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Grit and Self-Control as Predictors of First-Year Student Success

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GRIT AND SELF-CONTROL AS PREDICTORS OF FIRST-YEAR STUDENT

SUCCESS

By

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A.O.S. American Academy of Dramatic Arts, 1995

B.A. San Francisco State University, 2001

M.S. University of Southern Maine, 2005

A DISSERTATION

Submitted in Partial Fulfillment of the

Requirements for the Degree of

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Advisory Committee:

Dr. David Silvernail, Professor of Educational Leadership, Advisor

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Dissertation Advisor: Dr. David Silvernail

An abstract of the dissertation presented in partial fulfillment of the requirements for the
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The objective of this exploratory quantitative study was to investigate the

relationships between grit, self-control, and the first academic semester of college

students, and determine if the relationships differed by gender. Two research questions

were examined; (1) *What are the relationships between the individual factors of grit, self-*

control, and first-semester college GPA? And do they differ by gender? and (2) *What*

combinations of factors (grit, self-control, high school GPA, and SAT scores) best

predicts first-semester college GPA? And do they differ by gender?

This study investigated 88 first-time, first-year college students and their

academic success during their first college semester using three instruments: the 12-Item

Grit Scale, the Self-Control Scale, and the Short-Form C of the Marlowe-Crowne Social

Desirability Scale. Correlation analysis and stepwise regression methods were used to

examine relationships.

Findings from this study reinforce that high school GPA and SAT scores are

predictors of college academic performance. However, the relationships between high

school GPA, SAT scores, and fall GPA in this study were not as strong as indicated in

previous studies. Results indicated that grit and academic performance had no

relationship, while a small yet significant relationship was found between self-control and academic performance. Additionally, male and female students had somewhat different results in terms of grit, self-control, and academic performance. Predictors of academic performance for male students were high school GPA, self-control, and SAT scores. Female students' predictors were high school GPA and SAT scores. During an exploration process in this study, self-control was the only predictor of students' fall GPA when it was less than 2.67. Gender did not play a role in that particular finding, and the best and only predictor of all students' fall GPA < 2.67 was self-control. That indicated that levels of earned GPA may be related to levels of self-control. The overall findings of this study contribute to further understanding factors related to college success, graduation, and better options for both life and career.

DEDICATION

A doctoral dissertation is a journey, not only for the person pursuing the degree, but for her family as well. I have been blessed to have two amazing men in my life: my husband, Matthew and my son, Ozric. I thank you both for your patience, support, and encouragement. You give my life purpose and direction. Thank you for the laughter and the love that you bestow upon me every day. I will love you forever and always and anon.

ACKNOWLEDGEMENTS

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CHAPTER I: INTRODUCTION

Statement of Problem

The goal of this study was to explore potential new predictors of first-semester success in first-year college students. More specifically, the study intended to determine if grit and self-control were stronger predictors or complements of success than the Scholastic Aptitude Test (SAT) and high school grade point average (HSGPA). Sparkman et al. (2012) stated that "success in college, as defined by student retention and academic performance, may be related to other variables or combination of variables" (p. 642). Hiss and Franks (2014) asked, "does standardized testing support good decision making, or does it artificially truncate the pool of students who would succeed in college if they were given a chance?" (p. 61). Recent studies, including Duckworth, Peterson, Matthews & Kelly, 2007; NACAC, 2008; Duckworth et al., 2012; Honken and Ralston; 2013 Hiss and Franks, 2014; and Duckworth and Carlson, 2013, suggested that success in college is related to predictors other than the current best predictors: SAT and HSGPA. This study intended to investigate two possible additional predictors --grit and self-control--and contribute its findings to the current discussion about predictors of student success.

Originally, universities were established to meet the "learning and investigation" (Haskins, 1957, p. 25) needs of students. Over time the purpose of universities has expanded; they have developed into places of "acquisition of knowledge and skills for specific social ends" (Altbach & Berdahl, 1981, p. 17). Once the purpose of college was to better oneself, to raise oneself up and out of one's current standing. Today, the university is a place of learning, investigation, and "serve(s) as the gateway to significant

roles in society" (Altbach & Berdahl, 1981, p. 21); however, those roles now come as economic necessities. Over the years colleges and universities have had to adapt to the changing needs of the economy, as well as to the influx of a "more diverse pattern of ethnic and cultural backgrounds and aspirations" (Altbach & Berdahl, 1981, p. 43). College is no longer a place for just learning and discovering: it is a necessity for economic prosperity.

Over the past few decades the earnings differential between a high school graduate and a college graduate has expanded, indicating that college has economic importance. Schmitt and Boushey (2012) found that "among 25- to 34-year-olds, for example, a college graduate earned 25 percent more than a high school graduate at the end of the 1970s, and by the late 2000s, the pay premium for college graduates in the same age range climbed to 60 percent" (p. 79). The National Center for Education Statistics (2014) found that in 2012 the average annual salary of a bachelor's degree holder was $46,900, while a high school graduate earned an average of $30,000, and those without a high school degree averaged $22,900. In 2013, the unemployment rate for holders of a baccalaureate degree was 7.0 percent, compared to 17.5 percent unemployment for holders of a high school diploma (Education, 2014). Thus a college education has become more important to life and career success. The first-year, and especially the first-semester of college, is often regarded as the most important, and the most challenging for students.

In 1987, Tinto stated in *Leaving College: Rethinking the Causes and Curses of Student Attrition* that "it is estimated that only 44 percent of all entering students will persist via continuous enrollment in their institution of initial registration" (p. 15). In

2004, the first-year to second year national college retention rate for all institutions was 68.3 percent. In 2012, the first-year to second year retention rate for all institutions was 66.5 percent (ACT, 2013). The rate of persistence to a degree for all institutions in 2004 was 46.2 percent and in 2012 was 45.4 percent (ACT, 2013).

There are many theories as to why the transition into college is so tumultuous. Tinto (1988) referred to *The Rites of Passage* by Van Gennep (1960) to describe the three stages a student experiences when leaving high school, entering college and completing his or her degree: separation, transition and incorporation. Sparkman et al. (2012) stated that "for students to be successful in college, they must first be able to navigate the transition from high school, a controlled and limited environment, to college, which offers more options and decisions to be made by the student" (p. 645). Palmer et al. (2009) suggested those transitions are turning points that are "rarely smooth or linear; but rather more indeterministic rather than deterministic, and more discontinuous than continuous" (p. 51). Those theories strongly suggest that the first-year of college has a significant impact on a student's overall success, and completion of a college degree. Currently the potential for success is determined through the admissions process using two primary predictors: HSGPA and SAT scores.

As the economic necessity of a college degree has increased over the years, colleges have found ways of determining a student's academic preparedness and fit for their institutions. The top two ways to assess academic preparedness now are to use a student's HSGPA and SAT scores. In 2010, according to "the NACAC State of College Admission report, 89.8 percent of colleges attributed either 'considerable' or 'moderate' importance to admission test scores in the admission process" (Patterson, Mattern, &

Swerdzewski, 2012, p. 35), suggesting that most college admissions offices base their

acceptance decisions on students' SAT and HSGPA scores. Menson, Patelis & Doyle

(2009) state:

> One way to assess advanced academic skills is SAT performance…
> The College Board's 2008 SAT Validity Studies concluded that the SAT
> continues to be an excellent predictor of how students will perform in
> their first-year of college. The best predictor of first-year college GPA is
> a combination of high school GPA with SAT scores (p. 22).

However, the term "excellent predictor" was not defined in that study; therefore, it was

difficult to determine the strength of the relationship between performance and SAT

scores.

Other research calls into question the importance of SAT scores and HSGPA in

predicting success and retention. Mattson's *Beyond Admission: Understanding Pre-*

College Variables and the Success of At-Risk Students (2007) concluded that "by

identifying leadership experience, high school GPA and gender as positive predictors of

academic achievement this study adds to the literature and provides further questioning as

to the heavy usage of SAT scores" (p. 12). Mattson went on to state that "higher

education must look deeper into the true nature of applicants when deciding admission"

(p. 12). A study by Hiss and Franks (2014) spanned three years, and concluded that

HSGPA was a better predictor of success than SAT scores. Their results appeared to

explain approximately 24 percent to 30 percent of the variance, suggesting that HSGPA

predicted success only 24 percent to 30 percent of the time, leaving room for other

possible predictors, and suggesting that college success was complex and difficult to

predict. The researchers Kobrin, Patterson, Shaw, Mattern & Barbuti (2008) compared SAT scores, HSGPA, and first-year college GPA (FYGPA) using a single and multiple correlation study. The HSGPA correlated with SAT 0.21 and 0.25 (0.45 to 0.49 adjusted) when the three sections of SAT were looked at individually. When the three SAT sections, all together, were run through a multiple regression with HSGPA, it resulted in 0.28 (0.53 adjusted) correlation. The researchers stated, "This correlation shows that the SAT and HSGPA are indeed related, but there is far from a perfect relationship between these two measures. This finding suggests that the SAT and HSGPA may measure different aspects of academic achievement" (p. 5). When Kobrin et al. (2008) focused their findings on FYGPA they found the correlation between HSGPA and FYGPA to be 0.36 (Adj. r= 0.54) and SAT and FYGPA 0.35 (Adj. r = 0.53) (p.5). Finally, the researchers compared HSGPA and all three SAT sections to FYGPA. The multiple correlation between all three (HSGPA, SAT, and FYGPA) was 0.46 (Adj. r= 0.62), indicating that 0.54 (0.38 adjusted) was accounting for some other variables.

In addition to the research on SATs and GPAs, there are various studies on different aspects of character strengths. Park, Peterson & Seligman (2004) defined character strengths as "positive traits reflected in thoughts, feelings, and behaviors. They exist in degrees and can be measured as individual differences" (p. 603). Their definition of character strengths was not focused on moral character, but on "personal growth and achievement" (Tough, 2012, p. 60). Park et al. (2004) found that "the more intensely a strength is endorsed, the more life satisfaction is reported" (p. 615).

The research on character and its strengths by Peterson and Seligman (2004), and Duckworth, Peterson, Matthews, & Kelly (2007) brought to light the concept that

character was a necessity in the growth, development, and success of students. Their research investigated character strengths (i.e. self-control, curiosity, grit, zest, optimism) and their roles in human development. Duckworth's (2013) research narrowed down those character strengths, and suggested that grit and self-control are the two traits needed for success. However, Duckworth's definition of success was dependent on what was being studied. Success in higher education is based on academic performance. Duckworth et al. (2007) defined grit as "perseverance and passion for long-term goals" (p. 1087). Self-control was defined by Tangney, Baumeister & Boone (2004) as "the ability to override or change one's inner responses, as well as to interrupt undesired behavior tendencies (such as impulses) and refrain from acting on them" (p. 274).

In 2011, Moffitt, Arseneault, Belsky, Dickson, Hancox, Harrington, Houts, Poulton, Roberts, Ross, Sears, Thomson & Caspi found that children with low self-control ranked high for alcohol/drug problems, and financial struggles, and were more likely than others to have been convicted of a crime as adults. The research by Moffitt et al. (2011) and Duckworth, Quinn & Tsukayama (2012) suggested that for students to live productive, happy, successful lives, building self-control and grit needs to be written into public policy as a long-term goal in the education of all children. Duckworth et al. (2012) stated:

> If the goals of formal education extend to setting children on paths toward more productive and happier lives (Brighouse, 2008), then, in our view, there is good reason for explicitly encouraging self-regulation of attention, behavior, and emotion in the service of long-term goals. (p. 449)

Character strengths play an important role in student development, academic achievement, and success in life (Tough, 2012).

Duckworth's (2013) research suggested that grit and self-control were stronger predictors of academic success than IQ and SAT scores. However, Duckworth studied grit and self-control only separate from each another. The research on grit focused on student achievement (the ability to accomplish more over a period of time than could individuals of equal intelligence). The self-control research focused on academic performance (completion of high school and higher grades). There was little research on the combination of grit, self-control, and academic success within a traditional college population. Additionally, Duckworth's subjects were all from specialized populations: high achieving psychology majors from Penn State averaging SAT scores of 1415; cadets from West Point; and National Spelling Bee finalists. All data collected were based on self-reporting, bringing into question social desirability bias. Grit questions were self-reflective, so participants may have reflected on the past versus the present, and it is unknown how grit related to other predictors of achievement, locus of control, for example.

In 2013, the U.S. Department of Education, Office of Educational Technology, released a draft report *Promoting Grit, Tenacity, and Perseverance: Critical Factors for Success in the 21st Century* (Shechtman, DeBarger, Rosier, & Yarnall). Included in the draft were fourteen conclusions and recommendations. Two of the fourteen recommendations supported this current study.

The twelfth conclusion/ recommendation stated:

Conclusion 12: While there are many programs demonstrating impacts in particular contexts, there is still a gap between the research and how practitioners can use the various intervention approaches effectively across a wide variety of settings for a diversity of students.

Recommendation 12: Researchers should conduct field-based implementation research at small and large scale to build on the extant research literature and leverage multidisciplinary knowledge of experts in theory, practice, and research methodology. Research methodologies should include small-scale design research grounded in the concerns of everyday practice, as well as larger-scale efficacy studies to establish variations across settings and effectiveness studies to establish impacts at scale (p. xvi).

The fourteenth conclusion/recommendation stated:

Conclusion 14: Researchers, practitioners, and policymakers indicated the need for a broad spectrum of multidisciplinary research on important non-cognitive student competencies.

Recommendation 14: Foundations and federal agencies should invest in programmatic portfolios of research that investigate mutually informing research questions spanning the range from basic theory, to intervention and evaluation research, to assessment research. Portfolios should leverage the capacities of multidisciplinary teams and program networks (p. xvi).

That draft report opened doors for further research in the area of character strengths and their effects on student success in high school, college, and beyond. The research of Duckworth (2013) "has established the predictive power of Grit and Self-Control, over and beyond measures of talent, for objectively measured success outcomes" (Retrieved from https://sites.sas.upenn.edu/duckworth/pages/research-statement).

Currently, secondary and post-secondary education focuses enormous attention on a student's SAT and HSGPA scores to determine potential for success in a post-secondary setting, despite inconsistent evidence regarding the relationship of those scores on success. According to Moffitt et al. (2011) college retention, and persistence to the second-year numbers are dropping, suggesting that SAT scores and HSGPA are not the best predictors of college success. A more important question is whether grit and self-control may be stronger predictors or complements of success than SAT scores and HSGPA.

With retention and persistence rates dropping, colleges and universities have created task forces to determine what they can do to retain students, and to increase their persistence rates. Research in the area has been based on getting students connected to campus so they feel they are part of the college environment, and creating accessible academic supports (Morrow & Ackermann, 2012). Currently, there is little research on the combined impact of grit and self-control and their relation to first-semester student success. The goal of this research was to add to the existing analyses of grit and self-control as predictors of student success.

Purpose of the Study

The purpose of this research was to examine the relationship of grit and self-control on a first-year student's success during the first-semester of college. The research compared grit and self-control results to SAT scores and HSGPA, which have long been considered the best predictors of a student's first-year experience and retention (Menson, Patelis, & Doyle, 2009).

The objective of this study was to explore the relationships among grit, self-control, and the first academic semester of college students, and determine if they differed by gender.

Research Questions

The following research question(s) were examined in this study:

1. What are the relationships between the individual factors of grit, self-control, and first-semester college GPA? And do they differ by gender?

2. What combinations of factors (grit, self-control, HSGPA, SAT scores) best predicts first-semester college GPA? And do they differ by gender?

Significance of the Study

This study contributes to the emerging research on grit and self-control by comparing the effects of those character strengths to those of SAT scores and HSGPA, currently used by high schools and colleges to predict the academic performance of students. Findings from this study may assist with four areas of academic performance: scholarships, academic probation, retention, and persistence rates. Academic performance assists students with maintaining their scholarships. Most academic scholarships require a

maintained GPA of 3.0 or above. For example, Honken and Ralston (2013) found in a recent study of 279 engineering students that "it is estimated, based on their 1st year GPA, that 31% of the students with full scholarships and 50% with partial scholarships subsequently lost their scholarships due to not meeting the minimum GPA requirement" (p. 109). Additionally, academic performance assists students in avoiding academic probation. In the same study Honken and Ralston found that "17% of the [engineering] students were either on academic probation or had received an academic warning at the end of their 1st year" (p. 109). Students who are academically successful tend to be retained from one semester to another.

Findings from this study also suggest that strategies for supporting academic performance be further investigated. And finally, this study contributed to the emerging research on college performance predictions, that is, a student who is academically successful is more likely to persist to graduation. It is hoped that the overall findings of this study will contribute to students' college success, graduation, and better options for both life and career.

CHAPTER II: LITERATURE REVIEW

This chapter reviews the literature surrounding commonly used predictors in college success, specifically SAT and HSGPA, as well as two potential additional predictors of college success: Grit & Self-Control.

Commonly Used Predictors of College Success

On June 23, 1926, the first Scholastic Aptitude Test (SAT) was administered to students with the intention of measuring "innate' intelligence" (Stickler, 2007, p. 2). The original SAT was designed to standardize college entrance exams, allowing students of little wealth to be recognized for their intellect and aptitude. Over time the U.S. Department of Education used the results of the SAT as a comparison tool, publishing and comparing rates by individual states. As a result of the comparison, colleges began to accept high-scoring students to improve their status (Stickler, 2007). Currently there is a nationwide debate on whether the SAT is the best predictor of student success.

A National Association for College Admission Counseling (NACAC) report, *The Use of Standardized Tests in Undergraduate Admissions,* (2008) stated that there is not "a 'one-size-fits-all' approach to the use of standardized tests in undergraduate admissions" (p.7). The report suggested a student is more than just test scores, "that college success is a term of sufficient breadth that it includes degree attainment, a wide range of GPAs, and the acquisition of experiences and skills that will propel a student into the workforce, graduate education, or responsible citizenship" (p.11).

The report cited several limitations to the use of HSGPA and SAT scores. The first limitation discussed was that HSGPA is not a valid predictor of academic success in

college. Because high schools across the country differ in grading systems, and have different course strengths, it was impossible and unfair to compare students from different high schools to one other. Therefore, colleges and universities have been placing more importance on standardized test scores. In 2006, colleges "attributed *considerable importance"* to the following factors: 62 percent admission test scores; 62 percent to strength of curriculum; 51 percent to grades in all courses; and 76 percent to grades from college prep courses. Then the percentages fall: e.g., 28 percent for the admissions essay, 23 percent for class rank (NACAC: National Association for College Admission Counseling, 2008, p. 18).

Second, the report suggested that the SAT is a limitation to colleges and universities in that it cannot meet "the varying form, function and mission of colleges and universities" (p. 19). A "one-size-fits-all approach" (p. 19) no longer fits the framework of today's college campuses. Student populations are becoming more diverse each year; the demographics are changing.

The third SAT limitation discussed, similar to that of HSGPA, is that colleges and universities do not use SAT scores to measure students equally:

> The Commission acknowledges that there are distinct score differences between subgroups of test takers…The Commission agrees that by overemphasizing SAT and ACT scores in the admission process, colleges and universities may exacerbate existing disparities among under-represented students. While often referred to as "common yardsticks" for measuring applicants, test scores (on average) are strongly correlated with student and family attributes over which a student has no control. (p. 39)

Fourth, the report discussed three misuses of SAT scores: using a SAT score as a cut-off for awarding scholarships; using SAT scores to rank institutional quality (e.g., an institution that accepts only students with high SAT results was a better institution); and believing that SAT scores were a valid way to assess a student's academic history in high school.

Finally, the NACAC discussed socioeconomic status and test score differences, especially in under-represented populations (p. 39). The report looked at two factors: family income and level of parent education. In both cases, less equaled less; the lower the income or level of education, the lower the test scores.

The Use of Standardized Tests in Undergraduate Admissions recommended that colleges and universities truly understand how they use standardized testing in relation to their student populations. The authors stressed that there are limitations to standardized testing, and that more research should be spent on "non-cognitive" skills, "variables relating to adjustment, motivation, and perceptions, rather than the traditional verbal and quantitative (often called cognitive) areas typically measured by standardized tests" (p.18).

The current purpose of the SAT was discussed in the research report of Kobrin, Patterson, Shaw, Mattern & Barbuti (2008) published by The College Board. It stated, "the primary purpose of the SAT is to measure a student's potential for academic success in college" (p.1). That particular report discussed the validity of the revised SAT, which incorporated a writing section, and added to the critical-reading section (formerly the verbal section) and the mathematics section. Their study consisted of 110 U.S. colleges and universities, with 151,316 students participating. The correlation between HSGPA

and the individual sections of the SAT was 0.21 and 0.25 (0.45 to 0.49 adjusted); when combining the three sections with the HSGPA the relationship increased to 0.28 (0.53 adjusted). The researchers stated, "This correlation shows that the SAT and HSGPA are indeed related, but there is far from a perfect relationship between these two measures. This finding suggests that the SAT and HSGPA may measure different aspects of academic achievement" (p. 5). The researchers did not speculate as to what those differences might be. They then focused their investigation on FYGPA; the researchers found a 0.36 (0.54 adjusted) correlation between HSGPA and FYGPA, and 0.35 percent (0.53 adjusted) between SAT and FYGPA. Finally, the researchers compared HSGPA and all three SAT sections to FYGPA. The amount of correlation accounted for all three was 0.46 (0.62 adjusted). Based on their findings, the researchers recommended that colleges use both HSGPA and SAT scores to predict FYGPA.

Kobrin et al. (2008), suggested that there is more to a student than just the HSGPA and SAT scores. The correlation between HSGPA and SAT scores in relation to FYGPA was 0.46 (0.62 adjusted), suggesting that other factors were contributing to the FYGPA. Additionally, there were several limitations in the study, although those limitations were not discussed in the report. First, 57 percent of the participating college and universities were private institutions; which was not an accurate representation of the national college and university population. Also, selectivity of applicants was not equally represented, since 54 percent came from institutions that admit 50 percent to 75 percent of their applicants. The researchers chose to use a self-report questionnaire, completed by students, to obtain student's HSGPA. Thus, there was no way to accurately determine if students' self-assessed HSGPA was correct. The results of the study might have been

different had the researchers chosen to obtain the HSGPA data from the colleges and institutions involved in the study: they would have had precise information with which to work.

Hiss & Franks (2014) over three years investigated a total of 123,000 student records at thirty-three different colleges and universities. Their research question was "are college admissions decisions reliable for students who are admitted without SAT or ACT scores?" (p.2). Among the 123,000 students, 30 percent were non-submitters (students who opted to not use their SAT scores in the admissions process). The researchers found that there was no significant difference between submitters and non-submitters in regards to cumulative GPA or graduation rates (p. 3). Hiss & Franks stressed that cumulative GPA and HSGPA "closely track," suggesting that HSGPA is a better indicator of college success than SAT scores (p.3). Additionally, they stated that HSGPA is "a broadly reliable predictor of college performance" (p. 5). The researchers found the greatest difference between submitters and non-submitters was SAT scores; there was an average 149 point difference between the two groups, non-submitters having the lower scores. Their research found that students who were considered the "Low-Testing Non-Submitter" had SAT averages that were 240 points below the cohort average (p.38). The group of "Below-Average-Testing" students had a 67 percent higher graduation rate and better overall GPA's of 2.78 (p.38). However, in the research finding Hiss & Franks were able to explain only about 24 percent to 30 percent of the variance, meaning that their prediction of college success based on non-submitters and GPA would only be correct 24 percent to 30 percent of the time, calling into question what accounts for the other 70 percent to 76 percent. The study provided valuable information that calls

into question the high reliance on standardized tests to inform college admissions and predict college persistence. It leaves an important unanswered question: what additional potential predictors are related to the unaccounted for 70 percent to 76 percent of variance?

Potential Additional Predictors of College Success

One potential better predictor or complement to academic success that researchers have identified is a factor referred to as "Grit." According to Duckworth, Peterson, Matthews & Kelly (2007), to be "Gritty" an individual needs to be resilient and persistent. Within resiliency, acts of failure come with a positive response; regardless of the set-back a resilient person will find the positive, and not be beaten by failure (Perkins-Gough, 2013, p. 15). Persistence, then, keeps a person moving forward, focused on long-term commitments or goals. The student who learns for the sake of learning, regardless of grades earned, is more likely to be gritty and successful than the student who strives only for good grades (p.16-17). In the *Significance of GRIT: A Conversation with Angela Lee Duckworth* (Perkins-Gough, 2013), Duckworth stated:

> The people who are, for lack of a better word, "ambitious"—the kids who are not satisfied with an *A* or even an *A+*, who have no limit to how much they want to understand, learn, or succeed—those are the people who are both talented *and* Gritty. (p.17)

This statement suggested that students may be successful even if they have a low HSGPA and SAT scores--if their learning and understanding were more important than grades and scores. Duckworth also suggested that many students are unfamiliar with failure, and do

not know how to struggle or persist, and that being academically gifted does not necessarily mean a student will be successful.

Duckworth, Peterson, Matthews & Kelly (2007) set out to answer, "why do some individuals accomplish more than others of equal intelligence?" (p. 1087). Their answer: Grit. The researchers defined Grit as "perseverance and passion for long-term goals" (p. 1087). Their hypothesis was that Grit was necessary to any type of important achievement. According to Duckworth et al's. (2007) review of the literature, studies showed that even if a person was intelligent, that intelligence was useful only if the person was persistent. Grit differed from achievement in that achievement was "short-term intensity" and grit was "long-term stamina" (p. 1089). When comparing grit to achievement, Duckworth et al. (2007) suggested there were two distinct differences between grit and achievement. First: "individuals high in Grit deliberately set for themselves extremely long-term objectives and do not swerve from them- even in the absence of positive feedback" (p. 1089). Second: "the need for achievement is by definition a non-conscious drive for implicitly rewarding activities and therefore impossible to measure using self-report methods" (p. 1089).

Duckworth et al. (2007) conducted six different studies to explore the concept of Grit and its relationship to high achievement: **Study 1** assisted in the creation of the twelve-question Grit Scale and then compared Grit to age and Grit to education attainment levels. Education levels ranged from some high school to post-college graduate degrees. The results verified the researchers' predictions that "more educated adults were higher in Grit than were less educated adults of equal age" (p. 1091). The researchers asserted that there was a correlation between grit and age, as well as with

education; as one ages and experiences life, grit would increase. When controlling for education, grit increased over age. When controlling for age, the researchers found in a post hoc comparison that post-college graduates were higher in grit than most of the other groups.

In **Study 2** the objective was to investigate the relationships between grit, age, and education by controlling for the Big Five traits. The Big Five trait-theory or Five Factor Model consists of five personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1993). McCrea & John (1992) stated that the model is threefold: "it integrates a wide array of personality constructs, thus facilitating communication among researchers of many different orientations; it is comprehensive, giving a basis for systematic exploration of the relations between personality and other phenomena; and it is efficient, providing at least a global description of personality with as few as five scores" (p. 206). Duckworth et al. (2007) asked two questions (1) "does Grit provide incremental predictive validity over and beyond Big Five traits?" and (2) "is there evidence that Grittier individuals make fewer career switches than their less Gritty peers?" (p. 1093). The researchers found that age and education were significant predictors of Grit, even when conscientiousness was added as a covariate into the analysis. Participants with "some college" were lower in Grit than participants with associate and graduate degrees, who were higher in grit than bachelor's-degree holders. In regards to career changes, "individuals who were a standard deviation higher in Grit than average were 35% less likely to be frequent career changers" (p.1093).

Study 3 assisted Duckworth et al. (2007) in researching whether Grit and college GPA had any correlation to each other. The intended purpose was to see if grit had anything to do with differences in college GPA levels outside of intelligence. The results indicated that "Gritty students outperformed their less Gritty peers: Grit scores were associated with higher GPAs (r=.25, p<.01), a relationship that was even stronger when SAT scores were held constant (r=.34, p < .001)" (p. 1093). The researchers found that GPA and SAT were associated with each other (r=.30, p < .001). One interesting discovery was that grit and lower SAT scores were correlated, which suggested that students with lower SAT scores were grittier than their peers with higher SATs.

Study 4 investigated success in challenging environments. Using West Point cadets, and six measures--the Grit Scale, the Brief Self-Control Scale, the Whole Candidate Score "a weighted composite of high school rank; SAT score; Leadership Potential Score…and Physical Aptitude Exam" (p.1094-1095), summer retention, academic GPA and the Military Performance Score--the researchers predicted that grit would be a determining factor in retention rates during West Point's summer training program. They also predicted that grit would determine if a cadet persisted through the military and academic first-year GPA (Duckworth, Peterson, Matthews, & Kelly, 2007). The researchers anticipated that grit would be a better indicator of retention rates than self-control. They did not think that intelligence or physical aptitude would be related to grit (p. 1094). The results indicated that grit was the best predictor of retention from the summer training program. They found that:

Cadets who were a standard deviation higher than average in Grit were more

than 60% more likely to complete the summer training (β = .48, OR = 1.62, p <

.001), whereas cadets who scored a standard deviation above average in Self-

Control were only 50% more likely to complete the summer course (β = .41, OR

= 1.50, p < .01). (p. 1095)

Among the matriculated West Point cadets, grit did not predict first-year GPA and

military performance. Self-control was a better predictor of GPA than grit (r = .13, p <

.001 compared to r = .06, p < .05). The researchers suggested that there was a "qualitative

difference between minor and major accomplishments" (p. 1096). The rigorous summer

training program required more grit than the academic and military performance of the

first-year.

In **Study 5** the researchers wanted to see if "Grit had incremental predictive

validity for summer attrition over and beyond Big Five Conscientiousness" (p. 1096).

Results indicated, in regards to retention, grit was the best predictor out of the

conscientiousness and the Whole Candidate Score. Conscientiousness was related to the

Whole Candidate score (r = .12, p< .001); however, the Whole Candidate Score was not

related to grit (r= .03, ns). And as was found in Study 2, grit and conscientiousness were

highly correlated (r= .64, p < .001) (Duckworth, Peterson, Matthews, & Kelly, 2007).

Finally, **Study 6** was a longitudinal study beginning in 2005 in which participants

were participants in the Scripps National Spelling Bee. Duckworth et al. (2007) had two

interests: (1) grit and extracurricular accomplishments, and (2) to test the effect of grit on

the number of hours spent studying for the final competition, as well as the amount of

prior competitions participants had experienced. Grit was able to predict progression to

higher rounds. Grit, age, and verbal IQ, and not self-control, were positive significant

predictors to the final round (Duckworth, Peterson, Matthews, & Kelly, 2007). The finalists who were grittier tended to study longer, and progress farther in the competition. Therefore, the "enduring personality characteristic we call Grit is driving the observed correlations with success outcomes rather than the other way around" (p. 1098).

The research of Duckworth et al. suggested that for students to be academically successful they must have grit. That grit, defined by Duckworth et al. (2007) as "perseverance and passion for long-term goals" (p. 1087), played a large role in academic success, potentially more than did SAT scores and HSGPA.

In summary, the six studies performed by Duckworth et al. (2007) found that grit was related with success more so than was IQ. They did question whether to be successful one needs more grit than intelligence. Duckworth et al. (2007) found four limitations in their six studies. First, self-reporting was the only avenue used to collect data; therefore, social desirability bias came into question. Second, the Grit Scale asked participants to self-reflect; participants may have reflected on the past versus the present. Third, all participants in Studies 3, 4, 5, 6 had relatively high IQs; therefore, they "may have underestimated the correlations among Grit, IQ, and achievement" (p.1099). The researchers suspected that grit results would transfer to "less talented populations" and that "Grit may matter more, not less" (p. 1099). The final limitation was in not knowing how grit related to other predictors of achievement: locus of control, for example. Overall, Duckworth et al.'s research was focused on achievement versus success in college. The one study that involved college students was very limited in that all subjects were high achievers and there were still unknown relationships between grit and college GPA.

Another reported potential better predictor or complement to academic success is self-control. Duckworth (2011), in *The Significance of Self-Control,* suggested success in adulthood was based on having self-control as a child. According to Duckworth, self-control indicates academic success, which in turn suggests success in adulthood (p. 2639). People with self-control were less impulsive, and able to achieve long-term goals because they could regulate "their behavioral, emotional, and attentional impulses" (p.2639). Duckworth also noted that children who make improvements on their self-control will ultimately do better than children who do not.

In 2004, Tangney, Baumeister & Boone asked, "What good is Self-Control?" (p.271). In their study of self-control the researchers had two goals: (1) to provide evidence that "individual differences in Self-Control would effectively predict positive outcomes across a variety of life domains" and (2) "to develop an up-to-date scale for measuring individual differences in Self-Control" (pp.272-273). Upon reviewing several self-control scales, the researchers determined that all were lacking. They then created their own scale, based on their concept that "Self-Control was the ability to override or change one's inner responses, as well as to interrupt undesired behavior tendencies (such as impulses) and refrain from acting on them" (p.274).

Tangney, Baumeister & Boone (2004) conducted two independent studies: Study 1 consisted of 351 undergraduate students in a psychology course from a large east coast state university; the second study consisted of 255 undergraduate students in a psychology course from another large east coast state university. All subjects received credit in their psychology course for participating in the study. Results found by the researchers were as follows: (1) Achievement and Task Performance – there was a

significant relationship between high GPA and high self-control; (2) Impulse Control - people with high self-control report fewer eating disorders, as well as fewer alcoholic problems; (3) Adjustment – there was no relationship between high self-control and psychological problems. The researchers also found a "significant positive correlation between Self-Control and the Rosenberg self-esteem scale" (p.299); (4) Interpersonal Relationships – researchers found positive correlations between self-control and positive family environment, secure attachment, empathy, and absence of anger. Overall, "Self-Control is linked to beneficial interpersonal patterns" (p.308); (5) Moral Emotions – participants with high self-control were more apt to handle their transgressions; and (6) Related Personality Features- there was a positive correlation between conscientiousness and self-control. Tangney et al. (2004) found that "individuals genuinely high in Self-Control have the ability to exert Self-Control when it is required (e.g. forgoing a party to study for an exam, passing on dessert) and to suspend Self-Control when it is not (e.g. during spring break, at one's own birthday party)" (p.314).

Mansfield, Pinto, Parente, & Wortman (2009) asked "do high academic performers differ from low academic performers in terms of their reported level of Self-Control?" (p. 508). Questionnaires were given to 304 undergraduate students at a public college in the northeastern United States. The students represented two general education courses and two business courses. The researchers found that there was a significant difference between the achievements of high and low performers in relation to their self-control (p. 510). Mansfield et al. (2009) also found that there were key areas of self-control that affected academic performance: impulsivity, risk seeking, and physical activity (p. 511). High performers were able to delay gratification (impulsivity),

postponing activities until academic work was complete. High performers were considered "risk averse, more apt to accept rules and regulations" (p. 512). Low performers were more physically active; sitting down to study was not a commitment they were apt to make (p. 513). The researchers suggested that college administrations inform themselves about self-control and students' needs in that area in hopes that campuses start creating and implementing programs to assist with building self-control in students so all can be academically successful (p. 514).

Zusho and Edwards (2011) investigated the difference between mastery-oriented and performance-oriented students and their academic successes in college. Using two case-studies, the first a male college student who did well during high school, earning straight As without trying, and the second a female college student who did well in high school; but with effort.. During their study, the researchers specifically focused on self-regulated learning (SRL), one's ability to take charge of individual learning. Within SRL there are three phases of self-regulation: forethought, enactment, and management (p.23). The researchers used those three phases as guidelines in their research, knowing that learning occurs in a variety of ways. The focus was on motivation. Specifically, achievement goal theory "specifies the kinds of goals (i.e. purpose or reasons) that direct achievement-related behaviors" (p.25). In relation to student achievement, there are two types of goals: mastery and performance. Learning is a result of hard work and effort for a mastery-oriented student. Such students compare their achievements against their own achievements, not against the achievements of others. Showing others that they are capable, and that others are not, is the focus of a performance-oriented student. Learning is a means to an end for a performance-oriented student, whereas for mastery-oriented

students learning is the reward (p.26). Zusho and Edwards (2011) discovered that there is

"almost a one-to-one correspondence [sic] between SRL and mastery goals" (p.26).

Mastery-oriented students were likely to "use more efficient and effective cognitive and

metacognitive strategies" (26). With those strategies, mastery-oriented students are more

likely to believe in their academic worth when they failed, and have fewer issues with

anxiety and bad thoughts. However, for performance-oriented students motivation and

learning are negatively affected when they focus on "performance-avoidance goals" (p.

26). They reported higher levels of anxiety and lower levels of performance and interest

(p.26).

Moffitt, Arseneault, Belsky, Dickson, Hancox, Harrington, Houts, Poulton,

Roberts, Ross, Sears, Thomson & Caspi (2011) published a longitudinal observational -

correlational study investigating self-control. The researchers questioned whether

subjects who rate as having "mastered" self-control as children would be successful in

their adult lives (p. 2693). The study group consisted of 1000 children who were

observed from birth to 32 years of age. At ages 3 to 5, 7, 9, 11, 28, and 32, the children

were assessed in the areas of health, wealth, and public safety. Moffitt et al. found that

children with low self-control ranked high for alcohol/drug problems, financial struggles,

and were more likely to have been convicted of a crime as adults. Their findings

suggested that high self-control/self-regulation leads to delay of gratification; delaying

gratification leads to completing necessary tasks and therefore being successful in all

aspects of life. Based on their findings, Moffitt et al. recommended that self-control

interventions be considered if self-control is a predictor of adult success, then public

policy should place more emphasis on developing it at a young age, thereby saving

people and the government time and money (p. 2697). Moffitt et al. acknowledged that a single study, even though it was over a 32- year period, was not enough; they advocated for further research in the area.

Duckworth, Quinn & Tsukayama (2012) continued that type of research with their study questioning the No Child Left Behind Act of 2002. The researchers investigated self-control, IQ, report cards, and standardized achievement tests. They questioned whether a student's academic performance should be assessed solely by standardized testing (p. 440). Duckworth, Quinn, and Tsukayama conducted three different studies involving 1,913 middle school students and 57 teachers. Their findings suggest that "Self-Control predicted changes in report card grades over time better than did IQ, whereas IQ predicted changes in standardized achievement test scores better than did Self-Control" (p. 448). The researchers found that report cards were useful for giving students feedback and motivating them, while standardized testing was more for administrators and policymakers to "sample what students can do in an academic domain" (p. 448). That led to the question: does standardized testing truly assist students? In their research implications, Duckworth, Quinn & Tsukayama refer to a study by Geiser & Santelices (2007) which revealed that for "almost 80,000 students admitted to the University of California, high school GPA was a better predictor than SAT tests scores of cumulative college GPA" (p. 448). According to the research teams of Moffitt et al. (2011) and Duckworth, Quinn & Tsukayama (2012) for students to live productive, happy, successful lives, the building of self-control/self-regulation should be written into public policy as long-term goals in the education of all children.

In the *Handbook of Temperament* Duckworth and Allred (2012) discuss a variety of studies that investigate "how traits unrelated to general intelligence influence academic outcomes" (p. 627). Temperament was defined as "individual differences in behaving, feeling and thinking that are relatively stable across time and situation and reflect the relatively enduring biological makeup of the organism, influenced over time by heredity, maturation, and experience" (p. 627). In discussing academic performance, the authors used Rothbart and Rueda's (2005, p. 169) definition of effortful control (a temperament factor): "the ability to inhibit a dominant response to perform a subdominant response, to detect errors, and to engage in planning…a major form of self-regulation… children's ability to control reactions to stress, maintain focused attention, and interpret mental states in themselves and others" (p.628). In their review of the research, Duckworth and Allred stated that the "core function of effortful control seems to be goal-directed self-regulation [self-control] of more reactive behavioral, attentional, and affective processes" (p. 628). Duckworth and Allred then discussed academic performance and its three dimensions starting from kindergarten through post-secondary education: school readiness, academic achievement, and educational attainment. The researchers discussed how the entrance into "formal" (p. 630) schooling, for young students, "marks a dramatic change" (p. 630) in their lives. Synthesizing the research of Martin (1989), Blair and Razza (2007), Munis, Greenfield, Henderson & George (2007), Valiente, Lemery-Chalfant, Swanson & Reiser (2010), and McClelland et al. (2007), Duckworth and Allred concluded that effortful control was more necessary, and led to more success in students' academic experience, than did other temperament qualities (pp. 630-631). As students progressed through school and into primary, secondary, and postsecondary education,

academic achievement became more prominent in their lives. The researchers' question was why traits related to Conscientiousness (a Big Five Factor) and effortful control became increasingly important as students progressed through school. Duckworth and Allred answered that with the research of Zimmerman (2002) to suggest that the phenomenon occurs because as students mature and progress through their schooling, they are required to self-regulate more by having to take homework home, spend more hours studying, focus more in class, and take more responsibility for themselves overall (p. 632). Duckworth & Allred (2012) then discussed the "overlap and divergence between course grades and standardized achievement tests" (p. 632). Using the research of Finn, Pannozzo & Voelkl (1995), Mischel, Shod & Rodriguez (1989), and Willingham, Pollack & Lewis (2002), they found that effortful control forecasts performance on standardized achievement tests. However, they also discovered from Duckworth, Quinn & Tsukayama (2012), that "IQ predicted changes in standardized achievement test scores over time better than did self-control, whereas self-control predicted changes in report card grades over time better than did IQ" (p. 633). In addition, through the research of Bowen, Chingos & McPherson (2009), they found that GPA was a better indicator of class rank and graduation than SAT or ACT scores. Finally, Duckworth and Allred (2012) looked at the research in and around educational attainment. They discussed how the quantity of education matters in predicting success later in life, referencing the research of Heckman and LaFontaine (2007). They also emphasized, citing the research of Heckman and Rubinstein (2001), that students who dropped out of high school and eventually pursued a GED, and who had the same intelligence as their high school graduate peers, had jobs with lower hourly and yearly

wages, and fewer years in post-secondary education, suggesting that they "lack the abilities to think ahead, to persist in tasks, or to adapt to their environments" (p. 633). Overall, Duckworth and Allred (2012) discussed how "effortful control and its facets have emerged as the most robust predictors of the broadest range of academic outcomes, including school readiness; course grades in primary, secondary, and postsecondary school; and graduation from high school" (p. 635). They concluded their discussion by indicating that short-term research is needed in all dimensions of temperament as a "means of efficiently investigating the 'active ingredients' of behavior change" (p. 639).

In *Self-Regulation and Autonomy: Social and Developmental Dimensions of Human Conduct,* Duckworth and Carlson (2013) discussed in Chapter 10, Self-Regulation and School Success, how "several prospective studies have confirmed that self-regulation predicts successful graduation from high school" (p.212). By reviewing the current research the researchers discussed how self-regulation of attention and interpersonal behavior were the two best predictors of high school graduation (p.212-213). They also asserted that IQ and grades were not the best predictors of "academic outcomes;" self-regulation was (p. 215). Duckworth and Carlson refer to a report by McClelland, Piccinin, Acock & Stallings (2011) in which the researchers stated that "with school achievement levels controlled, children who were rated one standard deviation above the mean on attention span/persistence at age 4 years had 39% greater odds of completing college by age 25" (p. 215). Duckworth and Carlson (2013) also discussed several studies from 1995 and 2007 that found self-regulation was "strongly associated" with GPA versus SAT scores (p. 217). The researchers also referred to a study by Bowen, Chingos & McPherson (2009), which found that "cumulative high

school GPA predicts graduation from college dramatically better than SAT/ACT scores do, even without adjusting for differences in high school quality" (p. 217). Duckworth and Carlson concluded that a student's school success was largely impacted by self-regulation, especially delay of gratification, and plays a very important role in all aspects of a student's life (p. 222).

One of the original and most well-known studies related to self-control is the Stanford Marshmallow Experiment, performed by Mischel and Ebbsen (1970) that investigated delay of gratification, a component of the trait. In the study, children were given the option to receive one reward immediately, or receive two rewards after a short period of time. Children who were able to wait and receive two rewards showed a higher ability to delay gratification. Ten years after the initial study, Mischel, Shoda & Rodriguez (1989) followed up with the initial sample of children and their family members. They discovered that the children who had delayed gratification the longest had grown into "more cognitively and socially competent adolescents, achieving higher scholastic performance and coping better with frustration and stress" (p.933). The researchers explained that children "who tend to prefer delayed rewards also tend to be more intelligent, more likely to resist temptation, to have greater social responsibility, and higher achievement strivings" (p.934). Those findings suggested that a first-year college student who was able to delay gratification would be academically successful regardless of HSGPA and SAT scores. It also suggested that students with a lack of self-regulation may experience the opposite. Duckworth, Grant, Loew, Oettingen & Gollwitzer (2011) investigated self-regulation in their study "Self-Regulation Strategies Improve Self-Discipline in Adolescents: Benefits of Mental Contrasting and

Implementation Intentions," and stated, "in light of recent findings suggesting that a major reason for adolescents falling short of their intellectual potential is a lack of self-discipline…effective interventions geared at helping students exercise self-discipline are of pivotal importance" (p.23).

Duckworth and Gross (2014) discussed the similarities and differences between grit and self-control. The two traits were similar in that they assisted a person in being successful, whether it be related to academics or work. The difference between self-control and grit occurred in time. "Self-Control is more tightly coupled with everyday success, whereas Grit is more tightly coupled with exceptional achievements that often take decades -- or even an entire lifetime – to accomplish" (p. 12). A notable limitation of the current research was the lack of studies looking at both grit and self-control, as well as those comparing the two to HSGPA and SAT scores.

Basis for Investigation

In Paul Tough's (2012) book *How Children Succeed: Grit, Curiosity and the Hidden Power of Character*, he synthesized the work of Duckworth, Peterson & Seligman into a comprehensive analysis of how research was proposing that character strengths were better predictors of success than IQ. The book argued that the building of a student's character may be more necessary for academic and life success than academic standardized testing (Tough, 2012). Research in the area of grit is relativity new, while self-control has long been studied. Administrators, educators, and parents often have conversations about building character; "surveys of American parents over the past 30 years indicate that their most important goal for education was to prepare children to become responsible citizens" (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009, p.

295). The studies reviewed in the literature review suggested that policies should incorporate character building as part of the everyday K-12 and post-secondary curriculum. However, further research was needed to determine the relationship between character, college readiness, and retention.

Additionally, among the Duckworth et al. (2007) studies, participants included undergraduate psychology majors with average SAT scores of 1415, West Point cadets, and members of the National Spelling Bee competition. Members of those three groups typically have high aspirations and are high achievers, which was noted as one of the limitations in the Duckworth et al. 2007 study. The goal of this research was twofold, examine the relationship of grit, self-control, and academic success using traditional undergraduate students.

CHAPTER III: METHODOLOGY

Introduction to the Study

The purpose of this research was to examine the relationship of grit and self-control on a first-year student's success during his/her first-semester of college. The research compared grit and self-control results to SAT and HSGPA scores, which have long been considered the best predictors of a student's first-year experience and retention (Menson, Patelis, & Doyle, 2009).

The objective of this study was to explore the relationships between grit, self-control, and the first academic semester of college students and determine if the relationships differed by gender.

Methodology

The following research question(s) were examined in the study:

1. What are the relationships between the individual factors of Grit, Self-Control, and first-semester college GPA? And do they differ by gender?

2. What combinations of factors (Grit, Self-Control, HSGPA, SAT scores) best predicts first-semester college GPA? And do they differ by gender?

Research Hypothesis

As the literature review suggests, there are connections and or relationships between and among Grit, Self-Control, and college GPA; however, it is unclear as to the magnitude of those connections and/or relationships and how they might be connected to gender. Therefore, this study was conducted with two research hypotheses (H_1 and H_2):

Research Hypothesis 1

H$_1$: Grit and Self-Control relate to first-semester college GPA.

Research Hypothesis 2

H$_2$: Grit and Self-Control add to the predictability of first-semester college GPA.

Operational Definitions

The operational definitions of this study were as follows

Self–Control:

Definition: "the ability to override or change one's inner responses, as well as to interrupt undesired behavior tendencies (such as impulses) and refrain from acting on them" (Tangney, Baumeister, & Boone, 2004, p. 274).

Measured By: Brief Self-Control Scale created by Tangney, Baumeister and Boone (2004).

Grit:

Definition: "perseverance and passion for long-term goals" (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1087).

Measured By: 12-Item Grit Scale (Grit-O) created by Duckworth et al. (2007)

Traditional College Student:

Definition: Newly accepted fall-2014 first-time, first-year undergraduate students, 18-24 years old, with no prior college credit.

Measured By: Registrar data, based on admissions-office application data.

Sampling and Sampling Procedures

The study took place on a metropolitan multi-campus university in the northeastern United States. The metropolitan area had a population of 203,914 people. All demographic information about the university was obtained from the university's Office of Institutional Research (2015): 78.0 percent of the university's population was in-state and 21.9 percent out-of-state. In 2014, total undergraduate enrollment for the university was approximately 6,628 students. In the fall of 2014, 6,052 students applied to the university, 4,781 were admitted and 1,864 enrolled. Of the total enrolled students 737 were first-time, first-year students with the average age of 19. The average high school GPA of first-time, first-year students was 3.04 (Office of Institutional Research, 2014). Of the students enrolled, approximately 97 percent were 24 years of age and under. Average SAT scores were: Math 491, Verbal 498, and Written 483; 91 percent of students submitted their SAT scores (Office of Institutional Research, 2014). Of the 6,628 undergraduate student, 3,760 were female and 2,868 were male. Of the students 18 to 24 years of age, 84.8 percent were retained from fall 2014 to spring 2015, with a 13.5 percent attrition rate. The average first-time, first-year students' fall semester GPA was 2.87, and the average cumulative GPA was 2.88.

The sample in this study consisted of fall 2014, first-time, first-year undergraduate students with less than 24 college credits who were enrolled in the Entry Year Experience (EYE) course at the university. The EYE course is required for all first-year students with fewer than 24 credits. To be considered a first-year student, a student's academic transcript must have fewer than 24 college credits upon acceptance to the university.

All students enrolled in an EYE Fall 2014 course were invited to participate in the research study by email invitation, and were given a link to the Grit-O and the Brief Self-Control Scale. Students were also asked four optional questions in regards to religious affiliation, highest level of education completed by parents or guardians, highest level of education a student planned to complete, and family income. In addition, students were asked to sign an electronic consent form. The consent form gave the researcher permission to obtain from the university's registrar's office the students' HSGPA, SAT scores, gender, age, place of birth, race/ethnicity, name of high school, in/out of state status, degree sought, full- or part-time status, commuter or on-campus housing, as well as their fall 2014 cumulative FSGPAs and course registrations for spring 2014. As an incentive to participate, after completing the scales students were given an opportunity to submit their name for a raffle to win a $100 gift card from Amazon.com.

Instrumentation

This study investigated first-time, first-year college students and their academic success during their first college semester using three instruments: the 12-Item Grit Scale (Grit-O), the Brief Self-Control Scale, and the Short-Form C of the Marlowe-Crowne Social Desirability Scale (M-C Form C) to account for potential social desirability bias.

The 12-Item Grit Scale (Grit-O) designed by Duckworth et al. (2007) is a 12-item self-report instrument designed to determine the grittiness of an individual. The Grit-O determined the subject's level of grit, using the following Likert items choices: *very much like me, mostly like me, somewhat like me, not much like me,* and *not like me at all*.

The Grit-O was used in six different studies to create and validate the scale. The scale was developed to meet four criteria: (1) evidence of psychometric soundness; (2)

face validity for adolescents and adults pursuing goals in a variety of domains (e.g. not just work or school); (3) low likelihood of ceiling effects in high-achieving populations; and (4) a precise fit with the construct of Grit.

The Grit-O is related to the Big Five trait, Conscientiousness (Duckworth, Peterson, Matthews, & Kelly, 2007) as well as to self-control; however, the objective of the scale is to assess high achievements over time. The first version of the Grit-O scale contained twenty-seven questions. Initial interviews for question development occurred with high achievers: lawyers, academics, businesspeople. Duckworth et al. "intentionally wrote items that would be face valid for both adolescents and adults and that did not specify a particular life domain" (p. 1090). Questions were designed to relate to "sustaining effort when faced with adversity" and "consistency of interests over time" (p.1090). Ten questions were eliminated after considering "item-total correlations, internal reliability coefficients, redundancy, and simplicity of vocabulary" (p. 1090). An exploratory factor analysis was performed on the remaining seventeen questions. From this analysis the final twelve items were retained, falling on two factors, which Duckworth et al. (2007) stated were on "conceptually distinct dimensions" (p. 1090); these two factors were *consistency of interest* and *perseverance of effort,* and correlated at $r = .45$. The two-factor solution found that each factor was larger than the error of variance for that factor. Confirmatory factor analysis supported the two-factor solution (comparative fit index = .83 and root-mean-square error of approximation = .11); that resulted in the 12-Item Grit Scale or Grit-O. The overall scale had a high internal consistency ($\alpha = .85$), and for each factor (Consistency of Interests, $\alpha = .84$; Perseverance

of Effort, α = .78). Duckworth et al. (2007) found that the two factors together were more predictive of outcomes than the factors by themselves.

The Brief Self-Control Scale designed by Tangney et al. in 2004 is a 13-item self-report assessment designed from the original 36-item Total Self-Control Scale created by the same researchers. The Brief Self-Control Scale determines a subject's level of self-control, using a 5-point scale "anchored from 1 *not at all like me* to 5 *very much like me"* (Tangney, Baumeister, & Boone, 2004, p. 282). The correlation between the Total Self-Control Scale and the Brief Self-Control Scale was .93 and .92.

In designing the Self-Control Scale, Tangney et al. (2004) had two goals: to provide evidence that "individual differences in self-control would effectively predict positive outcomes across a variety of life domains," and "to develop an up-to-date scale for measuring individual differences in self-control" (pp.272-273). The researchers created six domains on which to focus the development of their self-control scale: (1) Achievement & Task Performance, (2) Impulse Control, (3) Adjustment, (4) Interpersonal Relationships, (5) Moral Emotions, and (6) Related Personality Features.

Maloney, Grawitch & Barber (2012) questioned the "unidimensionality" of the scale, and continued the analysis. They discovered a two-factor solution within the scale: *self-discipline* and *impulse control*. Confirmatory factor analysis, by way of two studies, supported the two-factor solution (Study 1, r = -.75) and (Study 2, r= -.71). Each factor also showed strong reliability results: Impulse Control, α = .73; and Self-Discipline, α = .72.

Reliability results for the Total Self-Control included a high alpha .89 for Studies 1 & 2. The Brief Self-Control Scale's alpha was .83 for Study 1 and .85 for Study 2. The

results of those studies suggest that both the Total and the Brief Scales have high reliability. Test-retest reliability was established when 233 participants from Study 2 retook the scales. The Total received a .89 and the Brief a .87 for reliability.

The Short-Form C of the Marlowe-Crowne Social Desirability Scale (M-C Form C) was selected for this research study to assist with identifying levels of social desirability responding (SDR). Social desirability responding was defined as "the tendency to give answers that make the respondent look good" (Robinson, Shaver, & Wrightsman, 1991, p. 17). In order to control for social desirability responses, the M-C Form C was used. The Short-Form C of the Marlowe-Crowne Social Desirability Scale (M-C Form C) was designed by Reynolds in 1982. It was a 13-item self-report assessment, designed from the original 33-item Social Desirability Scale created by the Marlowe-Crowne in 1960 (Reynolds, 1982). The M-C Form C determines a subject's social desirability bias, using a true-false response format.

The 33 items on the original Social Desirability Scale created by the Marlowe-Crowne "were chosen for scale inclusion on the basis that they describe culturally approved behaviors that have a low incidence of occurrence, and that response to items in the keyed or non-keyed direction have minimal implication of psychopathology" (Reynolds, 1982, p. 119).

Reynolds created three Short-Form versions for the Marlowe-Crowne Social Desirability Scale: Short-Form A, Short-Form B, and Short Form C. The M-C Form C was used in this research study because it showed a strong correlation with the original 33-item Social Desirability Scale created by the Marlowe-Crowne in 1960 ($r = .93$ $p <$

.001) and it "demonstrates an acceptable level of reliability ($r_{\text{KR-20}} = .76$) and compares favorably with the reliability of the standard form" (Reynolds, 1982, p. 123).

In summary, all scales were found to be valid and reliable. However, the scales were validated on a different sample than that of this study. Thus re-establishing the validity and reliability of each scale was a part of this study.

Data Analysis

The first step in the analysis process was to administer the scales and optional questions to students registered in EYE courses. Results from the scales were collected and then combined with the demographic data gathered from the registrar's office (2015). Once the data set was complete, it was then cleaned, ridding the data of any missing, immaterial, or flawed information. That process assisted in compiling the data needed for this study. Once the data had been mined and cleaned, factor analysis was run in order to re-establish validity and reliability of the three scales. The "primary purpose [of factor analysis] is to define the underlying structure among the variables in the analysis" (Hair, Jr., Black, Babin, Anderson, & Tatham, 2006, p. 104).

The next phase of the analysis was on the social desirability scale to account for subjects who answered with "culturally approved behaviors" (Reynolds, p. 119). Once the social desirability responses had been accounted for, then the results of the surveys were analyzed to determine the relationship between Grit, Self-Control, HSGPA, and SAT scores against first-semester of college GPA and persistence to the second semester. This analysis assisted in determining if Grit and Self-Control predict academic success among first-semester college students and explored the relationship between Grit, Self-Control, and the first academic semester for college students.

The independent variables in this study were Grit, Self-Control, HSGPA, and SAT scores. The one continuous dependent variable consisted of FA14GPA (Fall 2014 Semester GPA). Next, multiple regression was run to determine the relationships between the variables. Multiple regression was the analysis chosen for this study as there were more than two independent variables used (Hair, Jr., Black, Babin, Anderson, & Tatham, 2006). In statistics, regression "attempts to predict the values of a given variable (termed the dependent, outcome, or response variable) based on the values of one or more other variables (called independent variables, predictors, or covariates)" (Guido, Winters, & Rains, 2006, p. 1). There are several types of regression analyses: determining which type to use is based on the response variable and the overall purpose of the study. Since the one dependent variable in this study (FA14GPA) was continuous, a multiple regression analysis was selected (Pallant, 2013).

Stepwise regression was selected to assist with the estimation technique. Stepwise is a "method of selecting variables for inclusion in the regression model that starts by selecting the best predictor of the dependent variable. Additionally, independent variables are selected in terms of the incremental explanatory power they can add to the regression model" (Hair, Jr., Black, Babin, Anderson, & Tatham, 2006, p. 175). Stepwise regression allows the SPSS program to determine which independent variables have the strongest relationship with the dependent variable, and in what order. Izzett (2015) stated:

> In a stepwise regression, predictor variables are entered into the regression equation one at a time based upon statistical criteria. At each step in the analysis the predictor variable that contributes the most to the prediction equation in terms of increasing the multiple correlation, R, is entered first. This process is continued

only if additional variables add anything statistically to the regression equation. When no additional predictor variables add anything statistically meaningful to the regression equation, the analysis stops. Thus, not all predictor variables may enter the equation in stepwise regression. (p. 24)

The statistical analyses for this research study were conducted using the computer program Statistical Package for the Social Sciences (SPSS) version 22. The α level was set at .05 for statistical significance.

The result of the analysis assisted in determining if there was a relationship between grit, self-control, and a first-year college student's academic success during his/her first-semester of college and if there were differences by gender. Additionally, the results examined a combination of factors (Grit, Self-Control, HSGPA, SAT scores) to see which best predicted first-semester college GPA, and whether there were differences by gender.

Limitations and/or Delimitations of the Study

All research studies have limitations and delimitations. An initial limitation to this research study was the use of a convenience sample, and the sample was not representative of the overall population. However, the results are generalizable to similar student populations from other universities. Next, the assessment data of grit and self-control were solely based on self-report surveys. Limitations to self-report surveys include inflated and/or under-reported responses, social desirability responding, and potential lack of responses. The researcher attempted to control for social desirability responding by administering the Social Desirability Scale. Another limitation was the self-reflective aspect of the Grit-O and Brief Self-Control scales: the researcher assumed

that the students had a vested interest in the survey and its results. That was a potential limitation: students may not have had motivation or interest in completing the survey to the best of their ability, thereby affecting the overall results. Finally, only one academic semester was considered for the study. More reliable data may have been obtained from multiple semesters.

CHAPTER IV: ANALYSIS

Purpose of the Study

The objective of this study was to explore the relationships between Grit, Self-Control, and the first academic semester of college students and determine if the relationships differed by gender.

The following research question(s) were examined in the study:

1. What are the relationships between the individual factors of Grit, Self-Control and first-semester college GPA? And do they differ by gender?

2. What combinations of factors (Grit, Self-Control, HSGPA, SAT scores) best predicts first-semester college GPA? And do they differ by gender?

Preparation for Analysis

During the fall 2014 semester, first-year, first-semester students in Entry Year Experience (EYE) courses were asked by email to participate in this study. Of the 555 students invited, 106 chose to participate. Students were asked to sign a consent form; complete three scales (12-Item Grit-O, Brief Self-Control Scale, and the Marlowe-Crowne Social Desirability Scale); and answer four optional demographic questions (religious affiliation, highest level of education completed by parent or guardian, highest level of education student planned to complete, and family's household income). The four optional questions were asked to gather additional demographic information not provided by the university's registrar. The consent form, scales, and four optional demographic questions were given electronically via the Snap program (Snap 11 Professional, 2015). Additional student demographic information was gathered from the

registrar's office for students who had chosen to participate in the study. Students' HSGPA, SAT scores, gender, age, race/ethnicity, place of birth, name of high school, in/out of state status, degree sought, full- or part-time status, commuter or on-campus housing, cumulative fall 2014 GPA, and course registration for spring 2014 were gathered. The last four digits of student's social security number, date of birth, and student ID number were used to cross reference survey results and the information provided by the registrar's office.

Upon receiving the results of the survey and the data collected from the registrar, the data were compiled into one set, and reviewed for students above the age of 24. Since this study was to examine traditional first-year students ages 18 to 24, all older students were removed. All data (continuous and categorical variables) were then examined for inconsistencies and miscodings; items were then re-labeled/re-coded for the purpose of analysis. To determine if any data were missing or had been miscoded, descriptive statistics and frequency analyses were conducted. After reviewing and checking the data for discrepancies, the final sample used in this study comprised 88 students.

Analysis of the data was conducted in several steps:

- Establishing Reliability and Validity of the Scales

- Description of Demographics of the Sample

- Examination of the Relationships between the Traditional College Predictors (HSGPA & SAT), Grit and Self-Control, and First-Semester College GPA

- Relationship between Predictor Variables and Gender

- Examination of the Best Predictors of fall 2014 GPA (FA14GPA)

- Examination of the of Best Predictors for Gender

- Exploration of Best Predictors for Higher and Lower Performing First-Semester College Students

Establishing Validity and Reliability of the Scales

The first step in the data analysis process was to re-establish the validity and reliability of the Grit-O and Brief Self-Control scales. Validity assists in establishing that the scales are indeed measuring what they are designed to measure, i.e., construct structure. Reliability establishes the repeatability and internal consistency of the scales: no matter how many times the scales are taken, the results will be the same and the scales measure the same information each time.

The research of Duckworth et al. (2007) and Tangney et al. (2004) established the original validity and reliability of the two scales. However, in this study it was important to re-establish the validity and reliability of each of the scales, because study used a different sample than did the original studies.

Construct validity was established with exploratory factor analysis, and reliability analysis was then conducted in order to confirm the prior research on the scales' development.

Factor Analysis & Reliability: Grit-O

The 12-item Grit Scale, taken by the 88 students, was factor-analyzed to determine its construct structure. Principle components analysis (PCA) using SPSS version 22 was employed to conduct the exploratory factor analysis.

Three factors, each with eigenvalues exceeding 1, were revealed in the initial exploratory analysis.. An additional analysis of the factors loading and scree plot using a

Varimax Rotation was conducted to establish the two factor structure of the scale. (The confirmatory factor loadings appear in Table 4.1) Examination of the factor loadings revealed that 11 questions loaded onto one of two factors, and one item loaded substantially on both Factors 1 and 2. Six items loaded onto Factor-1, and five onto Factor-2. It was determined that Question 8 would be removed as the difference between the two factor loadings was less than .25. Question 5 loaded as .332 on Factor-1, and .683 on Factor-2, and consequently it was determined that Question 5 would remain with Factor-2. The final 11-item scale accounted for 47.2 percent of the variance. The finding of two factors is consistent with the research of Duckworth et al. (2007), and consequently the original factors labels were retained; Factor-1 (Subscale 1) identified as P*erseverance of Effort* and Factor-2 (Subscale 2) was labeled as C*onsistency of Interest*.

Table 4.1

Grit-O Scale Rotated Component Matrix[1]

	Component	
	1	2
G10. I have achieved a goal that took years of work.	.787	
G12. I am diligent.	.747	
G1. I have overcome setbacks to conquer an important challenge.	.649	
G6. I am a hard worker.	.634	
G9. I finish whatever I begin.	.631	
G4. Setbacks don't discourage me.	.600	
G8. I have a difficult time maintaining my focus on projects that take more than a few months to complete.	.599	.348
G11. I become interested in new pursuits every few months.		.723
G3. My interests change from year to year.		.696
G5. I have been obsessed with a certain idea or project for a short time but later lost interest.	.332	.683
G7. I often set a goal but later choose to pursue a different one.		.678
G2. New ideas and projects sometimes distract me from previous ones.		.597

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization
[1]Rotation converged in three iterations

Based on the re-validation analysis of the new 11-item Modified Grit-O Scale

(MGRIT-O), the reliability was established. Duckworth et al. (2007) stated that the 12-

Item Grit Scale had high internal consistency, with a Cronbach alpha coefficient of $\alpha =$

.85 for the overall scale, and each factor (Consistency of Interests, $\alpha = .84$; Perseverance

of Effort, $\alpha = .78$). This study found the Cronbach alpha for the Modified Total Grit-O to

be α =.75, Consistency of Interest, α = .72, and Perseverance of Effort, α = .77. All

Cronbach alpha scores were considered acceptable.

Factor Analysis & Reliability: Brief Self-Control

The 13-item Brief Self-Control Scale was also factor analyzed to determine its

construct structure. Principle components analysis (PCA) using SPSS version 22 was

employed to conduct the exploratory factor analysis to confirmatory factor analysis. Four

factors, each with eigenvalues exceeding 1, surfaced during the initial analysis. An

additional analysis of the factor loadings and screeplots using Varimax rotation was

conducted to establish the factor structure of the scale. (The confirmatory factory

loadings appear in Table 4.2.) Upon inspection, nine scales items were revealed and had

sufficient loadings on one of two factors and four items loaded on both Factors 1 and 2.

Five items loaded onto Factor-1, and four onto Factor-2. It was determined that Questions

4, 5, and 7 would be removed as the difference between each factor loading was less than

.20. Question 13 listed as .604 on Factor-1, and .512 on Factor-2, and therefore it was

determined that Question 13 would remain with Component-1. The ten-item scale

accounted for 46.7 percent of the variance. The findings of two components was

consistent with the research of Maloney et al. (2012), and consequently the original factor

labels were retained; Factor 1 (Subscale 1) was labeled as *Impulse Control* and Factor 2

(Subscale 2) was labeled as *Self-Discipline*.

Based on the re-validation of analysis of the new 10-item Modified Brief Self-

Control Scale (MBSC), the reliability was re-established. Tangney et al. (2004) reported

that the 13-Item Brief Self-Control scale (BSC) had an internal consistency, with a

Cronbach alpha coefficient of α = .83 and α = .85, based on the results of two studies.

Maloney et al. (2012) reported Cronbach alpha coefficient of each self-control factor
(Impulse Control, α = .73, Self-Discipline, α = .72). This study found the Cronbach alpha
for the Modified Brief Self-Control to be α =.78, Impulse Control, α = .78 and Self-
Discipline, α = .71. All Cronbach alpha scores were considered acceptable.

Table 4.2
Brief Self-Control Scale Rotated Component Matrix[1]

	Component	
	1	2
SC9.Pleasure and fun sometimes keep me from getting work done.	.755	
SC10.I have trouble concentrating.	.736	
SC2.I have a hard time breaking bad habits.	.659	
SC12.Sometimes I can't stop myself from doing something, even if I know it is wrong.	.650	
SC13.I often act without thinking through all the alternatives.	.604	.512
SC3.I am lazy.	.519	
SC7.I wish I had more self-discipline.	.461	.343
SC6.I refuse things that are bad for me.		.746
SC8.People would say that I have iron self-discipline.		.739
SC1.I am good at resisting temptation.		.658
SC5.I do certain things that are bad for me, if they are fun.	.446	.594
SC11.I am able to work effectively toward long-term goals.		.533
SC4.I say inappropriate things.	.414	.433

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax
with Kaiser Normalization
[1]Rotation converged in three iterations

Description of Demographics of the Sample

As shown in Table 4.3, of the 88 students participating in the study, 31.8 percent (N = 28) were male and 68.2 percent (N = 60) were female. Students HSGPAs ranged from 1.80 to 5.39, with the average HSGPA at 3.19 (N = 88, SD = .66). The average for males was slightly higher at 3.34 (N = 28, SD= .85), than females at 3.12 (N = 60, SD =.55). Male students presented slightly higher then female students on all factors, additionally all Standard Deviation scores were within range. This study's average HSGPA's were slightly higher than the in-coming first-year student average (3.04) reported by the Office of Institutional Research for 2014 (2014). The national average for high school GPA in 2009 was 3.0 (Statistics, 2011), thus males and females in this study obtained GPAs above the national average.

Table 4. 3
Demographic Breakdown Performance

Factors	All (N = 88)		Male (N = 28)		Female (N = 60)	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
HSGPA	3.19	.66	3.34	.85	3.12	.55
SAT	976	179.17	1039	196.63	946	163.36
MSAT	487	98.45	534	101.26	467	89.99
VSAT	488	100.78	505	112.69	479	94.39
FA14GPA	2.93	.86	2.98	.89	2.90	.84

Note. HSGPA= High School GPA, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA.

At the university where this study was held, Math SAT and Verbal SAT were the only two components used to determine total SAT scores, so this study used only those two scores as well. Students' scores ranged from 650-1490, with an average score of 976 (N =88, SD=179.17). SAT Math scores ranged from 310-800, with an average score of 487 (N = 88, SD=98). SAT Verbal scores ranged from 300-800, with an average score of

488 (N = 88, SD=100.78). Females averaged an overall SAT score of 946 (N = 60,

SD=163.36), while males averaged a slightly higher score of 1039 (N = 28, SD=196.63).

The national 2013 average for SAT was 1010, mathematics and the verbal combined;

Math SAT averaged 513 and Verbal SAT averaged 497 (Average Scores, 2015). Male

students in this study were slightly above the national average, and female students were

64 points below. Students 2014 Fall GPA ranged from .00 – 4.00, with the average

FA14GPA being 2.93 (N = 88, SD=.86). Male students averaged a FA14GPA of 2.98 (N

= 28, SD=.89) and female students averaged 2.90 (N = 60, SD= .84).

Table 4.4 breaks down the sample by Grit-O and Brief Self-Control (BSC) results.

Table 4.4
Demographic Breakdown: Grit & Self-Control

Factors	**All** (N = 88)		**Male** (N = 28)		**Female** (N = 60)	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Grit-O	3.48	.54	3.47	.59	3.49	.51
EGrit	3.92	.64	3.79	.67	3.98	.62
IGrit	2.96	.74	3.10	.76	2.90	.73
BSC	3.28	.70	3.30	.77	3.27	.67
ISC	3.25	.84	3.18	.89	3.28	.83
SDSC	3.35	.86	3.50	.90	3.28	.84

Note. Grit-O= Total Grit, EGrit = Effort Grit, IGrit = Interest Grit, BSC= Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

Student scores on the Grit-O ranged from 2.45-4.64 with an average of 3.48 (N =

85, SD=.54). Those scores indicated that students were moderately gritty, with the

highest score achievable at 5.0 – indicating strong grit. On the two subscales, students

averaged 3.92 (N = 88, SD=.64) on *Perseverance of Effort* (EGrit) and 2.96 (N = 88,

SD=.74) on *Consistency of Interest* (IGrit). Female students results on the Grit-O

averaged 3.49 (N = 60, SD=.51) and were similar to male students, 3.47 (N = 28,

SD=.59). A difference in female and male student results was observed in the subscale results; female students results on EGrit averaged 3.98 (N = 60, SD=.62) and IGrit averaged 2.90 (N = 60, SD=.73), while male students results on EGrit averaged 3.79 (N = 28, SD=.67) and IGrit averaged 3.10 (N = 28, SD=.76). Female students were higher in *Perseverance of Effort* Grit, while male students were higher on *Consistency of Interest* Grit.

Scores on the Brief Self-Control (BSC) ranged from 1.40 to 4.80, with an average of 3.28 (N = 88, SD = .70). Once again, the scores indicated that students had moderate Self-Control with the highest score achievable at 5.0 – indicating strong Self-Control. Scores on the two subscales averaged 3.25 (N = 88, SD =.84) *Impulse Control* (ISC) and 3.35 (N = 88, SD = .86) on S*elf-Discipline* (SDSC). Male students results on the Brief Self Control were slightly higher, averaging 3.30 (N = 28, SD = .77) compared to female students at 3.27 (N = 60, SD = .67). On the subscales, males averaged 3.18 (N = 28, SD = .89) on the ISC and 3.50 (N = 28, SD = .90) on SDSC. Females averaged the same results on both subscales, 3.28 (N = 60, SD = .83) on ISC and 3.28 (N = 60, SD = .84) on SDSC. Male students were higher on Self-Discipline Self-Control and female students on Impulse Self-Control.

Table 4.5 reports additional demographic information gathered from the university's registrar.

Table 4.5

Additional Demographic Information: Registrar's Office

Students	Avg. Age	Declared	Undeclared	Full Time	Part Time
All (N = 88)	19.23	62.5% (N = 55)	37.5% (N = 33)	96.6% (N = 85)	3.4% (N = 3)
Male (N = 28)	19.32	65.9% (N = 19)	34.1% (N = 9)	92.9% (N = 26)	7.1% (N = 2)
Female (N = 60)	19.18	60% (N = 36)	40% (N = 24)	98.3% (N = 59)	1.7% (N = 1)

Analysis of the data indicated that of the 88 student participants the average age was 19.23. Furthermore, 62.5 percent (N = 55) had declared a major, while 37.5 percent (N = 33) were undeclared; 96.6 percent (N = 85) of students were considered full time, meaning students were taking 12 or more credits during the fall 2014 semester. Additional information indicated that of the 88 student participants 85.2 percent (N = 75) were White and 14.8 percent (N = 13) were Non-White. Most students were in-state, 87.5 percent (N = 77) and 12.5 percent (N = 11) were out-of-state. The majority of students lived on-campus, 60.2 percent (N = 53), while 39.8 percent (N = 35) commuted to their classes.

Table 4.6 reports the results of the additional demographic questions asked of the students in the survey.

Table 4.6

Additional Demographic Information: Student Self-Reporting

Students	Family's Highest Level of Education: High School	Family's Highest Level of Education: Bachelor's	Student's High Level Education to Achieve: Bachelor's	Student's High Level Education to Achieve: Master's
All (N = 88)	36.4% (N = 32)	27.3% (N = 24)	39.8% (N = 35)	36.4% (N = 32)
Male (N = 28)	25% (N = 7)	35.7% (N = 10)	28.6% (N = 8)	42.9% (N = 12)
Female (N = 60)	41.7% (N = 25)	23.3% (N = 14)	45% (N = 27)	33.3% (N = 20)

Of the four optional demographic questions, two were excluded because they contained a large amount of missing data. The two remaining questions contained sufficient data to be analyzed; highest level of education completed by parent or guardian, and highest level of education student planned to complete.

Students self-reported on the highest level of education obtained within their family; 36.4 percent (N = 32) of students came from families where the highest level of education was a high school diploma; females 41.7 percent (N = 25), and males 25 percent (N = 7). 27.3 percent (N = 24) stated that a family member had a bachelor's degree, 13.6 percent (N = 12) some college, 8.0 percent (N = 7) some graduate or professional schooling, 5.7 percent (N = 5) a graduate degree and 1.1 percent (N = 1) stated no high school diploma.

Students were also asked to self-report on the highest level of education they planned to achieve; 39.8 percent (N = 35) intended to obtain a bachelor's degree, 36.4 percent (N = 32) a master's degree, 14.8 percent (N = 13) doctoral or related degree, 6.8 percent (N = 6) were undecided, 1.1 percent (N = 1) stated other, with no response given and 1.1 percent (N = 1) chose not to respond.

Further analysis on the additional demographic data was discontinued, as the amount of data from each question were too small to provide robust analysis.

Examination of the Relationships between the Traditional College Predictors (HSGPA & SAT), Grit and Self-Control, and First-semester College GPA

Correlation Analysis

The next step in the data analysis process examined the relationships between variables, and was accomplished using correlation analysis. Correlation analysis looks at

the relationship strength between variables, as well as the direction of the relationships, whether positive or negative (Pallant, 2013, p. 133). The Pearson correlation coefficient is indicated by *r* and can range from 0 to ±1. If the relationship between two variables is perfect, either 1 or -1, then the two variables are predictive of one another. When *r* is squared and multiplied by 100, the shared variance is determined. The variance indicates the spread between numbers in relation to the mean, where shared variance is how much the two variables have in common with each other.

The direction of the relationship is determined by an indicator in front of the variable. If a variable has a negative sign, then as one variable increases the other decreases. If there is a positive relationship, there is no negative sign, and it indicates that as one variable increases, the other increases as well.

Correlation Analysis: Social Desirability

It was important to establish if students had answered with socially desirable responses prior to any correlational analysis of the MGRITO or MBSC scales. Therefore correlational analysis of the Short-Form C of the Marlowe-Crowne Social Desirability Scale (M-C Form C) was performed first.

In Table 4.7, the correlation analysis of the Social Desirability Scale, the modified Grit, and the modified Self-Control scales appears. That analysis was performed using the Pearson product-moment correlation coefficient, to investigate the relationship between the scales. It assisted in determining if students responded with socially desirable answers, i.e., responding according to how they thought they should answer versus giving truthful answers.

Table 4.7

Correlation Analysis: Social Desirability

Scale	MGritO	EGrit	IGrit	MBSC	ISC	SDS	TSD
Total Social Desirability (TSD)	.340**	.214*	.324**	.389**	.368**	.263*	-

Note. MGritO= Modified Total Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Total Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Results of the correlation analysis between the Modified Grit-O, Modified Brief Self-Control, and Social Desirability scales suggest there was no substantial correlation between the scales. The MGRITO and the Social Desirability scales shared only 12 percent of the variance ($r = .340$, N = 84, $p < .002$), indicating that 88 percent of the variance was determined by other variables. MBSC and the Social Desirability scales shared 15 percent of the variance ($r = .389$, N = 84, $p < .000$), meaning that 85 percent of the variance was not shared. Both results suggest that students did not respond with socially desirable answers as the shared variances were low.

Correlation analysis was then used to "describe the strength and direction of the linear relationship" (Pallant, 2013, p. 133) between the various variables in the study: Fall 2014 GPA (FA14GPA), High School GPA (HSGPA), Total SAT (TSAT), Math SAT (MSAT), Verbal SAT (VSAT), Grit (MGRIT-O), Perseverance of Effort (EGRIT), Consistency of Interest (IGRIT), Brief Self-Control (MBSC), Impulse Control (ISC), Self-Discipline (SDSC). Variable categories and groups were created to assist in the analysis process. Three categories were created: Performance (Fall 2014GPA, High School GPA, and all SAT scores); Grit & Self-Control; and All Variables. Groups

included all subjects, males/females, High School GPA (≥ 2.67 & < 2.67) and Fall 2014

GPA (≥ 2.67 & < 2.67).

Correlation Analysis: All Variables

The first research question in this study asked *What are the relationships between*

the individual factors of Grit, Self-Control, and first-semester college GPA? And do they

differ by gender? To assist in understanding how those factors correlated and interacted

with one another, all potential predictors of academic success were examined: Fall 2014

GPA (FA14GPA), high school GPA (HSGPA), Total SAT (TSAT), Math SAT (MSAT),

Verbal SAT (VSAT), Modified Grit (MGRITO), Perseverance of Effort (EGRIT),

Consistency of Interest (IGRIT), Modified Brief Self-Control (MBSC), Impulse Control

(ISC), and Self-Discipline (SDSC), as seen in Table 4.8. All variables were investigated

using the Pearson product-moment correlation coefficient.

Table 4.8
Correlation Analysis: All Variables

Scale	FA14 GPA	HSG PA	TSA T	MSA T	VSA T	MGri tO	EGrit	IGrit	MBS C	ISC	S D S
FA14GA	-										
HSGPA	.440**	-									
TSAT	.447**	.385**	-								
MSAT	.434**	.443**	.897**	-							
VSAT	.370**	.254*	.902**	.617**	-						
MGRITO	.190	.219*	.051	.062	.029	-					
EGRIT	.111	.083	-.024	-.030	-.013	.787**	-				
IGRIT	.166	.256*	.092	.119	.047	.767**	.208	-			
MBSC	.289**	.318**	.175	.174	.141	.474**	.445**	.295**	-		
ISC	.236*	.210	.110	.120	.077	.407**	.426**	.200	.886**	-	
SDSC	.233*	.348**	.191	.191	.169	.328**	.255*	.294**	.730**	.328**	-

Note. HSGPA= High School GPA, TSAT= Total SAT, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Correlations between HSGPA and SAT scores (r=.385, N = 84, p<.000) had a shared variance of 15 percent, suggesting a relationship, but also indicating that they measured separate attributes. The interrelationship between SAT, SAT Mathematics (MSAT), and SAT Verbal (VSAT) indicated a high multicollinearity ("when a single independent variable [SAT] is highly correlated with a set of other independent variables [MSAT and VSAT]" (Hair, Jr., Black, Babin, Anderson, & Tatham, 2006, p. 170). SAT and MSAT shared 80 percent of the variance (r=.879, N = 86, p<.000) and SAT and VSAT shared 81 percent of the variance (r=.902, N = 86, p<.000); indicating that both subscales were highly correlated to TSAT. Kobrin et al. (2008) found the correlation between HSGPA and SAT scores to be between 21- 25 percent (45- 49 percent adjusted) of the variance, which was higher than the 15 percent found in this study (p. 5). The results of this analysis indicated that HSGPA and SAT scores were substantially unrelated to each other; they were in large measuring different attributes.

Correlation Analysis: HSGPA, SAT, & FA14GPA

As seen in Table 4.8, the next phase in the analysis looked at the relationships between HSGPA, SAT, and FA14GPA. The variables of HSGPA and FA14GPA (r = .440, N = 86, p < .01) shared 19 percent of the variance, which was significantly lower than the findings of Kobrin et al. (2008); they found the shared variance between HSGPA and FYGPA to be 36 percent (54 percent adjusted).

Total SAT and FA14GPA (r=.447, N = 86, p < .001) shared 20 percent of the variance. Again, that was less than the shared variance that Kobrin et al. found (i.e. 35 percent); however, it was more than the 9 percent shared variance that Duckworth et al. (2007) found. Results of the analysis between HSGPA, SAT, and FA14GPA were far

lower than typically found. The results indicated that neither HSGPA nor SAT were

strongly related to exploring the relationships between Grit, Self-Control, and the first

academic semester of college student's FA14GPA.

Correlation Analysis: Grit, Self-Control & FA14GPA

In Table 4.8, the final phase of the correlation analysis investigated the

relationships between the Modified Grit-O (MGRITO), the Modified Brief Self-Control

(MBSC), their subscales, and FA14GPA. First, MGRITO and MBSC shared 22 percent

of the variance ($r = .474$, $N = 83$, $p < .000$) which indicated a significant relationship

between Grit and Self-Control, and yet they were measuring two different attributes. That

relationship is lower than the 40 percent shared variance ($r = .63$, $p < .001$) found by

Duckworth et al. (2007).

A multicollinearity was found between MGRITO and its subscales, Perseverance

of Effort (EGRIT) and Consistency of Interest (IGRIT). MGRITO and EGRIT ($r = .787$,

$N = 85$, $p < .000$) shared 62 percent of the variance, while MGRITO and IGRIT ($r = .767$,

$N = 85$, $p < .000$) shared 59 percent of the variance. No significant relationships were

found between MGRITO, its subscales and FA14GPA.

A multicollinearity was also found between MBSC and its subscales, Impulse

Control (ISC) and Self-Discipline Control (SDSC). MBSC and ISC ($r = .886$, $N = 85$,

$p < .000$) shared 78 percent of the variance and MBSC and SDSC ($r = .730$, $N = 85$, $p < .000$)

shared 53 percent of the variance. Additionally, MBSC and FA14GPA ($r = .289$, $N = 85$,

$p < .007$) shared 8 percent of the variance. ISC and FA14GPA ($r = .236$, $N = 85$, $p < .027$)

shared 6 percent of the variance and SDSC and FA14GPA ($r = .233$, $N = 85$, $p < .032$)

shared 5 percent of the variance. Statistically significant relationships were found

between MBSC, its subscales, and FA14GPA, as all met the $p < .05$ level of significance; however, the relationships between them were not very strong, as all shared variances of less than 10 percent.

Correlation Analysis: Summary

Results of the eleven by eleven simple correlation analysis assisted in answering the first part of the research question, *What are the relationships between the individual factors of Grit, Self-Control and first-semester college GPA?* The relationships between the traditional predictors of FA14GPA, SAT, and HSGPA were unlike the relationships discussed in the literature review. Each relationship was statistically significant, having met the $p < .05$ level of significance; however, unlike the literature, strong relationships were not found. The strongest shared variance was between SAT and FA14GPA, at 20 percent. Results of that aspect of the study indicated that other factors (variables) were contributing to students' FA14GPA. Additionally, statistically significant relationships were found between MBSC, its subscales, and FA14GPA, as all met $p <. 05$ level of significance; however, the relationships between them were not very strong as all shared variances of less than 10 percent. No relationships were found between MGRITO and FA14GPA.

Relationships between Predictor Variables and Gender

Correlation Analysis: Male Students

The second part of the first research question asked if the relationships between Grit, Self-Control, and FA14GPA differed by gender. Table 4.9 displays the Pearson product-moment correlation coefficient used to investigate the relationship between male students ($N \approx 28$) and all variables.

Table 4.9

Correlation Analysis: Males & All Variables

Scale	FA14 GPA	HS GPA	TSAT	MSAT	VSAT	MGritO	EGrit	IGrit	MBSC	ISC	SDSS
FA14GPA	-										
HSGPA	.573**	-									
TSAT	.506**	.300	-								
MSAT	.570**	.391*	.909**	-							
VSAT	.371	.172	.928**	.688**	-						
MGRITO	.429*	.430*	.093	.154	.023	-					
EGRIT	.405*	.300	.161	.148	.148	.837**	-				
IGRIT	.279	.361	-.009	.111	-.116	.813**	.361	-			
MBSC	.565**	.507**	.430*	.388*	.401*	.559**	.477*	.461*	-		
ISC	.450*	.434*	.415*	.371	.391*	.506**	.387	.454*	.909**	-	
SDSC	.496**	.442*	.293	.272	.267	.434*	.411*	.318	.781**	.450*	-

Note. HSGPA= High School GPA, TSAT= Total SAT, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Correlations were found between several of the traditional and non-traditional variables for male students (N ≈ 28). The traditional predictors of HSGPA and TSAT showed significant and strong correlations: HSGPA and FA14GPA (r = .573, N = 27, p < .002) shared 33 percent of the variance, suggesting that male students HSGPA had a strong and statistically significant relationship to FA14GPA. Next, TSAT and FA14GPA (r = .506, N = 28, p < .006) shared 26 percent of the variance. That also had a significant relationship; however, the shared variance was not as strong as HSGPA. Finally, MSAT and FA15GPA (r = .570, N = 28, p < .01) shared 32 percent of the variance, indicating that it had a strong significant relationship with FA14GPA.

Next, the non-traditional predictors of Grit and Self-Control were investigated. Additionally, a strong inter-correlation was also found between the MGRITO and the

MBSC (r =.559, N = 26, p < .003) scales for males, sharing 31 percent of the variance.

That was a stronger correlation than the analysis between MGRITO and MBSC when

looking at gender as a whole, MGRITO and MBSC shared 22 percent of the variance (r =

.474, N = 83, p < .000). That 31 percent shared variance is closer to what Duckworth et

al. (2007) found overall, which was 40 percent shared variance. Additionally for males,

FA14GPA and the MGRITO, MBSC, and their subscales had significant correlations.

Grit scores ranged from 16 percent to 18 percent, shared variance with FA14GPA. While

Self-Control scores ranged from 20 percent to 31 percent shared variance with

FA14GPA, the strongest and most significant relationship discovered was between

FA14GPA and the overall MBSC scales, as they shared 31 percent of the variance. That

relationship was comparable to the HSGPA and MSAT finding for male students.

Significant and strong relationships for male students were discovered in this

analysis. Results of the correlation analysis suggested that there were three variables with

strong, significant relationships to FA14GPA for male students; High School GPA, Math

SAT, and Modified Brief Self-Control. The findings differed significantly from the

analysis conducted before gender was split. Those relationships begin to assist in

answering the second half of research question one, *And do they differ by gender?*. For

male students a strong correlation was found between Self-Control and FA14GPA and a

significant correlation between Grit and FA14GPA.

Correlation Analysis: Female Students

To continue investigating the research question, *And do they differ by gender?* the

next step in the correlation analysis was to investigate the results of the female students.

As seen in Table 4.10, a Pearson product-moment correlation coefficient was used to

investigate the relationship between female students (N ≈ 58), the dependent variable

(FA14GPA), and all independent variables (HSGPA, TSAT, MSAT, VSAT, MGRITO,

EGRIT, IGRIT, MBSC, ISC and SDSC).

Table 4.10

Correlation Analysis: Females & All Variables

Scale	FA14 GPA	HS GPA	TSA T	MSA T	VSA T	MGri tO	EGrit	IGrit	MBS C	ISC	S D S
FA14GPA	-										
HSGPA	.354**	-									
TSAT	.418**	.423**	-								
MSAT	.374**	.456**	.880**	-							
VSAT	.367**	.302*	.892**	.570**	-						
MGRITO	.059	.080	.032	.020	.036	-					
EGRIT	-.033	-.021	-.090	-.068	-.089	.770**	-				
IGRIT	.100	.160	.110	.074	.119	.757**	.166	-			
MBSC	.136	.174	.013	.052	-.027	.424**	.439**	.208	-		
ISC	.130	.065	-.044	.022	-.097	.352**	.442**	.086	.877**	-	
SDSC	.086	.273*	.096	.078	.091	.278*	.161	.271*	.706**	.278*	-

Note. HSGPA= High School GPA, TSAT= Total SAT, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Statistically significant relationships were indicated between FA14GPA and

HSGPA, TSAT, MSAT, and VSAT for female students. HSGPA (r =.354, N = 59, p <

.01) shared 13 percent of the variance with FA14GPA, while SAT scores ranged from 13

percent to 17 percent shared variance with FA14GPA. Those findings were less than

those of the male students, and indicated that the variables did not significantly contribute

to a female student's FA14GPA. A correlation was found between the MGRITO and the

MBSC scales (r = .424, N = 57, p < .001), as they shared 18 percent of the variance.

Their relationship was not as strong a correlation as the analysis between MGRITO and

MBSC before separating the results by gender. Additionally, no significant relationships were found between FA14GPA and MGRITO, EGRIT, IGRIT, MBSC, ISC or SDSC. A slight correlation was found between HSGPA and SDSC (r= .273, N = 57, p < .040), indicating that HSGPA and SDSC shared 7 percent of the variance. Although not strong, a statistically significant relationship between HSGPA and Self-Discipline Self-Control existed, suggesting that SDSC may have an influence on female students' HSGPA.

For female students there were no strong correlations between FA14GPA and the independent variables. All shared variance findings were below 20 percent, indicating that other factors, in addition to the ones investigated, were contributing to female student's FA14GPA. The correlation between HSGPA and SDSC suggested that further research in the area of HSGPA and Self-Control is recommended.

Correlation Analysis: Major Findings

The correlation analysis set out to answer the first research question, *What are the relationships between the individual factors of Grit, Self-Control, and first-semester college GPA? And do they differ by gender?* Results of the correlation analysis indicated a relationship between Self-Control and a first-semester college GPA. Although the correlations were small, for example MBSC and FA14GPA shared 8 percent of the variance, the relationships were significant, validating that Self-Control does play a significant part in students' FA14GPA. Grit showed no relationship with FA14GPA.

The male and female correlation analysis findings assisted in answering the second half of research question one, *And do they differ by gender?*. Yes, based on the correlation analysis of male and female students, relationships between Grit, Self-Control, and first-semester college GPA do differ by gender. Male students had

significantly stronger correlations between Self-Control, Grit, and FA14GPA, while female students had no significant findings between Self-Control, Grit, and FA14GPA. Based on those results, individual factors that lead to first-semester college GPA do significantly differ by gender.

Hypothesis 1:

The results of this analysis only partially supported Hypothesis 1: $H_{1:}$ Grit and Self-Control relate to first-semester college GPA. A small but significant relationship was found between Self-Control and first-semester college GPA, and no significant relationship was found between Grit and first-semester college GPA.

Examination of the Best Predictors of FA14GPA

The first part of the second research question asked, *What combinations of factors (grit, self-control, HSGPA, SAT scores) best predicts first-semester college GPA?* To assist in answering the question, stepwise regression was used to determine the best combination of independent variables (HSGPA, Total SAT, Math SAT (MSAT), Verbal SAT (VSAT), Modified Grit-O (MGRITO), Perseverance of Effort (EGRIT), Consistency of Interest (IGRIT), Modified Brief Self-Control, Impulse Control (ISC), and Self-Discipline (SDSC) to predict the dependent variable Fall 2014 GPA (FA14GPA).

Stepwise Regression: All Variables

Table 4.11 presents the results of the first stepwise regression when all independent variables: HSGPA, TSAT, MSAT, VSAT, Grit, Self-Control, and their subscales, were added to determine the best predictor(s) of FA14GPA.

Table 4.11

Stepwise Regression Results: All Variables

Model Summary[c]			
Model	R	R Square	Adjusted R Square
Total SAT	.447[a]	.200	.190
HSGPA	.533[b]	.284	.266

[a]Predictors: (Constant), Total SAT
[b]Predictors: (Constant), Total SAT, High School GPA
[c]Dependent Variable: Fall 14 GPA

Total SAT entered first and was significantly related to FA14GPA, $F (1, 81) =$ 20.206, $p < .001$, indicating that 20 percent of the FA14GPA variance was accounted for by Total SAT. HSGPA entered next, $F (2, 80) = 15.856$, $p < .001$, indicating that 28.4 percent of the FA14GPA variance could be accounted for by Total SAT and HSGPA. The findings supported the research of Kobrin et al. (2008), Menson et al. (2009), NACAC (2008), and Patterson et al. (2012) who found that SAT and HSGPA were the best indicators of success for first-year college students, not Grit or Self-Control.

Having established the best predictors of FA14GPA using all variables, a stepwise regression was then used to investigate the best predictor of FA14GPA using just Grit, Self-Control, and their subscales.

Stepwise Regression: Grit and Self-Control

As seen in Table 4.12, the variables of MGRITO, EGRIT, IGRIT, MBSC, ISC, and SDSC were assessed to see which, if any, variables were the best predictors of FA14GPA.

Table 4.12

Stepwise Regression Results: Grit, Self-Control and Subscales

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Total Self-Control	.289[a]	.084	.072

[a]Predictors: (Constant), Total Self-Control
[b]Dependent Variable: Fall14 GPA

Total Self-Control entered as the only predictive variable, and was significantly related to FA14GPA with 7.4 percent of the variance shared, $F(1, 81) = 7.404$, $p < .008$, indicating that 7.4 percent of the FA14GPA variance was accounted for by Total Self-Control. That finding indicated that there was a significant relationship between Self-Control and FA14GPA, as it met the $p < .05$ level of significance; however, the relationship was not very strong at just 7.4 percent.

Examination of the Best Predictors by Gender

The second part of the second research question asked if there was any difference in gender when looking at the combination of factors to best predict first-semester college GPA.

Stepwise Regression: Male Students

A stepwise regression, presented in Table 4.13, was conducted to determine the best combination of the independent variables to predict the dependent variable in relation to male students.

Table 4.13

Stepwise Regression Results: All Variables and Males

Model Summary[c]			
Model	R	R Square	Adjusted R Square
HSGPA	.573[a]	.328	.300
Math SAT	.685[b]	.469	.423

[a]Predictors: (Constant), High School GPA
[b]Predictors: (Constant), High School GPA, Math SAT
[c]Dependent Variable: Fall 14 GPA

High School GPA (HSGPA) for males was the first predictor that entered into the

regression equation and was significantly related to FA14GPA, $F(1, 24) = 11.724$, $p <$

.01, indicating that 32.8 percent of FA14GPA could be accounted for by HSGPA for

male students. Math SAT for males entered next, and was significantly related to

FA14GPA, $F(2, 23) = 10.170$, $p < .01$, indicating that 46.9 percent of the FA14GPA

variance could be accounted for by HSGPA and Math SAT.

Table 4.14 presents the results of the stepwise regression analysis with Grit, Self-

Control, and their subscales to determine the best predictor(s) of FA14GPA for male

students.

Table 4.14

Stepwise Regression Results: Grit, Self-Control, Subscales, and Males

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Total Self-Control	.565[a]	.319	.291

[a]Predictors: (Constant), Total Self-Control
[b]Dependent Variable: Fall 14 GPA

Total Self-Control explained 32 percent of the variance in determining FA14GPA

for male students $F(1, 24) = 11.255$, $p < .003$. That finding indicated a significant and

strong relationship between Self-Control and FA14GPA for males, which coincided with the results of the correlation analysis with just males that indicated that Self-Control would be a predictor of success for male students.

<div align="center">

Stepwise Regression: Female Students

</div>

A stepwise regression with all independent variables and females is presented in Table 4.15. The analysis was conducted to determine the best combination of the independent variables to predict the dependent variable in relation to female students.

Table 4.15
Stepwise Regression Results: All Variables and Females

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Total SAT	.418[a]	.175	.160

[a]Predictors: (Constant), Total SAT
[b]Dependent Variable: Fall 14 GPA

Total SAT was the only significant variable related to FA14GPA that entered into the regression equation, $F (1, 52) = 11.447$, $p < .01$, indicating that 17.5 percent of the variance of FA14GPA could be accounted for by Total SAT for female students. Results suggested that other variables outside those tested would be stronger predictors of female students' FA14GPA, accounting for the 82.5 percent of the variance not accounted for by Total SAT and the other variables.

When the stepwise regression for female students was conducted with Grit, Self-Control, and their subscales, no variables entered into the equation. That indicated that Grit, Self-Control, and their subscales were not predictors of female students' FA14GPA.

Stepwise Regression: Major Findings

Stepwise regression was used to determine the best combination of predictors of a student's fall 2014 semester GPA, to assist in answering the second research question *What combinations of factors (Grit, Self-Control, HSGPA, SAT scores) best predicts first-semester college GPA?* Initial results when Grit, Self-Control, and their subscales were the only variables submitted to predict FA14GPA indicated that Self-Control was a predictor of FA14GPA, sharing 7.4 percent of the variance. Overall results of the stepwise regression, using all variables, indicated that High School GPA and SAT scores were the best predictors of a student's fall 2014 GPA. Those results support the research of Kobrin et al. (2008), Menson et al. (2009), NACAC (2008), and Patterson et al. (2012), who found that SAT and HSGPA were the best predictors of success for first-year college students.

Hypothesis 2:

The results of this analysis only partially supported H_2: Grit and Self-Control add to the predictability of first-semester college GPA. Yes, Self-Control added to the predictability of a student's first-semester college GPA, while Grit was not a significant predictor of FA14GPA. Initially, the traditional predictors of HSGPA and SAT presented themselves as the strongest and only predictors of a student's fall 2014 GPA. Total SAT was the best predictor of FA14GPA, and HSGPA increased that prediction when added.

The second half of the second research question asked if there was a difference in predictors when looking at gender. Yes, the best predictors for males were HSGPA and MSAT, and for females TSAT. When Grit, Self-Control, and their subscales were entered as the only predictors, Self-Control explained 32 percent of FA14GPA for male students,

indicating that self-control was a significant and strong predictor of FA14GPA for males. When Grit, Self-Control, and the subscales were entered for females, no variables entered into the equation, suggesting that Grit and Self-Control were not predictors of female students FA14GPA.

Exploration of Best Predictors of High- and Low-Performing First-Semester College Students

Results of the stepwise analysis indicated that Grit and Self-Control did not predict a student's fall GPA. The findings were counterintuitive to the studies in the literature review. Because of the conflicting results, further exploration was undertaken, specifically in regards to academic performance and the non-traditional predictors – Grit and Self-Control. At the university where the study was held, an A grade (4.0-3.67) represented high honors achieved, a B (3.33-2.67) signified honors achieved, a grade of C (2.33-1.67) was considered satisfactory, D (1.33-0.67) was low-level work, below average, and F (0.00) was a failure to meet course objectives (Registrar, 2015). To assist with further exploration, students' FA14GPAs were split into two groups: high and low performers. The high performers were students whose FA14GPA was ≥ 2.67 and the low performers were students whose FA14GPA < 2.67. With FA14GPA split between ≥ 2.67 and < 2.67, correlation analyses and stepwise regression were run again, and gender differences were investigated as well.

The first exploratory research question asked *What are the relationships between the individual factors of Grit, Self-Control and first-semester college GPA?* The first phase of th exploration investigated the question, but split the FA14GPA to be either $\geq$

2.67 or <2.67. Table 4.16 examines the relationships between FA14GPA ≥ 2.67 and all

factors using the Pearson product-moment correlation coefficient.

Table 4.16
Correlation Analysis: FA14GPA ≥ 2.67 & All Variables

Scale	FA14 GPA	HS GPA	TSAT	MSAT	VSAT	MGritO	EGrit	IGrit	MBSC	ISC	SDSS
FA14GPA	-										
HSGPA	.411**	-									
TSAT	.547**	.422**	-								
MSAT	.467**	.460**	.890**	-							
VSAT	.508**	.299*	.892**	.587**	-						
MGRITO	-.212	.220	.017	.017	-.011	-					
EGRIT	-.252	.079	-.094	-.094	-.046	.816**	-				
IGRIT	-.079	.286*	.142	.142	.032	.740**	.215	-			
MBSC	.001	.285*	.160	.160	.207	.476**	.487**	.234	-		
ISC	-.156	.145	.048	.048	.103	.348**	.439**	.075	.891**	-	
SDSC	.211	.382**	.251	.251	.260	.416**	.304*	.346**	.750**	.369**	-

Note. HSGPA= High School GPA, TSAT= Total SAT, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Correlation analysis of FA14GPA ≥2.67 and HSGPA, TSAT, MSAT, and VSAT

indicated significant relationships between all variables. The most significant relationship

was between FA14GPA≥2.67 and TSAT (r=.547, N = 57, p <.000) with a shared

variance of 30 percent. The second most significant relationship was between FA14GPA

≥2.67 and Verbal SAT (r=.508, N = 57, p<.000), indicating a shared variance of 26

percent. FA14GPA ≥2.67 and Math SAT (r=.467, N = 57, p<.000) shared a 22 percent

variance. The results were more in line with the Kobrin et al (2008) findings of a shared

variance of 35 percent (53 percent adjusted) between SAT and First-Year GPA.

The exploration also revealed a shared variance of 17 percent between FA14GPA ≥2.67 and HSGPA (r=.411, N = 57, p<.001); unlike Kobrin et al. (2008) who found the correlation between HSGPA and FYGPA to be 36 percent (54 percent adjusted).

Additionally, the exploration revealed significant relationships between HSGPA and TSAT, and MSAT and VSAT – where MSAT shared the strongest relationship (r=.460, N = 55, p< .000) or 21 percent of shared variance. That discovery correlated with the findings of Kobrin et al. (2008) who found the relationship between HSGPA and SAT to explain 21 percent to 25 percent (45- 49 percent adjusted) of the variance (p. 5).

No significant findings were found between FA14GPA ≥2.67 and MGRITO, or MBSC and their subscales. However, the correlation analysis between MGRITO and MBSC (r =.476, n =57, p < .000) revealed a significant shared variance of 23 percent. This result was closer to the original correlation analysis between Grit and Self-Control (Table 4.8) when the two scales shared 22 percent of the variance, prior to the FA14GPA being split.

Interesting findings surfaced in the correlations between HSGPA and IGRIT (r = .286, N = 56, p < .033), a shared variance of 8 percent: between HSGPA and MBSC (r = .285, N = 55, p < .035) sharing a variance of 8 percent: and between HSGPA and SCSD (r = .382, N = 55, p < .034) sharing a variance of 15 percent. Further research on relationships of Grit, Self-Control, and High School GPA is recommended based on those statistically significant findings.

The next phase of this study investigated the relationships between the independent variables and a FA14GPA < 2.67. Table 4.17 examines the relationships

between FA14GPA < 2.67 and all factors using the Pearson product-moment correlation

coefficient.

Table 4.17
Correlation Analysis: FA14GPA < 2.67 & All Variables

Scale	FA14 GPA	HS GPA	TSA T	MSA T	VSA T	MGri tO	EGri t	IGrit	MBS C	ISC	S D S
FA14GPA	-										
HSGPA	.377*	-									
TSAT	.117	-.014	-								
MSAT	.312	.162	.876**	-							
VSAT	-.093	-.177	.891**	.562**	-						
MGRITO	.388*	.052	-.041	-.005	-.063	-					
EGRIT	.352	-.052	-.011	.038	-.054	.708**	-				
IGRIT	.266	.120	-.066	-.058	-.058	.805**	.152	-			
MBSC	.558**	.188	-.143	.012	-.253	.401*	.291	.352	-		
ISC	.513**	.188	-.038	.414	-.198	.465*	.353	.364	.861**	-	
SDSC	.337	.235	-.179	-.142	-.173	.084	-.001	.170	.677**	.208	-

Note. HSGPA= High School GPA, TSAT= Total SAT, MSAT = Math SAT, VSAT= Verbal SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, EGrit = Effort Grit, IGrit = Interest Grit, MBSC= Modified Brief Self-Control, ISC= Impulse Self-Control, SDSC= Self-Discipline Self-Control.

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

When FA14GPA was less than 2.67, the correlation between it and HSGPA,

TSAT, MSAT and VSAT changed significantly; the only factor that shared a significant

relationship with FA14GPA < 2.67 was HSGPA (r=.377, N = 29, p < .044) sharing a

variance of 14 percent. There were no significant correlations between FA14GPA < 2.67

and TSAT, MSAT, and VSAT. That suggested two things: that other variables outside of

those factors were contributing to students' FA14GPA < 2.67, and future research is

needed on students' first-semester college GPAs that are < 2.67.

The correlation analysis between MGRITO and MBSC when FA14GPA < 2.67 (r

= .401, N = 26, p < .042) revealed a significant shared variance of 16 percent. That

correlation was slightly less when FA14GPA was ≥2.67, as MGRITO and MBSC shared 23 percent of the variance. The difference suggested that students with a FA14GPA ≥ 2.67 had a stronger relationship between Grit and Self-Control than did students with a FA14GPA < 2.67.

A strong and significant correlation was discovered between FA14GPA < 2.67 and Modified Brief Self-Control (r = .558, N = 28, p < .002) sharing 31 percent of the variance. The finding correlated to the earlier correlation analysis findings. Additionally, FA14GPA <2.67 and Impulse Control (r = .513, N = 29, p < .004) shared 26 percent of the variance, and FA14GPA <2.67 and Modified Grit-O (r = .388, N = 27, p < .046) shared 15 percent of the variance. The correlation results suggested that Grit and Self-Control for students with a FA14GPA < 2.67 played a larger part in a student's success than did the traditional indicators of SAT & HSGPA as research suggests. It also indicated that as a student's FA14GPA went down, his or her Self-Control went down as well and vice versa. The findings suggest that more emphasis on building Grit and Self-Control may be needed for such students to be successful. The exploration continued as stepwise regression was used to determine best predictors of FA14GPA when it was split between ≥ 2.67 and < 2.67.

Grit and Self-Control presented no relationship to students' fall ≥2.67 GPA. However, Self-Control presented as the strongest predictor of all variables when students' fall GPA was less than 2.67.

The second exploratory research question asked *What combinations of factors (Grit, Self-Control, HSGPA, SAT scores) best predicts first-semester college GPA?* The

second phase of this investigation considered the question, and again split the FA14GPA

to be either ≥ 2.67 or < 2.67.

As seen in Table 4.18, a stepwise regression analysis was used to predict the best

combination of factors to determine FA14GPA ≥ 2.67.

Table 4.18
Stepwise Regression Results: FA14GPA≥2.67

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Total SAT	.547[a]	.299	.286

[a]Predictors: (Constant), Total SAT
[b]Dependent Variable: Fall 14 GPA

For FA14GPA ≥ 2.67, the strongest predictor was Total SAT, indicating that 30

percent of FA14GPA, $[F (1, 53) = 22.648, p < .000]$, was explained by Total SAT. The

results of FA14GPA ≥ 2.67 was consistent with this study's earlier stepwise regression

findings, and it also aligned with Kobrin, Patterson, Shaw, Mattern & Barbuti (2008) who

stated "the primary purpose of the SAT is to measure a student's potential for academic

success in college" (p. 1).

Presented in Table 4.19 are the stepwise regression results when FA14GPA was

less than 2.67.

Table 4.19
Stepwise Regression Results: FA14GPA< 2.67

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Self-Control	.558[a]	.312	.283

[a]Predictors: (Constant), Modified Brief Self Control
[b]Dependent Variable: Fall 14 GPA

For FA14GPA < 2.67, the strongest predictor of was Modified Brief Self-Control. The R Squared for FA14GPA < 2.67 was .312, [F (1, 24) = 10.872, p < .01], indicating that 31.2 percent of FA14GPA variance was explained by Modified Brief Self-Control. That aligns with the results of the correlational analysis in Table 4.17 when FA14GPA was < 2.67. The results of FA14GPA < 2.67 suggested that not all students are able to be measured equally by Total SAT or High School GPA. In this particular analysis, Brief Self-Control explained 31.2 percent of the variance and was the only predictor retained, suggesting that students who achieve a college GPA of less than 2.67 may need additional supports in the realms of Self-Control, Impulse Control, and Self-Discipline to be successful.

To further understand the GPA differences within the correlation and regression analyses, and to find potential correlations with gender, stepwise regression was run with the GPA level differences and gender split.

As seen in Table 4.20, for males the strongest and only predictor of FA14GPA ≥ 2.67 was Total SAT. That correlated with Table 4.18, suggesting there was no significant difference between FA14GPA ≥ 2.67 and male students.

Table 4.20
Stepwise Regression Results: FA14GPA ≥ 2.67 & Males

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Total SAT	.551[a]	.303	.260

[a]Predictors: (Constant), Total SAT
[b]Dependent Variable: Fall 14 GPA

FA14GPA ≥ 2.67 & Males entered into the regression equation and were significantly related to FA14GPA, with an R Squared of .303, F (1, 16) = 6.963, p < .05,

indicating that 30.3 percent of FA14GPA variance was explained by Total SAT for males with a FA14GPA $\geq$ 2.67.

Stepwise Regression for males with a FA14GPA $<$ 2.67 indicated no variables entered into the equation, suggesting that other variables outside of this study's independent variables predicted male students' fall GPA when it is less than 2.67.

As seen in Table 4.21, female students' strongest two predictors of FA14GPA $\geq$ 2.67 were Total SAT and Effort Grit.

Table 4.21
Stepwise Regression Results: FA14GPA $\geq$ 2.67 & Females

Model Summary[c]			
Model	R	R Square	Adjusted R Square
Total SAT	.548[a]	.301	.280
Effort Grit	.638[b]	.406	.370

[a]Predictors: (Constant), Total SAT
[b]Predictors: (Constant), Total SAT, Effort Grit
[c]Dependent Variable: Fall 14 GPA

For Total SAT, the R Squared explained .301[$F_{(1, 34)}$ = 14.614 p < .01], indicating that Total SAT accounted for 30.1 percent of the FA14GPA $\geq$ 2.67 variance. Effort Grit became the second predictor of FA14GPA $\geq$ 2.67 with females. R Squared explained .406, $F_{(2, 33)}$ = 11.299 p < .000, or when Effort Grit was added to the Total SAT, the two together explained 40.6 percent of the FA14GPA variance.

As discussed, Total SAT has traditionally been the predictor of first-semester academic success in college, and results from this particular part of the analysis suggest that females whose fall GPA was greater than or equal to 2.67 not only had the traditional predictor of Total SAT, but additionally highlighted Effort Grit as a predictor. That suggests that Total SAT was the best predictor of success for females with a fall GPA of

≥ 2.67. However, to increase the likelihood of their success, females who had Effort Grit increased their success rate by 10.5 percent to obtain a first-semester college GPA of $\geq$ 2.67.

Presented in Table 4.22, the best predictor of FA14GPA < 2.67 and females was Modified Brief Self-Control, the R Squared at .235, F (1, 17) = 5.230 p < .05, indicating that Brief Self-Control accounted for 23.5 percent of the FA14GPA variance.

Table 4.22
Stepwise Regression Results, FA14GPA < 2.67 & Females

Model Summary[b]			
Model	R	R Square	Adjusted R Square
Self-Control	.485[a]	.235	.190

[a]Predictors: (Constant), Modified Brief Self Control
[b]Dependent Variable: Fall 14 GPA

The results of the analysis of FA14GPA < 2.67 and female students suggested that not all students are able to be measured by Total SAT or High School GPA. In this particular analysis, Brief Self-Control explained 23.5 percent of the variance for females, and was the only predictor retained, suggesting that students who achieve a college GPA of less than 2.67 may need additional supports in the realms of Self-Control, Impulse Control, and Self-Discipline to be successful.

This additional exploration analysis uncovered more nuances. Grit and Self-Control related to a student's first-semester college GPA, and results differed by gender. Results shifted when fall GPA was split between ≥ 2.67 and < 2.67 and gender was considered. The best predictor of fall GPA ≥ 2.67 was Total SAT. However, when fall GPA was < 2.67, Self-Control was the best predictor, indicating that SAT and HSGPA have their limits in predicting some students' first-semester college GPA.

Another shift was seen when gender was reconsidered with the split in fall GPA. Male and female students again presented different findings. For male students, SAT was the best predictor of fall GPA ≥ 2.67. That was a shift with the results prior to GPA being spit. The best predictor of fall 2014 GPA ≥ 2.67 for female students was Total SAT, which was the same prior to the split. However, the prediction was increased by Effort Grit, suggesting that Total SAT and Effort Grit were the best combination of predictors for female students with fall GPAs ≥ 2.67. The finding reinforced the notion that a combination of factors assists students in being academically successful.

When fall GPA was < 2.67 and split by gender, the results changed again. Male students presented no variables into the equation, suggesting that other factors outside the ones in this study predict male students' fall GPA when it is < 2.67. Female students with fall GPAs < 2.67 presented Self-Control as the only predictor of the academic fall 2014 success.

Overall, this exploration process assisted in discovering that in addition to the traditional predictors of college GPA (High School GPA and SAT scores), Grit and Self-Control were also related to, and added to the predictability of, that first-semester's GPA. The traditional predictors of HSGPA and SAT were still the best predictors of a student's first-semester GPA, but explained only approximately 28 percent of the relationship. Gender also played a role in the determination of the predictors. In summary, Grit and Self-Control have a relationship to first-semester GPA, and add to the predicting of the first-semester college GPA.

As shown in Table 4.23, further analysis of overall scores for all students revealed interesting findings. All academic performance results (HSGPA, FA14GPA, TSAT)

between the two groups were expected; students with a FA14GPA ≥ 2.67 had higher

scores for their HSGPA and TSAT than students with FA14GPA < 2.67. Results on the

Modified Grit-O and the Modified Brief Self-Control scales were unexpected, as both

groups averaged approximately the same results on the scales (≈ 3.33), suggesting that

both groups of students had moderate Grit and Self-Control, regardless of HSGPA and

FA14GPA. Those results went against all literature research findings, which all suggested

that as HSGPA and/or FAGPA decrease so would the scores on Grit and Self-Control and

that an increase in HSPGA and/or FAGPA would increase Grit and Self-Control scores.

Table 4.23
Performance Breakdown between FA14GPA ≥ 2.67 and FA14GPA < 2.67

	HSGPA	FA14GPA	TSAT	MGRITO	SD	MBSC	SD
FA14GPA≥2.67	3.32	3.41	1017	3.55	.53	3.36	.71
	(N = 57)	(N = 59)	(N = 57)	(N = 58)		(N = 57)	
FA14GPA<2.67	2.92	1.94	895	3.34	.54	3.09	.66
	(N = 29)	(N = 29)	(N = 29)	(N = 28)		(N = 28)	

Note. HSGPA= High School GPA, TSAT= Total SAT, FA14GPA= Fall 2014 GPA,
MGRITO= Modified Grit, MBSC= Modified Brief Self-Control, SD = Standard
Deviation.

As seen in Tables 4.24 and 4.25, the next step in the exploration process was to

see if there were any differences in the findings when results were split between male and

female students.

Table 4.24
Males: Performance Breakdown between FA14GPA ≥ 2.67 and FA14GPA < 2.67

Males	HSGPA	FA14GPA	TSAT	MGRITO	SD	MBSC	SD
FA14GPA≥2.67	3.16	3.46	1089	3.65	.51	3.51	.67
	(N = 18)	(N = 19)	(N = 19)	(N = 19)		(N = 19)	
FA14GPA<2.67	2.81	1.96	933	3.03	.56	2.78	.78
	(N = 9)	(N = 9)	(N = 9)	(N = 8)		(N = 8)	

Note. HSGPA= High School GPA, TSAT= Total SAT, FA14GPA= Fall 2014 GPA,
MGRITO= Modified Grit, MBSC= Modified Brief Self-Control, SD = Standard
Deviation.

Male students did present a difference in their Grit and Self-Control scores when divided by FA14GPA. Male students with a FA14GPA ≥ 2.67 presented higher Grit (3.65, SD =.51) and Self-Control (3.51, SD =.67) scores compared to the male students who averaged a FA14GPA< 2.67, with Grit (3.03, SD= .56) and Self-Control (2.78, SD = .78) scores, supporting the findings of Duckworth et al. (2007) whose results indicated that "Gritty students outperformed their less Gritty peers" (p. 1093) and the findings of Tangney et al. (2004) that there was a significant relationship between high GPA and high Self-Control.

Finally, in Table 4.25 female students results were revealed. Female students did not present any real difference between Grit and Self-Control scores when divided by FA14GPA. The results indicated that all female students were moderately "Gritty" and had moderate Self-Control regardless of their FA14GPA.

Table 4.25
Females: Performance Breakdown between FA14GPA ≥ 2.67 and FA14GPA < 2.67

Females	HSGPA	FA14GPA	TSAT	MGRITO	SD	MBSC	SD
FA14GPA≥2.67	3.19 (N = 39)	3.38 (N = 40)	981 (N = 38)	3.50 (N = 39)	.53	3.29 (N = 38)	.72
FA14GPA<2.67	2.97 (N = 20)	1.93 (N = 20)	879 (N = 20)	3.47 (N = 19)	.49	3.22 (N = 20)	.58

Note. HSGPA= High School GPA, TSAT= Total SAT, FA14GPA= Fall 2014 GPA, MGRITO= Modified Grit, MBSC= Modified Brief Self-Control, SD = Standard Deviation.

The overall findings from splitting the FA14GPA, and looking at gender, revealed that male students mirrored the findings reflected in the literature review: male students who had higher FA14GPA's were higher in grit and self-control then male students with lower FA14GPAs. However, female students did not mirror what the literature review suggested: all female students, regardless of FA14GPA, were moderately gritty, and had

moderate self-control. Those findings reconfirm that gender may influence a student's academic success, and further research in that area is recommended.

CHAPTER V: CONCLUSION

The objective of this ex post facto quantitative study was to investigate the relationships between Grit, Self-Control, and the first academic semester of college students and determine if the relationships differed by gender. Two research questions were examined; (1) *What are the relationships between the individual factors of Grit, Self-Control, and first-semester college GPA? And do they differ by gender?* and (2) *What combinations of factors (Grit, Self-Control, HSGPA, SAT scores) best predicts first-semester college GPA? And do they differ by gender?*

First-year students from an east coast metropolitan university were given the Grit-O and Brief Self-Control scales during their first college semester. Validity and reliability of each scale was then re-established, as this study's sample population differed from previous studies. Socially desirable answers were investigated, and it was determined that students were not answering questions in socially desirable ways. Results from the scales were then analyzed to see if there were any relationships between the scales and fall GPA using correlation analysis.

Next, stepwise regressions was used between the scales, high school GPA, and SAT scores to determine which were the best predictors or combination of predictors of students fall GPA. Correlation analyses and stepwise regressions were also used to determine if there was a difference by gender. Further exploration occurred when findings were found to be counterintuitive to the literature-review findings. Correlation

analysis and stepwise regression were rerun on all the data with the fall GPA split into two groups; (≥ 2.67 and < 2.67, and then again with gender differences.

Summary of Findings

This study found four major findings in relation to its objective of investigating the relationships between Grit, Self-Control, and the first academic semester of college students and determining if the relationships differed by gender.

Key Findings and Discussion

Finding 1:

Findings from this study reinforce that HSGPA and SAT scores are predictors of college academic performance. However, the relationships between HSGPA, SAT, and FA14GPA in this study were not as strong as indicated in previous studies. Possible reasons as to why this study indicated a smaller relationship are as follows. First, the sample was limited and unique. The overall range of results was very narrow, affecting the ability to possibly see the true relationships between factors. A more diverse group of students may have presented clearer results and findings. Second, it is possible that other predictors outside HSGPA, SAT, Grit, and Self-Control have a relationship to academic performance. Finally, time may have been a factor since only one semester of students' academic results were captured in this study. Had the students' entire academic year been followed, the data and results may have been richer and more detailed, thereby affecting the findings.

Finding 2:

Results indicated that Grit and academic performance had no relationship, while a relationship was found between Self-Control and academic performance. In a recent article by Duckworth and Gross (2014), *Self-Control and Grit: Related but Separable Determinants of Success*, the authors discussed the differences between Self-Control and Grit. They stated:

> Self-control is required to adjudicate between lower-level goals entailing necessarily conflicting actions. One cannot eat one's cake and have it later, too. In contrast, grit entails maintaining allegiance to a highest-level goal over long stretches of time and in the face of disappointments and setbacks. (p. 4)

With that newer understanding of the differences between Grit and Self-Control, the results of this study become clearer. Incoming first-semester college students may not have determined high-level goals, therefore they may also have limited Grit. Parts of their college experience and exploration will most likely build said goals, and therefore their Grit maybe built over time. If the students from this study were assessed later in their college experience their Grit levels in relation to their academic performance might be different.

Female students with a ≥ 2.67 fall GPA, were the exception to that overall finding. In addition to SAT being a predictor of their success, Effort Grit was as well. Adding the Effort Grit to the SAT actually increased their academic performance chances by approximately 10 percent. That finding was the first and only time that Grit surfaced in the results of the students surveyed. Further research in that area is recommended to understand why this particular group of students presented those results.

Self-Control, on the other hand, was found to be related to academic performance. The relationship was small yet significant, when Self-Control and fall GPA were analyzed prior to the FA14GPA split. There were several possible reasons why Self-Control and FAGPA indicated a smaller relationship. The study sample was very small and limited. Had a larger group, more equally distributed across all levels of Self-Control, been used, results may have been different. Two other potential reasons for the Grit and Self-Control findings are related to time and scale design. As with HSGPA and SAT, only one semester of students' academic results were captured. Had the students' entire academic year been followed, the data and results may have been richer and more detailed, thereby affecting the overall findings. Second, both the Grit and Self-Control scales are designed to be very general; they were not designed to specifically look at academic performance. Therefore, had items on each scale been designed with an academic focus, Grit, Self-Control, and college-level academic performance may have yielded different results.

Finding 3:

Male and female students had somewhat different results in terms of Grit, Self-Control, and academic performance. Predictors of academic performance for male students were HSGPA, Self-Control, and SAT scores. Female students' predictors were HSGPA and SAT scores. For female students the variance shared between HSGPA, SAT scores, and FA14GPA was very low (13 percent and 17 percent), and for male students it was moderately high (33 percent and 26 percent). Although both genders' HSGPA and SAT scores presented as having a correlation and shared variance with students' fall GPA, the differences based on gender were rather unequal. Because of those gender

differences, traditional academic predictors may not be the best tools to determine academic performance. Additionally, for female students other predictors of academic performance outside HSGPA, SAT, Grit, and Self-Control may exist. The biggest difference between genders was Self-Control; it predicted academic performance only for male students and not female students prior to the fall GPA split, suggesting that what may be a good predictor for male students may not be for female students.

Finding 4:

During the exploration process in this study, Self-Control was the only predictor of students' fall GPA when it was less than 2.67. Gender did not play a role in that particular finding, and the best and only predictor of fall GPA < 2.67 for all students was Self-Control. That indicated that levels of earned GPA may be related to levels of Self-Control. Further research in the area is highly recommended, along with research for potential interventions to assist students who fall into that category. Again, the sample size may have played a part in that aspect of the study, and having a more diverse sample may have resulted in richer results.

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Future Research

</div>

The findings from this study suggested that the non-traditional predictors, Grit and Self-Control, did have some relationship to students' academic performance. To truly understand the significance of these relationships, how they relate to student performance, and what measures could be taken to implement potential interventions, further research is necessary.

Sample

The sample population of this study proved to be very narrow in relation to Grit and Self-Control responses, making it challenging to differentiate between the various relationships and potential predictors. It is recommended that future research endeavors access a larger variety and more diverse and representative group of students. Such effort would assist in acquiring stronger relationship and prediction results, furthering the research of this study.

Other Predictors

Female students presented results that suggested that other predictors outside of HSGPA, SAT, Grit, and Self-Control scores may play a role in academic performance. Prior to the exploration process, HSGPA and SAT scores presented as having very small variances with female students' fall 2014 GPA (13 percent and 17 percent). Grit and Self-Control did not have any relationship with female students' fall 2014 GPA. When the GPA was split, female students with ≥ 2.67 showed SAT and Effort Grit as the best predictors. To truly understand and support female students in their academic performance, further investigation and research is needed in the area of potential predictors of their academic success.

Time

One academic semester gave a brief snapshot of student performance, and that led to the biggest limitation in this research study: time. Had students' first academic year been followed, the data and results would have been richer and more detailed. Since Grit develops over time, had this study been lengthier, the results on the Grit scale may have been different. Additionally, a clearer understanding of the relationship between female

students with ≥ 2.67 fall GPAs and Effort Grit may have been possible had the study been longer. It is recommended that future research entail a study that covers at least a year, if not two years, of students' academic performance.

Scales

The Grit and Self-Control scales were designed to capture a general overview of a person's grittiness and ability to self-regulate. This study specifically looked at academic performance and potential predictors using those current scales. Future researchers may want to redesign the Grit and Self-Control scales to reflect an academic focus. For example, question six on the Grit scale states, "I am a hard worker." If the phrase was changed to "I am a hard academic worker," it would have an academic element. Adding the words "my homework" to question nine on the Self-Control Scale – "Pleasure and fun sometimes keep me from getting my homework done" -- shifts the context from general to academic. Refocusing each scale with an academic emphasis might assist in aligning the results of the scales with HSGPA and SAT scores to accurately measure academic performance. Once the scales have an academic focus, and validity and reliability have been established, it would be good to replicate this study with a more diverse population, using the revised scales. That may assist in further clarifying if Grit and Self-Control are academic predictors of a first-year student's first-semester success.

Gender

Further study of male and female academic-performance predictors is recommended based on the findings of this study. Male and female students presented as having different predictors for their academic performances, indicating that one size does not fit all, especially in regard to the traditional predictors of HSGPA and SAT scores.

Further research in understanding the gender differences, and how they occur through high school experiences, is recommended.

Performance Differences

Self-Control was a statistically significant predictor of students' academic performance when fall 2014 GPA was split, particularly for students with a GPA < 2.67. Self-Control was the best predictor of a student's academic performance, more so than HSGPA, SAT, and Grit, when fall GPA was split. Self-Control policy implications touch both the K-12 and post-secondary realms. Self-Control in this study was defined as "the ability to override or change one's inner responses, as well as to interrupt undesired behavior tendencies (such as impulses) and refrain from acting on them" (Tangney, Baumeister, & Boone, 2004, p. 274), and that definition could assist in developing policy for K-12 and post-secondary environments. The determination of college readiness cannot be left up to just SAT and HSGPA; students need to build and develop their Self-Control to navigate the college experience and expectations. Success in college would be far greater if students came to college having already learned to self-manage.

Another performance indicator to investigate would be SAT scores, and splitting them between high and low performers -- at or around 900 – and then analyzing them with Grit, Self-Control, and college GPA. Investigating the different relationships between the SAT scores, Grit, Self-Control, and college GPA could help further understand the best predictors or combinations of predictors of students' first-semester college GPA.

Interventions

Students who end their first fall semester with a GPA < 2.67 are identified and labeled by most colleges as students "at risk." They are the students who struggle, falter, and may fail in subsequent semesters of college. The majority of colleges and universities use incoming SAT and HSGPA to identify such students. Many colleges and universities have programs that assist students in building their academic skill sets, to assist with navigating their college experiences. Results from this study suggested that a critical variable for students with < 2.67 FA14GPA was their self-control. Based on the results of this study, further research that investigates the building and improving of students' self-control both prior to college and during college may assist many students in being academically successful. Future research is needed to understand how development of self-control can be conducted. Do community engagement, religious practice, or family relations contribute to its development? Can K-12 education implement curriculum within school environments to assist with developing self-control?

It is recommended that K-12 education and colleges devote time researching, investigating, and then implementing programing to develop self-control in all students, specifically students who fall into the < 2.67 category.

Highs and Lows

Another area for future research would be to look at incoming students with low HSGPAs who earned high first-semester college GPAs and vice versa, as well as their relationships to Grit and Self-Control, discovering if students with high Grit and/or Self-Control who entered the semester with low GPAs and ended with high GPAs would be

useful information the research on Grit and Self-Control as predictors of academic performance.

Additionally, although the relationships among high school GPA, Grit, and Self-Control were not investigated in this study, statistically significant relationships were noticed. Future research in that area could assist K-12 and post-secondary educators and administrators in understanding the relationships between and among those three factors and student success. If Self-Control and/or Grit assisted in predicting high school GPA, policy, procedures, and curriculum could be designed to assist and support students in K-12 environments.

Parent Education

A little more than one-third of the group in this study indicated that a high school diploma was the highest level of education attained by family members. Future research with a similar population could assist in further understanding Grit and Self-Control and academic performance. Does the education level of their parents affect the Grit and Self-Control levels of students, and if so, how does it influence first-semester GPA?

Policy Implications

Educational policy and reform are necessary processes for the growth and development of our educational system. This study adds to the growing research that the traditional predictors of SAT scores and high school GPA may not be the only predictors of a student's academic success. Further study and examination of grit and self-control and their role in students' academic performance is necessary before any changes to educational policies are made. If future research confirms relationships between and among grit, self-control and academic success then college admissions offices may want

to compliment the traditional measures of SAT and High School GPA with measures of Self-Control and Grit. That may assist with early identification of students who might face more challenges later on, and connect them with support services. Additionally, if grit and self-control indeed are associated with high levels of academic success, policy practices that foster grit and self-control have the potential to increase K-16 retention and persistence rates. Further examination of the relationships between and among grit, self-control, and academic performance is highly recommended.

Conclusion

The goal of this study was to explore potential new predictors of first-semester success in first-year college students. Findings from this study supported Sparkman et al.'s (2012) statement that "success in college, as defined by student retention and academic performance, may be related to other variables or combination of variables" (p. 642). SAT and HSGPA did present as indicators of academic performance; however, this study also revealed that the non-traditional predictors, Grit and Self-Control, do play a part in a student's academic performance, especially Self-Control. If that trait is developed at a young age, then the ability to self-regulate continues into adulthood, as seen in the study by Moffitt et al. (2011). Students entering college with higher Self-Control may be more likely to successfully navigate the college environment. During their first-semester, students with high Self-Control who experience mishaps (e.g. low test scores, difficult relationships) may be able to self-regulate; lift themselves out of negative situations, assess their options, refocus, plan, and move on.

The Grit subscale P*erseverance of Effort* did surface as an academic performance predictor for female students. The findings of Grit and Self-Control as predictors of

students' academic performance suggest that further exploration of Grit and Self-Control may provide valuable information to assist in greater retention and college success. Additionally, exploring of strategies specifically targeted at improving Grit and Self-Control may also promote greater retention and college success.

This study assisted in adding to the current research of Duckworth, Peterson, Matthews & Kelly, 2007; NACAC, 2008; Duckworth, Quinn & Tsukayama, 2012; Honken & Ralston, 2013 Hiss & Franks, 2014; and Duckworth & Carlson, 2013, which all suggested that success in college is related to other predictors in addition to the current best predictors--SAT and high school GPA. Two non-traditional predictors, Grit and Self-Control, may be able to assist in supporting and increasing retention and persistence rates. The overall findings of this study contribute to further understanding factors related to college success, graduation, and better life and career options for all students.

REFERENCES

ACT. (2013). *College Student Retention and Graduation Rates from 2000 through 2012*.
Retrieved from ACT Improve Yourself:
http://www.act.org/research/policymakers/reports/graduation.html

Altbach, P. G., & Berdahl, R. O. (Eds.). (1981). *Higher Education in American Society.*
Buffalo: Prometheus Books.

Average Scores. (2015, June 12). Retrieved from College Board:
https://professionals.collegeboard.com/testing/sat-reasoning/scores/averages

Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false
belief understanding to emerging math and literacy ability in kindergarten. *Child
Development, 78*, 647-663.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). Test scores and high school
grades as predictors. In *Crossing the Finish Line: Completing College at
America's Public Universities* (pp. 112-133). Princeton, NJ: Princeton University
Press.

By the Numbers Academic Year 2013-2014. (2015, May 29). Retrieved from Office of
Institutional Research: usm.maine.edu/ori/numbers

Duckworth, A. L. (2011). The significance of self-control. *PNAS, 108:7*, 2639-2640.
Retrieved from Proceedings of the National Academy of Sciences of the United
States of America.

Duckworth, A. L. (2013, June 11). *Research Statement*. Retrieved from University of
Pennsylvania: https://sites.sas.upenn.edu/duckworth/pages/research-statement

Duckworth, A. L., & Allred, K. M. (2012). Temperament in the Classroom. In L. Shiner, & M. Zentner (Eds.), *Handbook on Temperament* (pp. 627-644). New York: Guilford Press.

Duckworth, A. L., & Carlson, S. M. (2013). Self-Regulation and School Success. In B. Sokol, F. Grouzet, & U. Muller (Eds.), *Self-Regulation and Autonomy: Social and Developmental Dimensions of Human COnduct* (pp. 208-230). New York: Cambridge University Press.

Duckworth, A. L., & Gross, J. J. (2014). Self-Control and Grit: related but separable determinants of success. *Current Directions in Psychological Science*, 1-20.

Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance in adolescents. *Psychology Science, 16*, 939-944.

Duckworth, A. L., Grant, H., Loew, B., Oettingen, G., & Gollwitzer, P. M. (2011). Self-regulation strategies improve self-discipline in adolescents: benefits of mental contrasting and implementation intentions. *Educational Psychology, 31:1*, 17-26.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 92:6*, 1087-1101.

Duckworth, A. L., Quinn, P. D., & Tsukayama, E. (2012). What No Child Left Behind Leaves Behind: The Roles of IQ and Self-Control in Predicting Standardized Achievement Test Scores and Report Card Grades. *Journal of Educational Psychology, 104*(2), 439-451.

Education, U. D. (2014, July 29). *Fast Facts: Employment Rates of College Graduates*. Retrieved from Natioanl Center for Educational Statistics: http://nces.ed.gov/fastfacts/display.asp?id=561

Finn, J. D., Pannozzo, G. M., & Voelkl, K. E. (1995). Disruptive and Inattentive-Withdrawn Behavior and Achievement Among Fourth Graders. *Elementary School Journal, 95*, 421-434.

Geiser, S., & Santelices, M. V. (2007). Validity of High School Grades in Predicting Student Success Beyond the Freshman Year: High-School Record vs. Standardized Tests as Indicators of Four-Year College Outcomes. *Research and Occasional Papers Series from the Center for Studies in High Education at the University of California, Berkeley*, 1-35.

Gennep, A. V. (1960). *The Rites of Passage.* London: Routledge & Kegan Paul Ltd.

Goldberg, L. R. (1993, January). The Structure of Phenotypic Personality Traits. *American Psychologist, 48*(1), 26-34.

Guido, J. J., Winters, P. C., & Rains, A. B. (2006). *Logistic Regression Basics.* Cary: SAS Institute, Inc.

Guiffrida, D. A., Lynch, M. F., Wall, A. F., & Abel, D. S. (2013). Do Reasons for Attending Collge Affect Academic Outcomes? A Test of a Motivational Model From a Self-Determination Theory Perspective. *Journal of College Student Development, 54*(2), 120-138.

Hair, Jr., J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis* (6th ed.). New Jersey: Pearson Prentice Hall.

Haskins, C. H. (1957). *The Rise of Universities.* London: Cornell University Press.

Heckman, J. J., & LaFontaine, P. A. (2007). *The American High School Graduation Rate: Trends and Levels.* Discussion Paper No. 3216, Institute for the Study Labor, Bonn, Germany.

Heckman, J. J., & Rubinstein, Y. (2001). The Importance of Noncognitive Skills: Lessons From the GED Testing Program. *American Economic Review, 91*, pp. 145-149.

Hiss, W. C., & Franks, V. W. (2014, February 5). *Defining Promise: Optional Standardized Testing Policies in American College and University Admissions.* Retrieved from National Association for College Admission Counseling: http://www.nacacnet.org/research/research-data/Pages/default.aspx

Honken, N. B., & Ralston, P. A. (2013). High-Achieving High School Students and Not So High-Achieving College Students: A Look at Lack of Self-Control, Academic Ability, and Performance in College. *Journal of Advanced Academics*, 108-124.

Izzett, R. (2015, June 6). *SPSS Windows Instructions.* Retrieved from Oswego State University of New York: www.oswego.edu/Documents/psychology/spss/spss.pdf

Karris, A. M., & Craighead, W. E. (2012). Differences in Character Among U.S. College Students. *Individual Differences Research*, 69-80.

King, Jr., M. L. (1947, January-February). The Purpose of Education. *Maroon Tiger*.

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for Predicting First-Year College Grade Point Average.* New York: The College Board.

Maloney, P. W., Grawitch, M. J., & Barber, L. K. (2012). The Multi-Factor Structure of the Brief Self-Control Scale: Disciminant Validity of Restraint and Impulsivity. *Journal of Research in Personality, 46*, 111-115.

Mansfield, P. M., Pinto, M., Parente, D. H., & Wortman, T. I. (2009). College Students and Academic Performance: A Case of Taking Control. *NASPA Journal*, 502-518.

Marsh, C. M., Vandehey, M. A., & Diekhoff, G. M. (2008). A Comparison of an Introductory Course to SAT/ACT Scores in Predicting Student Performance. *The Journal of General Education, 57*(4), 244-255.

Martin, R. P. (1989). Activity Level, Distractibility, and Persistence: Critical Characteristics in Early Schooling. In G. A. Kohnstamm, J. E. Bates, & M. K. Rothbart (Eds.), *Temperament in Childhood* (pp. 451-461). Chichester, UK: Wiley.

Mattson, C. (2007, Summer). Beyond Admission: Understanding Pre-College Variables and the Success of At-Risk Students. *Journal of College Admission*, pp. 8-13.

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links Between Behavioral Regulation and Preschoolers' Literacy, Vocabulary, and Math Skills. *Developmental Psychology, 73*, 947-959.

McClelland, M. M., Piccinin, A., Acock, A. C., & Stallings, M. C. (2011). Relations between preschool attention and later school achievement and educational outcomes. *Manuscript submitted for publication*.

McCrae, R. R., & John, O. P. (1992). An Introduction to the Five-Factor Model and Its Applications. *Journal of Personality*, 175-215.

Menson, R. P., Patelis, T., & Doyle, A. (2009). New England's State College Readiness. *New England Board of Higher Education*, 22-23.

Mischel, W., & Ebbesen, E. B. (1970). Attention in Delay of Gratification. *Journal ol Personality and Social Psychology, 16*(2), 329-337.

Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of Gratification in Children. *Science, 244*(4907), 933-938.

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2011). A Gradient of Childhood Self-Control Predicts Health, Wealth, and Public Safety. *PNAS*, 2693-2698.

Morrow, J. A., & Ackermann, M. E. (2012). Intention to Persist and Retention of First-Year Students: The Importance of Motivation and Sense of Belonging. *College Student Journal*, 483-491.

Munis, P., Greenfield, D. B., Henderson, H. A., & George, J. L. (2007). Development and Validation of the Preschool Temperament Classification System for Use with Teachers. *Early Childhood Research Quarterly, 22*, 440-450.

NACAC: National Association for College Admission Counseling. (2008). *Report of the commission on the use of standardized tests in undergraduate admission.* Arlington: NACAC.

Office of Institutional Research. (2014). *University of Southern Maine Common Data Set 2014-2015: Admission Information.* Portland: Office of Institutional Research.

Pallant, J. (2013). *A step by step guide to data analysis using IBM SPSS: SPSS Survival Manual* (5th ed.). New York: McGraw-Hill Companies.

Palmer, M., O'Kane, P., & Owens, M. (2009, February). Betwixt Spaces: Student Accounts of Turning Point Experiences in the First-Year Transition. *Studies in Higher Education, 34*(1), 37-54.

Park, N. (2009). Building Strengths of Character: Keys to Positive Your Development. *Reclaiming Children and Youth, 18*, 42-47.

Park, N., & Peterson, C. (2008). Positive Psychology and Character Strengths: Application to Strengths-Based School Counseling. *Professional School Counseling, 12*(2), 85-92.

Park, N., Peterson, C., & Seligman, M. E. (2004). Strengths of Character and Well-being. *Journal of Social and Clinical Psychology*, pp. 603-619.

Park, N., Peterson, C., & Seligman, M. E. (2006). Character strengths in fifty-four nations and the fifty US states. *The Journal of Positive Psychology: Dedicated to furthering research and promoting good practice, 1:3*, 118-129.

Patterson, B. F., Mattern, K. D., & Swerdzewski, P. (2012). Are the Best Scores the Best Scores for Predicitng College Success? *Journal of College Admission*, 34-45.

Peng, C.-Y. J., Lee, K. L., & Ingersoll, G. M. (2002). An Introduction to Logistic Regression Analysis and Reporting. *The Journal of Educational Research*, 3-14.

Perkins-Gough, D. (2013, September). The Significance of GRIT: A Conversation with Angela Lee Duckworth. *Educational Leadership*, 15-20.

Peterson, C., & Seligman, M. (2004). *Character Strengths and Virtues, a Handbook and Classification.* Oxford: Oxford University Press.

Peterson, C., Park, N., Hall, N., & Seligman, M. E. (2009). Zest and Work. *Journal of Organizational Behavior*, pp. 161-172.

Registrar, O. (2015, July 03). *Academic Policies - Undergraduate*. Retrieved from

    University of Southern Maine: https://usm.maine.edu/catalogs/2014-15/academic-

    policies-undergraduate#GradingSystem

Reynolds, W. M. (1982, January). Development of Reliable and Valid Short Forms of the

    Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology,*

    38(1), 119-125.

Robertson-Kraft, C., & Duckworth, A. L. (2014). True Grit: Trait-level Perseverance and

    Passion for Long-term Goals Predicts Effectiveness and Retention among Novice

    Teachers. *Teachers College Record*, 1-27.

Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). *Measures of Personality and*

    Social Psychological Attitudes Volume 1 in Measures of Social Psychological

    Attitudes Series. San Diego: Academic Press, Inc.

Romer, D., Duckworth, A. L., Sznitman, S., & Park, S. (2010, September). Can

    Adolescents Learn Self-Control? Delay of Gratification in the Development of

    Control over Risk Taking. *Prevention Sciene, 11:3*, 319-330.

Rothbart, M. K., & Rueda, M. R. (2005). The Development of Effortful Control. In U.

    Mayr, E. Awh, & S. W. Keele (Eds.), *Developing Individuality in the Human*

    Brain (pp. 167-188). Washington, CD: American Psychological Association.

Schmitt, J., & Boushey, H. (2012, July/August). Why Don't More Young People Go to

    College? *Challenge, 55*(4), 78-93.

Seligman, M. E., & Csikszentmihalyi, M. (2000). Positive Psychology: An Introduction.

    American Psychologist, Vol 55.(No. 1), 5-14.

Seligman, M. E., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009, June). Positive Education: Positive Psychology and Classroom Invterventions. *Oxford Review of Education, 35*(3), 293-311.

Shechtman, N., DeBarger, A. H., Rosier, S., & Yarnall, L. (2013). *Promoting Grit, Tenacity, and Perseverance: Critical Factors for Success in the 21st Century.* Washington D.C.: U.S. Department of Education.

Snap 11 Professional. (2015). Retrieved from Snap WebHost: https://snapsurvey.usm.maine.edu/snapwebhost/

Sparkman, L. A., Maulding, W. S., & Roberts, J. G. (2012). Non-Cognitive Predictors of Student Success in College. *College Student Journal, 46:3*, 642-652.

Statistics, N. C. (2011). *The Nation's Report Card: America's High School Graduates.* Alexandria: U.S. Department of Education.

Stickler, L. (2007). A Critical Review of the SAT: Menace or Mild-Mannered Measure? *TCNJ Journal of Student Scholarship, IX*, 1-8.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004, April). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality, 72:2*, 271-324.

Tinto, V. (1987). *Leaving College Rethinking the Causes and Cures of Student Attrition.* Chicago: The University of Chicago Press.

Tinto, V. (1988). Stages of Student Departures: Reflections on the Longitudinal Character of Student Leaving. *The Journal of Higher Education, 59*(4), 438-455.

Tough, P. (2012). *How Children Succeed Grit, Curiosity, and the Hidden Power of Character.* New York: Houghton Mifflin Harcourt Publishing Company.

Valiente, C., Lemery-Chalfant, K., Swanson, J., & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*, 67-77.

Von Culin, K., Tsukayama, E., & Duckworth, A. L. (2014). Unpacking Grit: Motivational Correlates of Perseverance and Passion for Long-Term Goals. *Journal of Positive Psychology*, 1-23.

Willingham, W. W., Pollack, J. M., & Lewis, C. (2002). Grades and test scores:Accounting for observed differences. *Journal of Educational Measurement, 39*, 1-37.

Zimmerman, B. J. (2002). Achieving Self-Regulation: The Trial and Triumph of Adolescence. In F. Pajares, & T. Urdau (Eds.), *Academic Motivation of Adolescents* (pp. 1-27). Greenwich, CT: Information Age.

Zusho, A., & Edwards, K. (2011). Self-Regulation and Achievement Goals in the College Classroom. *New Directions For Teaching and Learning, 126*, 21-31.

APPENDICES

Appendix A: 12- Item Grit Scale

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

1. I have overcome setbacks to conquer an important challenge.
   - o Very much like me
   - o Mostly like me
   - o Somewhat like me
   - o Not much like me
   - o Not like me at all

2. New ideas and projects sometimes distract me from previous ones.*
   - o Very much like me
   - o Mostly like me
   - o Somewhat like me
   - o Not much like me
   - o Not like me at all

3. My interests change from year to year.*
   - o Very much like me
   - o Mostly like me
   - o Somewhat like me
   - o Not much like me
   - o Not like me at all

4. Setbacks don't discourage me.
   - o Very much like me
   - o Mostly like me
   - o Somewhat like me
   - o Not much like me
   - o Not like me at all

5. I have been obsessed with a certain idea or project for a short time but later lost interest.*
   - o Very much like me
   - o Mostly like me
   - o Somewhat like me
   - o Not much like me
   - o Not like me at all

6. I am a hard worker.
- o Very much like me
- o Mostly like me
- o Somewhat like me
- o Not much like me
- o Not like me at all

7. I often set a goal but later choose to pursue a different one.*
- o Very much like me
- o Mostly like me
- o Somewhat like me
- o Not much like me
- o Not like me at all

8. I have difficulty maintaining my focus on projects that take more than a few months to complete.*
- o Very much like me
- o Mostly like me
- o Somewhat like me
- o Not much like me
- o Not like me at all

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

10. I have achieved a goal that took years of work.
- o Very much like me
- o Mostly like me
- o Somewhat like me
- o Not much like me
- o Not like me at all

11. I become interested in new pursuits every few months.*
- o Very much like me
- o Mostly like me
- o Somewhat like me
- o Not much like me
- o Not like me at all

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

*Reversed Items

Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit:

Perseverance and passion for long-term goals. Journal of Personality and

Social Psychology, 9, 1087-1101.

Appendix B: 13-Item Self-Control Scale

Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

			Not at all Very much
	1	I am good at resisting temptation.	1—2—3—4—5
(R)	2	I have a hard time breaking bad habits.	1—2—3—4—5
(R)	3	I am lazy.	1—2—3—4—5
(R)	4	I say inappropriate things.	1—2—3—4—5
(R)	5	I do certain things that are bad for me, if they are fun.	1—2—3—4—5
	6	I refuse things that are bad for me.	1—2—3—4—5
(R)	7	I wish I had more self-discipline.	1—2—3—4—5
	8	People would say that I have iron self- discipline.	1—2—3—4—5
(R)	9	Pleasure and fun sometimes keep me from getting work done.	1—2—3—4—5
(R)	10	I have trouble concentrating.	1—2—3—4—5
	11	I am able to work effectively toward long-term goals.	1—2—3—4—5
(R)	12	Sometimes I can't stop myself from doing something, even if I know it is wrong.	1—2—3—4—5
(R)	13	I often act without thinking through all the alternatives.	1—2—3—4—5

(R) Reversed Items

Appendix C: Short-Form C of the Marlowe-Crowne Social Desirability Scale (M-C

Form C)

1. It is sometimes hard for me to go on with my work if I am not encouraged. (F)

2. I sometimes feel resentful when I don't get my way. (F)

3. On a few occasions, I have given up doing something because I thought too little of my ability. (F)

4. There have been times when I felt like rebelling against people in authority even though I knew they were right. (F)

5. No matter who I'm talking to, I'm always a good listener. (T)

6. There have been occasions when I took advantage of someone. (F)

7. I'm always willing to admit it when I make a mistake. (T)

8. I sometimes try to get even rather than forgive and forget. (F)

9. I am always courteous, even to people who are disagreeable. (T)

10. I have never been irked when people expressed ideas very different from my own. (T)

11. There have times when I was quite jealous of the good fortune of others. (F)

12. I am sometimes irritated by people who ask favors of me. (F)

13. I have never deliberately said something that hurt someone's feelings. (T)

(F) = False

(T)= True

Appendix D: Email EYE Instructors

[DATE]

Dear *<Instructors Name>*

My name is Stacy Stewart, and I am a doctoral candidate here at USM. The research I wish to conduct for my Doctoral Dissertation is **Grit and Self-Control as Predictors of First-year Student Success.** This study will be conducted under the supervision of David Silvernail, PhD., Director of the Center for Education Policy, Applied Research and Evaluation at USM.

The study has been approved by USM's Office of Research Integrity and Outreach (ORIO). The aim of this research study is to examine the relationship of grit and self-control on a first-year student's success during his/her first-semester of college and persistence to the second semester. More specifically, the study intends to determine if grit and self-control are stronger predictors or compliments of success than the Scholastic Aptitude Test (SAT) and high school grade point average (HSGPA).

I am writing to ask that you encourage your Entry Year Experience (EYE) student to take the online survey. Students will be receiving an email with the link to the survey shortly. The survey consists of a 38 multiple choice questions which can typically be answered by participants within 25-30 minutes. By completing this survey, participants will have the option to be entered into a lottery. One winner will be randomly selected to receive a $100.00 Amazon gift card.

Your assistance is very much appreciated. If you have any further questions regarding the research or survey, please feel free to contact me at (207) 228-8156 or via e-mail: stacyann.stewart@maine.edu. Again, thank you very much for your help.

Sincerely,
Stacy Stewart

Doctoral Degree Candidate
(207) 228-8156
stacyann.stewart@maine.edu

Appendix E: Student Email- Invitation to Participate

Subject: First-Semester Survey – Your Chance to win $100.00 Amazon gift card

Dear [Name of Student],

My name is Stacy Stewart, I am a doctoral candidate in the PhD Public Policy program at USM. Below is a link to a survey that is part of my research for my doctoral dissertation. It is a 38 multiple-choice question survey about grit and self-control. The survey takes approximately 25-30 minutes to complete. By completing this survey, you have the option to be entered into a lottery. <u>One winner will be randomly selected to receive a $100.00 Amazon gift card</u>. Your participation is greatly appreciated!

[URL]

Thanks for your time,

Sincerely,
Stacy Stewart

Appendix: F: Student Consent Form

<u>**Informed Consent for Participation as an Intervention Subject in a Research Study**</u>

Title: **GRIT AND SELF-CONTROL AS PREDICTORS OF FIRST YEAR STUDENT SUCCESS**

Principal Investigator: Stacy Stewart, 119 Payson Smith Hall, University of Southern Maine, Portland, ME 04104, (207) 228-8156, sstewart@usm.maine.edu.

Faculty Advisor: Dr. David Silvernail, 220/221 Bailey Hall, University of Southern Maine, Gorham, ME 04038, (207) 780-5297, davids@usm.maine.edu

<u>**Introduction:**</u>
- Please read this form carefully. The purpose of this form is to provide you with information about this research study, and if you choose to participate document your decision.
- You are encouraged to connect with the researcher via email or phone to ask any questions that you may have about this study, now, during or after the project is complete.
- You can take as much time as you need to decide whether or not you want to participate.
- **Your participation is voluntary and you can ask questions at any time.**

<u>**Purpose of Study:**</u>
- The purpose of this research is to examine the relationship of grit and self-control on a first year student's success during his/her first semester of college and persistence to the second semester.
- More specifically, the study intends to determine if grit and self-control are stronger predictors or compliments of success than the Scholastic Aptitude Test (SAT) and high school grade point average (HSGPA).

<u>**Participant Selection:**</u>
- You are being asked to be in a **research** study on Grit and Self-Control as Predictors of First Year Student Success. Specifically, predictors of first semester success in first year college students will be examined.
- You were selected as a possible participant because you are currently a first semester, first year college student registered in an Entry Year Experience (EYE), HON 101 or RSP 103 course at the University of Southern Maine.
- The total number of subjects is six hundred ninety-five (695).

<u>**Description of Study Procedures:**</u>
- If you agree to participate in this study, you can expect to:
- Complete one (1) online survey containing three (3) assessments: The 12- Item Grit Scale, Self-Control Scale and the Marlowe-Crowne Social Desirability Scale. The survey consists of thirty-eight (38) multiple choice questions.

- Allow the researcher permission to obtain from the USM Registrar's Office your high school GPA, SAT scores, gender, age, place of birth, race/ethnicity, name of high school, in/out of state status, degree seeking, full or part time status, commuter vs. on-campus housing, religion, financial information, as well as your fall 2014 cumulative first semester GPA and course registration for spring 2015.
- You will need to commit the necessary time and effort to completing the online instrument. – Approximately 25 -30 minutes.

Risks to Being in Study:
- There are no foreseeable risks and/or discomforts that may result from participation.
- Potential social risks include the remote possibility of harm to reputation due to breach of privacy. The information obtained from the USM Registrar's Office is generally held private; by signing this consent form you will allow the researcher access to this information and your grades will not be impacted from taking part in this opportunity or choosing not to.

Benefits of Being in Study:
- There are no direct benefits to you for participating in this study.
- Significance of this study will contribute to the emerging research on grit and self-control and will compare the effect of such character strengths to those of SAT and HSGPA, currently used by high schools and colleges to predict the academic success of students. In addition, this study, contributes to the emerging research on college success predictions.

Payments:
- You will not be paid.
- You will have the opportunity to register for a raffle to win a $100.00 Amazon gift card.

Confidentiality and Privacy of Data:
- The records of this study will be kept confidential to the extent <u>allowed</u> by law.
- All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in number form only.
- Last four digits of your Social Security number will be used so your name will not be identified.
- All survey information will be destroyed upon completion of the project.
- Access to the survey and MaineStreet information will be limited to the researcher; however, please note that sponsors, funding agencies, regulatory agencies, and the Institutional Review Board may review the research records.
- In any sort of report that maybe published, the report will not include any information that will make it possible to identify you.
- The survey data will be collected on a secure server.

- You are giving consent to for the researcher to access and link to FERPA-type private information.
- While your name is available in the USM Registrar's database, no names will be included in any downloaded files used or stored by the researcher or in any presentation of results.
- Please note that the Institutional Review Board may review the research records.

Voluntary Participation/Withdrawal:
- **Your participation is voluntary**. If you choose not to participate, it will not affect your present or future relations with the University.
- You are free to withdraw from this research study at any time, for whatever reason.
- Withdrawing participation will not risk loss of present or future relations with the University.

Contacts and Questions:
- The researcher conducting this study is Stacy Stewart. For questions or more information concerning this research you may contact Stacy Stewart at sstewart@usm.maine.edu or (207) 228-8156.
- If you believe you may have suffered a research related injury, contact Dr. David Silvernail, (207) 780-5297, davids@usm.maine.edu
- If you have any questions about your rights as a research subject you may contact: Human Protections Administrator, Office of Research Integrity and Outreach, USM at (207) 228-8434, or usmirb@usm.maine.edu, or TTY (207)780-5646.

Copy of Consent Form:
- You may print a copy of this consent form and one will be kept in our records file for future reference.

Statement of Consent:

I understand the above description of the research and the risks and benefits associated with my participation as a research subject. I understand that by proceeding with this survey I agree to take part in this research and do so voluntarily.

Signatures/Dates:

Study Participant (Print Name): _____

Date _____

☐ I understand that checking this box constitutes a legal signature confirming that I

acknowledge and consent to the above terms of this research study.

BIOGRAPHY OF THE AUTHOR

Stacyann Stewart is originally from Chebeague Island, Maine, and currently lives in Yarmouth, Maine with her husband, Matt, her son Ozric, her mother Bánu, and Dazee, their yellow lab. Following her graduation from Yarmouth High School in 1995, she earned an associate's degree from the American Academy of Dramatic Arts. She obtained a bachelor's degree in psychology from San Francisco State University in 2001, and in 2005 earned a master's degree in school counseling from the University of Southern Maine.

Stacy began working for the University of Southern Maine in 2004 as the coordinator of USM STRIVE U. She oversaw the partnership; a post-secondary opportunity for students with development disabilities until 2014. That year, she became coordinator of career services at the University of Southern Maine. Stacy began teaching *HRD 110 Choices, Changes & Careers* in 2005, and currently teaches *LAC 188 College and Career Success*. She also co-coordinates that course and its development. Stacy is certified as a global career development facilitator; certified in administering and interpreting the Myers-Briggs Type Indicator, the Strong & iStartStrong; and is trained in StrengthsFinder, and Gatekeeper.

Stacy is a member of the National Academic Advising Association, the National Career Development Association, the Maine Career Development Association, the Psi Chi National Honor Society in Psychology and the Phi Kappa Phi Honor Society. She is a co-author of "Branding" published in the NACADA Monograph Series, *Academic Advising Administration: Essential Knowledge and Skills for the 21st Century*, No. 22 2011.

Currently, Stacy is a candidate for a doctorate in public policy with a concentration in educational leadership from the University of Southern Maine's Muskie School of Public Service in August, 2015.

"The function of education is to teach one to think intensively and to think critically. Intelligence plus character - that is the goal of true education" (King, Jr., 1947, p. 10).