with required readings ($M=6.94$, $SD=2.13$) and *taking effective class notes* ($M=7.75$, $SD=1.79$), males scored significantly lower. The finding that females may have higher self-efficacy on such tasks is consistent with literature indicating that male students receive less guidance in selecting paths for their futures (Almås, Cappelen, Salvanes, & Tungodden, 2016). Male students ($M=6.82$, $SD=1.99$) indicated higher self-efficacy on the task of *asking questions in class* than females ($M=5.64$, $SD=2.14$). All of these findings support the existing literature that determines females are better adapted to school environments (Spinath, Eckert, & Steinmayr, 2013).

It also is of note that male students had significantly higher self-efficacy scores ($M=9.56$, $SD=.93$) than females ($M=8.98$, $SD=2.34$) in their *likelihood to stay enrolled next semester*. These findings are mostly consistent with the literature, with the following exception: Almas, Cappelen, Slavanes, and Tungodden (2016) determined that male students were 10 percent more likely to drop out, and in this particular study that did not appear to be the case. The literature also determines there to be a significant difference in males and females in performance on exams and GPA, which also did not appear as significant in this study.

When evaluating differences in race, some findings were expected, yet still troubling. African-American students ($M=2.10$, $SD=1.0$) and those who reported other ($M=1.83$, $SD=1.10$) performed at a significantly lower rate than white students as determined by first semester GPA ($M=2.67$, $SD=.99$). This finding is consistent with the literature (Espinosa, Gaertner, & Orfield, 2015). Hispanic students ($M=2.57$, $SD=1.0$) did not perform significantly different than white students, which was also expected based on the literature (Espinosa, et. al, 2015). There was no

significant difference on the grit and self-efficacy scores between groups. One self-efficacy factor (*getting along with family members*) and one grit factor (*new ideas and projects sometimes distract me from previous ones*) did correlate with race, but looking deeper it was established that the difference was due to the low number of students in the Asian/ Pacific Islander category. This finding may have been due to only two students reporting as Asian/ Pacific Islander, and there was a high standard deviation. Aside from the correlation of race and GPA, which was expected based on the literature, race did not produce any other significant findings in this study.

Socioeconomic status was expected to have a meaningful impact on the performance of students (Espinosa, Gaertner, & Orfield, 2015; Jerrim, Chmielewski, & Parker, 2015; Stephens, Brannon, Markus, & Nelson, 2015). This study did produce data that demonstrated a significant impact of socioeconomic status on self-efficacy ($r=.17, p,<.05$). Similarly, individual self-efficacy factors also demonstrated positive significant correlations with socioeconomic status. Upper class students scored significantly higher on *writing term papers* ($M=8.46, SD=1.80$), *finding a major* ($M=8.88, SD=1.72$), *getting the grades I want* ($M=7.57, SD=1.57$), *understanding college regulations* ($M=8.62, SD=1.50$), and *studying effectively* ($M=7.63, SD=1.61$) in comparison with lower socioeconomic class students. The lower socioeconomic group indicated lower self-efficacy in *writing term papers* ($M=7.78, SD=1.97$), *finding a major* ($M=8.28, SD=1.82$), *getting the grades I want* ($M=7.05, SD=1.70$), *understanding college regulations* ($M=8.05, SD=1.65$), and *studying effectively* ($M=6.76, SD=1.80$). The major finding through this portion of the study was that self-efficacy does significantly correlate with socioeconomic status.

All of these findings were supported in the interviews. Picking a major, coming from a good high school, and understanding rules and regulations all impacted the success of students

based on their GPAs in college. These themes emerged from the interviews, with a lack of understanding for college regulations hindering the GPA of students, while selecting a major and stronger primary and secondary school experiences were discussed by interviewees with higher GPAs. The literature supports these findings and also supports that the impact of socioeconomic status may not be seen in the first semester of college (Stephens & Brannon, 2015). This study acknowledges that self-efficacy is a construct built through experiences, and demonstrated that those from higher socioeconomic status are more likely to have higher self-efficacy. This finding is important since self-efficacy correlates with student success. Next, the findings of the impact of first-generation status as it relates to the existing literature will be explained.

Most students at four-year institutions are non-first-generation status (Stephens & Brannon, 2015). In this study, nearly two-thirds of the sample reported to be non-first-generation. The literature also indicates that non-first-generation students have higher self-efficacy, which was not demonstrated within the quantitative portion of this study. While two factors did correlate with first-generation status, the change in degrees of freedom was too extreme to justify them as significant. A key difference in first-generation status was found within the interview process.

Three of the six interviewees were first-generation students. This grouping did not correlate with lower GPAs. In fact, two of the three high achieving students were first generation. The most significant themes determined were pressure and support. Students who were first generation put more pressure on themselves, while their support system at home was much more supportive than that of students who were not first generation. Students who were not first-generation were the opposite, and felt more pressure extrinsically from their support

system at home. This finding helps in understanding the reason first-generation status may not have shown an impact within the quantitative portion of the study.

The final and perhaps most interesting finding of this study was unexpected and challenges findings in the literature. For the sample of 184 students at-risk, when the three binary (gender, socioeconomic status, first-generation status) demographics were entered into the regression, none had a significant impact on variance of GPA. The research would suggest that socioeconomic status and first-generation status would have a strong impact on GPA variance within this group. That was not, in fact, the case; instead, two items from the CSEI stood out as the only two variables with a significant predictive ability on GPA: *getting papers done on time* and *meeting my parents' expectations*.

In summary, the significant impacts of each demographic variable was determined. Each variable had its own way of relating to self-efficacy, while the connections to the grit construct were not evident. Gender showed a task-specific impact on self-efficacy. Race had the strongest impact on GPA. Socioeconomic status had the strongest impact on self-efficacy and individual CSEI factors. Finally, first-generation status had the least meaningful impact on performance, grit, and self-efficacy, yet had the most impact on the pressure and support students had.

Implications

This research explored the implications of grit and self-efficacy as each applies to students at-risk. It also explored factors that are necessary for a student labeled at-risk to become successful. As many colleges and universities move away from the cognitive measures that once were said to determine student success, scholars have begun exploring noncognitive predictors and traits. Decades of past research have suggested that factors like grit and self-efficacy may help to identify which students have what it takes to perform at high levels. Developmental

education professionals have explored the impacts of socioeconomic status, race, and first-generation status. The findings of this study have implications in all of the above areas. Beyond what has been discovered for higher education professionals, this research has also found some implications for parents as well as for primary and secondary school teachers. Below, each of these implication will be discussed.

For those working in developmental education, the implications of this study give both hope for the students with low cognitive measures and reason to continue to conduct research. First and foremost, grit and self-efficacy can be ingrained in students; therefore, success can be attained regardless of standardized cognitive measures. Developmental educators know the students they work with most likely have low SAT/ACT and placement test scores, but rarely are the noncognitive abilities addressed. In establishing self-efficacy and grit scores on students early in the year, educators will have more knowledge about their students. Next, if these traits are not ingrained, others have determined that these traits can be taught (Tough, 2012). Nurturing such traits would be most helpful at the earliest levels, as learned from the interviews. Students who were confident in their own ability and had grit from a young age were in the high-achieving group. This research also demonstrated reason to continue to evaluate what is already believed to be known about this group of students. Discovering a model which could predict 13 percent of the GPA variance is just the beginning of understanding the impact of noncognitive traits. Continued exploration could lead to a much deeper understanding of this population.

For decades, the developmental population, or students at-risk, has been said to fit the following categories: low SAT/ACT, low high school GPA, low socioeconomic status, single parent homes, and/ or first-generation student status. This study examined some of these factors and how they impacted student performance. Researchers have explored the impact of

socioeconomic status and first-generation status for years (Jerrim, Chmielski, & Parker, 2015; Stephens, et. al, 2015). The findings were likely to determine that the GPA of low socioeconomic status or first-generation students were lower than those with high socioeconomic and non-first-generation status. These variables and the usual findings are troubling to educators because they cannot be changed. Findings from this study determined that two factors from the self-efficacy instrument, *getting papers done on time* and *meeting my parents' expectations of grades* had a more significant impact on GPA than socioeconomic status and first-generation status. First-generation status and socioeconomic status had no significant impact on GPA in the first semester for at-risk students. This finding is the opposite of what practitioners and researchers have found as a trend. Exploring further, the impact of gender was, as shown in other research, task-specific. Males excel at some processes and female students find strength in other areas. This finding led to no significant impact as well. It is suspected that these factors, like socioeconomic status, may demonstrate a more visible impact later in the college career. As educators, it is important to note that the importance of *getting papers done on time* is something that can be taught to be important to students.

Race was also a factor and particularly the way *African American* and the *Other* category performed in comparison to *White* students. This finding supports existing research but further supports the need for developmental educators to assist in building grit and self-efficacy in these populations. If these factors have an impact and are teachable, educators can help *African American* and *Other* students to close the gap in performance between themselves and *White* students.

The other implication for educators gathered from this study was the importance of time management. Developmental educators know that students' time management ability is one key

to their success. This study supported that research, as time management and task-specific time management were impactful variables. Many of the repeatedly appearing variables were specific to time management. A student's confidence in *getting papers done on time* was the top predictor found in this study, predicting over ten percent of the grade point average variance. Other factors connecting time to GPA were *managing both school and work* and *having enough time to study*, among others. As developmental educators continue to teach this skill, this research reiterates the importance in doing so.

As college admissions adapt and admit more students at-risk, this study has implications for administrators and political figures alike. First, as public universities begin to become more oriented to open-enrollment, administrators need to know which teachable factors have the most impact on student success and be able to relay that information to the faculty. This study uncovered the importance of teaching noncognitive skills like grit and self-efficacy. If administrators can see this importance, the faculty can assist in changing performance outcomes of these students. This effort does not come without a price. Developmental education, and attention spent on teaching noncognitive skills, can be seen as expensive and taking away from the time spent in the curriculum. Because noncognitive skills are transferrable (Duckworth, 2016), they are an important part of a college graduate's skillset. Colleges and universities need to understand the importance of these traits in their students, if for no other reason than the fact that GPA's will likely be impacted positively. There is a high cost of developmental education, but students with high levels of grit and self-efficacy will perform at higher levels. If this information assists in retaining students, it is more affordable for institutions to retain a student than recruit a new one.

Policy and lawmakers can also use this study's findings to justify monetary investments in developmental education, allowing the time for noncognitive development. This support can come in grants or funding to the college, university, or directly to the student at-risk. This research could also be introduced to primary and secondary teachers to begin discussion and planning on how to facilitate students' noncognitive skill development, thereby helping to create a more college-ready population. These types of initiatives take time, money, and commitment at all levels, from the policy and law makers to the actual student.

The last implication of this study to be discussed is the implication that is perhaps the most important. It is for parents. First, this study discovered that whether parents have a college education or not did *not* impact the GPA and performance of the student. Next, noncognitive skills are not always part of the school curriculum and can be nurtured at home. This study determined the importance of parental expectations on the student. It also showed an impact of parent-student relationships on GPA. A child may not be the smartest student in the class but can still be the most productive. Parents' belief in their children and goals and support for their children matter. If students receive this support, this research indicates that students will perform at higher levels.

Limitations

First, generalizability must be addressed as a limitation. This study was conducted with 184 students at a single four-year public institution. The second limitation of this study would be on students' placement categories. While all students were in a developmental placement category, as defined by the institution, with below an 890 on the reading and mathematics portion of the SAT and/ or below a 2.5 grade point average, there is still a large variance within the group. Another limitation would be the self-reporting nature of the instrument, which could

be questioned in future research. The last limitation would be the timeframe of the study, as it may not have been longitudinal enough to really examine the impact of the constructs of grit and self-efficacy. The interviews allowed for the impact of these factors to be examined over the longer term of a college career.

Recommendations for Future Study

This research has determined that there is more *to be* known than *is* known pertaining to the impact of grit and self-efficacy on students at-risk. Grit is still a relatively new construct and the understanding of the impacts and reachability of grit need continued examination. Self-efficacy has been studied for decades and, through this study and other studies, has demonstrated a relationship to student success. Studies like this one are complex, due in part to noncognitive constructs that are hard to measure because of their ambiguous nature. Gritty people with high levels of self-efficacy are not swayed by what may be seen as complex or hard. The following recommendations are for future research related to this topic as it pertains to students at-risk.

The first recommendation is that the concepts of grit and self-efficacy be studied longitudinally over the course of the college career of a student at-risk. While this research demonstrated an impact, if studied over the course of a college career, the constructs could be more fully understood. It would be beneficial to take into account what has been learned in this study, give the instrument early, and then track the students over the four- to five-year period. This process may allow grit to emerge as a more impactful variable just as it did in the interviews of upperclassmen within this study.

The second recommendation would be to explore the impacts of grit and self-efficacy longitudinally as a case study. This type of study would allow researchers to learn about the experiences that impact levels of grit and self-efficacy throughout college. It may still be of

value to use both the grit and self-efficacy instruments as they will likely provide valuable insights. Conducting such a study would also lead to a deeper understanding of the confounding variables that impact the performance of these students.

Another recommendation would be to do the same study on a more controlled group. Some of the existing research studied grit and self-efficacy on a particular major or particular SAT/ACT score range (Duckworth, et. al, 2007). In doing this, more threads may emerge. While all of the participants had lower SAT scores, there was still a broad range that could be narrowed and explored further. In controlling the sample more, the impacts of these constructs may become clearer.

Another recommendation is to revisit the impactful factors from this study and designing a specific instrument that would be validated and tested. The relationship between grit and self-efficacy factors demonstrated a correlation with performance, and may be able to be developed into a much stronger instrument. It is expected that in doing this, the 45 question survey used in this study could be shortened significantly, which could lead to a larger sample.

Along the lines of sampling, another recommendation would be to expand this study to other universities with similar placement categories. This process would improve the generalizability of this study. With a broader sample from different universities, the impacts may become stronger and generalizable to larger groups.

Another recommendation would be to ask more specific demographic questions, further pinpointing their differences. Gathering financial information from the financial aid office to remove the self-reporting nature of such questions may be advantageous. Additionally, determining specific SAT and high school GPAs as opposed to looking at the placement

category as a whole may be beneficial. In developing the demographic side of the study, findings may relate more strongly to the existing literature.

Finally, continuing to research how to teach grit and self-efficacy. As the impact of these constructs becomes more apparent, it is important to discover how to teach such concepts to students so they can experience the positive impact on their performance.

Conclusion

This research was developed on the theoretical constructs of grit and self-efficacy and the literature on what is known about students at-risk. Grit is a newer concept that evaluates a person's ability to stick with a goal until it is completed (Duckworth, 2016; Hanford, 2013). Self-efficacy has been explored for decades and has shown an impact on individual success based on a personal belief in ability (Bandura, 1997; Gore, 2006; Vuong, Brown-Welty, & Tracz, 2010). Using these two constructs, relationships were explored to discover how they relate to what is already known about students at-risk (Saxon, & Boylan, 2010).

The findings demonstrated that there was an impact of grit and self-efficacy on student performance. Additionally, these two constructs were impacted by demographic information of gender, race, socioeconomic status, and first-generation student status. While grit did not have a direct impact on GPA as demonstrated in the quantitative data, it did impact self-efficacy which directly did impact GPA.

There is still much exploration to be done on grit and self-efficacy as each impacts the performance of students at-risk. Both of these constructs have been determined to be impactful in human success in many instances (Bandura, 1997, Duckworth, 2016). Teaching of these transferrable skills is also being explored (Tough, 2012). In understanding the impact of these two constructs, a deeper understanding about which students will become successful in

developmental placement categories may be possible. As the impact of the variables becomes understood, the necessity for teaching such skills becomes more apparent.

This research has explored the impact of these constructs and demonstrated their importance. In assisting in this understanding, the project has deepened the understanding of students determined to be at-risk. As more students in this category enter college, this research has expanded the understanding of the students and what it may take to help them perform at higher levels.

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Appendix A
Survey Instrument

Quantitative Survey

Please write your four letter email code in the blank_____

1. What is your gender? (Circle One) Male Female
2. Are you 18 years of age or older? (Circle One) Yes No
3. Which best describes your racial background?
 - A. White or Caucasian
 - B. Black or African American
 - C. Hispanic or Latino
 - D. Native American or American Indian
 - E. Asian or Pacific Islander
 - F. Other _____
4. How would you describe your family's socio-economic background?
 - A. upper class
 - B. upper middle class
 - C. lower middle class
 - D. lower class
5. Did your parents attend college? (Circle One) Yes No

For the following, please indicate the likelihood that you will...

6. Complete this semester/quarter
 - A. 0%
 - B. 20%
 - C. 40%
 - D. 60%
 - E. 80%
 - F. 100%

7. Continue to stay enrolled next semester

- A. 0%
- B. 20%
- C. 40%
- D. 60%
- E. 80%
- F. 100%

For the following, please indicate your level of confidence in accomplishing the following tasks:

8. Asking questions in class

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

9. Keeping up with the required readings

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

10. Understanding my instructors

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

11. Writing term papers

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

12. Meeting my parents' expectations of my grades

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

13. Making friends at school

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

14. Doing well on exams

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

15. Getting papers done on time

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

16. Passing more than one test in the same week

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

17. Taking effective class notes

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

18. Managing both school and work
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
19. Preparing for exams
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
20. Managing time efficiently
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
21. Getting along with family members
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
22. Improving my reading skills
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
23. Improving my writing skills
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
24. Using the internet to find research resources
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
25. Getting the grades I want
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
26. Getting along with my roommate(s)
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
27. Communicating issues or concerns to a counselor/advisor
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
28. Finding time to study
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
29. Understanding my text books
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
30. Participating in class discussion
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all
31. Understanding college regulations
Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

32. Studying effectively

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

33. Finding a major

Extremely 10 9 8 7 6 5 4 3 2 1 Not at all

For the following questions please be honest and select the box that corresponds with how much the statement describes you.

34. I have overcome setbacks to conquer an important challenge.

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

35. 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

36. My interests change from year to year.

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

37. Setbacks don't discourage me.

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

38. 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

39. I am a hard worker.

☐ Very much like me

☐ Mostly like me

☐ Somewhat like me

☐ Not much like me

40. 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

41. 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

42. I finish whatever I begin.

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

43. I have achieved a goal that took years of work.

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

44. I become interested in new pursuits every few months.

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

45. I am diligent.

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

Appendix B

Interview Protocol

1. Could you give me an example of a time when you experienced academic adversity in college and how you overcame it?
2. What is one specific goal you have and when will you complete it?
3. Give an example of a time when you thought something was impossible? How did you proceed?
4. How committed are you to your goals? On a scale of 1-10, 10 being the highest. Why?
5. When you were younger was there anyone who taught you the importance of accomplishing goals? If so, how did they teach this to you?
6. What else in your background taught you to never give up?
7. When did you start believing in yourself academically?
8. Did anyone else play a role in this? If so who and how?
9. Give an example of a time when you stopped believing in yourself academically?
How did you get through this?
10. Describe any past support you have been given in the past in terms of academic goals?
11. When thinking about your academic goals, what types of things have hindered success for you in the past?
12. Is there anything which I haven't asked you about but you would like to tell me related to this topic?

