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Grit as a predictor of success and persistence for community college students

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ABSTRACT

GRIT AS A PREDICTOR OF SUCCESS AND PERSISTENCE FOR COMMUNITY COLLEGE STUDENTS

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Northern Illinois University, 2018
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This quantitative study investigated the ability of the noncognitive characteristic of grit to predict community college student success and persistence. Grit levels were measured using the eight-item Grit-S scale that was administered to students in classes of a large suburban community college. Individual-level institutional data also were collected at the time of application and during the time students were enrolled. Community college student success was assessed using two measures: (1) students' completion of all the courses they enrolled in at the beginning of the semester and (2) students' end-of-semester, noncumulative, grade point average. Persistence was assessed by determining students' enrollment status during the semester immediately following data collection. If students were enrolled as of the college's official census day, they were considered to have persisted. Preliminary bivariate correlations were conducted in addition to multiple linear regressions. Multiple logistic regression was performed to determine to what extent grit predicted end-of-semester grade point averages, course completion rates, and semester-to-semester persistence of community college students. The results of the study indicated that grit was a predictor of student

success; “grittier” community college students were more likely than students with lower grit scores to complete the classes they enrolled in and to have higher end-of-semester grade point averages. Grit was not found to be a predictor of semester-to-semester persistence.

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GRIT AS A PREDICTOR OF SUCCESS AND PERSISTENCE FOR COMMUNITY
COLLEGE STUDENTS

BY

KATHRYN A. ROGALSKI
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE
DOCTOR OF EDUCATION

DEPARTMENT OF COUNSELING, ADULT AND HIGHER EDUCATION

Doctoral Co-Directors:
Gene L. Roth and Thomas J. Smith

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PREFACE

My passion as an educator and administrator at community colleges developed from my own journey as a first-generation college student and a young mother attending college. The challenges I faced as a student in college were met with caring faculty and staff who had a desire to help me reach my educational goals and who also helped me to create new educational goals, ones which I would have never dreamed of on my own. The ability to help students to achieve and create their own goals motivates me to offer all students opportunities and access to higher education. I want to create equity for students who do not come from privileged backgrounds, who are first-generation students, who have family obligations and all the other circumstances that bring students to community colleges.

When I returned to college after having my daughter, I did not have strong test scores, an adequate high school grade point average, or success at a previous higher educational institution. What I did have was a strong desire to succeed and to earn my college degree. During the years of my college education, with the strong support of my faculty, I exceeded my own expectations, graduating with honors, presenting research at national conferences, and publishing research in peer-reviewed journals. If only my test scores were used to predict my chances of success in college, I would have most likely been a dropout or, at best, a very average or below-average student. Instead, I was motivated to work hard by my life circumstances and was met with faculty who supported my desire and allowed me to excel.

Many students come to community colleges with backgrounds similar to mine. Most are academically underprepared, are first-generation students, and have family obligations that require them to split their time between school and family. Many of these students do not persist in college due to one or more of these factors. I do believe, however, that if students have an internal drive to be successful, educators have a responsibility to provide the necessary support to help them succeed.

This research was guided by my desire to find better ways to serve community college students and to help them reach their educational and career goals. I believe community colleges must meet students “where they are” and create equity through student support and access. I believe that with better tools to assess the likelihood of student success, community colleges will be able to focus resources on students who are in the most need and will therefore have the greatest impact.

CHAPTER 1

INTRODUCTION

Community colleges in the United States serve nearly half of all undergraduate students, 10 million students each year, and yet fewer than 40% of these students will complete any type of degree or certificate within six years (Bailey, Jaggars, & Jenkins, 2015). Community colleges serve a disproportionate number of low-income, first-generation, and ethnic minority populations, including many students who, without the open-access policies of community colleges, would not have the opportunity for higher education (Bailey et al., 2015). With the number of students accessing institutions of higher education, specifically at community colleges, and the low percentage of students who earn a degree or certificate, finding ways to support student success is a national priority (McPhail, 2011). The contemporary emphasis on helping students achieve their educational goals stems from a heightened focus on college completion in the United States, which is in contrast to an earlier emphasis on merely attending college.

Community colleges are open-access institutions that attempt to eliminate barriers for entry to higher education. However, open-access policies can increase challenges for colleges and faculty who are trying to help students meet their goals (Goldrick-Rab, 2010). Over half of the students who enroll at community colleges are in need of at least one remedial course, and a quarter of students must take two or more remedial courses before they are college ready (Goldrick-Rab, 2010). Enrollment in remedial courses prior to earning college-level

credit increases the amount of time and money community college students spend at college and is correlated with the decrease in completion rates for these students (Bailey et al., 2015).

The changing demographics of college students have caused community colleges to reconsider best approaches for student services. Community colleges do not use traditional methods of assessing students for admission and their likelihood of persistence. Traditional college students, just out of high school, attending college full time, and fully prepared to take on university-level work, have become scarce (Kasworm, 2010; Staley & Trinkle, 2011). Recent higher education trends involve older and more diverse students with previous life experience and who have commitments beyond being college students (Kasworm, 2010; Staley & Trinkle, 2011). The average age of college students has evolved from 18 to 23 years to over 25 years (Staley & Trinkle, 2011). Another trend involves the social class of higher education students. Higher education is no longer reserved for the elite and wealthy because contemporary high school graduates have greater access to higher education compared to previous generations of college students (Fike & Fike, 2008; Mertes & Hoover, 2014). This greater access means that student populations entering colleges and universities are much more diverse and have different needs compared to stereotypical college students in previous decades. More women, students of color, and students from diverse cultures are enrolling in higher education. Additionally, these students are not as academically prepared as past generations of college students (Bound, Lovenheim, & Turner, 2010).

In addition to changes in student demographics, levels of preparedness, and cultural differences, the learning needs of students appear to be shifting. Past generations of college students were predominantly fulfilling a specific role – that of being a student. Typically,

these students lived on campus full time, maintained a full course load, developed a circle of friends who also were college students at the same school, and, if they worked, it was most likely on campus. These students had the opportunity to engage in campus activities, student life, and with their college peers. Contemporary college students differ in many ways from this description. They may hold many roles in addition to being a college student, and these roles may prevent them from immersion in their college studies and extra-curricular activities. These students may have full- or part-time jobs and/or have family obligations (Bound et al., 2010; Crawford & Jervis, 2011; Goldrick-Rab, 2010). They may live off campus and have their main relationships with family and friends who are not enrolled in higher education (Staley & Trinkle, 2011). These students' outside responsibilities with family and work often prevent them from becoming a part of the college and campus community. Ultimately, these differences change students' level of commitment to the institution as well as their learning needs (Windham, Rehfuss, Williams, Pugh, & Tichner-Ladner, 2014).

Community college students arguably are different from traditional university students. Community college students often are part-time, commuter students who have responsibilities outside of school including full-time employment and/or families to care for (Napoli & Wortman, 1998). Compared with four-year college and university students, the community college student is more likely to be an ethnic minority, first-generation, low-income, and older student. The majority of four-year students enter college before the age of 20, while only 32% of community college students start college by that age (Ma & Baum, 2016). Because community colleges do not have campus housing, their students commute to and from class. Commuting to and from school often limits a student's time on campus,

especially if these students are attending school on a part-time basis while working. To serve this changing and more diverse population of students and to support their learning and development, researchers have suggested that the current organizational structures, philosophies of education, and teaching/learning styles need to be modified (Kasworm, 2010; Staley & Trinkle, 2011).

In addition to being open-access institutions, community colleges serve a wide variety of educational needs. They provide the first two years of a bachelor's degree to prepare students for transfer (Associate of Arts degree), and they prepare students for specific career fields through short-term certificates or Associate in Applied Science two-year degrees (Goldrick-Rab, 2010). Community colleges are challenged to identify ways to measure success for community college students and to develop accurate measures in order to determine which students will need access to support services. With varying educational preparedness as well as differing educational goals, community colleges must have flexible and reliable measures to use when determining the needs of their students (Staley & Trinkle, 2011).

To address low completion and persistence rates, community colleges have adopted the student development models of student departure and student involvement proposed by Tinto (1975, 1993) and Astin (1984). Considerable research has examined student success of four-year college and university students who are most likely to benefit from these seminal student development models (Alfonso, Bailey, & Scott, 2005). These models were originally theorized based on the traditional college student who attended school full time and lived on campus. These models are not best suited for most community college students who are part-

time, commuter students of nontraditional age who have priorities outside of higher education. Living at home in an off-campus environment affects the engagement or involvement of community college students simply because their campus presence is limited (Astin, 1975). Astin (1975) also notes that involvement of both faculty and students is reduced because they are both only on campus part time. In fact, most community college students have jobs outside of campus, often only come to campus for their classes, and then leave immediately afterwards. More than 25% of all community college students who start college with the intention of getting a degree do not return for a second year of college and a majority leave after their first semester (Crosta, 2013). Although some of these students will transfer to a different institution, many of them will never return to college. According to Schneider and Yin (2011), the cost of community college students who begin college as first-time, full-time, degree-seeking students but do not return for a second year in school is about \$4 billion in appropriations and grants. These costs are paid by federal, state, and local authorities. With so many students not meeting their initial goals upon entrance into the community college and the costs to state, federal, and local authorities, the need to address the problem in helping these students persist is evident.

Because the first year in college, or in some cases the first semester in college, is critical to community college students, it is important to determine which factors promote persistence and success. These factors must go beyond the traditional predictors such as ACT, SAT, engagement, involvement, and institutional commitment since many community college students do not take college entrance exams and most do not live on campus or maintain high levels of engagement or involvement due to their commuter status. Community

colleges are constantly seeking ways to support their students and keep them enrolled until completion (Balog & Search, 2006; Levin, Cox, Cerven, & Haberler, 2010; McClenney, 2006).

One factor that may be helpful in determining if a community college student will stay enrolled in college and be successful is the construct of “grit.” Grit is a noncognitive personality characteristic that has been defined as passion for and perseverance toward long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014). Previous research findings have identified high levels of grit in soldiers as a predictor for completing an Army Special Operations Forces selection course. Additionally, grit was a predictor of Chicago public high school students graduating on time (Eskreis-Winkler et al., 2014). These studies found that grit is a stronger predictor of retention when compared to characteristics such as intelligence, physical aptitude, and the Big Five personality traits (Duckworth et al., 2007; Eskreis-Winkler et al., 2014). Grit research studies have also found that higher grit scores were associated with higher cumulative GPAs in university students (Duckworth et al., 2007) and that grit scores were predictive of college success for African American university students (Strayhorn, 2013). If measuring students’ grit levels predicts the term-to-term persistence and academic success of community college students to a stronger extent than traditional factors such as high school GPA while holding other background characteristics constant, this finding will contribute significantly to the research on community college student persistence. Because most community college students are predicted to drop out or fail out of college (Astin, 1984; Bean, 1980; Tinto, 1975), studying students’ noncognitive characteristics such as level of grit

could provide valuable information that might enhance the ability to predict the likelihood of community college students' success in college. This ability would allow community colleges to provide additional supports to students who are less likely to succeed.

Problem Statement

A completion agenda and a focus on community colleges trended during the Obama administration years during which the need intensified to identify methods that could indicate college success (Belfield, Crosta, & Jenkins, 2014). Unfortunately, community college funding dipped during the same time period, and community colleges were asked to do more with less (Belfield et al., 2014). Community college funding from state appropriations has declined by 25% over the past two decades and, as a result, colleges have cut costs per student by over 9% (Bailey et al., 2015). The reduction in cost per student adds to the already difficult task of helping community college students succeed and persist. Cost-cutting strategies have included increasing reliance on part-time instructors, reducing student-to-faculty ratios, and increasing fully online instruction. These cost savings methods have negative impacts on community college student completion rates (Bailey et al., 2015).

Community colleges are struggling to increase persistence and success among students (Goldrick-Rab, 2010; Windham et al., 2014). They are battling to retain students from term-to-term and sometimes even throughout a single term (Crosta, 2013; Schneider & Yin, 2011). These difficulties are fueled by several conditions. Community college students are typically commuter students; they do not live on campus. Their lives are often more complex than the lives of students who live on campus in a more traditional college setting. They work outside

of school and have families and jobs that require their time and energy. Perhaps the most compelling condition that affects retention is that students often enter the community college academically underprepared (Fike & Fike, 2008, Mertes & Hoover, 2014). All of these challenges can derail students from their educational paths, leaving them as noncompleters without college credentials (Goldrick-Rab, 2010). Therefore, alternative ways of predicting success (student grades) and persistence (enrolling in the following term) of community college students need to be examined.

Currently, cognitive measures such as standardized test scores and academic placement tests are used to predict the success and persistence of community college students. These measures may not have adequately helped colleges identify which students will be retained. They are inadequate for reliably identifying if students will reach their educational goals or if they will drop out. Standardized test scores and/or placement tests have been used by community colleges for these purposes, but student completion rates have not increased (Bound et al., 2010).

A low-cost and reliable measurement tool to help predict community college success would help schools direct scarce resources toward students who are at greatest risk for dropping out or failing. Additionally, many of the traditional predictors are often not available to community colleges. Examples of such predictors are high school performance and college entrance exams such as the ACT and SAT tests. As open-access institutions, community colleges do not require students to complete college entrance exams, and students who enroll at community colleges may not be entering directly out of high school (Schudde & Goldrick-Rab, 2015; Zeidenberg, 2008).

Grit, as a tool to measure passion and perseverance, has been found to predict the success of students in four-year universities (Duckworth et al., 2007; Strayhorn, 2013); however, it has not been studied in a community college context. Therefore, the purpose of this research is to examine grit's effectiveness as a predictor of student performance (grades) and successful course completion and persistence (enrollment in subsequent terms) in the community college context.

Significance of the Study

Traditionally, college students' academic success and likelihood of persistence have been predicted using measures such as aptitude test scores and previous academic achievement (Roberts, Markham, Matthews, & Zeidner, 2005). These measures have been found to be valid predictors for students who score high on aptitude tests and who are academically well prepared for college; however, many students are not well served by these measures (Mertes & Hoover, 2014). Other measures, such as noncognitive skills and personal traits that may promote success and perseverance, are not assessed by academic tests used to predict college success. According to Duckworth et al. (2007), noncognitive traits such as grit and other personal characteristics are key factors in predicting student persistence and success. These noncognitive characteristics account for students' ability to sustain effort for long-term goals as well as their levels of conscientiousness and self-efficacy.

In previous studies, grit has been used to predict the success of African American male students at primarily White institutions (Strayhorn, 2013), to predict graduation from high school in the Chicago public school system (Eskreis-Winkler et al., 2014), and to predict the

success of college students at the University of Pennsylvania (Duckworth et al., 2007). In all of these studies examining the predictive capacity of grit, the researchers found that grit was able to predict success and retention among different contexts, including in military settings, academic high school and university settings, and in highly competitive spelling bee contests. A dearth of research, however, exists for the capacity of grit to predict community college students' success and persistence. This research will fill a gap on grit as well as research surrounding community college student persistence and success.

Purpose Statement

This study investigates students enrolled in community college business or social sciences introductory-level courses to determine the extent to which grit predicts student success and persistence. If grit is determined to help predict a student's success and persistence, the findings of this study can inform the way community colleges assess readiness for college and identify students who need support services. Additionally, if "grittier" students are more likely to perform and be retained at higher levels, community colleges can focus on helping the "less gritty" students increase their levels of this construct.

Research Questions

The following research questions guided this study:

1. To what extent does grit predict the end-of-semester GPA of community college students?

2. To what extent does grit predict success in course completion among community college students?
3. To what extent does grit predict the semester-to-semester persistence of community college students?

Conceptual Framework

The area of research that guided this research study is positive psychology and the psychosocial studies researching the effects of personal characteristics on student success and persistence (Bean & Eaton, 2001; Chemers, Hu, & Garcia, 2001; Eppler & Harju, 1997; Komarraju, Karau, & Schmeck, 2009; Masten, 2001). Research on college student success has seen a shift in focus from primarily intellectual ability of students and their ability to acclimate to college life to using a psychological and individualistic trait-based approach (Seidman, 2012). This focus of positive psychology and looking at individual student traits is more appropriate for community college students than traditional student development theory models (Napoli & Wortman, 1998).

Positive psychology models are relatively recent and focus on how psychosocial behaviors, personal traits, and characteristics can predict success and retention for college students (Bean & Eaton, 2001; Braxton, 2000). Psychosocial factors, including the Big Five personality traits (Komarraju et al., 2009), self-efficacy (Chemers et al., 2001), motivation (Dweck, 1986; Eppler & Harju, 1997), and resilience (Martin & Marsh, 2008; Masten, 2001), have been linked in varying degrees to college student success and persistence. These research studies have focused on how individual traits and characteristics of incoming

students relate to student retention (Robbins et al., 2004). These studies use positive psychology to focus on the strengths of the individual to predict success and persistence. According to Dweck (1999, 2007), academic success is linked to more than a student's intelligence and ability.

This study uses the psychosocial and positive psychology focus on noncognitive individual trait characteristics as a framework. Student success and persistence in the community college are examined in light of the personal characteristics of grit, lack of grit, and grittiness.

Definition of Terms

The following terms and definitions are used throughout this research:

Career student: Community college students whose intent in college is to obtain vocational skill and earn a certificate or an Associate in Applied Science degree that is a pathway to a career field.

Course completion success: A measure of courses successfully completed by a student during the semester. The number of courses successfully completed with a grade of "C" or better is divided by the total number of courses in which the student is enrolled.

Cognitive measures: Standardized tests of cognitive ability in the areas of verbal and mathematical skills (Scholastic Assessment Test/American College Testing Assessment [SAT/ACT]) and sometimes records of achievement in specific subject matter areas to assess student potential.

Commuter student: A student who lives off campus and commutes to and from college.

Completion: Graduation with an Associate of Arts degree or an Associate in Applied Science degree.

Engagement: “The amount of physical and psychological energy the student devotes to the academic experience” (Astin, 1984, p. 297).

Grit: Passion and perseverance for achieving long-term goals (Duckworth & Quinn, 2009).

Involvement: The investment of students’ psychosocial and physical energy; the amount of energy invested varies from student to student. Involvement may be qualitative and/or quantitative (Astin, 1984).

Noncognitive measures: Variables relating to adjustment, motivation, and student perceptions rather than quantitative (often called cognitive) variables typically measured by standardized tests (Sedlacek, 1998a, 1998b, 2004).

Persistence: Continued enrollment (or degree completion) at any higher education institution – including one different from the institution of initial enrollment – in the fall semesters of a student’s first and second years. (National Student Clearinghouse Research Center, 2015).

Retention: Continued enrollment (or degree completion) within the same higher education institution in the fall semesters of a student’s first and second years (National Student Clearinghouse Research Center, 2015).

Stop out: Noncontinuous enrollment that is temporary (Grosset, 1993).

Traditional student: A student who enters college immediately after graduating from high school and who lives on campus with education being his/her main priority.

Transfer student: A community college student whose intent is to (1) obtain an Associate of Arts degree, (2) complete the first two years of college, and (3) transfer to a four-year college or university.

Summary of Chapter 1

Chapter 1 introduced the phenomenon under examination in this study. The topic of the study was positioned within relevant literature. The problem statement and significance of the study, research questions, and conceptual framework were presented. Terms and definitions that are used throughout the study were described.

Overview of Chapter 2

The next chapter provides an extensive literature review on factors that affect community college students' success and persistence in college. Specifically, the seminal theories of student development and their relation to community college student success and persistence are discussed. Applications of positive psychology by colleges and universities are described as a means to study student characteristics and their relationship to student success and persistence. Additionally, the personal characteristic of grit is explained, including how grit has been found to predict success and persistence in various contexts.

CHAPTER 2

LITERATURE REVIEW

This chapter begins by providing the context and related information of community colleges and their students. The history of student development theories is discussed as a precursor to establishing the need for this research. Specifically, the argument is made that research focused on positive psychology and the psychosocial individualistic traits of students is very relevant to the success and persistence of community college students. The construct of grit is examined and discussed in the context of student success and persistence. Finally, grit is differentiated from other psychosocial characteristics used to predict college student success and persistence.

Community college students are at high risk for dropping out of college, and within the first year of college, over 25% of full-time degree-seeking students will drop out before entering their second year (Crosta, 2013; Mertes & Hoover, 2014; Windham et al., 2014). Moreover, more community college students leave college after only one term than any other period of attendance (Crosta, 2013). Significant research exists in the areas of student success and persistence looking at both institutional roles and student characteristics; however, the majority of this research has pertained to traditional four-year colleges and universities (Wild & Ebbers, 2002). These studies have focused on the importance of student involvement, engagement, and integration into college as predictors of persistence and success (Astin, 1984; Tinto, 1975). Additionally, institutions often rely on measures of intelligence using

cognitive ability tests to predict the success of college students (Kuncel, Hezlett, & Ones, 2001). Colleges also use more holistic ways to predict success among college students, including high school GPA (a reflection of a student's work over time and not necessarily academic ability) and noncognitive personality characteristics (Duckworth & Yeager, 2015; Noonan, Sedlacek, & Veerasamy, 2005). These internal, noncognitive measures can provide information beyond test scores that are more relevant to community college students and may offer a glimpse into why some students succeed while others do not.

Tinto's theory of student departure highlights the importance of college students' interactions and level of involvement with faculty and peers both inside and outside the classroom. According to Tinto (1993), students' learning is directly related to their persistence and this learning occurs through interactions with faculty and peers. Students' level of interaction is based on their involvement with their institution and campus environment.

According to Astin (1984), student involvement is the amount of physical and psychological effort a student puts towards the academic experience. Astin's theory of student involvement notes the following key measures for student success and persistence: (1) investment of physical and psychosocial energy will occur along a continuum with different levels of investment occurring at different times, (2) it involves both quantitative and qualitative aspects, (3) student learning and personal development are directly related to the quality and quantity of the student's involvement, and (4) the effectiveness of any educational policy or practice is directly related to the capacity of the policy or practice to increase student involvement.

Both the theory of student departure (Tinto, 1975) and the theory of student involvement (Astin, 1984) identify the need for college students to have high levels of engagement and involvement with their faculty, peers, and institutions both inside and outside of the institution. Four-year colleges and universities that employ policies and practices aimed at meeting the goals of these models are typically focused on traditional, on-campus, full-time students. These students have the capacity to be fully involved in campus life both in and out of the classroom. Community colleges also work to engage students, offering opportunities to engage with student support services outside of class, including advising and tutoring. Community college student engagement with these services is correlated with success and persistence (Saenz, Hatch, Bukoski, Kim & Lee, 2011); however, participation is limited because students spend less time on campus compared to their four-year-college peers.

Community College Students

Community college students differ from traditional college students in many ways. Community college students are twice as likely to be from a low socioeconomic status and less likely to apply for financial aid compared to students at four-year universities. Community college students have less access to federally subsidized loans because many colleges have blocked students' ability to access these loans in order to reduce student debt. This dilemma creates problems for community college students who need access to money in order to pay tuition costs and many times causes them to work more hours at outside jobs (Handel & Williams, 2012). Additionally, community college students have a disproportionate amount of first-generation students enrolled compared to four-year

universities. Historically, these first-generation students have tended to be adults, women, ethnic minorities, and/or from working-class families (London, 1992). The population of community college students compared with four-year university students includes more low-socioeconomic status, first-generation, minority, and working students. These community college students are more likely to be ethnic minority and women than at four-year universities (Provasnik & Planty, 2008). Many of these factors put community college students at risk for not being academically prepared or financially able to complete their educational goals (D'Amico, Dika, Elling, Algozzine, & Ginn, 2014).

According to the 2015 American Association of Community Colleges fact sheet (Juszkiewicz, 2015), 12.4 million students are enrolled in community colleges across the country. Sixty percent of these students are enrolled in credit-bearing classes, whereas 40% are enrolled in noncredit classes (e.g., English as a Second Language classes and adult basic education). A majority (61%) of community college students enrolled in credit courses are attending college part time. Sixty-two percent of full-time students are employed at least part time, while 73% of part-time students are employed. The average age of the community college student is 28 years, and women make up 57% of the enrollment. Fifty percent of community college students are White, 21% Hispanic, 14% African American, 6% Asian/Pacific Islander, 1% Native American, 3% indicated three or more races, and 4% other/unknown. Thirty-six percent of community college students are first-generation students and 17% are single parents. Seventy-two percent of community college students apply for financial aid and 33% receive Pell Grants (Juszkiewicz, 2015). Almost half (46%) of all undergraduate students attend a community college (Juszkiewicz, 2015), and only 45%

of students who enter community college with a goal of completing a degree or certificate actually meet their goal (CCCSE, 2010). First-year attrition rates at community colleges have been a longstanding problem (Liao, Ferdenzi, & Edlin, 2012), as Terenzini and Pascarella (1991) concluded that community college students are less likely to persist compared to four-year college students.

Several traits/indicators of successful two-year and four-year college students have been identified (Reyna, Reindl, Witham, & Stanley, 2010). Students meeting these indicators are more likely to persist through college and to be successful while enrolled. These indicators include:

- completion of college-level math or English in the first semester
- completion of a college-level success course (a course that teaches academic study skills, time management, and personal and career goals for college students)
- completion of 20-30 credit hours in the first year
- full-time enrollment
- summer course completion
- continuous enrollment without stopouts
- registration on time
- adequate GPA while in college

Community college students are less likely than four-year college students to meet these indicators, since 61% of these students are attending college part time (Juszkiewicz, 2015). Furthermore, 43% of students at community colleges are not able to take college-level courses upon entering and must receive some type of remediation (Vandal, 2010). Much of

the existing research on community college students suggests that the majority of enrolled students are unlikely to persist and succeed (CCCSE, 2010; Terenzini & Pascarella, 1991). More than half of students enrolled at community colleges are employed, compared with only 37% of four-year college and university students (Goldrick-Rab, 2010). The need to work in addition to obtaining an education is a barrier for student success, affecting their ability not only to focus on coursework but also preventing them from full-time enrollment. Students who drop out prior to receiving a college credential, whether it is a certificate or a degree, are at risk for not re-enrolling and have decreased earning potential over their lifetime compared with students who earn a credential (Dadgar & Trimble, 2015).

Community colleges are open-access institutions offering opportunities to students who may lack college preparation. However, an issue connected to the practice of open access is that 61% of the students must take remedial courses before beginning college-level work (Goldrick-Rab, 2010).

Early research on the life stress of college students (Napoli & Wortman, 1998) has found that family pressures and obligations affect persistence at community colleges. These stressors may not have a direct impact on the student's GPA; however, they are likely to indirectly affect the student's class attendance and study time (Napoli & Wortman, 1998). These outside pressures can have significant effects on how students perform and persist at community colleges. Although only 45% of students complete their academic goals within six years of entering the community college (CCCSE, 2010), those who persist have overcome significant obstacles in the process.

In addition to community college students' differing life circumstances (commuter students, mostly employed outside college, and part-time status), additional factors have been found to be detrimental to the success of the community college student (Jenkins & Cho, 2013). Many community college students enter college without having a specific program of study. This lack of clear direction results in students taking courses that are not required for graduation, thus increasing time to completion and cost of college (Jenkins & Cho, 2013). University and four-year college students also enter college with a lack of clear direction; however, these students are often more prepared financially and have fewer outside pressures that prevent them from getting derailed (Goldrick-Rab, 2010).

Student Development Theories

Several student development theories have been developed over the past 40 years that pertain to student persistence and success. These studies have focused on sociological theories pertaining to the role of higher education institutions as well as the role of the college student in success and persistence. These student development theories are widely accepted among higher education institutions, and many of their recommendations and findings of what increases student success and persistence have been implemented at both four- and two-year institutions. Select theories are highlighted in the following paragraphs.

Astin's (1984, 1993) student involvement theory asserts that students must be engaged in their environments in order to learn and grow. Student learning and growth in this theory are directly related to the quality and quantity of students' involvement in their environment. Astin believed that successful college students are those involved in both academic and social

aspects of college life. According to this theory, students are more likely to be successful if they devote ample time to student organizations, on-campus activities, and meetings with faculty outside of class time. Astin's (1984) involvement theory also considered student motivation and the level of seriousness with which they participated academically and socially. This theory posits that student success is enhanced if students approach their college involvement with commitment and seriousness.

Similarly, Tinto's (1975, 1993) theory of student departure explains that students leave college when they are not able to adjust to their new environment, feel isolated, and/or lack the ability to integrate their new knowledge and information with previously learned knowledge and information. Tinto suggests that students need to be integrated both socially and academically into the institution in order for the student to be retained. Tinto noted that students come to college with differing needs and support systems. He recognized that students do not come from the same backgrounds and do not have the same life experiences; therefore, they have differing needs during their adjustment to college. Tinto argued that to retain students, colleges and universities must be intentional about creating opportunities for students to engage in the institution academically and socially, including social opportunities between students and faculty and student to student. According to Tinto (1993), when students do not feel connected, involved, or have significant interactions on campus, they are less likely to persist.

Pascarella and Chapman's (1983) research supported Tinto's social integration when looking at four-year residential students, finding that social integration has a direct relation to persistence for students. However, when looking at commuter students at both two- and four-

year colleges, the findings were very inconsistent. When looking specifically at community college and commuter students, neither social nor academic integration had significant effects on retention (Nora, 1987; Pascarella & Chapman, 1983). However, Fox (1986) found that academic integration did have a positive effect on community college student retention. Later research (Terenzini & Pascarella, 1991) found that social integration may have negative consequences for commuter students, while Napoli and Wortman (1998) found that social integration has a role in the term-to-term persistence due to the high withdraw and stop-out rates of community college students. As is evident from the contradictory research findings, research regarding student involvement and integration has not been conclusive.

In addition to academic and social integration, Tinto (1993) stressed the importance of students having institutional and goal commitment. Institutional commitment reflects the students' motivation to graduate from the specific institution they attend. Goal commitments reflect a student's motivation to earn a college degree. According to Napoli and Wortman (1998), students at both commuter and two-year colleges who demonstrate institutional and goal commitment are more likely to persist than students who are unsure or less committed to their goals and/or their institution. However, Terenzini and Pascarella (1991) found that community college students are less likely to persist than four-year college students due to having multiple demands from various communities, making it less likely for many students to form the necessary institutional commitments, according to Tinto's (1993) theory of student departure. Also, community college students with the intent to transfer to a four-year institution have less institutional and goal commitment for the specific community college institution and degree. These decreased commitments are because their goal is to graduate

from a four-year institution and receive a bachelor's degree and because they are less likely to be involved with the institution (Wild & Ebbers, 2002). These findings highlight two important factors regarding community college students and Tinto's student development theory. First, if community college students can form goal and institutional commitments, they are more likely to persist compared to students who do not form these commitments (Napoli & Wortman, 1998). Second, community colleges struggle to form these commitments within their institutions because students have demands from multiple sources rather than just their college (Terenzini & Pascarella, 1991).

The student development theories of Astin (1984) and Tinto (1975) are focused on four-year college students. These theories pertain to students who are recent high school graduates, reside on campus, and have degree completion as a top priority (Wild & Ebbers, 2002).

When community college students are similar to four-year students and maintain high levels of engagement and involvement, these theories of student departure and retention are relevant for them (Napoli & Wortman, 1998). However, community college students are different from four-year college students (Napoli & Wortman, 1998; Terenzini & Pascarella, 1991).

Students at community colleges have a harder time becoming involved and engaged at their institutions for various reasons, including the nature of a commuter school as well as obligations outside of college, e.g., work and families (Fike & Fike; 2008; Goldrick-Rab, 2010; Napoli & Wortman, 1998; Terenzini and Pascarella, 1991). Some community college students succeed and earn a degree and/or transfer to a four-year institution; thus, other factors beyond involvement and engagement may lead to the success of community college students.

Table 1 summarizes the seminal student development theories and their major ideas.

Table 1

Student Development Theories

Author	Theory	Major Ideas
Tinto (1975)	Theory of Student Departure	Students leave college when they are not able to adjust to their new environment, feel isolated and/or lack the ability to integrate their new knowledge and information with previously learned knowledge and information. Students need to be integrated socially and academically to persist at the school.
Pascarella & Chapman (1983)	Social Integration	Students at four-year residential schools who are socially integrated are more likely to be retained.
Astin (1984)	Student Involvement Theory	Students must be engaged in their environments in order to learn and grow. Quantity and quality of students' involvement in their environment will increase student success and persistence.
Tinto (1993)	Institutional and Goal Commitment	Stressed importance of students having institutional and goal commitment in order for students to be successful and to persist.
Fox (1996)	Academic Integration	Academic integration has positive effects on community college student persistence.
Napoli & Wortman (1998)	Institutional and Goal Commitment	Students who demonstrate institutional and goal commitment are more likely to persist.

Additional research specific to community college student success and persistence is needed to determine if there may be different and/or additional characteristics that would make a traditional community college student successful (Fike & Fike, 2008; Napoli & Wortman, 1998).

Cognitive Measures and Predictors of Student Success

Traditional measures and predictors of college student persistence and success include cognitive measures such as the American College Testing (ACT test), Scholastic Aptitude Test (SAT test), high school GPA, and class rank (Ishitani & Desjardins, 2002; Kahn & Nauta, 2001; Komarraju, Ramsey, & Rinella, 2013, Richardson, Abraham, & Bond, 2012). Standardized test scores have long been used by universities to make decisions regarding college admissions (Richardson et al., 2012) and have proven to be effective predictors of college performance (Kuncel et al., 2001). High school rank and standardized test scores have also been found to significantly predict students' first-year college success and persistence (Kahn & Nauta, 2001); however, high school GPA and standardized test scores account for only 25% of variance when predicting first-year college GPA (Robbins et al., 2004), leaving much of the variance in GPA unexplained. In addition to only accounting for one-quarter of the variance found in students' GPAs, questions have been raised about the socioeconomic and cultural biases of standardized tests used for college admissions (Robbins et al., 2006; Zwick, 2004). Unlike the ACT or SAT test scores, the high school GPA and class rank represent more than a student's cognitive ability. Noncognitive implications are associated with GPA and class rank, such as the student's work ethic and motivation through high

school. However, high school grades do not take into account differences in school expectations or grade inflation (Robbins et al., 2006). As a result of the concerns surrounding the standardized college admissions tests (Robbins et al., 2006; Zwick, 2004) and the inconsistent nature of these scores or high school GPA to predict success or persistence in college, additional measures for prediction of college success are needed (Robbins et al., 2004). Additionally, community colleges are open-access institutions, and although students' records often include high school transcripts, many students have not taken a standardized placement test (Goldrick-Rab, 2010) and, therefore, additional measures are needed to predict their college success (Fike & Fike, 2008; Napoli & Wortman, 1998).

Positive Psychology, Noncognitive Measures, and Predictors of Student Success

To address the limitations of traditional student development theories and cognitive measures in predicting community college success and persistence, applications of positive psychology and noncognitive measures need to be investigated (Thomas, Kuncel, & Credé, 2007). Noncognitive personality traits, when used as predictors of academic performance, reflect what an individual actually will do, compared with cognitive ability, which predicts what an individual can do (Furnham & Chamorro-Premuzic, 2004). According to Thomas et al., three goals have led to the interest in studying noncognitive predictors: increased minority admissions, improved prediction of student performance, and increased college retention of all students. Noncognitive measures are not designed to measure students'

academic ability but instead to measure students' personality traits and attitudes that may affect student retention and success in college.

Bean and Eaton (2001) developed a student attrition model that focused on student psychological factors instead of sociological factors in student success. In the attrition model, psychological factors (including locus of control and self-efficacy) along with student background characteristics have a significant role in the persistence and success of college students (Fike & Fike, 2008). Several noncognitive measures have been studied to help predict the success and persistence of college students (Bandura, 1977; Barrick & Mount, 1991; Chemers et al., 2001; Garza, Bain, & Kupczynski, 2014; Komarraju et al., 2009; Robbins et al., 2004; Torres & Solberg, 2001). According to Komarraju et al. (2009), "Academic success is strongly influenced by individual differences in motivation and achievement" (p. 47). Additionally,

improving the prediction of academic performance with standardized, noncognitive measures such as personality are desirable because such measures can complement commonly used predictors without sharing their limitations such as lack of compatibility (HSGPA), adverse impact for gender and race (SAT), and variability in how information is used. (Conard, 2006, p. 340)

Some of the most common noncognitive factors studied in relation to college student academic success and persistence include motivation, academic self-efficacy, and the Big Five personality traits (Chemers et al., 2001; Komarraju et al., 2009; Richardson et al., 2012; Robbins et al., 2004).

A predictive relationship exists between motivation and academic success, even when student background factors are considered (Eppler & Harju, 1997). Different from cognitive predictors of success that provide an understanding of students' cognitive abilities,

motivational studies lend insight into students' willingness to work hard, even if they may be less academically prepared (Eppler & Harju, 1997). Dweck (1986), along with Eccles and Wigfield (2002), looked at intrinsic motivation, the need to belong, and performance goals and their relationship to student success. These studies found relationships between student motivation and student success. Allen (1999) found that motivation was a predictor of persistence for minority students, but not performance. When looking specifically at academic motivation in both two- and four-year students, as measured by a student readiness inventory, it was found to be a predictor of academic performance over general motivational measures.

The Big Five personality traits have also been used to help identify student characteristics that can help predict success and persistence. The Big Five personality traits, also known as the five-factor model, is often used to understand personality and its link to performance (McCrae & Costa, 1987). The theory proposes five major dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism. Of these five traits, conscientiousness is most likely to be linked with performance (Barrick & Mount, 1991). Komarraju et al. (2009) found that academic success is strongly influenced by students' academic motivation and achievement. More specifically, the personality trait conscientiousness was found to be central to academic motivation and thought to be a trait that helps students to stay engaged. A meta-analysis found that the conscientiousness factor was consistently able to predict higher grades in students, while the neuroticism factor predicted worse satisfaction, and the traits of extraversion, openness, and agreeableness had little effect on a student's academic success (Trapmann, Hell, Hirn, & Schuler, 2007). Of the

Big Five personality traits, conscientiousness was most consistently linked with college student success (O’Conner & Paunonen, 2007) and has been positively associated with GPA. Although several studies have demonstrated associations between conscientiousness and achievement, a meta-analysis of these studies found wide variations in the strength of these relationships without a clear explanation for these variations (O’Conner & Paunonen, 2007). The lack of consistency among the findings of studies looking at the Big Five personality traits demonstrates the need for additional research into noncognitive factors that might predict success and/or retention.

Similar to conscientiousness, academic self-efficacy’s relationship to academic success and persistence in postsecondary students has been studied extensively. Bandura (1977) describes self-efficacy as a belief in one’s own ability to execute behaviors and control personal motivation and behavior. Bandura (1977) noted that people’s expectations of their self-efficacy will determine how likely they are to persist in activities that are perceived as difficult or threatening. Chemers et al. (2001) looked at self-efficacy in first-year university students. They found a strong relationship between self-efficacy of students and their college performance and ability to adjust to the college environment. Self-efficacy also was significantly and directly related to academic expectations and academic performance. Additionally, academic self-efficacy has been found to be strongly related to student grades, persistence, and the number of hours a student spends studying (Garza et al., 2014; Majer, 2009; Torres & Solberg, 2001). Torres and Solberg (2001) found that self-efficacy directly predicted social integration, persistence intentions, and stress in Latino students attending an urban commuter school. A significant positive relationship was also found between academic

self-efficacy and cumulative GPA in first-generation community college students (Majer, 2009). Researchers have also noted that self-efficacy is related to students' ability to use problem-solving and decision-making strategies, to plan and manage their resources more effectively, and to set higher goals. Students high in academic self-efficacy manage their learning environments more effectively as well as monitor their own efforts more effectively. These students have higher confidence in mastering academic subjects (Chemers et al., 2001). The majority of studies looking at self-efficacy in students have found that there is a relationship between academic self-efficacy and student success. Additional research is needed to determine what helps students develop high levels of academic self-efficacy and how students maintain academic self-efficacy.

Many noncognitive traits were examined in a meta-analysis in which Robbins et al. (2004) examined over 100 studies that measured these traits and college outcomes. They focused on nine constructs that fell under the educational retention models and motivational theories: achievement motivation, academic goals, institutional commitment, perceived social support, social involvement, academic self-efficacy, general self-concept, academics-related skills, and contextual influences. In support of the previous studies in this review, they found that several constructs can be used as predictors of college student success and persistence. These include achievement motivation, academic goals, and academic self-efficacy as predictors of academic performance. Academic goals, institutional commitment, social support, social involvement, academic self-efficacy, and academics-related skills were predictive of college students' persistence. These findings lend support to the importance of using noncognitive measures when looking to predict college student success; however,

additional research is needed to help researchers predict the success of college students in a more standardized way. The previous research showed positive relationships with noncognitive measures and their ability to predict academic success and persistence; however, the findings varied over different populations of students such as first-generation and minority college students. Many of the studies also were limited to students attending traditional four-year colleges and universities. Community colleges have large populations of minority and first-generation students, and much of this research does not address these populations.

Grit as a Predictor of Student Success

Grit is a noncognitive personal characteristic that has been shown to predict persistence in individuals through various tasks (Duckworth et al., 2007; Duckworth & Quinn, 2009). Duckworth et al. (2007) define grit as a passion for and persistence toward long-term goals. The notion of grit is related to conscientiousness, self-efficacy, and motivation, but it also extends to the need for passion and persistence over the long term. “Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress” (Duckworth et al., 2007, p. 1088). Unlike conscientiousness – one of the Big Five personality traits that puts the emphasis on being careful, reliable, and organized – grit, according to Duckworth and Quinn (2009), emphasizes long-term goals and the pursuit of tasks resilience and drive over a number of years, even without the need for positive feedback. While conscientiousness as a character trait consists of self-control traits, a person who has high grit levels will maintain stamina over time (Duckworth et al., 2007). Grit has been studied in several areas and found to be a stronger

predictor of persistence and completion than motivation, self-efficacy, and conscientiousness when looking at retention and persistence in high-school settings, university settings, and military training; however, studies are needed that examine grit in the context of community college student success and persistence.

The grit scale, a self-report questionnaire to measure grit, was developed by Duckworth et al. (2007). Duckworth et al. (2007) predicted that grit would be associated with the Big Five personality traits of conscientiousness and self-control; however, they found that grit emphasized more long-term traits such as effort and interest over time compared with conscientiousness and self-control. Thus, these findings showed that grit is able to predict accomplishments beyond the constructs of Big Five conscientiousness and self-control. Duckworth et al. (2007) conducted six studies looking at the predictive validity of scores obtained from the grit scale. In their first study, the purpose was to develop and provide validity evidence for a self-report measure of grit in adults. The findings showed that adults who were more educated had higher levels of grit and, when education level was controlled, levels of grit increased with age.

In their second study, Duckworth et al. (2007) looked at two questions. First, can grit provide incremental predictive validity over the Big Five personality traits, and second, do grittier individuals, those who scored higher on the grit scale, make fewer career changes compared with peers who scored lower on the grit scale? They found that of the Big Five traits, grit was most closely related to conscientiousness. Conscientiousness is a trait that involves self-control and goal-related behavior (Ivcevic & Brackett, 2014). Grit also was

linked to lifetime career changes. Individuals who had higher grit scores were 35% less likely than their peers with lower grit scores to be frequent career changers.

Across six studies, individual differences in grit accounted for significant incremental variance in success outcomes over and beyond that explained by IQ, to which it was not positively related...It was also determined that grit accounted for more variance in outcomes than commonly observed for Big Five Conscientiousness. (Duckworth et al., 2007, p. 1098)

In their third study, Duckworth et al. (2007) assessed whether grit scores were associated with cumulative GPA of undergraduate students at an elite university. They found that students who scored higher on the grit scale had a higher cumulative GPA than their peers with lower grit scores. They also found an inverse relationship between students' SAT scores and their grit levels. Students with higher SAT scores were less gritty. Duckworth et al. (2007) explained that "among elite undergraduates, smarter students might be less gritty than their peers" (p. 1093). Similarly, research looking at self-efficacy and college student success found that those who scored higher on self-efficacy were not likely to perform better than those with lower levels. In a separate study by the same authors, a negative relationship was found between self-efficacy and performance that was attributed to the overconfidence of those with high self-efficacy (Vancouver, Thompson, Tischner, & Putka, 2002).

In the fourth study, Duckworth et al. (2007) examined grit as a predictor of retention of first-year cadets at West Point over the first summer and then as a predictor of the GPA of the cadets who were retained one year later. In this study, grit was a predictor of the completion of the summer training program. Cadets who had higher grit scores were 60% more likely to complete their summer training course; in addition, grit predicted first-year GPA.

The fifth study replicated study four and again found that grit was better at predicting retention than conscientiousness. In the final study, Duckworth et al. (2007) conducted a longitudinal investigation involving the finalists from the 2005 Scripps National Spelling Bee. In this study, the researchers hypothesized that grit would mediate the number of hours the contestants spent studying for the final competition and performance at the spelling bee. Duckworth et al. (2007) found that grittier children performed better than their less gritty peers, and children who scored higher on the grit scale were more likely to work harder and study longer. In a later study, a short grit scale (Grit-S) was developed and validity evidence provided by Duckworth and Quinn (2009). This eight-item grit scale was found to be a more efficient measure of grit (Duckworth & Quinn, 2009).

Strayhorn (2013) researched the predictive ability of grit for academic success in African American male students at a predominant White university. Using the Grit-S scale, Strayhorn (2013) found that grit scores in African American male college students were predictors of academic success. Specifically, African American male students who scored higher on the Grit-S were more likely to perform better in college as reflected by their college grades than their lower grit peers. This finding emerged even when controlling for differences in age, year in school, transfer status, engagement activities, degree aspirations, and prior achievement. This finding is consistent with previous research that examined the predictive validity of grit (Duckworth et al., 2007; Duckworth & Quinn, 2009).

Kelly, Matthews, and Bartone (2014) measured the predictive ability of grit and hardiness for West Point cadets through their four years at the academy. Grit was measured using the Grit-O scale (Duckworth et al., 2007). Hardiness was defined as a pattern of

attitudes or skills that provide courage and motivation in stressful circumstances. In this study, grit was found to be a predictor of retention; cadets who had higher grit scores were more likely to complete the four years at the academy. Higher grit scores could predict retention; however, grit's capacity to predict academic performance was not strong after the first and most strenuous year for the cadets. Grittier cadets were not necessarily better students than their less gritty peers at the end of their first year.

Akos and Kretchmar (2017) looked at how grit scores, using the Grit-S scale, predicted end-of-semester grade point average, hours earned towards graduation, and how likely students were to stay in their declared major or to change majors. First-year, White, female students were the majority of the participants at the host university. The results of the study found that grit scores of participants were predictors of students' grade point averages, and students with higher grit scores were less likely to change majors than students with lower grit scores.

Grit has been examined in several contexts outside of higher education. Rojas, Reser, Usher, and Toland (2012) examined grit in children grades four through eight and found that grit was positively correlated with self-efficacy and self-regulation. The study also found that boys had higher levels of grit than girls. Grit also has been found to predict college students' role of purpose or having a purpose in life as well as their positive affect (Hill, Burrow, & Bronk, 2014). Hill et al.'s (2014) study supported the premise that grit has predictive validity over the Big Five traits (Duckworth et al., 2007; Duckworth & Quinn, 2009) and that students who had higher levels of grit were more likely to have a positive outlook on life and were therefore better able to achieve their long-term aims. Datu, Valdez, and King (2016) looked at

the predictive validity of grit in a collectivist culture (the Philippines) and found that cross-cultural differences influence grit. Specifically, in the Philippines they found the perseverance of effort was more important to predicting academic engagement than was the dimension of consistency of interests.

Although many of the recent studies looking at grit have found it to be predictive of success and retention, some studies produced counterfindings. Bazelais, Lemay, and Doleck (2016) studied grit as a predictor of academic success for pre-university students in Montreal. Using the original 12-item scale (Grit-O; Duckworth et al., 2007), Bazelais et al. (2016) found that grit was not a predictor of academic success among the students in the pre-university college-level physics program. The research found that grit levels increase with age, and that the age of the participants in their study may have affected the predictive validity of grit. Additionally, the participants in this study were enrolled in a highly selective program; thus, the students in the program may have been selected for their high levels of motivation and self-regulation, therefore mitigating the effect that grit may have played. This assertion would be consistent with the findings of Duckworth et al. (2007) that high-performing students at an elite university were less gritty than their lower performing peers.

Ivcevic and Brackett (2014) found that when studying the predictive validity of grit compared to the Big Five traits, there was no evidence to suggest that grit predicts school success over conscientiousness. However, the study was limited by its participants, who were from a small private high school with a majority of the White students coming from middle-class families.

Synopsis of Grit Literature

The construct of grit is relatively new (Duckworth et al., 2007), and research looking at the predictive capacity of grit must continue over several contexts before researchers will truly be able to generalize the findings of recent studies. In several studies, grit has been shown to be a predictive measure of success in various contexts, including high-stress military courses, elite universities, spelling bee competitions, and at-risk high schools (Duckworth et al., 2007; Duckworth & Quinn, 2009, Strayhorn, 2013). In these studies, a person who has grit can be described as someone who can persevere through hardships and other factors that might cause a less gritty person to give up (Duckworth et al., 2007; Duckworth & Quinn, 2009). Studies also have found that grit does not play a significant role in predicting the success of students (Bazelais et al., 2016; Chang, 2014) or in predicting success over other traits (Ivcevic & Brackett, 2014), and research on grit also has determined that higher achieving students tend to be less gritty than their lower achieving peers (Duckworth, et al., 2007).

Grit may be portrayed as a predictor of high achievement by inclining individuals to show up, work very hard, and continuously move toward a highly valued goal for years and even decades (Duckworth & Gross, 2014). These qualities are important for any college student, but especially for college students who must overcome significant barriers during their educational journey. In the broad area of grit research, research has examined the predictive validity of grit in elementary school children (Rojas et al., 2012), high school students (Bazelais et al., 2016; Ivcevic & Brackett, 2014), undergraduate university students (Duckworth et al., 2007; Strayhorn, 2013), and doctoral students (Cross, 2014). However,

research is lacking that focuses on grit and community college students. Studies are needed that address whether or not a student's level of grit can help predict persistence and success in community colleges.

Distinguishing the construct of grit from constructs such as conscientiousness, resilience, tenacity, determination, persistence, industriousness, and need for achievement has not been clearly established in the grit literature. According to Credé, Tynan, and Harms (2016), there has been almost no empirical investigation of the discriminant validity of grit. In fact, in many studies looking at grit, high correlations have been found between grit and conscientiousness (Ivcevic & Brackett, 2014; Reed, Pritschet, & Cutton, 2013). Additionally, there is a lack of evidence that grit research offers new findings compared to the literature and research that has been done looking at resilience, persistence, or need for achievement (DeFruyt, Van de Wiele, & Van Heeringen, 2000; Martin & Marsh, 2008; McClelland, 1985). Furthermore, the differences and similarities of resilience and conscientiousness traits within the grit literature merit attention.

Resilience is commonly viewed as a process that refers to exposure to adversity and positive adaptation (Luthar, Cicchetti, & Becker, 2000). Resilience also has been defined as the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances (Martin & Marsh, 2008). According to Masten (2001), "Resilience refers to a class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development" (p. 228). Resilience has typically been characterized in terms of "acute" and "chronic" adversities that are seen as "major assaults" on the developmental processes. This research commonly pertains to ethnic groups situated in adverse conditions

and situations, chronic underachievers, and the interaction of ethnicity and underachievement. Other research focuses on the issue of resilience in the academic setting for students with learning disabilities. Martin and Marsh (2008) suggest that the traditional resilience concept does not address the many individuals who are faced with setbacks, challenges, and pressures that are part of the ordinary course of life. Instead, they propose that an alternative construct, academic buoyancy, may be the positive psychology version of resilience.

Academic resilience is defined as the ability to succeed in the academic environment despite challenging life circumstances and risk factors (Martin & Marsh, 2008). In the studies conducted by Martin and Marsh (2008), the construct of academic buoyancy is differentiated from the construct of resilience. Resilience is characterized in terms of both acute and chronic adversities such as anxiety, depression, or ethnic minority group hardships, whereas academic buoyancy accounts for milder, everyday challenges students face. Many possible low-level stressors are present in a college environment, such as evaluative stress, test anxiety, social stress, adjustment to living on one's own, and balance of work and social responsibilities that could have an effect on a student's academic success. Academic buoyancy is more relevant for the whole population of students and broader groups of students. This construct is important in relation to resilience and grit. Although studying students' academic resilience is important, it is limited to smaller populations of students who are facing high levels of adversity. Constructs such as academic buoyancy and grit can provide opportunities to determine how lower levels of adversity can affect students' ability to succeed academically.

Yeager and Dweck (2012) looked at implicit theories of students to determine how students would react when faced with challenging work. According to their research, implicit theories are core assumptions about the malleability of personal qualities. They are referred to as implicit because they are not made explicit, and they are theories because they help to create a framework or schema from which students may make predictions and judgments. Students can have two types of implicit theories: (1) entity theory or (2) a more fixed theory of intelligence or incremental theory that is a more malleable theory of intelligence. Depending on a student's type of implicit theory, the judgments and actions they take when faced with academic challenges can lead to resilience or vulnerability. Similar to the research discussed earlier on self-efficacy, students' implicit theories can have effects on their own resilience. According to this research, there is a focus on increasing rigor in curricula and instruction through educational reform, but the focus needs to be on helping students build resilience in the face of challenge (Yeager & Dweck, 2012). Just as self-efficacy has been found to affect students' persistence and success (Chemers et al., 2001), implicit theory can affect resilience.

Although resilience and academic buoyancy have been found to be characteristics that can help children and adults who face adversity to persevere (Khanlou & Wray, 2014; Martin & Marsh, 2008), resilience is a very different characteristic than grit. According to Duckworth (in Perkins-Gough, 2013), "Grit is related because part of what it means to be gritty is to be resilient in the face of failure or adversity. But that's not the only trait you need to be gritty" (p. 1). The grit scale asks questions that are related to resiliency and adversity

but also asks questions about having consistency over prolonged time spans. The questions regarding consistency are not related to failure or adversity.

Like resilience, the construct of grit also has been found to be similar to the characteristic of conscientiousness. Conscientiousness is one of the Big Five personality traits and can be described as the trait that involves self-control and goal-related behavior (Ivcevic & Brackett, 2014) and includes lower level traits such as self-control and perseverance (MacCann, Duckworth, & Roberts, 2009). Because grit is defined as a personality trait that includes persistence and passion for long-term goals (Duckworth et al., 2007), it is closely related to conscientiousness (Ivcevic & Brackett, 2014). As noted earlier, Duckworth et al. (2007) predicted that grit would be associated with Big Five conscientiousness and self-control; however, they found that grit emphasized more long-term traits such as effort and interest over time compared with conscientiousness and self-control. According to Duckworth et al. (2007), although the traits are similar, measuring grit is a more accurate predictor of success and persistence than conscientiousness or self-control.

A meta-analytic synthesis of the grit literature by Credé et al. (2016) examined grit as a predictor of success and performance. The study included 88 samples and 584 effect sizes from current studies examining grit, its predictive ability, and its differentiation from other personal characteristics known to predict success and performance. The researchers noted that although some studies support the findings of Duckworth et al. (2007) that grit is strongly related to success, they explained that several studies have failed to find a strong relationship between grit and success, including those by Chang (2014), Cross (2014), and Davidson (2014). The meta-analysis found a modest relationship between grit and academic

performance ($r = .18$) and overall GPA ($r = .17$). Additionally, the relations between grit and demographic variables including gender, ethnicity, and age were weak. The study concluded that "...grit predicts retention approximately as well as many more traditional predictors of retention such as cognitive ability and high school grades – although not as well as some other noncognitive predictors" (Credé et al., 2016, p.11). A summary of research related to noncognitive measures of student success and their comparison with the noncognitive characteristic of grit is provided in Table 2.

According to Duckworth and Gross (2014), grit research is still in its infancy and more research is needed to understand the underlying psychological mechanisms of the construct. Many areas of research examine passion for long-term goals, but grit is specific to educational attainment and professional success (Duckworth & Gross, 2014). In addition to the limited scope of grit (educational attainment and professional success), Duckworth and Yeager (2015) emphasized the importance of seeking out the most valid measure for the intended purpose and using multiple measures to improve the reliability and validity of the measure. Duckworth and Yeager (2015) warned against using grit as a measure in high-stakes testing for several reasons, including possible self-reporting errors. For example, when a student is applying to college or taking placement tests, the grit survey would not be appropriate because these are high-stakes tests and can alter a person's ability to answer a self-reporting questionnaire.

Forty-two percent of all undergraduate college students enroll in community colleges. With so many college students beginning or returning to community colleges, it is critical to help these students succeed (Ma & Baum, 2016). Commonly, community college students

Table 2

How Grit Compares with Other Noncognitive Measures

Noncognitive Measure	Author/s	Major Ideas	Compare/Contrast with Grit
Motivation	Eppler & Harju, 1997; Dweck, 1986; Eccles & Wigfield, 2002	Motivational studies lend insight into students' willingness to work hard, even if they may be less academically prepared. Intrinsic motivation in students is related to student success.	Like grit, motivation studies look at students' willingness to work hard. However, the construct of motivation does not take into account the longevity of the motivation.
Academic Self-Efficacy	Bandura, 1977; Chemmers, Ju, & Garcia, 2001; Garza, Bain, & Kupezynski, 2014; Majer, 2009; Torres & Solberg, 2001	Students who have high levels of academic self-efficacy (the belief that they are capable of performing well academically) are more likely to have higher confidence. High levels of academic self-efficacy are linked with academic success	Grit focuses on a passion and perseverance for goals over a long time frame and it does not directly have measures that look at self-efficacy.
The Big-Five Personality Traits: Conscientiousness	Komarraju, Karau, & Schmeck, 2009; Trapmann, Hell, Hirn, & Schuler, 2007; O'Connor & Paunonen, 2007	Personality traits can help explain students' academic motivation and achievement. Conscientiousness is linked with students' academic motivation and higher grades.	Conscientiousness highly correlates with the construct of grit. Students who demonstrate conscientiousness show self-control and perseverance. What separates grit is that grit emphasizes more long term traits such as effort and interest over time compared with conscientiousness.
Resilience/ Academic Resilience or Academic Buoyancy	Luthar et al., (2000); Martin & Marsh (2008); Masten (2001); Khanlou & Wray (2014)	Resilience looks at a person's capacity to overcome or successfully adapt despite challenging or threatening circumstances. Academic resilience or academic buoyancy is the ability to succeed academically despite challenging life circumstances and risk factors.	Like grit, resilience is important for success; however, while resilience is focused only on overcoming challenging circumstances, the grit survey asks questions that are related to resiliency and adversity, but also asks questions about having consistency over long periods of time.

struggle to succeed and often do not persist to a second semester or a second year (Goldrick-Rab, 2010; Windham et al., 2014). Many factors contribute to the high drop-out and stop-out rates of community college students, including work and family responsibilities (Windham et al., 2014). Community college students often do not persist from term-to-term and sometimes drop out within a single term (Crosta, 2013; Schneider & Yin, 2011).

Community colleges are searching for new ways to assess students' readiness for college and are seeking effective predictors for success (Balog & Search, 2006; Levin et al., 2010; McClenney, 2006). For example, many colleges are using noncognitive characteristics as well as traditional predictors for success (Dweck, 1999, 2007; Robbins et al., 2004). Community colleges do not use these predictors during high-stakes situations such as the admissions process because they are open-access institutions where admission is not based on placement scores. Instead, these tests help to predict students' need for support services in order to help them meet their educational goals (Goldrick-Rab, 2010; Levin et al., 2010).

The purpose of this research is not to determine if grit is better than conscientiousness, resilience, or other traits at predicting academic success and persistence, but rather to determine if it can predict success and/or persistence of community college students. If using the grit scale can help to predict community colleges students' end-of-term grade point average, the number of classes they successfully complete, and/or if community college students will re-enroll the following semesters, it will be an additional tool for community college educators to employ to help students reach their educational goals. Given that the grit scale is short and easy to administer for both faculty and staff, it may provide access to information that was otherwise difficult to obtain.

Summary of Chapter 2

This chapter outlined existing research in relation to college student success and persistence. Much of the seminal research regarding student success and persistence has been focused on the more traditional college students, just out of high school, and attending four-year universities and colleges and living on campus. These studies highlight the importance of student engagement, involvement, and institutional commitment when predicting a student's college success and persistence. Other research studies focusing on student success and persistence have looked at noncognitive, personal characteristics of students as predictors. These studies, though mostly focused on the more traditional college student, highlight traits within the students such as conscientiousness and academic self-efficacy as driving forces for success and persistence. The recent research on grit and the focus of this study were highlighted and summarized in this chapter as they relate to student success and persistence in college.

Overview of Chapter 3

The following chapter describes the procedures used to conduct this study. It includes a detailed description of the research questions, hypotheses, participants, and research methods.

CHAPTER 3

METHODS

The purpose of this study was to investigate the construct of grit and its capacity to predict academic success as measured by persistence of community college students enrolled in college-level courses, student completion of courses within the Fall 2016 semester, and by student course grades.

To assess the constructs used in this study, students were administered the Short Grit Scale Survey (Grit-S; Duckworth & Quinn, 2009) during class time. This effective method of collecting data is referred to as a group-administered questionnaire (Trochim & Donnelly, 2008). Survey questionnaires are useful data collection tools for gathering large amounts of information from a sample (Ciccerelli & White, 2014).

Research Questions

The following research questions guided the study:

1. To what extent does grit predict the end-of-semester GPA of community college students?
2. To what extent does grit predict success in course completion among community college students?
3. To what extent does grit predict the semester-to-semester persistence of community college students?

Hypotheses

To address the research questions, the following hypotheses were proposed:

1. Grit positively predicts end-of-semester GPA for community college students.
2. Grit positively predicts successful course completion for community college students.
3. Grit positively predicts semester-to-semester persistence for community college students.

Target Population

The target population for this study consisted of community college students with varying ages, racial/ethnic backgrounds, and levels of academic preparedness who were enrolled in general survey courses offered to freshman and sophomore undergraduate students.

Sample

The participants in the study were enrolled in a large urban community college located in north suburban Chicagoland. This institution has an annual unduplicated enrollment of over 20,000 students in college-credit classes and offers associate degrees as well as certificates. According to the institution's 2014 Fact Book, 55% of students were female while 45% were male. Fifty-six percent of the students were Caucasian, and the majority of students were between the ages of 19 and 24. The majority of students at this institution

received Pell Grants, took out loans, and/or received some type of other grant or scholarship. This institution had a 21% graduation rate and a 29% transfer rate.

The sample for this study included students taking introductory college courses in the Business and Social Science Division of the community college. The survey courses included classes from several disciplines including accounting, business, early childhood education, economics, education, geography, history, political science, sociology, and psychology.

Data Collection

Data for this study were obtained through two methods. The first method used data collected at the time that the students applied for admission to the institution. These data are stored in the institutional data warehouse. These data include demographic information about the students including age, gender, race/ethnicity, and intent at college. Intent at college encompassed the following: whether or not a student planned to take courses for personal enrichment, to earn a certificate, to enroll in a career-related Associate in Applied Science degree, or to take classes or earn an Associate of Arts degree in order to transfer to a university. Additionally, the data included pre-enrollment information such as high school GPA, current cumulative GPA at the institution, enrollment status (full or part time), as well as information regarding students' enrollment in development coursework (courses that students needed to remediate to college level).

The second method of data collection involved administering grit scales to students enrolled in the introductory-level business and social sciences courses. The grit scales were coded with the student's name, student identification number, and course enrollment

information. The grit scales were completed during class time; once collected, their data were entered into a spreadsheet and they were later matched to the demographic data contained in the data warehouse. The survey procedures included informed consent (Appendix A), assuring students of minimal risk and confidentiality. All participants were administered the Grit-S, an eight-item grit scale created by Duckworth and Quinn (2009).

The wording of the Grit-S scale was not changed from its original version (Appendix B; Duckworth & Quinn, 2009). The Grit-S scale was developed as a more efficient measure of trait-level perseverance and passion for long-term goals than the original grit scale that had 12 items, and validity evidence for the scale was obtained.

During the validation, confirmatory factor analyses supported a two-factor structure of the self-report version of Grit-S in which Consistency of Interest and Perseverance of Effort both loaded on grit as a second-order latent factor. Both factors showed adequate internal consistency and were strongly inter-correlated, $r = .59, p < .001$. (Duckworth & Quinn, 2009, p. 172)

Duckworth and Quinn (2009) found further evidence in their research that “individuals may need both Perseverance of Effort and Consistency of Interest to succeed in the most demanding domains” (p. 172). The total Grit-S score was a better predictor than either factor alone, and therefore grit can be conceptualized as a compound trait and can be reported as the total score.

Participants were given the following directions for taking the grit scale: Please respond to the following eight items. Be honest – there are no right or wrong answers! (Duckworth & Quinn, 2009). Each of the eight items is associated with a set of ordinal response options, ranging from 1 to 5, with 5 being the maximum score and 1 being the lowest score. The response options included: *Very much like me, Mostly like me, Somewhat*

like me, *Not much like me*, and *Not like me at all*. The grit scales were scored by adding up the item scores and dividing by 8. The maximum score on this scale is 5 (extremely gritty) and the lowest score on this scale is 1 (not at all gritty). Items 2, 4, 7 and 8 were assigned the following point values for scoring the instrument: 5 = Very Much Like Me, 4 = Mostly Like Me, 3 = Somewhat Like Me, 2 = Not Much Like Me, and 1 = Not Like Me at All. Items 1, 3, 5 and 6 were assigned the following point values: 1 = Very Much Like Me, 2 = Mostly Like Me, 3 = Somewhat Like Me, 4 = Not Much Like Me, and 5 = Not Like Me at All. After the items on the scale were reverse scored, they were totaled and divided by 8 to give the final grit score for each participant. Only grit scales that were fully completed were analyzed and included in the final data set.

Variables

Dependent Variables

Academic success was measured by considering whether a student successfully completed all the courses they attempted in the Fall 2016 semester, end-of-semester student GPA, and term-to-term persistence (the three dependent variables of this study). Students who earned a grade of C or better in the course were considered successful. Students who earned a grade of D, F, Incomplete, or W were considered unsuccessful. End-of-semester GPA was a noncumulative GPA for the specific term of the study and was measured on a 4.0 scale. Academic persistence was measured by tracking students' enrollment into the following term. Term-to-term persistence rather than year-to-year persistence is a more meaningful measure when studying community college students (Napoli & Wortman, 1998).

If participants in the study enrolled in classes at the same institution for the following term (as of tenth-day enrollment), they were considered to have persisted at the institution. If the participants were not enrolled in classes at the tenth day of the following semester and they had not graduated from the institution, they were considered to have dropped out or stopped out of the institution.

Independent Variables

The independent variable examined in this study was grit score measured by the Grit-S scale. The Grit-S scale was developed by Duckworth and Quinn (2009) from the original longer, two-dimensional Grit-O scale. The Grit-S scale was developed using four fewer items than the Grit-O and reflects a two-factor model to predict passion and perseverance by assessing two subscales: Consistency of Interest and Perseverance of Effort. The whole grit score is reported since the pattern of findings in studies during the development and validation of the Grit-S supported the conceptualization of grit as a compound trait and because there was superior predictive validity of the whole scale compared to either subscale. The reliability of scores from the scale in this study was assessed using Cronbach's alpha. The grit scale was found to produced reliable scores (alpha = .76, 8 items).

Attribute Variables

Student background and demographic characteristics included age, race/ethnicity, gender, full-time or part-time student status, high school GPA scores, ACT test scores, and education goals (students seeking an Associate of Arts degree to transfer to a four-year

college or university or students who were seeking a certificate or Associate in Applied Science degree to pursue career goals). These characteristics were analyzed in relation to students' percent of successfully completed courses at the end of the term, persistence to the next semester indicated by enrollment in at least one class in Spring 2017, end-of-semester GPA (noncumulative, Fall 2016 only), and grit score measured using the Grit-S scale (Duckworth & Quinn, 2009).

Human Subjects

Human subjects approval was obtained through the Office of Research, Compliance, Integrity, and Safety, Division of Research and Innovation Partnerships, at Northern Illinois University. No known harm was done to any student regardless of the student's outcome on the Grit-S scale. Students were asked to complete the grit scale and told that the results would be used in a doctoral study related to community college students. Students also were informed that institutional data including grades and demographic information would be obtained for the study.

Data Analysis

The survey data were collected and merged with the student demographic and background data from the community college's data warehouse, and the data were entered into SPSS for analysis. Bivariate correlations analyzing the relationship between student grit with current semester GPA and course success were used in initial analyses. Multiple

regression and logistic regression analyses were carried out to determine if grit was able to predict end-of-semester GPA, end-of-semester successful course completion, and persistence of community college students from fall to spring semester, controlling for student demographic and background characteristics.

Summary of Chapter 3

This quantitative study took place at a large suburban community college. Participants in the study were current students at the community college enrolled in undergraduate courses in the Business and Social Sciences Division of the college. All students signed an informed consent form and completed the Grit-S instrument and agreed to allow the researcher access to their institutional data that were then merged with their Grit-S results. Data were entered into a statistical software package and analyzed using bivariate correlations, multiple linear regression, and a binary logistic regression.

Overview of Chapter 4

The following chapter presents results of the study. The results include the number of Grit-S scales returned and characteristics of the study participants. Data analyses examined the relationship of students' grit levels to their success measured by course completion and end-of-semester grade point average as well as persistence measured by their enrollment status upon the following semester.

CHAPTER 4

RESULTS

This chapter reports the analyses of data gathered from 1,338 students enrolled in a large suburban community college during the Fall 2016 semester. The data were gathered through the administration of the grit scale in college classes and merged with institutional data collected from students during the college application process. The results were analyzed using SPSS statistical software. Analyses were conducted to answer the three research questions and hypotheses using multiple statistical analysis, including bivariate correlations, linear multiple regression, and logistic multiple regressions.

Participant Selection

An email was sent to all faculty teaching in the Business and Social Science Division at the community college asking for their participation in this research (Appendix C). Faculty who agreed to participate were given the Grit-S survey instruments printed out using Class Climate survey software. Survey instruments were prepared for each student registered in the respective faculty member's course, and each survey instrument was printed with student name and school identification number pre-printed for accuracy. Faculty also were given an informed consent participation form that all participants were asked to read and sign before completing the survey instrument. Instructors were given a script to read to the students that informed students that this survey was part of a dissertation research project and their

participation was voluntary. Students were asked to complete the instrument within 15 minutes of class time. No credit or compensation was awarded to students who agreed to participate in the study.

A total of 2,577 survey instruments were generated and distributed to participating faculty. Of this total, 1,338 survey instruments were returned. Faculty described various reasons for lack of participation by some classes. For example, faculty reported that they ran out of class time, had a nontraditional class that was taught online, or, in one case, the entire class of students declined to participate. Of the 1,338 survey instruments completed, 128 were eliminated from the final data set because of incomplete responses. Of the 1,210 students who completed the instrument, 1,188 of those students reported that their intent in college was to complete a degree or certificate with the intention of transferring to a four-year college or university or to gain experience for their career. Twenty-two of the students reported attending college to take adult education courses or for personal interest, and these students were not included in the data analysis. Final results of the study included a total of 1,188 completed survey instruments. Of the 1,188 participants who completed the instrument and who reported they intended to earn a degree or a certificate while in college, 791 students reported both ACT scores and high school GPA scores. The final analyses in this study included these 791 students.

Participants

The sample consisted of 791 students who were enrolled in a large urban community college during Fall 2016 semester. The participants were 341 males (34%), and 450 females

(59%). All participants were enrolled in at least one college-level undergraduate course offered in the area of business or the social sciences. The participants ranged in age from 18 years to 50 years with a mean age of 20 years. The majority of the participants were White (448, 57%), 201 (25%) were Hispanic, 27 (3.4%) were African American, and 115 (14%) were categorized as Other. The race/ethnicity group Other consisted of American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, and unknown. Table 3 summarizes the personal and student characteristics of the study participants and Table 4 summarizes participant descriptive statistics.

Participant Characteristics

The majority of the participants, 72% (572), in the sample were attending college full time (enrolled in 12 or more credit hours in the Fall 2016 semester) while 28% (219) were enrolled part time. Upon entrance into college, students reported their intent to transfer to a four-year university or to prepare for a career or improve their current job skills. Students were categorized into two groups: transfer students and career students. The majority of participants (696, or 88%) indicated they were transfer students, while 95 (12%) indicated they were career students. Two hundred five (26%) of the participants had enrolled in at least one developmental course during or prior to the Fall 2016 semester to prepare them for college-level coursework, and for 168 (21%) of the participants, the current semester was their first time enrolled in college. Participants had a mean end-of-semester GPA of 2.85 and a mean course completion rate (successfully completed all courses enrolled in) of 60% for the semester. A majority of the students (684 or 86.5%) were retained to the next semester while

Table 3

Personal/Student Characteristics of Study Participants

Characteristic		Frequency	Percent
Gender	Male	341	43.10
	Female	450	56.90
	Total	791	100
Race/Ethnicity	White/Caucasian	448	56.60
	Hispanic/Latino/Latina	201	25.40
	Black/African American	27	3.40
	Other	115	14.50
	Total	791	100
Age	18-24	757	95.70
	25-30	28	3.50
	31-36	4	0.50
	Over 36	2	0.30
	Total	791	100
Student Enrollment Status	Full-time	572	72.30
	Part-time	219	27.70
	Total	791	100
Student Intent	Transfer: Earn a degree to transfer to a four-year college or university	696	88.00
	Career: Earn a certificate or degree towards a career	95	12.00
Developmental Course work	Student has not taken and developmental coursework	586	74.10
	Student is or has been enrolled in developmental coursework	205	25.90
	Total	791	100

Table 4

Additional Personal/Student Characteristics of Study Participants

	N	Minimum	Maximum	Mean	Std. Deviation
Student Age	791	18.00	50.00	19.96	2.45
High School GPA	791	1.45	5.00	3.36	0.76
ACT Test Score	791	12.00	34.00	21.06	4.02
End-of-Semester GPA	791	0.00	4.00	2.85	0.92
Grit Score	791	1.38	5.00	3.45	0.61

107 (13%) of the students did not re-enroll in the following semester. The mean high school GPA for participants was 3.4 out of a 5.0 scale. Participants had a mean grit score of 3.45 on a 5-point scale. Figure 1 presents the distribution of grit scores.

Summary of Participants

In summary, the participants in this study were more likely to be female than male, were more likely to be White than any other race/ethnicity, were more likely to be full-time than part-time, and were more likely to be attending community college in order to transfer to a four-year institution than for other reasons such as to obtain a career or develop job skills. The average age of the participants was 20 years, and participants were more likely to have attended college at least one additional semester compared to students who were brand new to college. Participants had a mean end-of-semester GPA of 2.85 and were more likely to re-

enroll in the following semester than to stop or drop out. The majority of participants were successful in high school, with a mean GPA of 3.4, and had a mean grit score of 3.45. Initial statistics examined were first-order Pearson/point-biserial correlations among the variables of interest (grit, end-of-semester GPA, course completion, and semester-to-semester persistence) to identify significant correlations. Table 5 provides these correlations.

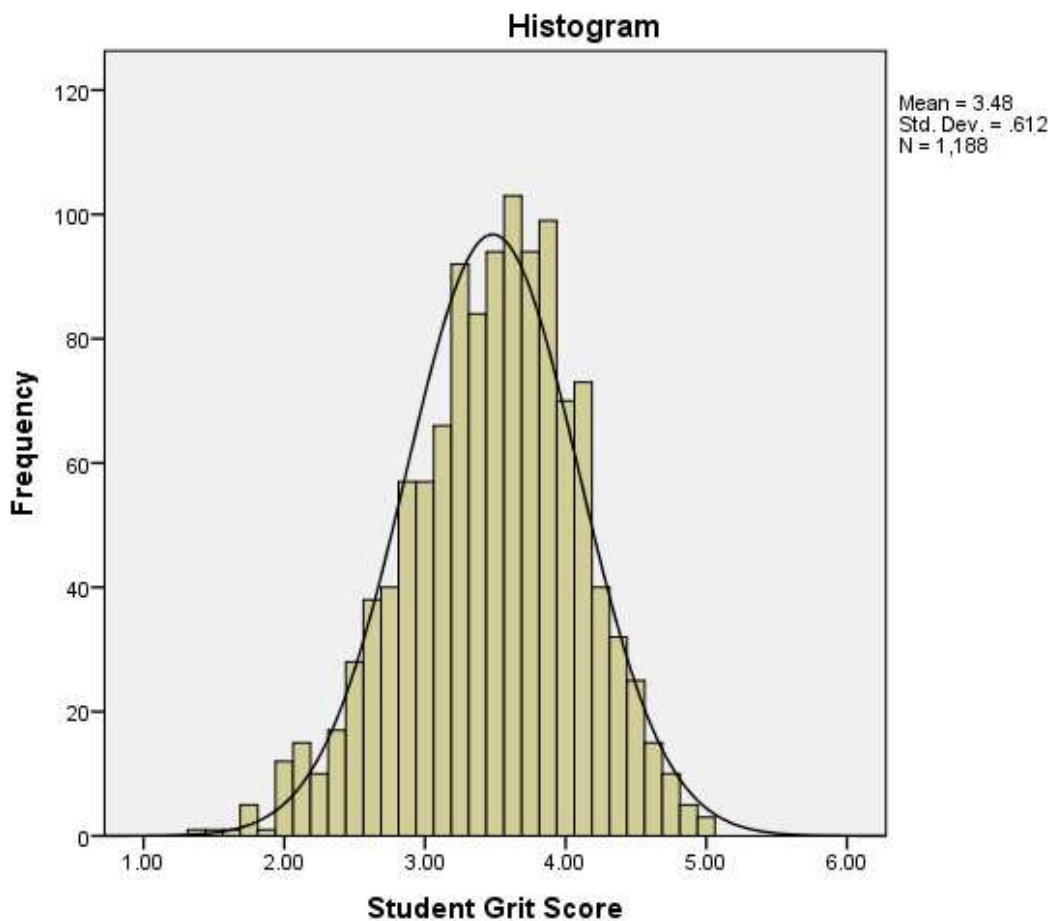


Figure 1. Distribution of Grit Scores.

Table 5

Pearson and Point-Biserial Correlations Among Grit, End-of-Semester GPA, and Persistence

		Student Grit Score	Fall 2017 Semester GPA	Successful Course Completion	Persisted in Spring 2017
Student Grit Score	Pearson Correlation	1	.15**	.18**	-.00
	Sig. (2-tailed)		.001	.001	0.98
Fall 2017 Semester GPA	Pearson Correlation	.15**	1	.59**	.17**
	Sig. (2-tailed)	.0001		.0001	.0001
Course Completion	Pearson Correlation	.18**	.59**	1	.05
	Sig. (2-tailed)	.0001	.0001		0.17
Persisted in Spring 2017	Pearson Correlation	-.001	.17**	.05	1
	Sig. (2-tailed)	.98	.0001	0.17	

** Correlation is significant at the 0.01 level (2-tailed), n=791

Students' grit scores were significantly and positively correlated to end-of-semester fall GPA and successful completion of courses. Grit scores were not correlated to whether or not students persisted into the spring semester.

Research Question 1 Results

To what extent does grit predict the end-of-semester GPA of community college students?

Hypothesis 1. Grit positively predicts end-of-semester GPA for community college students.

Multiple linear regression analysis was used to develop a model for predicting Research Question 1: To what extent does grit predict the end-of-semester GPA of community college students? Predictor student demographic and background variables including high school GPA, ACT score, student status (full time or part time), gender, student age, ethnicity, student intent (transfer program or career program), and student grit score were entered as one block. Students' end-of-semester fall GPA served as the dependent variable. The predictor demographic and background variables jointly accounted for a significant amount of variance in the students' end-of-semester GPA, $R^2 = .18$, *adjusted* $R^2 = .17$, $F(10,780) = 16.62$, $p < .001$. Table 6 displays the linear model of predictors of end-of-semester cumulative GPA, with 95% corrected and accelerated confidence intervals reported in parentheses. The findings in this research supported the original hypothesis, that students' grit score was a significant predictor of their end-of-semester GPA. Additional significant predictors of end-of-semester GPA are high school GPA, ACT score, gender, and age. Females are significantly more likely than males to have higher end-of-semester GPAs and grit scores ($b = .189$). ACT scores ($b = .041$) and age ($b = .054$) also were significant predictors of GPA. Figures 2 and 3 display the standardized residuals for the dependent variable Fall 2017 GPA.

Table 6

Linear Model of Predictors of End-of-Semester Cumulative Grade Point Average

	<i>B</i>	<i>SE B</i>	<i>Beta</i>
Constant	-.73	.38	
High School GPA	.30**	.05	.25
ACT Test Score	.04**	.01	.18
Full-time Enrollment Status	.14	.08	.07
Male Students	-.20*	.06	-.11
Student Age	.05**	.01	.14
Hispanic Students	-.02	.08	-.01
African American Students	-.01	.17	.00
Other Race/Ethnicity	-.10	.09	-.04
Career Students	-.08	.10	-.03
Student Grit Score	.19**	.05	.12

Note $R^2 = .18$ ($p < .001$). * $p < .01$, ** $p < .001$

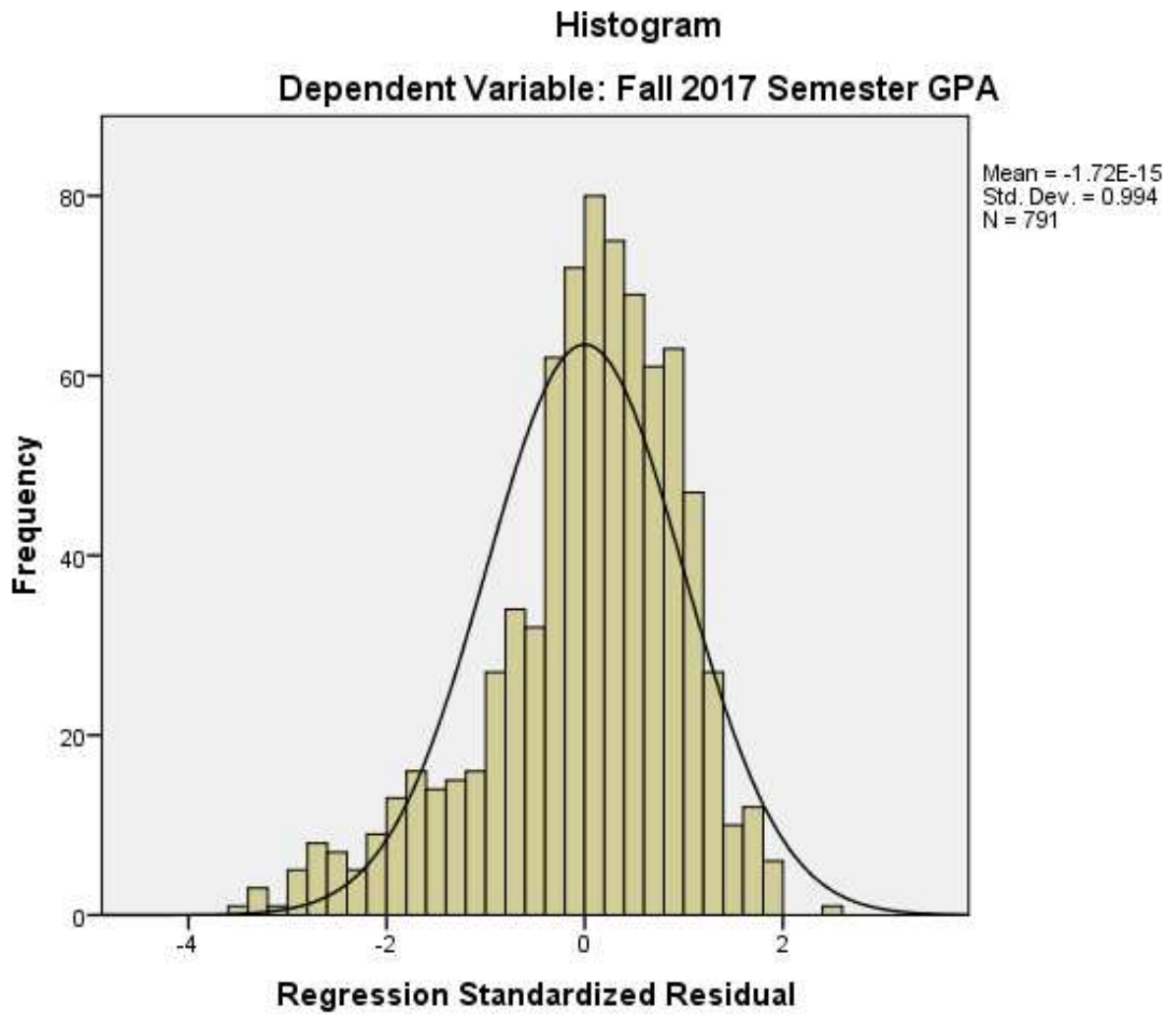


Figure 2. Regression Standardized Residual for Fall 2017 Semester GPA.

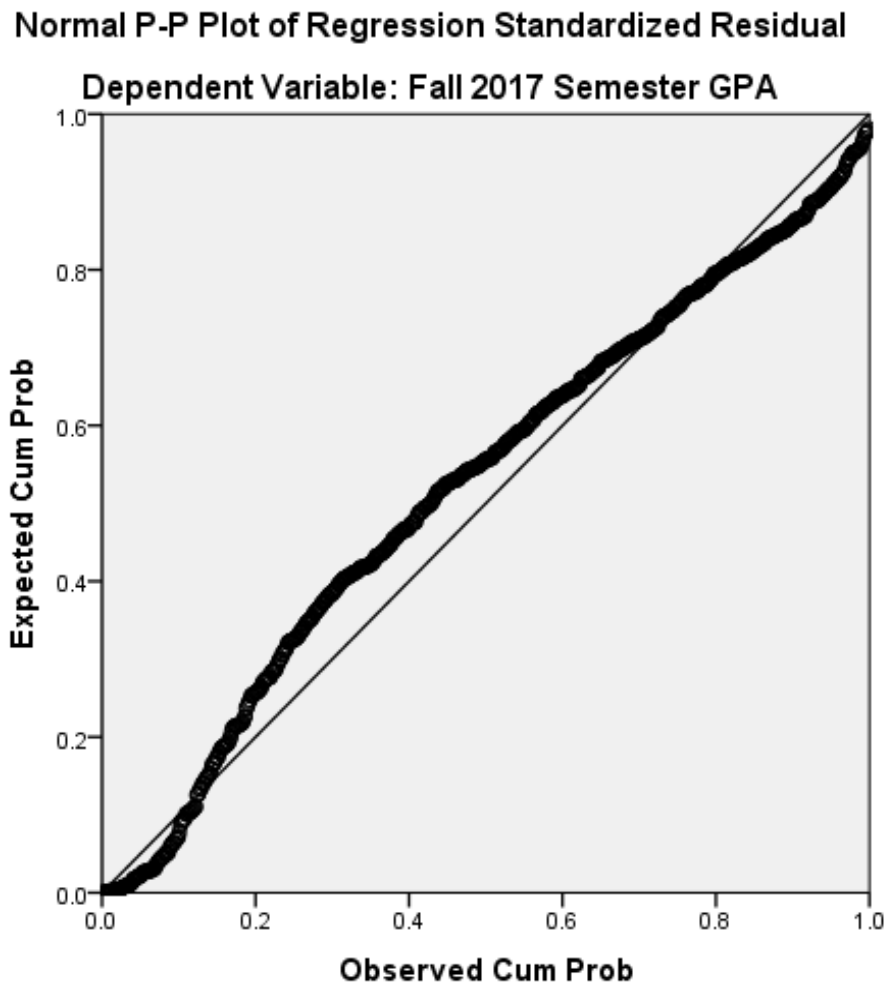


Figure 3. Normal P-Plot of Regression Standardized Residual for Fall 2017 Semester GPA.

Because nonnormality was found in the residuals of the end-of-semester grade linear regression model, the variable was log-transformed and the multiple linear regression was re-run using the log-transformed end-of-semester GPA variable and bootstrapping was performed. Multiple linear regression analysis was used to develop a model for predicting end-of-semester GPA using the log-transformed end-of-semester GPA. Predictor student demographic and background variables including high school GPA, ACT score, student

enrollment status (full time or part time), gender, ethnicity, student intent in college (transfer program or career program), and student grit score were entered as one block. Students' end-of-semester fall GPA was entered as the dependent variable. The predictor demographic and background variables jointly accounted for a significant amount of variance in the students' end-of-semester GPA, $R^2 = .19$, *adjusted* $R^2 = .18$, $F(10,780) = 18.49$, $p < .001$. Table 7 displays the linear model of predictors of log-transformed end-of-semester cumulative GPA, with 95% corrected and accelerated confidence intervals reported in parentheses. Confidence intervals and standard errors were based on 1,000 bootstrap samples. Similar to the previous model, these findings supported the original hypothesis that students' grit scores were a significant predictor of their end-of-semester GPA. Additional significant predictors of end-of-semester GPA were high school GPA, gender, age, and ACT score. Pratt Index scores indicate that the strongest predictors of end-of-semester GPA were high school GPA (.08), followed by ACT scores (.05). Grit and student age both had Pratt Index scores of .02, and gender was the weakest predictor with a Pratt Index score of .01. Figures 4 and 5 display the standardized residuals for the dependent variable Fall 2017 GPA after the variable was log-transformed.

Table 7

Linear Model of Predictors of Log-Transformed End-of-Semester Cumulative GPA

	<i>b</i>	SE <i>b</i>	Beta	Pratt Index
Constant	-.79	.17		
High School GPA	.14**	.02	.25	.08
ACT Test Score	.02**	.00	.20	.05
Full-time Enrollment Status	.05	.03	.05	
Male Students	-.09**	.03	-.11	.01
Student Age	.03**	.01	.15	.02
Hispanic Students	-.02	.03	-.02	
African American Students	.01	.08	.01	
Other Race/Ethnicity	-.02	.04	-.02	
Career Students	-.04	.04	-.03	
Student Grit Score	.09**	.02	.13	.02

Note $R^2 = .18$ ($p < .001$). * $p < .01$, ** $p < .001$. Pratt Index scores reported for significant predictors. Standard errors based on 1000 bootstrap samples.

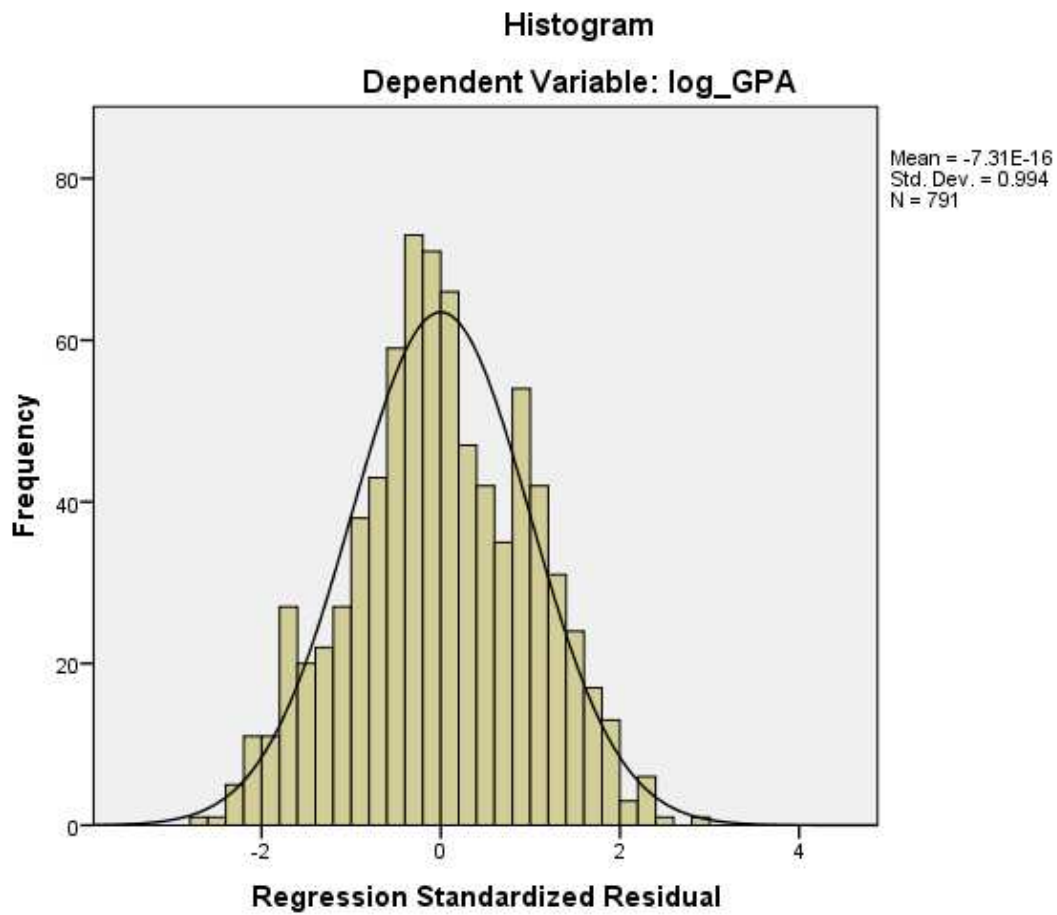


Figure 4. Regression Standardized Residual for Fall 2017 Semester GPA After Variable Was Log-Transformed.

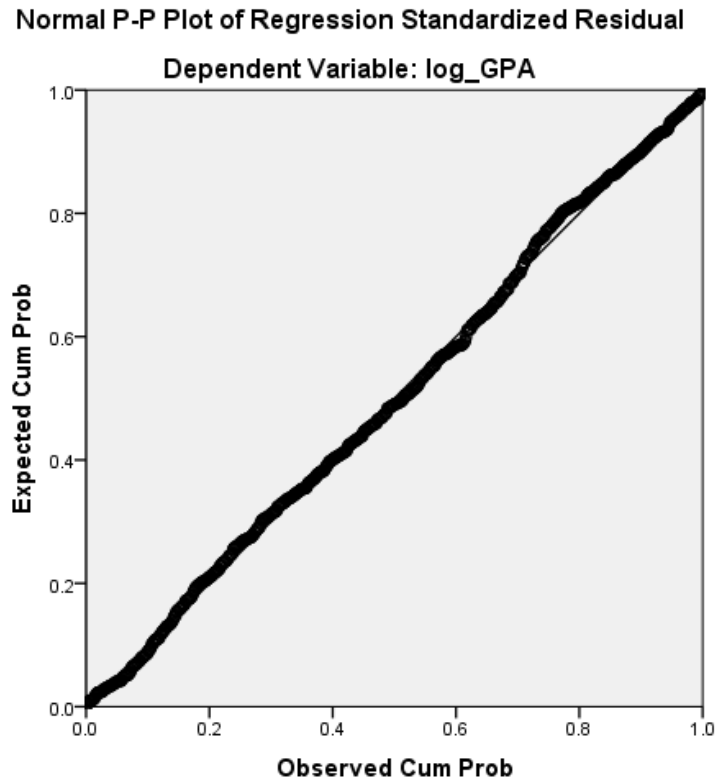


Figure 5. Normal P-Plot of Regression Standardized Residual for Fall 2017 Semester GPA After Variable Was Log-Transformed.

Research Question 2 Results

To what extent does grit predict the successful completion of courses among community college students?

Hypothesis 2. Grit positively predicts the successful completion of courses among community college students.

A binary logistic regression model was used to answer Research Question 2: To what extent does grit predict end-of-semester course completion of community college students? Eighty-one percent of participants in this study completed all of the courses in which they

were enrolled. Predictor student demographic and background variables including high school GPA, ACT score, student enrollment status (full-time or part-time), gender, student age, ethnicity, student intent in college (transfer program or career program), and student grit score were entered all in the same block. Students' end-of-semester course completion (whether or not students successfully completed all courses they were enrolled in during the semester) was entered as the dependent variable. The predictor demographic and background variables jointly accounted for a significant amount of variance in the students' successfully completing all courses they enrolled in, $\chi^2(10) = 75.76, p < .001$. Table 8 displays the logistic model of predictors of successful course completion, with 95% confidence intervals reported. Categorical predictors (including high school GPA, ACT score, age, and grit score) were converted to Z scores for the analyses. High school GPA scores and student grit scores were significant predictors of whether or not students successfully completed all of the courses they enrolled in at the start of the fall term. Effect sizes determined by the odds ratios showed that each standard deviation increase in high school GPA was associated with 1.55 times increase in the odds of successfully completing all the courses in which they were enrolled during the semester. Additionally, each standard deviation increase in age was associated with 1.51 times increase in the odds of successfully completing all the courses in which they were enrolled during the semester. These findings support the original hypothesis that grit scores will predict successful course completion for community college students. Students who had higher high school GPA scores and who scored higher on the grit scale were significantly more likely to successfully complete all of the courses in which they were enrolled during the

Fall 2016 semester. Specifically, each unit increase in the grit scale corresponded to a 1.9 times increase in the odds of successful completion.

Table 8

Logistic Model of Predictors of End-of-Semester Course Completion with 95% Confidence Intervals Reported

	<i>b</i> (SE)	95% CI for Odds Ratio		
		Lower	Odds Ratio	Upper
High School GPA (Z Score)	.44(.09)**	1.30	1.55	1.84
ACT Test Score (Z Score)	.10(.09)	.93	1.11	1.33
Full-time Enrollment Status	-.29(.20)	.51	.74	1.09
Male Students	.13(.16)	.83	1.14	1.56
Student Age (Z Score)	.41(.23)	.96	1.51	2.38
Hispanic Students	-.46(.19)	.43	.63	.91
African American Students	-.32(.42)	.31	.72	1.66
Other Race/Ethnicity Students	-1.6(.23)	.55	.85	1.33
Transfer Students	.00(.25)	.62	1.00	1.63
Student Grit Score (Z Score)	.39(.08)**	1.27	1.48	1.73
Constant	-5.34(1.09)			

Note R2 = .09 (Cox & Snell). .12 (Nagelkerke). Model X2 (8) = 5.27, $p = .728$. * $p < .01$, ** $p < .001$

Research Question 3 Results

To what extent does grit predict semester-to-semester persistence among community college students?

Hypothesis 3. Grit positively predicts the semester-to-semester persistence among community college students.

A binary logistic regression model was used to answer Research Question 3: To what extent does grit predict semester-to-semester persistence of community college students?

Predictor student demographic and background variables including high school GPA, ACT score, student enrollment status (full time or part time), gender, student age, ethnicity, student intent in college (transfer program or career program), and student grit score were entered all in the same block. Students' enrollment status in the Spring 2017 semester (students were either enrolled or not enrolled) was entered as the dependent variable. Categorical predictors (including high school GPA, ACT score, age, and grit score) were converted to Z scores for the analyses. The predictor demographic and background variables jointly accounted for a significant amount of variance in the students' persisting from the Fall 2016 semester to the following Spring 2017 semester, $\chi^2(10) = 38.97, p < .001$. Table 9 displays the logistic model of predictors of term-to-term persistence, with 95% confidence intervals reported. Two variables were found to be statistically significant predictors of semester-to-semester persistence; student enrollment status during the previous semester (full or part-time) and student age. Full-time students who were enrolled in 12 credit hours or more during the fall semester were more likely to return in the following spring semester. Additionally, younger

Table 9

Logistic Model of Predictors of Semester-to-Semester Persistence with 95% Confidence Intervals Reported

	<i>b</i> (SE)	95% CI for Odds Ratio		
		Lower	Odds Ratio	Upper
High School GPA (Z Score)	.13(.12)	.90	1.14	1.44
ACT Test Score (Z Score)	-.04(.13)	.74	.96	1.24
Full-time Enrollment Status	.71(.25)*	1.25	2.04	3.31
Male Students	.04(.23)	.67	1.04	1.63
Student Age (Z Score)	-.68(.24)*	.32	.51	.81
Hispanic Students	-.32(.26)	.43	.72	1.21
African American Students	.41(.67)	.41	1.51	5.59
Other Race/Ethnicity Students	-.45(.31)	.35	.64	1.16
Transfer Students	-.27(.30)	.43	.77	1.37
Student Grit Score (Z Score)	.02(.11)	.83	1.02	1.26
Constant	3.48(1.27)			

Note $R^2 = .05$ (Cox & Snell), $.09$ (Nagelkerke). Model $X^2(8) = 21.77, p < .05$. * $p < .01$, ** $p < .001$

students were more likely to enroll the following semester than older students. Effect sizes determined by the odds ratios showed that each standard deviation decrease in age was associated with .51 times increase in the odds of successfully completing all the courses in which they were enrolled during the semester. Additionally, each standard deviation increase for students who were enrolled as full-time students was associated with 2.04 times increase in the odds of persisting from fall to spring semester. However, the regression results did not support the original hypothesis that grit scores would predict semester-to-semester persistence for community college students.

Summary of Results

The purpose of this research was to investigate three research questions: (1) To what extent does grit predict the end-of-semester GPA of community college students? (2) To what extent does grit predict the successful completion of courses among community college students? and (3) To what extent does grit predict the semester-to-semester persistence of community college students? The hypotheses were that students who had higher grit scores would be more likely to have higher end-of-semester grade point averages, be more likely to successfully complete all of the classes they enrolled in, and be more likely to return to college in the following semester. Using a multiple linear regression model and multiple logistic regression models, the results showed that two of three hypotheses were supported by the data. Community college students with higher grit scores were more likely to have higher end-of-semester grade point averages compared to students with lower grit scores. Additionally, community college students with higher grit scores were more likely to

successfully complete all of the courses they enrolled in than community college students who had lower grit scores. The findings did not support the third hypothesis, that community college students with higher grit scores would be more likely to persist into the following semester.

In addition to the findings related to the research questions proposed, the analyses showed additional findings related to community college student success and persistence. Several variables are significant predictors in different areas of success and persistence for students. High school grade point average, ACT test scores, and gender are significant predictors of end-of-semester college grade point average in addition to grit scores. High school grade point average is the significant predictor of successful course completion for community college students in addition to grit. Finally, student enrollment status (students enrolled full time are more likely to persist) and student age (younger students are more likely to persist) are the two significant predictors when looking at semester-to-semester persistence. Results are summarized in Table 10.

Further Exploration

Summary of Grit by Student Characteristics

Student grit scores were positively correlated with course completion and end-of-semester GPA for both men and women, but grit was not a predictor of persistence in either group. Grit scores also were positively correlated with course completion and end-of-semester grade point average for White and Hispanic students but were not correlated with

course completion or end-of-semester grade point average for African American students or American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, and unknown students in the Other category. Although African American students and students who made up the Other ethnicity category had similar grit scores compared to White students, grit scores did not predict end-of-semester GPA or successful course completion for either of these groups. Grit was not a predictor of persistence in any race/ethnicity group. Grit was positively correlated with successful course completion and end-of-semester grade point average for students whose intent was to transfer to a four-year university and only for successful course completion for students who were enrolled to obtain career skills. Grit was not a predictor of persistence for transfer or career students.

Table 10

Summary of Results for Each Research Question by Predictor Variable (Multiple Linear Regression)

Predictor Variables	RQ 1	RQ 2	RQ 3
	End-of-Semester GPA	Course Completion	Persistence
High School GPA	.14**	.58**	.17
ACT Test Score	.02**	.03	-.01
Full-time Enrollment Status	.05	-.29	.71*
Male Students	.09**	.13	.04
Student Age	.03**	.07	-.12**
Grit Score	.09**	.64**	.04

* $p < .05$, ** $p < .001$

Summary of High School GPA by Student Characteristics

Students' reported high school grade point averages were correlated with course completion and end-of-semester GPA for both men and women but was not a predictor of persistence for either males or females. High school GPA scores also were correlated with course completion and end-of-semester GPA for White, Hispanic, and students in the Other ethnicity category but were not correlated with course completion or end-of-semester GPA for African American students. High school GPA was not a predictor in persistence for students of any ethnicity. High school GPA was correlated with successful course completion and end-of-semester GPA for transfer students but was not a predictor for career students in either end-of-semester-GPA or successful course completion.

Relationship Between Grit and High School GPA

Grit scores and high school GPA both positively and significantly correlated with course success rates and end-of-semester college GPA when analyzing all participants in the study. Similarly, when broken out into specific subcategories of students' grit and high school GPA, both are consistent in their correlation with student course success and end-of-semester GPA. There are slight differences in the correlations of grit and high school GPA with regard to course completion and end-of-semester GPA, although the larger distinction is seen in persistence. Although grit does not predict persistence for the whole sample nor for specific student groups, high school GPA is a predictor of persistence for the whole sample. Using a Pearson Correlation to determine if there is a relationship between grit and high

school GPA, the results showed no significant correlation ($r = .05, p = .157$). This finding suggests that high school GPA and grit work independently to predict course completion success, end-of-semester GPA, and semester-to-semester persistence among students.

Summary of Chapter 4

Chapter 4 provided an in-depth look at the relationship between community college student grit levels and their end-of-semester grade point averages, successful course completion rates, and term-to-term persistence. The results indicated that grittier students (those with higher grit scores on the Grit-S scale), when compared to students with lower grit scores, were more likely to successfully complete the classes they enrolled in and to have higher end-of-semester grade point averages. The results indicated that being grittier did not predict if a community college student was more likely to enroll in college the following semester. This section also discussed the relationship of community college background and demographic variables to students' success and persistence in their community college.

Overview of Chapter 5

Chapter 5 provides a summary of the research problem along with a discussion of the results, implications of the findings, recommended future research related to grit and community college student success, and limitations of this study. This final chapter discusses the relevance of this study to community college administrators, faculty, and student development personnel. Finally, grit is presented as another area of research and practice that community colleges can use to help students meet their educational goals.

CHAPTER 5

DISCUSSION, IMPLICATIONS, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

As the percentage of undergraduate students enrolling in community colleges increases and a national spotlight is held on the success of these students, community colleges are searching for new and better ways to help their students succeed (Balog & Search, 2006; Levin et al., 2010; McClenney, 2006). Colleges are working on developing new ways and improving current methods (beyond traditional measures such as ACT scores and high school GPAs) to predict the success and persistence of their students (Chemers et al., 2001; Garza et al., 2014; Komarraju et al., 2009; Robbins et al., 2004; Torres & Solberg, 2001). These developments are important for students who are coming to college as nontraditional students, especially those who may not have access to their high school transcripts and/or who may not have taken any college entrance exams. In order for these measures to improve student success, they need to be available to community college students who are enrolled in both transfer and vocational programs as well as who are enrolled full and part time.

Much of this research focuses on community college students who are attending school full time with the intent to transfer to a four-year university. This group, the first-time, full-time in college (FTIC), is the most manageable cohort to track and measure (Crosta, 2013; Wild & Ebbers, 2002). These full-time transfer students make up less than half of the population of students who attend community colleges (Juszkiewicz, 2015). Additionally,

studies that focus on university students are less generalizable to the community college student population due to their differences in diverse populations, educational priorities, and enrollment statuses (Wild & Ebbers, 2002). The majority of students attending community colleges are part time and have employment and family responsibilities outside of school that can increase the likelihood of stopouts and dropouts (Liao et al., 2012, Reyna et al., 2010).

Indicators of college persistence have included completing 20-30 credit hours in the first year enrolled in college, full-time college enrollment, and continuous enrollment without stopouts (Reyna et al., 2010). The majority of community college students will not meet the indicators of full-time enrollment or completion of 20 to 30 credit hours within their first year of college; therefore, other indicators need to be identified that may lead to success for these students. Furthermore, students who are the greatest risks for dropping out prior to reaching their academic goals need to be identified.

This study examined the personal characteristic of grit to measure its capacity to predict the academic success and semester-to-semester persistence of community college students. Academic success was looked at using two measures: (1) the student's successful completion of all the courses enrolled in for the Fall 2016 semester, and (2) the student's end-of-semester noncumulative GPA for the Fall 2016 semester. Persistence was measured by tracking students' re-enrollment in the following Spring 2017 semester. In order for students to be considered persistent, they needed to be enrolled in a least one credit hour by the tenth day (official census day of the college) of the following semester.

This research addressed three hypotheses related to student success and persistence. First, community college students with higher grit scores would be more likely than their less

gritty peers to successfully complete the courses they enrolled in during a given semester. Second, community college students with higher grit scores would achieve higher end-of-semester grade point averages compared to students with lower grit scores. Finally, this research addressed the hypothesis that students with higher grit scores would be more likely to persist in college, returning the following semester, compared to students who had lower grit scores.

During the Fall 2016 semester, students enrolled in business and social science courses at a large suburban community college were asked by their instructors to participate in this study. Data were gathered from students using the Grit-S scale developed by Duckworth and Quinn (2009). This instrument was chosen over an earlier version of the grit scale, the Grit-O scale (Duckworth, et al., 2007), because it was found to be a more efficient measure of trait-level perseverance and passion for long-term goals than the original grit scale. The Grit-S scale has eight items which students completed during class time. Participants completed the Grit-S scale and agreed to allow the researcher access to institutional data regarding students' current enrollment status, educational goals, demographic information, grades, and background information.

Of the 1,388 completed grit scales, 178 of the participants did not answer each of the items and their respective scales were excluded from the sample. One thousand two hundred and ten participants were included in the next step of the research that merged institutional data with the grit scale results. After the merge was completed and participant data were analyzed, an additional 419 participant instruments were excluded from the data either because the students were enrolled in college for personal interest reasons and not to earn a

credential or they did not have reported ACT scores and high school grade point averages reported to the college.

Discussion of Findings

Grit and Successful Course Completion

One strong predictor of student success in college is students' ability to successfully complete courses in which they are enrolled (Moltz, 2010; Reyna et al., 2010). The first question in this study examined the relationship of grit to student course completion. A significant, positive relationship was found between students' grit scores and the number of courses they successfully completed during the semester. Students' grit scores were significantly correlated with whether or not students completed all of the courses they enrolled in during their Fall 2016 semester. Students with higher grit scores were more likely to complete all of the courses they enrolled in compared to their less gritty peers. This finding is consistent with previous findings that grit influences academic achievement (Cross, 2014; Duckworth et al., 2007; Duckworth & Quinn, 2009; Hill et al., 2014; Strayhorn, 2013). Grit has predicted completion in a rigorous summer training program at West Point Military Academy for freshman cadets (Duckworth & Quinn, 2009) and has also been a predictor for spelling bee contestants. Contestants who scored one standard deviation higher on the Grit-S scale than their peers were 38% more likely to advance to further rounds in the spelling bee. The competitors with higher grit scores were able to outperform other competitors in part because they practiced more than their less gritty peers.

Additional predictors that were found to be significant indicators of course completion were age and high school GPA. As students get older, they are more likely to complete all of the courses in which they are enrolled. Additionally, students with higher high school GPAs are more likely to complete all of the courses in which they are enrolled.

Grit and End-of-Semester GPA

Another strong predictor for success and persistence among college students is having an adequate GPA (Moltz, 2010; Reyna et al., 2010). The second question examined in this study looked at the relationship of grit to end-of-semester student GPA. A significant, positive relationship was found between students' grit scores and their end-of-semester GPA. Students' grit scores were significantly correlated with their end-of-semester GPA scores. Students with higher scores on the Grit-S scale outperformed students with lower grit scores. This finding is consistent with other studies looking at the relationship of grit and academic achievement (Akos & Kretchmar, 2017; Credé et al., 2016; Cross, 2014; Strayhorn, 2013). Strayhorn (2013) found that Grit-S scores were moderately related to GPA and that grit was a positive predictor of African American males' grades in college. Additionally, the study found that grit positively predicted grades in college for African American male students almost as much as their high school GPA and ACT scores. In this study, similar to Strayhorn's findings, scores on the Grit-S were positively related to end-of-semester GPA, but students' high school GPA and their ACT scores were stronger than grit in predicting end-of-semester GPA. This study also supports the findings of Duckworth et al. (2007) that gritty students outperformed less gritty peers, specifically that higher grit scores were associated

with higher GPAs. The results in this study also support the findings of Akos and Kretchmar (2107), who found that grittier undergraduate students at a four-year university had higher GPA scores than their less gritty peers.

The findings in this study were not consistent with findings in Chang (2014), Crede et al. (2016), or Kelly et al. (2014). According to Chang's (2014) dissertation research findings, students' grit scores were not able to predict college grade point averages of first-year students. Students who had higher grit scores were not more likely than students with lower grit scores to have higher grade point averages. The current research findings also contradict Kelly et al. (2014), who found that grit was not able to predict academic performance for first-year cadets. Additionally, in a meta-analysis conducted by Crede et al. (2016) looking at the predictive ability of grit, they found that grit was unable to explain any of the variance in overall academic performance. The study did note, however, that grit did predict a small amount of incremental variance in college GPA that is consistent with the present findings.

Grit and Term-to-Term Persistence

Almost 25% of community college students do not return after their first year of college and many of these students leave after or during their first semester (Crosta, 2013; Schneider & Yin, 2011). The third research question in this study examined the relationship of grit to semester-to-semester persistence. Previous research has found that students who maintain continuous enrollment without stopouts are more likely to be successful in college (Moltz, 2010; Reyna et al., 2010). Grit was not found to be a predictor of semester-to-semester persistence for community college students. This finding is similar to the other

findings looking at the relationship of grit and student retention (Cross, 2014). These results support the findings of Cross (2014); that is, grit was related to academic GPA but was not predictive of persistence.

The results of this study did not support the findings of Eskreis-Winkler et al. (2014) that found that grit was a significant factor in predicting which participants were more likely to voluntarily drop out of a tough 24-day Army Special Operations Forces selection course. They also found that participants with higher grit levels were more likely to persist throughout the entire course, that grittier sales people were more likely to persist in the career field, and that grit was a significant factor in the high school graduation of Chicago public high school students. In their research, grittier students who were one standard deviation higher in grit than their peers were 21% more likely to graduate from high school than less gritty students. This research also contradicted the findings of Kelly et al. (2014) that found grit to be a predictor of retention among West Point cadets during their four years at the academy. One important difference in the present research compared with Kelly et al. (2014) is the type of student who was examined in the study. Community college students at open-access institutions are very different from students enrolled at a highly selective military academy.

Further Exploration

In addition to answering the research questions laid out in this study, subcategories of students were identified and examined to determine if the relationship between these subcategories and grit differed from the total sample. The subcategories included gender, race/ethnicity, and reason for attending college. Race and ethnicity were reported in four

groups: White, African American, Hispanic, and Other. The Other category was comprised of American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, and unknown students. The category for reason attending college included transfer (students who intended to transfer to a four-year school) and career (students who intended to obtain career related degrees and certificates). Upon entrance into college, students reported their intent to either transfer to a four-year university or to prepare for a career or improve their current job skills.

Most of these subcategories reflected similar findings to the initial results when looking at the relation between grit and course completion and semester-to-semester persistence compared with the whole group. Grit was related to course completion and end-of-semester GPA but not to persistence. Differences were found among African American students. Exploratory analysis in this study found that African American students and students in the Other race/ethnicity category had grit levels that were similar to those of White students, but these levels of grit were not able to predict course completion, end-of-semester GPA, or semester-to-semester persistence, as they were for White students. It is important to note that there was a small population of African American students in this study and more analyses and research are necessary in this area to confirm these findings. A more thorough investigation would need to look at moderating effects and use a larger sample size.

However, this finding is consistent with Chang (2014), who found that there was a different relationship with grit scores and academic GPA for African American students compared to White students. This finding contradicts the findings of Akos and Kretchmar (2017), who reported no differences among racial groups for grit scores. One possibility that may contribute to the differences in this study's results compared to those in Akos and Kretchmar

(2017) is the institution type. This research was conducted at an open-access institution, whereas the previous research was conducted at institutions with selective admissions. Four-year schools with selective admissions admit students based on their previous high school work and their college entrance exam scores. These admissions policies may be why racial and ethnic differences are less among students at four-year colleges and universities compared to community college students. The finding that there is a negative correlation with grit and success for African American students is extremely important to higher education faculty and administrators who are interested in using grit or other noncognitive measures to predict success and persistence among college students. Grit cannot be viewed the same for predicting success among all students. In fact, unless you are a White or Hispanic student, being grittier is not necessarily a positive indicator for success. Additional research is needed to determine how the grit characteristic differs for the various segments of students who are served by community colleges.

High school GPA was also examined to determine if a relationship exists regarding previous academic achievement to success and persistence among community college students. Previous research found high school GPA to be a predictor of college success and persistence over other factors, including noncognitive characteristics such as academic self-efficacy and motivation (Credé et al., 2016). In this study, high school GPA was found to have a moderate relationship with course completion and end-of-semester GPA; however, high school GPA was able to predict semester-to-semester persistence, whereas grit was not such a predictor.

High school GPA was also examined for the subcategories of gender, race/ethnicity, and for transfer and career students. Moderate relationships were found in all groups between high school GPA with course completion and end-of-semester GPA except in the case of African American students. High school GPA, similar to grit, was not correlated with course completion or semester-to-semester persistence for African American students. These findings also highlight the importance of not issuing blanket statements about the use of predictors for college success and persistence. Students differ in many ways based on their gender, race/ethnicity, and their goals in college, thus researchers and practitioners should be cautious about predicting success for large swaths of students.

Grit and high school GPA both shared similar relationships with student success; therefore, determining if the two variables are related was part of this inquiry. This study found that grit and high school GPA did not significantly correlate and therefore must be working independently of each other when predicting student success.

Implications

Community colleges struggle to maintain the high levels of academic integration, involvement, engagement, and institution commitment that are recommended by the seminal theory of departure (Tinto, 1975) and the theory of involvement (Astin, 1984) because the traditional community college student does not share the same student qualities as the traditional four-year college/university student. Measures of levels of engagement and involvement do not adequately predict success of community college students; thus, it is important to identify other mechanisms for measuring if students will be successful.

Richardson et al.'s (2012) meta-analysis looked at factors related to college student success and noted that their results did not support Tinto's (1975) account of student interactionist motivation.

As identified earlier, other noncognitive measures have been found to be better predictors of success and persistence of community college students than the student development theories of Astin and Tinto. Chemers et al. (2001) studied academic self-efficacy in university students to determine if it could predict academic performance. The results of their study found that academic self-efficacy was a significant and strong predictor of academic performance and that students who had higher expectations of themselves were more likely to show higher results. In this study, they also noted that students' academic self-efficacy was related to high school GPA and that higher self-efficacy could be related to success in secondary school. Although this study supports the use of academic self-efficacy to predict academic performance, it is not able to clearly show that academic self-efficacy is not a product of students' high school experiences. In this study, grit is a positive and significant predictor of academic success and was found to be working independently of high school GPA.

Thomas et al. (2007) tested the NonCognitive Questionnaire (NCQ), a 23-item measure that was thought to predict student performance and retention in college. In their study, they found that after conducting a meta-analysis on the research using the NCQ, the measure was not able to predict academic performance or retention of college students. In fact, their research concluded that the NCQ should not be used in future research. Additional research looking at academic self-efficacy, resilience, persistence, and student success in

senior college students at a four-year school found that there was no difference in the self-efficacy, resilience, persistence, or grade point averages of students who were first generation compared to those who were not first-generation college students (Garza et al., 2014). This study used one questionnaire to access demographic information and three scales to measure students' self-efficacy and resilience. The study noted that by the time college students reach their senior year and are able to persist, levels of academic self-efficacy and resilience level off for all students regardless of background. The findings of both studies looking at the relationships of self-efficacy and resilience with academic performance support the need for this research and its emphasis on finding a measure that is valid and reliable at measuring the noncognitive skills of students and using it as a predictor of academic success. A meta-analysis conducted by Richardson et al. (2012) reviewed over 13 years of research looking at factors related to college student success and found that self-efficacy was most strongly and consistently related to grade point average.

Unlike the NCQ, in this study the Grit-S scale was able to predict academic performance for college students. Additionally, the Grit-S is an eight-item scale that can be completed by college students in less than ten minutes. Student participation is more likely with a measure that is brief and does not require much time out of class.

The noncognitive trait of motivation was studied by Allen (1999) in relation to college students' persistence and performance in college. In that study, both two- and four-year college students were included. The results found that motivation was a significant predictor of persistence for minority students but not for nonminority students. The research also found that motivation could predict persistence in minority students, but it was not a predictor of

academic performance. These results are interesting in relation to this study and the differing results for African American and non-African American students. In this study, African American students with high grit levels are not more likely to be academically successful than their less gritty African American students, while White and Hispanic students who are grittier do show positive significant relationships with academic success. Results from Allen (1999) and this study suggest that it is important that researchers do not make blanket statements about whole groups of students or generalize results to all students without regard for their ethnicity or background.

Of the Big Five Personality traits, conscientiousness has been identified as the noncognitive trait that is most strongly linked to academic performance (O'Connor & Paunonen, 2007; Trapmann et al., 2007). Meta-analyses done by O'Connor and Paunonen (2007) and Trapmann et al. (2007) revealed that conscientiousness was strongly and consistently related to college student academic success. As noted earlier, while conscientiousness and grit have been found to be closely related in their ability to predict student success, grit has been able to predict student success and persistence over the conscientiousness personality trait (Duckworth et al., 2007). Since research has demonstrated that conscientiousness is a strong predictor of student success (O'Connor & Paunonen, 2007) and the more recent construct of grit has the capacity to predict student success over conscientiousness (Duckworth et al., 2007), this research on grit in the context of academic success for community college students is extremely relevant. Findings of this study also provide a case for future research looking at the predictive ability of grit compared to conscientiousness in the community college setting.

The results of this study provide valuable results and implications for community college administrators and student services personnel including community college counselors and advisors. Community colleges are open-access institutions that do not require students to submit high school grades, college entrance exams, student essays, or other selective-college admission information. These types of information would help to evaluate students' college readiness level or predict the likelihood that they will succeed. Without this information, community colleges must identify alternative methods to identify students in need of additional support services. Often this identification comes too late, after students are placed on academic probation. The Grit-S scale is an instrument that students can take in less than 15 minutes and can be scored easily. The results of the Grit-S can be used to identify students who are less likely to be successful when other information such as high school GPA or college entrance exams are not available.

The findings of this study show that community college student grit scores have a significant positive correlation with the number of courses students successfully complete during a given semester. The results of this study also indicate that higher grit scores in community college students correlate with higher end-of-semester grade point averages than students who scored lower on the grit scale. The more courses students complete and the more credit hours they earn, the more likely they are to be successful college students. According to Crosta (2013), early dropouts (students who drop out in their first semester of college) had 50% failure rates in their courses, and students who obtained poor grades were less likely to persist. The ability of colleges to identify which students will be less likely to successfully complete courses and maintain an adequate grade point average could aid

community college student services personnel at doing the much needed job of identifying at-risk students. Jenkins (2006) noted that in order for community colleges to be cost effective, they must offer targeted support for underperforming students. Identifying which students will receive targeted support early on in their academic career could lead to increased success and completion rates.

Although researchers have warned against using personal characteristics, including grit, for high-stakes measures such as admissions into colleges and universities (Duckworth & Yeager, 2015), community colleges do not have high-stakes admission testing. Because of this, applications of the grit scale may be more appropriate in the community college context than the university setting. Upon meeting with an advisor or counselor to determine their academic plans, students' grit scores could be measured and appropriate levels of support and early alert measures could be recommended. Use of these scores to select which students need additional services could help to effectively use the scarce resources of community colleges.

Additionally, the findings that higher levels of grit in community college students are indicators of student success in individual courses as well as in overall grade point average indicate that colleges should be determining ways to help improve grit levels among students. Students need to be offered opportunities to increase their grit levels. Dweck (2007) discussed two mindsets: fixed and growth. In the fixed mindset, individuals feel that they are born with certain capabilities such as their intelligence levels or their grit levels. This mindset reduces the likelihood that students would seek opportunities to increase their intelligence or grit level. On the other hand, students with a growth mindset believe that their abilities are

not fixed and that there are opportunities for growth. Community colleges should encourage students to move toward growth mindsets that would allow them to improve their grit levels. The ability to increase students' grit scores will depend on the college's ability to help students succeed even after perceived failures, including holding high standards while providing high levels of support.

Conclusions

This study investigated the relationship between student grit scores and academic success and persistence for community college students. The study's findings led to several conclusions. Most importantly, grit scores are predictors of community college students' academic success. Grittier community college students are more likely than less gritty students to complete more of the classes they enroll in and to have higher end-of-semester grade point averages. The study confirmed the findings of Duckworth et al. (2007), Duckworth and Quinn (2009), Cross (2014), Strayhorn (2013), and Akos and Kretchmar (2017). The results showed that community colleges should consider administering an eight-item grit scale to help predict if students will be academically successful.

Additionally, the results in this study concluded that grit is not a predictor of persistence for community college students. Furthermore, the study concluded that other factors such as age and full-time enrollment status are important factors in persistence. These findings indicate that being gritty will help community college students successfully complete their enrolled courses and to get better grades, but it is not a significant factor in whether or not they will return to college in following semesters. Grit was found to be a significant

predictor of academic success for students when measuring if students successfully completed their courses and their end-of-semester grade point averages; however, these conclusions were not found during further exploration looking at the effect of grit by ethnicity. African American students and American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander students with high grit scores were not found to be more academically successful than those with lower grit scores. These results are contradictory to Strayhorn (2013), who studied African American university students and found that grit was a predictor for academic success. These findings may have varied because of the different institution types of the respective studies. Strayhorn examined university students and this study examined community college students. Additionally, this study had a small proportion of African American students in the sample.

Results from this study also revealed that in addition to grit scores, students' high school GPA, ACT scores, age, and gender were predictors of academic success. The research concluded that students who had higher high school GPAs, possessed higher college entrance exam scores, were older, and were female were more academically successful. These considerations are important for predicating academic success and for identifying students at risk.

Limitations and Recommendations for Future Research

Several limitations to this study are worth noting. The first limitation concerns the generalizability of the study's findings. This study was conducted at one large suburban community college. The study focused on the predictive capacity of grit on the outcomes of

success and persistence of college students. Beyond understanding if grit is able to predict academic success and persistence of community college students, this research does not offer reasons for these possible predictions. It is important that future research compare the predictive power of grit and determine if grit is the reason students succeed in college or if grit is the catalyst that drives academic self-efficacy, motivation, engagement, and involvement.

Additionally, this study was unable to determine why students who did not persist into the following semester left college. In this study, there is a lack of information regarding why participants did not re-enroll in the following semester. The reason for not enrolling may have been due to factors that are positive, such as transferring to a four-year college or university or learning enough career skills to obtain a job. On the other hand, students who did not persist may have left college due to hardships including difficulty with course work, financial difficulty, or family obligations. Since the information regarding reasons for student attrition is not available, it is hard to demonstrate that being a grittier student would have made a difference in the persistence rate of students. Additionally, since the majority (84%) of the sample population in this study re-enrolled in the following semester, a relatively small number of students did not persist. Future research on grit and persistence is needed to unearth the underlying reasons why students do not re-enroll in the following semester.

Another limitation to this study is the time frame of the semester in which the study was conducted. Faculty were given the Grit-S survey to distribute to students during the fourth week of the semester. Students may have already withdrawn from their classes at this time in the semester. Future research measuring student grit levels and correlations with

student success should be done at the start of the semester to ensure that the sample includes students prior to their withdrawing from any particular course. This study allowed faculty to distribute the survey throughout the semester, which may have contributed to the large portion of the sample persisting into the following semester.

Additional research is needed that focuses on grit and community college students. Future research should include quantitative and qualitative data to examine relationships among grit scores, academic success, and persistence. It is important to understand why students do not persist, and exit interviews with students would be useful in determining if grit can predict persistence in students when the reasons for students leaving can be defined. If research could identify students who left college to transfer to a four-year school or to a higher paying job, those students could be separated from students who are considered nonpersisters.

Future research focusing on community college students should examine the predictive capacity of grit for non-White students. This study had a very small sample of African American student participants (3.4%, 27 students, of the sample), and this small number may not be representative of grit's capacity to predict academic success for African American students. Specifically, additional research on grit and minority students at community colleges needs to be conducted. This study found that grittier African American students and American Indian/Alaskan Native, Asian, and Native Hawaiian/Pacific Islander students were not more likely to be academically successful. This particular finding needs to be further explored to lend additional insights regarding its generalizability.

Summary of Chapter 5

Chapter 5 provided discussion of the findings from this study along with implications and recommendations. The chapter described how the study adds to the body of research on community college student academic success and how this study's results can help to guide community college student development practitioners, administrators, and faculty. This chapter also discussed the limitations of this research and the need for future research studying grit and community college students.

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APPENDIX A
CONSENT FORM

Dear Prospective Participant,

I invite you to participate in a research study entitled: Community College Student Grit Levels. Grit is defined as a passion and perseverance for long term goals. I am currently enrolled in the Adult and Higher Education Program at Northern Illinois University in DeKalb, IL and am in the process of writing my doctoral dissertation. The purpose of the research is to determine: grit levels of community college students.

Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential. In addition to the survey responses, this research study will collect information from the college regarding your college intent, grades, ethnicity, age, full-time/part-times student and work status as well as high school GPA and/or ACT score. This information will be collected during the fall 2016 and spring 2017 semesters. Data from this research will be kept under lock and key and reported only as a collective combined total.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately 10 minutes to complete. Please return the questionnaire to your professor. You must be at least 18 years of age to participate in this research.

If you have any questions about this project, feel free to contact *Kathryn Rogalski* at *rogalski35@gmail.com*. Information on the rights of human subjects in research is available through the Office of Research Compliance at Northern Illinois University at 815-753-8588.

I give my consent to participate in this study:

(Participant Signature/Harper ID)

Thank you for your assistance in this important project.

Sincerely yours,

Kathryn Rogalski

APPENDIX B
SHORT GRIT SCALE

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

1. New ideas and projects sometimes distract me from previous ones.*

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

2. Setbacks don't discourage me.

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

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

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

4. I am a hard worker.

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

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

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

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

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

7. I finish whatever I begin.

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

8. I am diligent.

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

Scoring:

1. For questions 2, 4, 7 and 8 assign the following points:

5 = Very much like me

4 = Mostly like me

3 = Somewhat like me

2 = Not much like me

1 = Not like me at all

2. For questions 1, 3, 5 and 6 assign the following points:

1 = Very much like me

2 = Mostly like me

3 = Somewhat like me

4 = Not much like me

5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

Grit Scale citation

Duckworth, A.L., & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (Grit-S).

Journal of Personality Assessment, 91, 166-174.

<http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf>

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

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

APPENDIX C
FACULTY INVITATION

Dear Faculty:

As many of you know, I am working on my Doctoral degree at Northern Illinois University and I am currently at the data collection stage. My dissertation research is focused on studying grit, the passion and perseverance for long term goals, as a predictor of success and persistence of community college students. I am writing to ask if you would consider having your students complete a short survey (**8 questions**) that will be used in my research. Your participation is completely voluntary, but would be very appreciated as I would like to collect as much student data as possible for my research. I anticipate the survey will take **no more than 10 minutes** for your students to complete.

If you decide that you have the class time to allow your students to participate in this research, please contact me and let me know. I will print off all the surveys as well as the consent forms for your students. I would ask that you respond to this email by the end of the week so that I can start preparing the surveys for distribution. If you have any questions, or would like someone to distribute the surveys during your class time, please let me know. At this time, the survey is a paper survey and is not available to online classes.

Thank you very much in advance for your consideration and willingness to help out with this research.

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