SELF-DETERMINATION OF MILITARY STUDENTS IN POSTSECONDARY EDUCATION

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The purpose of this quantitative study was to examine undergraduate military veteran students’ self-determination and academic effort in relation to their nonveteran college peers. A total of 734 undergraduates attending 4-year institutions in Texas completed a survey, including: 76 veterans (63% males, 37% females); and 658 non-veterans (26% males, 74% females). This research created a more holistic survey of self-determination by adding the 8-item New General Self-Efficacy Scale to the 10-item Self-determination Scale. The survey also included 13-items drawn from the National Survey of Student Engagement. A factor analysis with a varimax rotation of the items identified six factors: competence, autonomy, relatedness, reflection, learning strategies, and quantitative reasoning resulting in a significant Bartlett’s test of sphericity ($\chi^2 (465) = 12324.53, p < .001$). The first hierarchical ordinary least squares (HOLS) analysis results showed that undergraduate veteran students have statistically significant higher levels of self-determination than students without military experience with a small effect size ($R^2 = .022\%, p < .001$); however, a meta-analysis of self-determination revealed a large effect size of $d = 1.33$ between veterans ($M = .81, SD = .12$) and freshmen undergraduates ($M = .65, SD = .12$). The second HOLS analysis revealed that self-determination is a positively related, statistically significant factor in academic effort potentially adding 6.8% variance explained to the multi-factored general causal model of college impact (GCMCI).
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CHAPTER 1

INTRODUCTION

1.1 My Story

My family was not poor, but we were far from rich. My neighborhood was almost crime free. My high school was rated as one of the best in the country. I had access to good teachers, caring parents, and guidance counselors. All of whom regarded me as bright or smart. I had all the elements necessary to be a good student, but I was not.

Growing up I had a kind heart, insatiable curiosity, and adventurous spirit. My curiosity drove me to be interested in everything, but I had no focus or boundaries. Left unattended, there was no limit to the trouble I could get into. My parents and counselors called my behavior acting out, but I always thought, I’m not acting. I was who I was, but did not fit into what was considered normal. I felt like an outsider. I was depressed. I felt lost and alone. I can still feel the psychological pain of my youth. At times, I wanted to die.

I managed to graduate from high school. To this day, I believe I graduated because my high school administrators took pity on my mother or were just relieved to see me go. I lived with my father after graduation, worked odd jobs, and tried community college. My experience at community college was less than stellar, and I eventually dropped out altogether. My transcripts from the various community colleges I attended still serve as sources for embarrassment, the motivation to be better, and pride in how far I have come.

A year or so after I graduated high school, I ran into an old friend who was home on leave from the United States Air Force. He told me how the military had changed him, but he
did not have to tell me anything, because I could see something new in his eyes. Two weeks later, I joined the Air Force.

The first night in basic training, I knew my life would never be the same. I got off the bus at Lackland Air Force base in San Antonio, Texas just as the sun was setting. The military drill instructors seen on television do not do the ones I encountered in real life justice. Our drill instructor was fierce. He began yelling at us that night and did not let up until graduation 2 months later. He showed no flaws. He had impeccably ironed, shined, and tailored clothes. He exuded confidence beyond anyone I had ever met.

I had signed up for the hardest, mentally and physically, career available in the Air Force called Para-rescue. Para-rescue servicemen deploy to rescue pilots shot down behind enemy lines. After basic training, I immediately began my training with the Para-rescue school. The school was designed to weed out people not suited to the pressures of a rescue mission, and the school was good at what they did. Twenty or more students who had already passed a strenuous test were put through their paces for 2 months. When the 2 months ended, only a few students moved to the next phase. The first 2 months were just to trim the group’s size. In total, Para-rescue training was 1 year long, and by the end, only three to five students from the original group graduated. I washed out of the program. I was completely and utterly broken. To this day that failure haunts me; I wish I could go back and do it again.

After my experience in Para-rescue, I transferred into another combat unit and made it through the training. During the remainder of my Air Force career, I was rebuilt physically and psychologically. I do not attribute my rebuilding to any one moment. The whole experience of learning what it was like to be self-disciplined changed me. Discipline gave me focus, purpose,
and happiness. With discipline as a foundation, I began to feel confident. With discipline and confidence, I began achieving goals, feeling less threatened by others, and maintaining healthy relationships.

I served 4 years of duty in the Air Force. Upon my military separation, I immediately started attending the University of Colorado at Colorado Springs. Right from the start, I was a better student and wanted to be in class, to learn, and to be engaged. The discipline to study was easy for me at this point, and my grades showed it. As I progressed in my academic career, it became easier and easier. I went on to earn a Master’s degree in business from Southern Methodist University and finished my coursework for my Doctor of Philosophy at the University of North Texas with a perfect 4.0 grade point average (GPA).

From my personal experiences, I understand that discipline is the key to success. Great people are not born; they are made by spending more time on task, gaining confidence, and working with others. Self-discipline and confidence are factors that influence each other, building a person up, holding him or her back, or tearing him or her down. Deci and Ryan (1985a) developed self-determination theory (SDT) by understanding experiences that define self-discipline, self-confidence, and self-determination. Knowing the impact the Air Force had on me, I began to wonder if other veterans had experiences similar to mine.

Anecdotally, my military colleagues share similar success stories that can be related as applications of SDT. To date, scant research has been conducted on the differences of veterans who complete a 4-year degree and non-veteran adult students (Frederiksen, 1949; Lang & Powers, 2011). My study served to illuminate the differences in undergraduate veteran and non-veteran adult students in higher education and the effect of SDT on success in higher
education. Specifically, I examined if there was a difference in the level of self-determination of undergraduate veteran and non-veteran adult students. I also examined if the level of self-determination in undergraduate veteran students correlated to academic effort. Understanding the factors that contribute to academic effort represented the highest priority for academic administrators.

1.2 The Broader Context

Just as the population grows across the globe, so does the number of people wanting a postsecondary education. Complicating the mere population growth rate is the fact that more people by percentage of population are getting postsecondary educations. Examining United Nations Education Scientific and Cultural Organization (UNESCO, 2010) data reveals that Organization for Economic Co-operation and Development (OECD), an organization with member countries from most of Europe and North American, countries’ percentage of population educational attainment of postsecondary education grew from 22% to 28% during the 8 year period from 2001 to 2008. Global growth in higher education has had positive and negative consequences. Growth in higher education is positive because more people are receiving an opportunity to enrich their lives. However, adding more people to an already strained higher education system has created competition for resources. Unchecked growth has led to problems in institutional efficiency and quality. The United States Department of Education report commissioned by Secretary of Education, Margaret Spellings, examined the state of higher education in 2006 concluded that the quality of American higher education was declining (United States Department of Education, 2000, p. 13).
Private for-profit businesses have entered the industry to take advantage of the high demand. In one case, the University of Phoenix has grown into a giant institution having a 2010 student population of 307,965. However, University of Phoenix’s six year graduation rate was only 17% (Institute of Education Sciences, 2012). For comparison, the six year graduation rate for the University of Texas at Austin was 82.9% (Texas Higher Education Coordinating Board, 2012). The low graduation rates from universities like Phoenix are a national concern because it means that many students are wasting time and money. Under current economic condition, many higher education administrators are trying to improve retention and graduation rates with fewer resources and more students. Every advantage must be uncovered and examined (Jaschik, 2008; Texas Higher Education Coordinating Board, 2000). I examined the small, but growing, population of veteran college students.

As early as 1949, researchers have been interested in the veteran students. Frederiksen (1949) found that non-veteran students had higher achievement in an entry level mathematics course than veteran students. More recently, Lang and Powers (2011) found that veteran students had higher grades, retention and graduation rates than other adult learners. The results of these two studies appear to have opposite conclusions. The difference in the two studies could be the result of many different things. For example, the difference could be because of an improvement in veteran training, during the late 1940s there were many drafted veterans, or there were problems with either study’s methodology. Whatever the reason is for the difference in the two studies, it is clear that veteran academic effort is not a new concern in American higher education.
1.3 Self-Determination and Veteran Students

SDT has been used in educational research for over two decades (Flink, 1992; Miserandino, 1996; Vallerand & Bissonette, 1992; Vallerand, Fortier, & Guay, 1997; Flink, Boggiano & Barrett, 1990). These studies have repeatedly shown that students that are self-determined are more engaged in class, have deeper learning experiences, have higher retention rates, and enjoy their time in school.

1.3.1 Self-Determination

The term self-determination can take on different meanings. For example, in the field of exceptional children, self-determination focuses on choice, self-reliance and independence (Wehmeyer, 1997). Being self-determined can also be about a person or a society. For example, self-determination can be defined as the degree to which a country can operate without the influence of a foreign power. For the purposes of this study, self-determination was discussed, measured, and analyzed under the conceptual framework provided by Deci and Ryan (1985a). It was improved in 2000 when Ryan and Deci developed the original model for self-determination theory (SDT).

Deci and Ryan (1985a) described the three factors of SDT, which were autonomy, competence, and self-relatedness. Autonomy is defined as the freedom to do things (i.e., an external force isn’t holding them back). Competence is the feeling a person has about their abilities to achieve a goal. Competence is a commonly used factor when researching academic effort in higher education; however, it is generally referred to as self-efficacy. The theory of self-efficacy was created by Bandura (1997) and is a person’s view of their ability to achieve a goal. Lastly, self-relatedness is a sense of belonging to the environment. People who feel
integrated into social settings feel more comfortable and subsequently more motivated to achieve their goals. Relatedness is highly correlated to involvement and engagement, and involvement has been shown to be a critical factor for success in higher education (Astin, 1999). The three factors of self-determination are all related to extrinsic and intrinsic motivation, but each factor can be either, or both, extrinsically or intrinsically motivated.

Self-determination should not be confused with motivation. Figure 1 illustrates the relationship between factors of success. Motivation comes from external and internal sources. External sources of motivation are things like rewards, coaching, and threat of punishment. Internal sources of motivation are personal to the individual (i.e., internal desires, interest, and happiness). The primary idea behind self-determination theory is that people inherently want to integrate into their social environments, develop their skills and values, and desire the freedom to accomplish these goals without interference, which is different than when people are externally motivated (i.e., influenced) to do something (Deci & Ryan, 2002).

The amount of motivation is influenced by the person perception of the value of the outcome (i.e., external/internal source of influence) and the risks involved (Atkinson, 1957). The amount of motivation then influences the behaviors, which in turn influences the outcome (Atkinson, 1957). Notice in Figure 1 that effort doesn’t have a direct link to successful outcomes. External forces can act as a filter either enhancing success or preventing it. Figure 1 is presented and discussed as a quick introduction to self-determination. A full discussion is provided in the literature review.
Figure 1.1. Relationship of motivation and self-determination (Atkinson, 1957; Deci & Ryan, 2002). A mix of theories to illustrate that self-determination is separate from motivation and closer to behavior.

The practicality of SDT in education is a fundamental limitation. Teachers have known that “good” students do better. The characteristics of a good student are that they are engaged, interested, put forth effort, and have the desire to learn the topic. These characteristics fit a self-determined student, but they are personal characteristics that the student brings into the classroom.

Teachers can enhance the experience of self-determined students with their teaching style (Harter, 1974; Wehmeyer et al., 2012). Intuitively, enhancing students’ self-determination appears to be a paradox because when teachers try to improve students’ self-determination, it is no longer self-determination. Teachers can externally motivate students to become people who are empowered to choose to do what they want. Military discipline has a similar paradox. A goal of military training is to produce soldiers who are highly disciplined and obey commands without hesitation. Even the military has found that soldiers who are self-disciplined have better performance than soldiers who have to be externally influenced to be disciplined. The two questions that follow are: (a) Can people be taught to be more self-determined? and (b) Do
soldiers become more self-determined by their military experience? The academic success of veteran students warranted examination given their unique experiences in the military and transitioning back into society as a civilian.

1.3.2 Veteran Students

As already mentioned, the experience I received in the military changed me. The thought that exposing people to multiple years of a highly disciplined environment in the military should increase their levels of achievement outside of the military has occurred to many researchers. Brown and Gross (2011) claimed that veterans were a unique subpopulation of higher education adult learners because they brought in different experiences, challenges, and advantages. Some of the challenges a veteran faces entering higher education are relearning study skills, connecting with peers, and adjusting to becoming a civilian (DiRamio, Ackerman, & Mitchell, 2008). Another challenge veteran students face is post-traumatic stress disorder (PTSD). Many studies have noted the rise of PTSD in veterans who have had combat experiences (Ackerman, 2009; Cate, 2011; Murphy, 2011; Barry, Whiteman, & MacDermind-Wadsworth, 2013; Church, 2009; Murphy, 2011).

Veteran students are a part of a subpopulation of students in higher education called adult learners. Adult learners are students who start college at an age greater than 24 (National Student Clearinghouse, 2013). Adult learners have lower graduation and retention rates compared to full-time traditional students. Six year completion rates for adult learners, for the period 2006-2012, was 42% compared to full-time traditional students’ rate of 57% (National Student Clearinghouse, 2013). Notice that adult learners have lower graduation and retention
rates as a whole group; however, veterans have higher graduation and retention rates in comparison to adults (Lang & Powers, 2011).

Educating veteran students serves ethical, practical, and political purposes. From an ethical perspective, retraining those who served their country is the right thing to do. Veterans swear to protect their country, so their fellow countrymen should take care of them in return. Continuing the education of veterans also makes sense from a practical economic standpoint. Veterans have already had a great deal of intense skills, management, and leadership training. In fact, the degree of intensity of their training may be correlated to a rise in anxiety disorders (Lung, Lee, & Shu, 2006). Higher than normal numbers of disorders makes this group of students unique and requires special treatment, analysis and programming. Rumann and Hamrick (2010) outlined many reasons military students need services designed around their special needs. For example, if military students begin their studies while still on active duty, they often transfer between universities because they move all over the world. This mobility creates the need for thoughtful consideration of veteran admissions because their transcripts can become highly complex.

Finally, from a political perspective, limiting the opportunities of over 22 million plus veterans who know how to succeed on the battlefield would be unwise for our country’s future stability (U.S. Census Bureau, 2009). The government has taught them to become soldiers, but universities can help them transition back into society to become productive citizens with lives full of enriching experiences.

Veterans have challenges that non-veteran students do not have, but veterans also have advantages too. One advantage is that veterans have funding from the federal government for
college, known as the GI Bill. The GI Bill experienced change over the years. For example, the Readjustment Assistance Act of 1972 and the recent Post-9/11 Veterans Education Assistance Improvements Act of 2010 were both part of the GI Bill. No matter the change, however, the idea behind the GI Bill remains constant and that is to get more people who served their country educated and back into the workforce.

Another advantage veterans have over their non-veteran counterparts is in leadership experience and perseverance. Veterans begin leading small teams from the beginning of their service. Their responsibility and team sizes grow throughout their time in service, so by the end of their term of service, veterans have had many hours of leadership experience. This experience is an advantage but may also alienate them from the majority of college students and faculty because their confidence and demeanor can be viewed as hard, bossy, and threatening. Additionally, perceptions of people serving in the military vary between people and may change with current events. Military actions such as the Vietnam War and Iraq War influenced the image of the United States soldier. During the Vietnam War, soldiers returning from war were spit on by American citizens who were against the war (McGough, 2012). During the Iraq War, the majority opinion was that we did not want the war, but we were proud of our soldiers. This pride was shown as people volunteered to greet soldiers returning from the Iraq War at airports across the country (Taylor, 2012). In less than one-half of a century the view of the American soldier went from hated to beloved. These perceptions can aid or inhibit a soldier’s return to society.

Being associated with the military could negatively affect a veteran’s ability to assimilate into college life, and changes in public perception could increase the impact on the veteran’s
likelihood to stay and be successful in college. Pascarella (1979) found that social and academic integration are statistically significant factors that negatively correlate to voluntary dropout (i.e., the less a student successfully integrates into college the higher their probability the student has to dropout). So it is important for higher education administrators and faculty to understand veterans as a unique group that have unique needs socialization needs that have to be addressed to help veterans achieve their academic goals.

The number of veterans using their military education benefits rose from 570,000 in 2009 to over 800,000 in 2010 and the numbers of female veterans are also increasing (VA, 2012). The Department of Veterans Affairs (2007) expects the current level of 8 million female veterans to rise to over ten million by 2020. Gender differences have been studied extensively in higher education (Pascarella & Terenzini, 1983; Friedman & Mandel, 2011) because females account for 60% of students entering college (King, 2010). Understanding the factors that influence veterans, particularly female veterans, to dropout represented an issue of importance in the next few years because of the shifts and increases in veterans’ enrollments.

1.4 Problem Statement

The success of students in higher education has been studied from many different points of view. For example, Tinto (1975) and Pascarella (1985) studied the factor of academic effort as measured by persistence. Scholars have also explored a wide range of factors that affect persistence and success such as ethnicity (Wells, 2008) and adult students (Cavote & Kopera-Fyre, 2007). However, there are very few empirical studies done specifically on veteran students and the factors that affect their academic success (Frederiksen, 1949; Lang & Powers,
2011). One reason for the lack of research is that, until just recently, colleges failed to track veteran success as a separate cohort (Fain, 2011).

This study provides a necessary step in understanding veteran students. Furthermore, because of the training and experience that the veteran students received while in the military, it is logical to hypothesize that one factor of higher education success may be an increase in self-determination. Examining the differences between veterans and non-veteran non-traditional students is a good starting point because self-determination has been previously found to be a determinant of success in higher education.

1.5 Purpose of the Study, Research Questions, and Hypothesis

The purpose of this study is to examine the differences in self-determination between veteran and non-veteran students and the effect of these differences on academic effort at four year degree granting institutions. Self-assessments were used to define each student’s proclivity toward different factors of self-determination. The following research questions guided this study:

1. Is there a statistically significant relationship between veteran status and self-determination after controlling for gender and age?

2. Is there a statistically significant relationship between self-determination and academic effort after controlling for gender and age?

There are two hypotheses for this study. The first hypotheses was that students who have served in the United States military and then returned to four-year universities would have higher levels of self-determination than adult students who did not serve in the military, after controlling for gender and age. The second hypothesis was that self-determination would
contribute significantly to academic effort after controlling for gender and age at 4-year universities.

1.6 Conceptual Framework

The general causal model of college impact (GCMCI) by Pascarella (1985) was used in conjunction with self-determination theory as the conceptual framework for this study. The GCMCI model was developed on the basis of Pascarella’s (1983) analysis of the persistence model created by Tinto (1975). Tinto’s model was not used because of its loss of explanatory power when applied to non-traditional students (Pascarella, Duby, & Iverson, 1983). Figure 2 illustrates the GCMCI model’s six components: (a) structural/organization, (b) student background and pre-college traits, (c) interactions with agents of socialization, (d) institutional environment, (e) quality of student effort and learning, and (f) cognitive development. The student background and pre-college traits (SBPC) and academic effort components were the focuses of this study.

Pascarella (1985) framed the GCMCI and used a variety of measures for each factor. The SBPC factors included standardized test scores (e.g., ACT and SAT), gender, parent’s education, high school grades, high school engagement, education aspirations, and academic self-efficacy. This study extended these measures by including, military service, marital status, employment status, and student type (e.g., online or face-to-face). Three instruments were used to measure student self-determination. These instruments were: (a) New General Self-Efficacy Scale (NGSES) to measure self-efficacy (Chen, Gully, & Eden, 2001); (b) Self-Determination Scale (SDS) to measure students’ overall level of self-determination (Sheldon & Deci, 1996); and (c) three sections of the 2013 National Survey of Student Engagement (NSSE, 2011). The three NSSE
sections were the following: (a) reflective and integrative learning, (b) learning strategies, and (c) quantitative reasoning.

There are several ways to measure academic success. For example, grade point average (GPA) is a commonly used measure of academic success. However, Cohen (1984) completed a meta-analysis of 108 studies and concluded that although GPA is correlated to academic success, the effect size is very small. I used a more direct approach and asked students their perceived academic success using NSSE, a well-tested instrument (Gordon, Ludlum, & Hoey, 2008).

Figure 1.2. Pascarella’s (1985) GCMCI with squares to represent the GCMI aspects and circles to represent how veteran status and self-determination fit into the GCMI model.
1.7 Definition of Terms

This section contains the operational definitions of key terms used throughout this document. Two important constructs to this study were self-motivation and conscientiousness.

*Academic achievement.* Academic achievement was measured by combining survey items from NSSE (2012).

*Adult students.* For the purpose of this study, these are college students older than 24 years of age.

*Autonomy.* A person’s perception of having the option to act in the way he or she chooses (Moller & Deci, 2010).

*Conscientiousness.* “Socially prescribed impulse control” (Cheng & Lckes, 2009, p. 817).

*Extrinsic motivation.* People’s drive to action due to an outside or external influence, such as avoiding a punishment or obtaining a reward that has value. If a person has the choice and autonomy to act, then the action is self-determined even if the motivational source is external (Deci & Ryan, 1987).

*Graduation rate.* The percent of students meeting all of the requirements for obtaining a degree and is usually expressed by tracking cohorts in 4, 5, and 6 year increments.

*Intrinsic motivation.* The internal energy that moves people to act, but not all self-determined behaviors occur due to this innate motivation or internal energy (Deci & Ryan, 1987).

*Motivation.* “Energy, direction, persistence, and equifinality— all aspects of activation and intention” (Ryan & Deci, 2000, p. 69).
Persistent rate. A term used to describe the percentage of students who have not finished their college degrees but who continue to enroll from one term to another. For example, if 1,000 freshmen students attended the 2010 spring semester and 900 of those students enrolled in the 2010 fall semester, then the university’s persistence rate would be 90%. This rate of retention or persistence is not to be confused with the graduation rate.

Self-determination. For the purpose of this study, self-determination was measured using the self-determination scale created by Sheldon and Deci (1996).

Self-efficacy. People’s “confidence in their ability to organize and execute a given course of action to solve a problem or accomplish a task” (Eccles & Wigfield, 2002, p. 110).


Self-relatedness. A person’s perception of their peer or faculty relationships. The more students feel connected, included, and integrated, the higher their probability to stay in school and finish their degree (Pascarella, 1980).

Veteran students. These are current college students who are current or former members of the active duty military limited to the primary branches of the United States armed forces (e.g., Air Force, Army, Navy, and Marines), regardless of deployment status, combat experience, legal veteran status, or GI Bill use (Vacchi, 2012, p. 17).

1.8 Significance

Self-determination is important for parents, educators, policy makers, employers and students themselves, because self-determination has been shown to increase academic effort (Flink, Boggiano & Barrett, 1990; Miserandino 1996). Motivating people to do what is right for
themselves and for society is foundational to the meaningful life or the purpose of having a happy, fulfilling life. When people act positively because they want to, the results include better production and deeper learning, which leads to escalating successes (Ryan & Grolnick, 1986). Self-determination theory enhances the understanding of motivation and subsequent life fulfillment. Ryan and Deci (2000) explained as follows:

Research on the conditions that foster versus undermine positive human potential has both theoretical import and practical significance because it can contribute not only to formal knowledge of the causes of human behavior but also to the design of social environments that optimize people’s development, performance, and well-being. (p. 68)

This study is theoretically important in order to build on several factors of academic success. Gottfried et al. (2011) found that academic motivation strongly links childhood to adulthood. However, one category that they found not linked to adulthood from childhood was the social aspect of motivational development. Gottfried et al. claimed that social norms can influence the development of motivation throughout a person’s life. Experiences, such as serving in the military, might create the social environment that enhances the development of motivation. Therefore, this study offered a better understanding of motivational development between veteran and nonveteran students populating university and college classrooms.

1.9 Limitations and Delimitations

1.9.1 Limitations

The data collection occurred via an online survey. Online data collection limited participation to students with access to online resources and created a bias toward students tending to answer online surveys. The online survey method was a limitation due to expected
low response rates. The National Survey of Student Engagement’s (NSSE, 2012) response rates were as low as 2% for some institutions but were 31% on average for participating institutions in the United States. The low 2% return rate showed the magnitude of the limitation.

1.9.2 Delimitations

I only surveyed students starting at public 4-year universities. Because the primary purpose of the study was to examine differences between students who had and had not served in the armed forces, the comparison group of nonveteran students had to be similar to the veteran students in age to control for maturation effects.

This study was limited to United States military service organizations. Military forces exist throughout the world. Ahmadi and Fathi-ashtiani (2008) conducted a study of 400 veterans in the country of Iran and concluded military veterans had more academic motivation. For example, Iraq’s soldiers are just as fierce, determined, and proud as United States soldiers; however, their training, ideology, and mission would have been too varied to include. Additionally, foreign military organizations, such as the Israeli army, mandate required service to all citizens. Requiring military service could drastically change the profile of their soldiers, and the US, all military personnel serve voluntarily.

The major focus of the study was veteran students. Military service can come from many organizations. These organizations vary greatly in their mission. For example, the Army concentrates its fighting force on the ground with pride. In contrast, the Air Force fights using high-tech equipment from the air. Both services have ground and air forces, but their missions and identities are vastly different. What was important for this study involved the service units having extensive basic training requirements and requiring full-time service. Veterans of service
organizations like the Air National Guard or Army Reserves would not meet this definition. This study was limited to active duty veterans of the primary branches of the United States armed forces (e.g., Air Force, Army, Navy, Marines, and Coast Guard).

1.10 Organization of the Dissertation

This dissertation includes five chapters. As presented above, the Chapter I introduced self-determination, veteran students, an outline of the problem, the framework of the study. The first chapter also included my rationale for studying the topic. Chapter II contains a literature review for self-determination, veteran students, and non-traditional students. Chapter III provides the details for the methodology, including descriptions of the procedures for analysis and the instrument. Chapter IV presents the results of the analysis. Chapter V provides a discussion of the findings and implications for future studies.
CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to examine the differences in self-determination between veteran versus non-veteran adult students in postsecondary education and the correlation between veteran self-determination and academic effort. This chapter provides a review of the literature on self-determination, adult college students, and college students with military service (i.e., veterans).

A review of literature on self-determination and veterans is necessary as the focal points for the study. Adult students serve as the comparison group for the veteran students. Veterans do not enter college as 18 year olds, which could present confounding problems with maturation and life experience issues if veterans were compared to 18 year old freshmen who just graduated from high school. Furthermore, researchers have found that as a group, adult students tend to demonstrate statistically significant differences from students who entered college directly after high school (Dill & Henley, 1998; Eppler & Harju, 1997; Justice & Dornan, 2001; Taniguchi & Kaufman, 2007).

2.1 Motivation and Self-determination

Research on human motivation has a rich history, both vast in specialty and deep in lineage. Some of the original research in the field was conducted by notable psychologists such as Sigmund Freud (1927) and Clark Hull (1943) on motivation theories. Over the years of research, motivation has been shown by researchers to be a broad topic. Motivation in its entirety is well beyond the scope of the literature review. Ryan and Deci (2000) defined motivation as concerning “energy, direction, persistence, and equifinality--all aspects of
activation and intention” (p. 69). The focus of this review is motivation as it relates to self-determined behaviors (i.e., setting goals and achieving them).

Research on human motivation in the 1960s and 1970s tended to focus on external motivation. McGregor (1960) with his seminal work explained his Theory X and Y. Theory X stipulated that American businesses thought employees needed constant supervision; whereas, Theory Y considered that employees could achieve more if they were allowed to contribute autonomously.

During the 1970s, self-determination began to emerge as a major topic in academic success research. Felixbrod and O’leary (1974) examined whether students could be self-motivated using an experimental design with 24 students ages 8 to 9 years old. They showed that students who were self-determined performed better than the control group of students who were externally controlled during an academic test. During this same time, Bandura (1977) developed the unifying theory of behavioral change and introduced the construct of self-efficacy. Self-efficacy is a person’s view of his or her ability to achieve a goal (Bandura, 1977).

Subsequently, countless researchers have tested the effects of self-efficacy in fields ranging from sports to higher education. Self-efficacy was found to be positively correlated with academic achievement and was a core principle in the study of academic success (Lent, Brown, & Larkin, 1984; Pintrich & Groot, 1990; Vuong, Brown-Welty, & Tracz, 2010). Self-efficacy was important to this study as one of the factors of self-determination (Deci & Ryan, 1985a).

Deci and Ryan (1985a) theorized that self-determined behavior was made up of multiple factors including autonomy, competence, and self-relatedness. Autonomy is a person’s belief in having control over accomplishing desired outcomes and not being held back by an external
force. Competence (i.e., self-efficacy) is a person’s belief in the ability to accomplish something. Self-relatedness is a person’s view of how well he or she fits in the social environment.

As stated in Chapter I, the self-determination construct has different meanings depending on the content domain. Within the domain of education research, self-determination has two distinct theoretic frameworks. Special education research views self-determination as a developmental model for healthy maturation. For the purpose of this study, self-determination was framed as choice, self-reliance, and independence (Wehmeyer, 1997). From a broader point of view, self-determination is part of motivation. There are many sources of motivation, and some sources of motivation are external (e.g., parents, police, teachers) and some are internal. External sources of motivation may influence self-determination, but the focus of this study was the individual’s view of external motivation sources and not the external sources themselves (Deci & Ryan, 1985a). College students commonly have many sources of external motivators to become academically successful. For example, parents, teachers, advisors, deans, and finances may all act as external motivators for college students. It was beyond the scope of this study to examine each external source of motivation. Instead, this study captured college students’ perceptions of external motivation sources as reflections of autonomy, a factor of self-determination.

2.2 Self-determination and Academic Success

The relationship between self-determined students and academic effort has been studied in a variety of settings and at a range of levels starting as early as elementary school. This section of the literature review examines the relationship between self-determination and academic effort in different levels of education.
2.2.1 Elementary School Students

Studies of self-determination and academic effort have demonstrated statistically significant positive correlations for children. Flink, Boggiano, and Barrett (1990) used a multi-level model of teachers ($n = 15$) and elementary school students ($n = 267$) to examine the effects of teaching style on students’ self-determination. As predicted, teachers who employed a controlling style influenced self-determination negatively. Students’ self-determination levels were increased when teachers employed strategies that encouraged self-determined behaviors. Students who had controlling teachers had declining performance over time. Flink et al. made note of an important conflicting perspective. Controlling teachers were rated by evaluators as more effective, even though their students’ achievement was lower than students of teachers who were not controlling.

Similarly, Miserandino (1996) found a positive relationship between external control and academic effort via repeated measures regression ($n = 77$), and the results showed a positive relationship between external control (i.e., punishment or reward from parents and/or teachers) and academic effort. Children also showed decreases in academic effort if they had decreases in their competence construct. Meaning, if students had negative views of their abilities their actual outcomes were lower.

2.2.2 College Students

Self-determination effects on academic effort are not limited to children; the relationship exists in adults as well. For example, McHoskey (1999) conducted a series of studies on the relationship between self-determination and sources of motivation on adults. External motivation, such as financial desires, negatively correlated with social connectedness
Conversely, internal motivation positively correlated with family, self-love, and community factors, supporting the self-determination theory postulate that self-determined beliefs improve well-being (Deci & Ryan, 1985a). McHoskey’s (1999) findings supported the position that self-determined behaviors lead to increased well-being and external motivation leads to antisocial behavior and depression. McHoskey’s study had two significant limitations: (a) all participants came from a single class, and (b) all sample sizes were less than 150 adults.

Although their study was not aimed at self-determination, Allen, Robbins, Casillas, and Oh (2008) studied components of self-determination on the retention of college students. Allen et al. built on the findings of Robbins, Allen, Casillas, Peterson and Le (2006), wherein the researchers created a survey called the Student Readiness Inventory (SRI). They employed a longitudinal logistic regression method and incorporated 3 years of data from 2003 to 2005. Allen et al. tested the explanatory power of motivation and social connectedness on students’ third-year enrollment. Results indicated that social connectedness (i.e., the degree a person feels belonging to the groups of people in his or her surroundings) was a strong positive predictor of retention.

2.2.3 Mediating Factors of Self-Determination

Numerous factors affect motivation. Kaufman and Dodge (2009) studied the four academic motivation factors of performance approach, failure avoidance, mastery, and autonomy. Two separate regressions were run on relatedness and value of the task. The results of the study showed a small effect size ($R^2 = .10$) for autonomy and mastery on relatedness. Autonomy and mastery explained a large amount ($R^2 = .45$) of the variance of the value
construct; however, a major limitation of the study was small convenience sample \( (n = 222) \) from a single university.

Chen and Jang (2010) tested self-determination in a full model to explain academic success by analyzing online class environments. They used a variety of established instruments, such as the Learning Climate Questionnaire (LCQ) and Academic Motivation Scale (AMS), and employed structural equation modeling (SEM) as the method of analysis. Chen and Jang showed that contextual support can explain the variance in need satisfaction and learning outcomes. They showed need satisfaction to have a mediating effect between contextual support and self-determination. Some of Chen and Jang’s findings supported SDT; however, the sample was only two classes with a sample size of 262, and the study was performed at a single university in the United States.

Beachboard, Beachboard, and Adkison (2011) studied the effects of relatedness as a mediating variable on learning communities using a stratified random sample of the 2005 NSSE data that originated from 529 four-year public institutions. Beachboard et al. examined whether student cohorts affected academic effort. They employed three steps to test the theories. Beachboard et al. used stepwise linear regression to predict whether cohorts affected academic effort. The cohort variable was used independently in the first block, then control variables were added, and finally a relatedness variable was added. Results indicated that being in a cohort is mediated by relatedness. The effect size was extremely small, but Beachboard et al.’s results support the assumptions of the relatedness element of SDT.

Wehmeyer et al. (2012) took a different approach to self-determination by examining the relationship of self-determined teaching methods and students’ self-determined learning
behaviors. Wehmeyer et al. employed complex SEM with latent variables using a control group and a treatment group for longitudinal data collection over 3 years. The treatment group displayed a statistically significant improvement in self-determination learning behavior in each period. The control group’s self-determination decreased from the base year until the second year when the participants in the control group began receiving the same intervention as the treatment group. Wehmeyer et al. revealed that teaching methods can improve students’ self-determination learning behavior and subsequently attain deeper, more meaningful learning experiences.

2.2.4 Self-determination Methodology Summary

Research in self-determination has commonly involved a series of complimentary quantitative methodologies. The most common methodology is some form of regression. As more factors affecting self-determination have emerged, the analyses have become more complex. Recently more advanced statistical techniques such as SEM and HLM have been used to arrive at the most parsimonious solutions. One rather concerning fact arising from this review of self-determination literature is the paucity of qualitative research in the area of self-determination. This leaves the field of self-determination to be shaped by a very limited perspective. Even more concerning is that only a handful of experimental studies have been performed.

2.3 Non-Traditional Students and the Variables Affecting Adult Students’ Academic Success

Academic success has been studied on both traditional students and non-traditional students. The National Center for Education Statistics (NCES, 2013) defined non-traditional students as delaying postsecondary education enrollment, attending part time, having no
dependence on parents and probably having their own dependents (e.g., single parenting), simultaneously going to school and working full-time during enrollment, and as most likely holding a GED or high school equivalent certificate. One difficulty of studying non-traditional students is the diverse characteristics of today’s non-traditional students.

Based on the NCES definition of non-traditional student, the classification of slightly non-traditional or highly non-traditional depends on how many non-traditional characteristics student have. In 1996, 59% of undergraduates were older than 24, and 42% of college students attending college part-time (NCES, 2013). The trend for college students to attend school part-time has increased over the years. In 2011, only 27% of students older than 24 attended college full-time, meaning the vast majority of 73% of non-traditional students attended part-time (Shapiro & Dundar, 2011). In the following section, I discuss how the demographic factors of age, working commitment, learning commitment, and gender affect non-traditional students’ success in college.

2.3.1 Age

While non-traditional students might have a complex make up, age was differentiating factor for this study. Specifically, I defined adult students as delaying enrollment into a 4-year university and being at least 24 years of age when starting college. The age of 24 years was the delimiting age for this definition because it allowed enough time for both 4- and 6-year military service commitments to have ended, and 24 years of age is a standard nontraditional age reference for college students by national data centers (NCES, 2013). The reason for the difference in the national standard definition and the definition for this study was that adult students served as a comparison group for veterans for the purpose of controlling for effects of
maturation. The overwhelming bulk of the research on academic effort of non-traditional aged students has shown that older students demonstrate better academic performance than their traditional aged peers (Kaufman, Agars, & Lopez-Wagner, 2008; Sparkman, 2012; Wyatt, 2011).

2.3.2 Working Commitments

Eppler and Harju (1997) found that non-traditional students usually have more outside work commitments than traditional students. Additionally, they noted when non-traditional students had to work greater numbers of hours at employment outside of school, they suffered from lower GPAs. Gantt (2009) showed that students with increased work demands were less likely to complete their academic programs.

2.3.3 Learning Commitment

Dill and Henley (1998) found that differences between non-traditional and traditional students desire to learn. Justice and Dornan (2001) found non-traditional students spent statistically significant more time in the incorporation and integration of difficult concepts compared to traditional students. Eppler and Harju (1997) also found that non-traditional students were more interested in learning and integrating concepts than traditional students. In contrast, traditional students focused only on completing the necessary academic tasks for finishing a class.

Other studies have found little to no difference between traditional and non-traditional students in terms of traits leading to academic success. Justice and Dornan (2001) found the two groups were not statistically different in memory, study habits, motivation, self-efficacy, or performance. The differences that Justice and Dornan (2001) did find expressed very small
effect sizes, and a criticism of their conflicting results involves using participants from a single
class and very small group sizes, such as 50 traditional and only 36 non-traditional students.

2.3.4 Gender

One opposing difference between college students and military personnel is the
percentage of females. Females have shown a higher percentage of enrollment in higher
education (UNESCO, 2010). In the US, the percentage of women enrolled in higher education
exceeds 60%, whereas the percentage of females in the military, in both enlisted and officer
roles, has been low at 17%. The difference in percentages between the two groups might lead
to a limitation when studying female veterans enrolled in higher education, because of the
disproportionate amount of female representation in higher education. Nonetheless,
investigations of gender differences for college students tend to yield mixed findings. Friedman
and Mandel (2011) found gender not to be a statistically significant factor in academic
retention. However, gender can play a role in female students’ academic success because of
cultural or physical issues. Pregnancy, for example, is obviously unique to females. Additionally,
men face cultural stigmas when enrolling part-time or having a gap in work history, yet women
do not face the same stigmas (Taniguchi & Kaufman, 2007).

2.3.5 Summary

To reiterate, the literature supported the need to control for age as a factor. As a whole,
adult students are more similar to veterans than traditional students. To reiterate, adult
students expect to be treated as adults, prefer to work collaboratively, and need options to
make schooling convenient (e.g., online courses, night courses, or courses held at facilities
closer to their homes; Wyatt, 2011).
2.4 Veteran Students

The military has five higher education institutions. The higher education institutions in the military are the Air Force Academy, Coast Guard Academy, Merchant Marine Academy, Military Academy (a.k.a., West Point), and Naval Academy. The Military Academy is oldest and was established in 1801 (West Point, 2012). To expand the number of trained military members, the Morrill Act of 1862 formally incorporated military training into land grant universities (Runman, 2010).

The major influx of military service men at public universities did not occur until the U.S. Congress passed the Servicemen’s Readjustment Act of 1944, commonly known as the GI Bill. Because veteran students are usually older than traditional college students, they are usually classified as non-traditional students. However, veteran students are distinctly different than most non-veteran non-traditional students. For example, veterans tend to have a low academic self-efficacy and high opinion about personal leadership ability (Lang & Powers, 2011). Veterans might also bring into college symptoms of physical and emotional trauma from combat deployments such as post-traumatic stress disorder (PTSD; Church, 2009). PTSD among veterans has gained national attention because the increase in occurrence among veterans deployed during recent conflicts in the Middle East. PTSD might affect some of the veterans participating in the study and lead to skewed results. As discussed in the Chapter III, PTSD in veteran students is out of the scope of this study, and question was included on the survey to capture students’ combat experiences in order to isolate these influences.

An interesting distinction has been found by researchers between veteran and non-veteran adult students. While adult students demonstrate lower graduation rates than
traditional students, Bound and Turner (1999) found that veteran students were statistically more likely to graduate than adult students who had not served in the military. Tracking the success of veterans has not been done regularly at higher education institutions. By 2012, nearly 70% of all institutions did not separately track veterans’ academic progress in terms of GPA, retention, and graduation, even though most higher education institutions now recognize their veteran students as an important group and have begun to provide them with special services (Fain, 2011). In a qualitative study of veteran students’ needs on college campuses, Murphy (2011) concluded that veterans want a special service center able to address their unique needs. Veterans are concerned about the credit they received from colleges for their experiences in the military and about admissions personnel considering their experience when admitting them to college (Murphy, 2011).

2.5 Conclusion

This chapter provided a review of the existing research in the field of self-determination, adult students, and veteran students as related to the current study. The next chapter provides a review of the methodology used in the study.
CHAPTER 3

METHODS

This study had two objectives. The first objective was to determine if there was a statistically significant relationship between veteran status and self-determination after controlling for gender and age. The second objective was to determine if there was a statistically significant relationship between self-determination and academic effort after controlling for gender and age. This chapter provides the methodology used in the study.

3.1 Population and Sample

Veterans are a growing special group in higher education. The population of this study was undergraduate veteran and non-veteran students from 4-year institutions in the United States. The universities included in the study were medium (i.e., at least 10,000 students) to large public universities that confer doctoral degrees. Other universities and community colleges were excluded because of the potential differences in their student populations compared to 4-year universities.

The sample of this study was created by soliciting all students at each participating public 4-year university. Age was included as a control variable because students’ self-determination may change with maturity. Furthermore, students starting an undergraduate education when 24 or older have shown statistically significant differences in the factors that influence academic effort compared to students who start an undergraduate education at the traditional age of 18 (Dill & Henley, 1998).

Requests to participate were distributed via email to as many students as possible. I sought to reach a minimum of 6,300 veteran and non-veteran, students. I sent open records
requests to each university to obtain directory information for their entire populations of veteran and nonveteran undergraduate students aged 24 and above. The average size of the veteran student population at these universities was 700. A conservative estimate of a 3% response rate for the survey was made. I anticipated receiving 21 veteran participant responses from each university. I continued to solicit responses until I obtained 80 total veteran participants, which was well above the number necessary to achieve adequate power for conducting hierarchical regression analysis with study’s variables.

The survey invitations were distributed through email. Participants were asked to complete the questionnaire voluntarily. I kept all responses confidential. In the cases where bulk mail was used, I sent three follow-up emails as reminders. Participants could opt-out of receiving additional emails from me. The first reminder was sent 3 days after the initial request for participation. The second reminder sent 1 week following the initial request, and the final reminder was sent after 2 weeks.

3.2 Instruments and Data Collection Procedures

The instrument had five sections with a total of 46 items. I developed the first two sections and used existing survey instruments for the items included in the remaining sections. The first section captured demographic information, and the second section captured military background information including veterans’ combat careers. The second section was only presented to participants who reported having had military experience.

The third section was borrowed from the New General Self-Efficacy Scale (NGSES) by Chen, Gully, and Eden (2001). The NGSES had many advantages over other self-efficacy instruments. First, the instrument was short, consisting of eight items. Second, the instrument
did not focus on a particular type of self-efficacy. The instrument was thoroughly examined for test-retest coefficients \( (r = .67) \) and reliability with an average Cronbach’s alpha of .88 (Cable & Judge, 1994; DeWitz, Woolsey, & Walsh, 2009). To demonstrate content validity, Chen et al. (2001) conducted evaluation panels using graduate students. The graduate student panel categorized 98% of the NGSES items as self-efficacy. Chen et al. examined the NGSES’s construct validity using principle components analysis. The results of the principle components analysis showed the instrument loaded on one dimension, meaning the instrument measured one construct as intended by its creators. The NGSES was designed to be used to measure self-efficacy in higher education students, the population of this study. Therefore external validity was not a concern because I did not generalize the NGSES measures onto a different population or setting.

The fourth section captured the student’s academic effort using the National Survey of Student Engagement’s (NSSE, 2012) student academic challenge section. The academic challenge section was a small part of the NSSE questionnaire with 13 items designed to capture students’ perspectives about how well they think they are doing in college. I included these 13 items to create a self-reported measure of how the students perceive they are doing in the three areas of reflective and integrative learning, learning strategies, and quantitative reasoning. The items were repeatedly tested with national data and demonstrated good reliability and validity for use with higher education students (Campbell & Cabrera, 2011; Carle et al., 2009; NSSE, 2011). The validity of the assessment was established through forums and expert review (NSSE, 2013). NSSE (2013) construct validity was examined by its creators and external researchers through factor analysis, and the results showed the concepts being
measured loaded consistently. Construct validity was confirmed by external researchers (Campbell & Cabrera, 2011; Carle et al., 2009). Campbell and Cabrera (2011) used confirmatory factor analysis and noted the inter-correlations between benchmarks resulted in a good model fit ($\chi^2 = 89.6, p < .05$). Additionally, the NSSE was specifically designed to be administrated to higher education students to measure engagement and academic gains, which was the intended use in this study (NSSE, 2011). The Cronbach’s alpha reliability measures for first year students were .87 for reflective and integrative learning, .77 for learning strategies, and .85 for quantitative reasoning (NSSE, 2011).

The fifth and final section of the survey was the Self-determination Scale created by Sheldon and Deci (1996) to measure the constructs of self-determination. The scale had 10 items and the two factors of sense of self and sense of choice. The instrument was repeatedly tested and demonstrated test-retest reliability, $r = .77$, and Cronbach's alphas ranging from .85 to .93 (Elliot & McGregor 2001; Sheldon, 1996; Sheldon & Deci, 1996; Thrash & Elliot, 2002). Sheldon and Deci, experts in the field of self-determination, created the assessment to measure self-determination in adults, making it appropriate for this study’s population. Additionally, the SDS was used in two studies in which the two factors loaded consistently with alternative assessments of self-determination (Sheldon, 1995; Sheldon, Ryan, & Reis, 1996).

3.3 Variables

There were two dependent variables in the study. The self-determination scale and self-efficacy sections of the survey were combined to create a latent self-determination variable as the dependent variable for the first research question. The two sections were combined
because the self-determination scale only measured autonomy and self-relatedness constructs. The self-determination scale did not measure the competence construct of self-determination.

I made the case in Chapter I that competence and self-efficacy represent the same constructs. The self-efficacy assessment measured competence and the two sections of self-determination and self-efficacy were combined together to provide a complete measure of self-determination. The autonomy construct in the self-determination scale had five items (Items 18, 20, 22, 24, 26). The self-relatedness construct in the self-determination scale had five items (Items 19, 21, 23, 25, 27). The competence (i.e., self-efficacy) construct had eight items (Items 16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8).

A percentage of maximum score was calculated for each construct, and the three scores were averaged to form the self-determination variable. The percentage was used to account for the different ranges of total score for each construct. By changing each construct into a percentage score the score will be standardized to a value from 0 to 1. In addition, the score inherently weights each construct as the same despite the number of questions it takes to determine the construct.

The NSSE items were used as indicators of academic effort to answer the second research question. The independent variables included the personal characteristics of gender, age, marital status, employment status, military status, and type of enrollment (e.g., online or face-to-face).

3.4 Ordinary Least Squares Data Analysis

Hierarchical ordinary least squares analysis (OLS) was utilized to answer both research questions. OLS has been used by researchers to analyze relationships between variables when
the relationships might be either positive or negative (Pedhazur, 1997). A positive relationship occurs when one variable’s value goes up and the second variable’s value increases; a negative relationship is defined by one variable going up and the other going down (Pedhazur, 1997). The amount of increase in each variable was not important so long as the increases were consistent with each other. For example, when one variable increases a single point, the second variable can increase by 10 points so long as it goes up 10 points each time the first variable goes up one point.

Hierarchical OLS is type of OLS analysis that adds single variables or groups of variables in sequence to examine the change in variance explained. The hierarchical OLS process begins by running a base model using primary variables. Then, additional variables are added to the OLS analysis, and the results of the base model and subsequent models are compared to determine if a change in the model’s statistical significance and in each variable occurs (Field, Miles, & Field, 2012).

To answer the first research question, hierarchical ordinary least squares analysis was used to determine if a statistically significant relationship between veteran status and self-determination, after controlling for gender and age, occurred. The self-determination latent variable was the dependent variable in three regression models. Model 1 contained the age and gender status independent variables. Model 2 contained the veteran status, age and gender independent variables.

To answer the second research question, hierarchical ordinary least squares analysis used to determine if a statistically significant relationship between veteran self-determination and academic effort, after controlling for gender and age, was observed. The academic effort
latent variable was the dependent variable in two regression models. Model 1 contained the
gender and age independent variables. Model 2 contained the gender, age, and self-
determination independent variables.

3.4.1 Assumptions

A number of assumptions had to be met before running OLS. For example, the variable
values had to be normally distributed. SPSS version 19 histograms and Q-Q plots and were used
to determine the distribution’s normality. In addition, skewness and kurtosis were examined,
and if either range was greater than 1, a transformation step was applied with the data to
reduce the effects of skewness and kurtosis (Pedhazur, 1997).

Another assumption of OLS requires the relationships to be linear and homoscedastic.

Violations of linearity and homoscedasticity can be detected by examining plots. To be
homoscedastic, the variance had to be equally distributed along the line of best fit. To
determine if the assumption of linearity and homoscedasticity were met, the standardized
residuals values were plotted against the predicted values. Additionally, independent variables in
a regression should have minimal correlation with each other (i.e., little to no multicollinearity).
A correlation matrix was analyzed to determine if multicollinearity existed. If collinearity
existed, structure coefficients were examined to describe which variables explained overlapping
variances (Courville & Thompson, 2001).

3.4.2 Limitations

OLS analysis provides researchers with results to indicate if relationships exist between
variables. Without employing specific steps through an experimental design, as in the case of
this study, OLS does not provide researchers adequate information to infer causation. As
previously discussed, the reason for two variables to have a relationship may not be evident in the analysis. Salkind (2011) provided the example that in the summer months, people eat more ice cream, and crime rates rise. People could eat more ice cream because it is getting hotter. More crime could be caused by the increase in heat or other economic factors associated with summer like higher unemployment. If the amount of ice cream consumed and crime rates were run in a regression, the result is likely to confirm a statistically significant positive correlation. The point is that the researcher cannot infer that eating ice cream causes more crime by basic OLS alone, so additional procedures have to be followed.

3.4.3 Variations

There are many types of regression. A single independent variable can be regressed with a single dependent variable. Multiple independent variables can be regressed with single or multiple dependent variables. Independent variables can be regressed all at the same time or added in blocks. Regression, ANOVA, and t-tests are all part of the General Linear Model (GLM) used for OLS (Salkind, 2011; Wilcox, 1987).

3.5 Justification of Selected Data Analysis Method

Studies of academic success and self-determination have used many of the available statistical analyses (Artino, 2009; Artino & Stephens, 2009; Aspelmeier, Love, McGill, Elliott, & Pierce, 2012; Beachboard, Beachboard, Li, & Adkison, 2012; Bowman, 2010; Brady-Amoon & Jairo, 2011; Brockelman, 2009; Gilardi, & Guglielmetti, 2011; Johnson & Nussbaum, 2012; Kaufman & Dodge, 2009; Lundberg 2012; Moller & Deci, 2010; Pintrich & Groot, 1990; Ryan et al., 2006; Sparkman, 2012; Thrash & Elliot, 2002). To help justify this study’s statistical analysis,
A review of analysis used in self-determination studies and academic success is provided. The review is from basic analytic procedures through advanced statistical processes.

Chi-square is a common statistical procedure for research that involves survey data. Chi-square analysis is not limited to assumptions of normality and is therefore considered a non-parametric test. Researchers of motivation have used chi-square to show orientations toward motivation and differences between groups (Koestner & Zuckerman, 1994; Lent, Brown, & Larkin, 1984). For example, Koestner and Zuckerman (1994) found, among 60 students, those with a higher orientation toward autonomy also had higher self-confidence.

The remaining quantitative methods involved use of the general linear model (GLM). T-tests are a rudimentary GLM statistical procedure for which two mean values are tested to determine if they exhibit a statistically significant difference. Researchers rarely use t-tests as the only analysis; however, the procedure tends to be incorporated as one of the tests performed. Researchers have used t-tests to help explain variances in differences between graduate and undergraduate students (Artino & Stephens, 2009) and in coping strategies between traditional and non-traditional students (Johnson & Nussbaum, 2012). There are many other studies related to motivation that used t-tests (Aspelmeier, Love, McGill, Elliott, & Pierce, 2012; Beachboard, Beachboard, & Adkison, 2011; Brockelman, 2009; Lent, Brown, & Larkin, 1984; Pintrich & Groot, 1990). Using two survey instruments on 320 participants, Johnson and Nussbaum (2012) found that students from families promoting self-expression and emotional well-being had statistically significant different levels of self-relatedness and integrated into college better. With an effect size of $r^2 = .34$, the explanation of variance was strong.
Analysis of variance (ANOVA) is similar to the $t$-test because it measures statistical differences between three or more groups at the same time. Multiple $t$-tests could be run to do what an ANOVA does, but the total accumulation of Type I error between groups would not be accounted for and would require the Bonferroni adjustment to be performed to reduce error. Like $t$-tests, many researchers use ANOVA to analyze data in conjunction with other statistical techniques, such as regression (Hayamizu, 1997).

A related but more advanced procedure is multivariate analysis of variance (MANOVA). MANOVA analysis can be used to discern differences between groups, but MANOVA is used with multiple dependent variables. Ryan, Rigby, and Przybylski (2006) studied self-determination with both ANOVA and MANOVA with 927 participants by using video games to measure the effects of the factors of self-determination theory (SDT) on continued game play (i.e., motivation to keep playing). The study was broken into four sub-studies, and although the results were statistically significant, little predictive power for future play was found. However, Ryan et al. found a strong relationship between level of enjoyment and SDT with an effect size of $r^2 = .45$. Additional examples of self-determination research via MANOVA were done by Johnson, Gans, Kerr, and LaValle (2010) and Pintrich and Groot (1990).

OLS is by far the most used statistical procedure in the study of self-determination. At least 15 examples of self-determination research using some type of regression occur in the literature (Artino, 2009; Artino & Stephens, 2009; Aspelmeier, Love, McGill, Elliott, & Pierce, 2012; Beachboard, Beachboard, Li, & Adkison, 2012; Bowman, 2010; Brady-Amoon & Jairo, 2011; Brockelman, 2009; Gilardi, & Guglielmetti, 2011; Johnson & Nussbaum, 2012; Kaufman & Dodge, 2009; Lundberg 2012; Moller & Deci, 2010; Pintrich & Groot, 1990; Ryan et al., 2006;
Sparkman, 2012; Thrash & Elliot, 2002). Academic development was also studied through OLS. For example, Beachboard et al. (2012) studied 1852 students and used regression to examine the relationships between individual characteristics and academic development. Beachboard et al. demonstrated that factors, including relatedness, affect academic development ($r^2 = .28$, $p < .001$).

The last two GLM statistical procedures that tend to be considered the most advanced procedures are hierarchical linear modeling (HLM) and structural equation modeling (SEM). Both methods have been used in the research of self-determination. Chen and Jang (2010) used SEM to examine a model of SDT against a series of variables and factors. They had 262 participants, and although they could not confirm a direct relationship with learning outcomes, they did confirm autonomy, competence, and self-relatedness to be distinct factors of SDT (Chen & Jang, 2010). Further by Sheldon et al. (1996); Thrash and Elliot (2002); Zajacova, Lynch, and Espenshade (2005); Shogren (2008); Stupnisky, Renaud, Daniels, Haynes, and Perry (2008); Gottfried et al. (2011); and Sonnert and Fox (2012) included the use of HLM and SEM.

3.6 Conclusion

This chapter provided an overview of the population, sample, instrument, variables, and methods of data analysis. The purpose of this study was to examine differences between veteran and non-traditional students and the relationship between self-determination and academic success. The selected statistical procedure, hierarchical OLS, appropriately aligned with the questions.
CHAPTER 4

RESULTS

This chapter provides the results of the study designed to answer two research questions. The first research question asked if there was a statistically significant relationship between veteran status and self-determination after controlling for gender and age. The second research question asked if there was a statistically significant relationship between self-determination and academic effort after controlling for gender and age. The survey was sent out via multiple email methods to universities in the southwest United States. Because the open records requests could not be isolated to apply only to undergraduate students, the survey included a question about the student’s current academic level as undergraduate versus graduate. This question offered the option to remove surveys by graduate students who were not the target population.

Before analyzing the data with the multiple regression models, the data were thoroughly examined to ensure the assumptions were met for the regression. A descriptive analysis is as provided to aid in later interpretation. When examining the data, issues of survey completeness and participants’ questionable intent came to light. Prior to running any statistical analysis, some of the responses were eliminated. Responses that took participants less than 3 minutes to complete and/or were missing key data (e.g., birth year, or responses to the self-determination scale) were eliminated. This decision was made because a sufficient number of responses were accumulated. Eliminating some surveys would not affect the statistical power of the results. In the case of the length of time, less than 3 minutes were just not enough time to read the survey, let alone consider a valid response. Removing questionable
responses may help to reduce the response bias. The average time to complete the survey, in earnest, was 9 minutes. The decision to eliminate the cases missing key data was made on the basis of current recommended procedures for dealing with missing data, such as the Amelia process described by Honaker, King, and Blackwell (2011), being complex and controversial. There was no need to perform a missing data process, when more than enough data had been collected to run the analysis. The full dataset contained a sample of 1,394 surveys. After eliminating the missing data, 1,101 surveys were retained as the sample. Of the 1,101 responses, 734 were undergraduates responses, and 351 were graduate responses. Because this study’s purpose focused on undergraduates, the remaining analysis was completed on only the 734 undergraduate students’ surveys. The number of military veteran students in the sample was 76, and the nonveteran adult student sample was 658).

4.1 Descriptive Statistics for the Variables

The following tables provide the descriptive statistics. Table 1 presents the total sample’s descriptive statistics for each variable. Autonomy, relatedness, and competence were all factors of self-determination as seen in the table.

Table 4.1

Descriptive Statistics for Sample of 734 Surveys Returned by Undergraduate Adult Students

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>1.87</td>
<td>4.00</td>
<td>3.29</td>
<td>0.47</td>
<td>-0.46</td>
<td>-0.38</td>
</tr>
<tr>
<td>Academic Effort</td>
<td>0.40</td>
<td>1.00</td>
<td>0.72</td>
<td>0.12</td>
<td>0.15</td>
<td>-0.27</td>
</tr>
<tr>
<td>Age</td>
<td>18.00</td>
<td>61.00</td>
<td>25.32</td>
<td>7.85</td>
<td>2.34*</td>
<td>5.26*</td>
</tr>
<tr>
<td>Self-Determination</td>
<td>0.15</td>
<td>1.00</td>
<td>0.80</td>
<td>0.12</td>
<td>-0.86*</td>
<td>1.07*</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.13</td>
<td>1.00</td>
<td>0.76</td>
<td>0.17</td>
<td>-0.88</td>
<td>0.88</td>
</tr>
<tr>
<td>Relatedness</td>
<td>0.13</td>
<td>1.00</td>
<td>0.79</td>
<td>0.16</td>
<td>-1.00*</td>
<td>1.01*</td>
</tr>
<tr>
<td>Competence</td>
<td>0.13</td>
<td>1.00</td>
<td>0.84</td>
<td>0.17</td>
<td>-2.20*</td>
<td>5.64*</td>
</tr>
</tbody>
</table>

Note. N = 734. * indicates high skewness and kurtosis values. Autonomy, Relatedness, and Competence are indented as the factors computed to create the self-determination variable.
In Table 1, the variables related to self-determination displayed high levels of skewness and kurtosis. These high levels were due to the ceiling effects of the survey. In other words, most undergraduate college students scored themselves at the highest levels for the factors of self-determination, which skewed the data. This skewness was problematic because one of the assumptions for regression analysis required the data be normal (Pedhazur, 1997). Howell (2007) recommended performing a series of transformational procedures to adjust for high levels of skewness, depending on the type and severity.

The approach taken for this study was to compute the log10 of the difference between a constant and the value (e.g., log10 (k - x)). The constant used was k = 1.1, because the maximum self-determination score was 1, and .1 was added to 1 to ensure using a non-negative number in the log10 function, which has a domain of only positive values. Figure 3 represents the histogram for the competence variable before the transformation. In the histogram, the data are all skewed toward the right and the distribution of data is negatively skewed.

Figure 4.1. Competence variable histogram before transformation.
Figure 4 illustrates the histogram for the competence variable after transformation. The following the transformation, the data gained dispersion. The competence, autonomy, and relatedness variables were all transformed in the manner described and used to calculate a new value for self-determination. Table 2 presents the new descriptive statistics for the transformed variables.

![Figure 4.2. Competence variable histogram after transformation.](image)

Table 4.2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Determination</td>
<td>-1.00</td>
<td>-0.02</td>
<td>-0.58</td>
<td>0.18</td>
<td>-0.08</td>
<td>-0.35</td>
</tr>
<tr>
<td>Autonomy</td>
<td>-1.00</td>
<td>-0.01</td>
<td>-0.65</td>
<td>0.23</td>
<td>0.49</td>
<td>0.05</td>
</tr>
<tr>
<td>Relatedness</td>
<td>-1.00</td>
<td>-0.01</td>
<td>-0.53</td>
<td>0.23</td>
<td>-0.34</td>
<td>-0.44</td>
</tr>
<tr>
<td>Competence</td>
<td>-1.00</td>
<td>-0.01</td>
<td>-0.56</td>
<td>0.22</td>
<td>-0.16</td>
<td>-0.55</td>
</tr>
</tbody>
</table>

After the transformation, the skewness and kurtosis levels fell within acceptable limits (Pedhazur, 1997). This transformation improved the robustness of the analysis by enabling the
data to meet the assumptions required for the hierarchical ordinary least squares (OLS) analysis. However, the transformation did impact the interpretation of the regression analysis. For example, the transformed self-determination data ranged from a minimum of -1 to a maximum of -.02 while in its non-transformed state, the data originally ranged from a minimum of .15 to a maximum of 1. Therefore, the relationship between the original variable and the independent variable is preserved after the transformation, but the magnitude of their difference is lost. The reason for this is the log function is a one-to-one monotonic increasing transformation, which means the relative relationship is preserved. For example, 100 is greater than 90 and log(100) is greater than log(90). In Table 9 shows that the transformed self-determination beta is negative. This would normally mean that the two variables have a negative relationship; however, the transformation was log10(k-x) it means the relationship is positive with the untransformed variable. The (k-x) portion of the equation inverts values. For example, an original value of 100 would be turned to 0 and an original value of 0 would be turned to 100. So, after unwinding the effect of the transformation, the results indicate a position, non-linear relationship between the original self-determination variable and academic effort.

4.2 Descriptive Statistics for the Veterans

The responses from the veteran students included the Air Force (n = 20), Army (n = 29), Marines (n = 18), and Navy (n = 18) branches of the United States armed forces. Army veterans composed the largest group of participants (see Table 3). Although the Air Force and Army participants yielded higher means for their self-determination scores, their scores were not
statistically significantly different from the participants representing the other military
branches, \( F (3, 71) = .455, p = .715. \)

Table 4.3

*Self-determination Means and Standard Deviations for the 75 Veteran Participants Providing Branch of Military Service*

<table>
<thead>
<tr>
<th>Military Branch</th>
<th>( n )</th>
<th>( M )</th>
<th>( SD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force</td>
<td>10</td>
<td>0.85</td>
<td>0.11</td>
</tr>
<tr>
<td>Army</td>
<td>29</td>
<td>0.85</td>
<td>0.11</td>
</tr>
<tr>
<td>Marines</td>
<td>18</td>
<td>0.80</td>
<td>0.15</td>
</tr>
<tr>
<td>Navy</td>
<td>18</td>
<td>0.82</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Even though 33% of participants reported the *other* category as their military career fields, 76 veteran participants presented with a broad selection of career fields (see Table 4).

Table 4.4

*Self-determination Means and Standard Deviations for the 76 Veteran Participants by Military Career Field*

<table>
<thead>
<tr>
<th>Military Career</th>
<th>( n )</th>
<th>( M )</th>
<th>( SD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close Combat</td>
<td>11</td>
<td>0.81</td>
<td>0.15</td>
</tr>
<tr>
<td>Other Combat Support</td>
<td>19</td>
<td>0.85</td>
<td>0.14</td>
</tr>
<tr>
<td>Logistics</td>
<td>9</td>
<td>0.81</td>
<td>0.10</td>
</tr>
<tr>
<td>Administrative</td>
<td>4</td>
<td>0.87</td>
<td>0.12</td>
</tr>
<tr>
<td>Intelligence</td>
<td>8</td>
<td>0.82</td>
<td>0.11</td>
</tr>
<tr>
<td>Other</td>
<td>25</td>
<td>0.83</td>
<td>0.13</td>
</tr>
</tbody>
</table>
4.3 Factor Analysis

A new instrument was not created for this study, but the survey used for this study did combine existing instruments. Therefore, a factor analysis was performed to ensure the expected factors occurred within the data set.

The 31 survey questions that made up the self-determination and academic effort latent variables were included in a principle components factor analysis. The factor analysis employed the varimax rotation procedure. Parallel analysis was used to determine the number of factors of retain (Cattell, 1966; O'Connor, 2000) (see Appendix B). The instrument loaded on the expected six factors with component coefficients ranging from .54 to .90. Table 5 shows the rotated values of the factor analysis.

4.4 Research Question 1

This study's first research question asked if there was a statistically significant relationship between veteran status and self-determination after controlling for gender and age. To answer this question, a hierarchical OLS analysis was run using age and gender against the log10 transformed self-determination variable in the first step. The OLS yielded a statistically significant result ($p < .001, R = .117$). The second step produced an improvement in total explained variation proportion and was statistically significant ($p < .001, R = .15$). Table 6 displays the results of the sequential models. Table 7 displays more detail about the model and includes each variable’s coefficients.
Table 4.5

Factor Pattern Matrix Rotated to the Varimax Criterion

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>$h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence Q1</td>
<td>0.88*</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.10</td>
<td>0.00</td>
<td>0.04</td>
<td>0.80</td>
</tr>
<tr>
<td>Competence Q2</td>
<td>0.87*</td>
<td>0.04</td>
<td>-0.11</td>
<td>0.11</td>
<td>0.06</td>
<td>0.04</td>
<td>0.80</td>
</tr>
<tr>
<td>Competence Q3</td>
<td>0.91*</td>
<td>0.05</td>
<td>-0.05</td>
<td>0.07</td>
<td>0.01</td>
<td>-0.01</td>
<td>0.84</td>
</tr>
<tr>
<td>Competence Q4</td>
<td>0.91*</td>
<td>0.06</td>
<td>-0.11</td>
<td>0.09</td>
<td>0.03</td>
<td>0.03</td>
<td>0.85</td>
</tr>
<tr>
<td>Competence Q5</td>
<td>0.91*</td>
<td>0.09</td>
<td>-0.09</td>
<td>0.14</td>
<td>0.05</td>
<td>0.02</td>
<td>0.86</td>
</tr>
<tr>
<td>Competence Q6</td>
<td>0.90*</td>
<td>0.09</td>
<td>-0.07</td>
<td>0.08</td>
<td>-0.01</td>
<td>0.07</td>
<td>0.83</td>
</tr>
<tr>
<td>Competence Q7</td>
<td>0.85*</td>
<td>0.08</td>
<td>-0.07</td>
<td>0.09</td>
<td>0.04</td>
<td>0.08</td>
<td>0.75</td>
</tr>
<tr>
<td>Competence Q8</td>
<td>0.85*</td>
<td>0.07</td>
<td>-0.12</td>
<td>0.10</td>
<td>0.08</td>
<td>0.07</td>
<td>0.77</td>
</tr>
<tr>
<td>Academic Effort Q1</td>
<td>0.09</td>
<td>0.54*</td>
<td>-0.10</td>
<td>-0.09</td>
<td>0.09</td>
<td>0.26</td>
<td>0.40</td>
</tr>
<tr>
<td>Academic Effort Q2</td>
<td>0.05</td>
<td>0.67*</td>
<td>-0.10</td>
<td>-0.08</td>
<td>0.11</td>
<td>0.06</td>
<td>0.48</td>
</tr>
<tr>
<td>Academic Effort Q3</td>
<td>0.04</td>
<td>0.64*</td>
<td>-0.06</td>
<td>-0.05</td>
<td>0.14</td>
<td>-0.02</td>
<td>0.44</td>
</tr>
<tr>
<td>Academic Effort Q4</td>
<td>0.03</td>
<td>0.69*</td>
<td>0.06</td>
<td>0.01</td>
<td>0.22</td>
<td>0.00</td>
<td>0.53</td>
</tr>
<tr>
<td>Academic Effort Q5</td>
<td>0.05</td>
<td>0.69*</td>
<td>0.05</td>
<td>0.09</td>
<td>0.03</td>
<td>-0.06</td>
<td>0.49</td>
</tr>
<tr>
<td>Academic Effort Q6</td>
<td>0.06</td>
<td>0.63*</td>
<td>-0.01</td>
<td>0.06</td>
<td>-0.02</td>
<td>0.15</td>
<td>0.42</td>
</tr>
<tr>
<td>Academic Effort Q7</td>
<td>0.07</td>
<td>0.60*</td>
<td>-0.08</td>
<td>-0.02</td>
<td>-0.05</td>
<td>0.28</td>
<td>0.45</td>
</tr>
<tr>
<td>Academic Effort Q8</td>
<td>0.12</td>
<td>0.25</td>
<td>-0.05</td>
<td>0.10</td>
<td>0.04</td>
<td>0.64*</td>
<td>0.50</td>
</tr>
<tr>
<td>Academic Effort Q9</td>
<td>0.01</td>
<td>0.04</td>
<td>-0.03</td>
<td>0.08</td>
<td>0.15</td>
<td>0.80*</td>
<td>0.67</td>
</tr>
<tr>
<td>Academic Effort Q10</td>
<td>0.07</td>
<td>0.16</td>
<td>-0.03</td>
<td>0.06</td>
<td>0.23</td>
<td>0.78*</td>
<td>0.71</td>
</tr>
<tr>
<td>Academic Effort Q11</td>
<td>0.06</td>
<td>0.08</td>
<td>-0.03</td>
<td>0.05</td>
<td>0.74*</td>
<td>0.28</td>
<td>0.65</td>
</tr>
<tr>
<td>Academic Effort Q12</td>
<td>0.04</td>
<td>0.18</td>
<td>-0.05</td>
<td>0.00</td>
<td>0.86*</td>
<td>0.09</td>
<td>0.79</td>
</tr>
<tr>
<td>Academic Effort Q13</td>
<td>0.07</td>
<td>0.21</td>
<td>0.02</td>
<td>-0.04</td>
<td>0.82*</td>
<td>0.08</td>
<td>0.72</td>
</tr>
<tr>
<td>Autonomy Q1</td>
<td>-0.10</td>
<td>-0.03</td>
<td>0.72*</td>
<td>-0.17</td>
<td>0.03</td>
<td>-0.05</td>
<td>0.56</td>
</tr>
<tr>
<td>Relatedness Q1</td>
<td>0.08</td>
<td>-0.01</td>
<td>-0.05</td>
<td>0.63*</td>
<td>0.05</td>
<td>0.01</td>
<td>0.41</td>
</tr>
<tr>
<td>Autonomy Q2</td>
<td>-0.14</td>
<td>-0.07</td>
<td>0.67*</td>
<td>-0.20</td>
<td>-0.06</td>
<td>-0.06</td>
<td>0.52</td>
</tr>
<tr>
<td>Relatedness Q2</td>
<td>0.14</td>
<td>0.00</td>
<td>-0.32</td>
<td>0.66*</td>
<td>-0.02</td>
<td>0.06</td>
<td>0.55</td>
</tr>
<tr>
<td>Autonomy Q3</td>
<td>-0.07</td>
<td>-0.07</td>
<td>0.68*</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.04</td>
<td>0.48</td>
</tr>
<tr>
<td>Relatedness Q3</td>
<td>0.16</td>
<td>0.02</td>
<td>-0.22</td>
<td>0.51*</td>
<td>-0.01</td>
<td>0.19</td>
<td>0.37</td>
</tr>
<tr>
<td>Autonomy Q4</td>
<td>-0.14</td>
<td>-0.01</td>
<td>0.80*</td>
<td>-0.20</td>
<td>-0.02</td>
<td>-0.02</td>
<td>0.71</td>
</tr>
<tr>
<td>Relatedness Q4</td>
<td>0.08</td>
<td>-0.02</td>
<td>-0.15</td>
<td>0.76*</td>
<td>0.02</td>
<td>0.00</td>
<td>0.60</td>
</tr>
<tr>
<td>Autonomy Q5</td>
<td>-0.05</td>
<td>-0.02</td>
<td>0.82*</td>
<td>-0.20</td>
<td>-0.02</td>
<td>0.03</td>
<td>0.72</td>
</tr>
<tr>
<td>Relatedness Q5</td>
<td>0.12</td>
<td>-0.03</td>
<td>-0.16</td>
<td>0.78*</td>
<td>-0.04</td>
<td>0.03</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Note. * indicates coefficient is greater than |.40|. $h^2$ is the communality coefficient. Rotation converged in 6 iterations.
Table 4.6

**Veteran and Self-determination Hierarchical Ordinary Least Squares Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>SE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.117</td>
<td>0.014</td>
<td>0.011</td>
<td>0.175</td>
<td>5.083***</td>
</tr>
<tr>
<td>2</td>
<td>0.150</td>
<td>0.022</td>
<td>0.018</td>
<td>0.174</td>
<td>5.588***</td>
</tr>
</tbody>
</table>

Note. N = 734. *** p < .001.

Table 4.7

**Veteran and Self-determination Coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-0.52</td>
<td>0.03</td>
</tr>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Gender</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-0.66</td>
<td>0.06</td>
</tr>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Gender</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Veteran Status</td>
<td>0.06</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Gender was not statistically significant in either model (t = .97, p = .33). Although the resulting models were statistically significant, the total variance explained was very small at $R^2 = .02$. However, the results supported the presence of a positive relationship between college veterans and self-determination due to the statistically significant ($t = 2.55, p = .01$) positive coefficient value for veteran status in Table 7. The reason and implications for the small effect size are discussed in Chapter V.

4.5 Research Question 2

The second research question asked if there was a statistically significant relationship between self-determination and academic effort after controlling for gender and age. To
answer this question, which built upon the first question, a second hierarchical OLS regression analysis was run to examine if self-determination was correlated to academic effort. The OLS included age and gender as predictors of the academic variable in the first step and added the self-determination variable in the second step. The results of both models were statistically significant (see Table 8). The results of the hierarchical OLS regression support a positive relationship between self-determination and academic effort. In other words, as college students become more self-determined, they produce more academic effort.

Table 4.8

**Academic Effort and Self-determination in the Two Hierarchical Regression Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>$SE$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.120</td>
<td>0.014</td>
<td>0.012</td>
<td>0.117</td>
<td>5.326**</td>
</tr>
<tr>
<td>2</td>
<td>0.262</td>
<td>0.068</td>
<td>0.065</td>
<td>0.114</td>
<td>17.874***</td>
</tr>
</tbody>
</table>

*Note. N = 734. ** $p < .01$. *** $p < .001$.*

Table 4.9

**Academic Effort and Self-determination Coefficients for the Two Hierarchical Regression Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-0.01</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>Self-determination$^a$</td>
<td>-0.16</td>
</tr>
</tbody>
</table>

*Note. $^a$ Self-determination was transformed using log10 (1.1 - x).*

The analysis showed gender failed to attain statistical significance in the models. The variables of age and self-determination were statistically significant, $p < .001$. Once again, the
model only explained a small portion of the variance, $R^2 = .07$. However, most of the variance occurred once the self-determination variable was added in Model 2, as evidenced by the change in $R^2$ from .01 in Model 1 to .07 in Model 2.

4.6 Additional Analysis

Because of the complications in the interpretation of the transformed variable, ANOVA allowed for comparing the mean self-determination scores for veteran and nonveteran students. The results of the ANOVA appear in Table 10 and indicate a significant difference in the self-determination mean score for veteran and non-veteran, $F(1, 732) = 6.56, p = .01$.

Table 4.10

ANOVA model on Veteran Status and Self-determination

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>0.10</td>
<td>1</td>
<td>0.10</td>
<td>6.56</td>
<td>.01</td>
</tr>
<tr>
<td>Within Groups</td>
<td>10.84</td>
<td>732</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10.94</td>
<td>733</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because of the main effect between veteran and non-veteran adult students, Table 11 shows the mean scores for self-determination between veteran and nonveterans. Veterans demonstrated a statistically significant higher self-reported level of self-determination. Veterans’ self-determination mean score was .83, and nonveterans’ self-determination mean score was .79.
Table 4.11

*Means and Mean Differences for Veteran Status and Self-determination*

<table>
<thead>
<tr>
<th>Veteran Status</th>
<th>$n$</th>
<th>$M$</th>
<th>$M$ Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veteran</td>
<td>76</td>
<td>0.83</td>
<td>0.04</td>
</tr>
<tr>
<td>Non Veteran</td>
<td>658</td>
<td>0.79</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* The SDs for veterans and non-veterans were .13 and .12, respectively.

4.7 Conclusion

The hierarchical OLS analysis results showed for the variables analyzed, age and veteran experience emerged as statistically significant factors in an undergraduate students’ level of self-determination. Additionally, veteran students displayed statistically significant higher levels of self-determination than students without military experience. The secondary hierarchical OLS analysis showed age and self-determination to be statistically significant factors of academic effort.
CHAPTER 5

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to examine differences in self-determination between veteran and non-veteran students and the effect of these differences on academic effort at 4-year degree granting institutions of higher education. There were two research questions. The first research question asked if self-determination differed between veteran and non-veteran college students, after controlling for age and gender. The second research question built on the first and asked if self-determination was related to academic effort. The analysis was a two-tier process to examine if veterans reported more self-determination than their nonveteran peers. If self-determination did display a difference, I sought to determine if it related to academic effort. I sent online surveys to students at 4-year colleges and universities in Texas. The schools’ fall 2013 enrollments ranged from 15,000 to 60,000 students. The total number of responses received was 1,395. After removing incomplete surveys and surveys completed by graduate students, the sample used for the analysis was 734, with 76 veterans and 658 nonveterans.

5.1 Discussion of Findings

Academic effort was conceptualized to capture Pascarella’s (1985) factor of quality of student effort in the general causal model of college impact (GCMCI). The results have further supported the GCMCI model. This findings support the GCMI model because the results confirm the model’s suggestion that student background characteristics have a relationship with the quality of student effort. This study could extend the model by adding self-determination as a
moderator between background characteristics and quality of student effort. Figure 5 illustrates how this study supported and may extend GCMCI factors.

Figure 5.1. Adaptation of Pascarella’s (1985) model for GCMI extension and support.

5.1.1 Veterans and Self-determination

Hierarchical ordinary least squares (OLS) analysis was used to determine if a relationship existed between veteran experience and self-determination. Because this study was concerned with the effects of maturation and gender, the first model for each research question included age and gender. A hierarchical OLS allowed for separating the explanatory effects of other variables before the variables of interest were introduced. In this way, the relationship of veteran status and self-determination could be examined while isolating the effects of age and gender.

The first model was statistically significant and showed that age has a relationship with self-determination. The second model was statistically significant and improved the explanation of variance. Veteran status has a relationship with self-determination. However, as noted in Chapter IV, the effect size was very small and only explained 2% of the variance. One of the
reasons for this low explanatory power was the level of self-determination for all college students being skewed toward the maximum score on the Self-determination Scale instrument.

Trash and Elliot (2002) used the Self-determination Scale and reported a range of scores from .30 to .90, with a mean of .65. Contrary to Trash and Elliot’s (2002) results, I observed the college students surveyed reported a mean of .78, with responses negatively skewed toward the upper limit of the maximum possible score. To be clear, in order to compare the results I had to remove the competence component that was added in for this study. Figure 6 illustrates the difference in self-determination between the general population and the college students included in the current sample.

Figure 6 is important because I looked at the relationship between the veteran status of college students and self-determination scores of college students. All veteran and non-veteran college students already scored near the upper end of the self-determination scale, leaving little room for improvement on a scale with a maximum score of 1. Trash and Elliot (2002) reported the self-determination mean to be .65 with a standard deviation of .13 within a population of psychology undergraduate students. The current sample of university students yielded a self-determination mean of .78, with a standard deviation of .13.
Figure 5.2. Self-determination in the previously studied population compared to self-determination among college students (Trash & Elliot, 2002). The patterned area in gray contains the previous population results, whereas the bars of the histogram offer the current student results.

5.1.2 Self-determination and Academic Effort

Following the first analysis, another hierarchical OLS analysis was run to determine if self-determination and academic effort had a relationship. Age and gender were added in the first model and regressed against academic effort. The second model included age and gender as control variables and added self-determination as the main predictor variable. Both models were statistically significant ($p < .001$). The improvement in effect size was an increase of 5% from Model 1 to Model 2. The total variance explained in Model 2 was an $R^2$ of .068. Once again, age and self-determination were statistically significant; however, the improvement to the second model came from self-determination.
5.1.3 Limitations

A weakness of any online survey is non-response bias. Non-response bias happens when only a certain group of participants respond to the survey, leaving out a group that would have impacted the variance being explored. The effect could be considered particularly important in this study because of the topic being self-determination. If only self-determined people were more likely to respond to the survey, then students with lower self-determination were not represented in the sample. Therefore, these results are likely to apply only to college students with the predisposition toward responding to a survey. Currently, there is no theoretical basis to assume that only highly self-determined people would respond to surveys. It is just as likely that less self-determined people would respond as people with higher self-determination.

Another concern related to the online survey method was the likelihood that the sample would generalize to the target population for the dimensions of interest. In Texas, the female and male undergraduate students were 55% and 45%, respectively, whereas the study sample was 70% female and 30% male undergraduate students. It was important to match the sample to the population’s ratio of veterans in college. The sample of responses received included 10% veterans and 90% nonveterans. However, at the universities included in the study, the percentage for veteran students was 4%, and for nonveteran students, it was 96%.

5.2 Implications and Recommendations

The two statistically significant models suggest potential for specific programs designed to improve student learning, retention, and graduation. First, veterans have greater levels of self-determination. Second, greater levels of self-determination positively relate to greater levels of academic effort. Although I did not set out to explore the general college student’s
level of self-determination, I found that college students have much greater levels of self-determination than previously studied freshmen students with a major in Psychology (Trash & Elliot, 2002).

The findings might guide practitioners in higher education to create programs for at risk college students. The Self-determination Scale could be used among the many other indicators of college readiness even though it is only one measure and indirectly relates to successful academic outcomes. Pascarella (1985) provided the GCMCI in which many factors combine to influence academic outcomes. The GCMCI factors include institutional characteristics, interactions with social agents, student background, institutional improvement, and quality of student effort (Pascarella, 1985). I am suggesting that the Self-determination Scale could be used as an indicator for practitioners to connect with students at risk because given the factors of the GCMCI, it could be a useful tool to implement with the various programs that exist at universities to improve the negative aspects of academic factors faced by at risk college students.

In Texas, universities are required by Texas Education Code (TEC) 19.1.4.C to test students’ math, writing, and reasoning readiness for college. The program for the pre-testing is called the Texas Success Initiative (TSI). The use of the TSI, where only academic skills are measured is misinformed based on the current findings and given that the GCMCI has many factors. Academically advanced (i.e., high skills in reading, writing, and math) students who lack financial backing, are first-time in college and minority, or have anxiety disorders preventing them from engaging with their faculty may still struggle in college. Math, writing, and reasoning
assessments that do not take all relevant factors into account could misinform and misguide practitioners.

Veterans are not assessed according to TSI for academic readiness because TEC 19.1.4.C exempts veterans from taking TSI assessments. Veterans, as a result of not being assessed, could experience unfair discrimination, because many veterans have been away from education environments since leaving high school. On the other hand, while veterans’ academic skills might be weak, their stronger self-determination needs to be considered as affording them with the ability to overcome weaknesses and willingness to solve problems, such as seeking out tutoring when they need academic assistance. Limiting veterans’ higher education opportunities without factoring in their military experiences is problematic because the Self-determination Scale assessment could provide university practitioners an indicator about veterans’ needs. Specifically, I suggest implementing a holistic assessment of readiness created on the basis of years of academic research to be used to inform college advising professionals and faculty for creating a summer bridge programs or special needs track designed to improve the higher education opportunities experienced by military veterans.

5.3 Recommendations for Future Study

The Self-determination Scale is problematic at the college level because students appear to be highly self-determined. To be a useful assessment at the college level, a new self-determination instrument is needed that expands the upper limits of the score. There are various options to accommodate assessing college student self-determination. One option is to increase the extremity of the items’ anchors. The more extreme items and their choices could
be validated and tested for reliability with college students as the general population to which the assessment is geared.

Alternatively, the assessment might be completely modified for college students as the target population. This solution is not preferred because the instrument currently captures the general population so well. If the instrument were modified for college students, the comparability to the general population could be impacted. A study to determine if such impact occurred would be needed.

The sample of adult college students in this study demonstrated higher levels of self-determination than those exhibited by the previous samples. Research on students entering college for the first time could be used to determine if freshmen students who enter college with lower self-determination are less likely to retain in college to past the first-year.

Additionally, the current Self-determination Scale does not include competence as a measured factor, even though competence is one of the three self-determination factors discussed in by Deci and Ryan (1985a). It could be prudent to add a competence factor to a self-determination assessment.

While college veterans reported higher levels of self-determination than their college peers, a causal relationship between veteran status and self-determination could not be stated. Veterans’ higher self-determination scores might have been due to a selection bias. For example, people with high self-determination may have chosen to go into the military or the military recruiting process may select people with high self-determination. Future studies could employ time series analysis to determine if the military experience increases self-determination. A further extension would be investigating whether military experience is a
variable that has a causal relationship with increased self-determination, research could be conducted on the factors of military experience that influence increased self-determination.

Finally, a qualitative study to capture the phenomenological reasons for veterans’ high self-determination might offer insight. As I shared in chapter I, my personal story is one of low self-determination before entering the military and high self-determination throughout the difficult challenges I faced during my military career. A story such as mine could not be captured by quantitative methods, but qualitative methods could add depth through the collection of an array of lived experiences by veterans.

5.4 Conclusion

DMDC (2014) showed 1.4 million currently active duty military personnel in the Air Force, Army, Marines, and Navy. At this moment; over 1 million people have made the choice to stand up and enlist to protect U.S. interests. While the U.S. military is strong because of its volunteers, today’s veterans are not viewed positively by all higher education stakeholders.

Even noted intellectual, Albert Einstein (1954) displayed bias:

This topic brings me to that worst outcrop of herd life, the military system, which I abhor . . . This plague-spot of civilization ought to be abolished with all possible speed. Heroism on command, senseless violence, and all the loathsome nonsense that goes by the name of patriotism--how passionately I hate them! (pp. 8-11)

Higher education has shaped the US since its founding, but researchers cannot make meaningful steps forward without the freedom to pursue politically unpopular topics. Higher education as a culture of intellectualism, creativity, and ideas operates on an opposite
spectrum from the military known as a culture of brute force. As the military provides the system for protecting freedom, higher education provides the need for protecting freedom.

Veteran students as primary participants of U.S. higher education institutions have the same challenges of other students even as they suffer from negative perceptions of some people within academia and attempt to face internal challenges such as combat induced post-traumatic stress disorder. Higher education administrators need to attend to the special needs of military veteran college students and appreciate and take advantage of veteran students’ strengths as part of improving the learning experience for all students. This study’s findings offer an example of the positive attributes veterans bring with them into the higher education system; veteran students have higher levels of self-determination than their non-veteran peers and that self-determination is related to academic effort.
APPENDIX A

EMAIL INVITATION AND INFORMED CONSENT
Greetings,

I am a PhD student interested in measuring self-determination. My goal is to reliably measure self-determination and then examine whether increases in self-determination also increase academic success. I am seeking volunteers for a study and I hope you will consider being one of those volunteers.

The survey is located at https://www.surveymonkey.com

Participation in this study is voluntary. The return of your completed questionnaire constitutes your informed consent to act as a participant in this research. Your decision whether or not to participate will not affect your relationship with the University. This study uses an online survey. The survey contains 45 questions that inquire about your values, likes, habits and outside influences. It will take approximately 15 minutes to complete. If you decide to participate, you are free to withdraw at any point in filling out the survey. As this survey is provided online, when and where the survey is taken is up to you. This researcher recommends that you consider your surroundings to give yourself adequate privacy.

The only possible risk to you would be a breach of confidentiality in which your responses to this survey would be inadvertently revealed to someone other than the study investigators. However, the study investigators will take all precautions necessary to protect your confidentiality as a research study participant. No personal identifying information, such as name or address, will be collected on this survey. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. To reduce the risk of the loss of confidentiality, the survey is hosted on a secure web site, not administered by the University or by this researcher. To further reduce the risk of loss of confidentiality, refrain from emailing the researcher directly. All data collected for this study becomes the property of the researcher.

Regards,

Robert Placido
APPENDIX B

PARALLEL ANALYSIS
<table>
<thead>
<tr>
<th>Factor</th>
<th>Study Eigen Value</th>
<th>Parallel Analysis Eigen Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.673</td>
<td>1.392</td>
</tr>
<tr>
<td>2</td>
<td>3.704</td>
<td>1.339</td>
</tr>
<tr>
<td>3</td>
<td>3.285</td>
<td>1.292</td>
</tr>
<tr>
<td>4</td>
<td>1.845</td>
<td>1.267</td>
</tr>
<tr>
<td>5</td>
<td>1.515</td>
<td>1.235</td>
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<td>1.287</td>
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<tr>
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<td>0.977</td>
<td>1.188</td>
</tr>
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<td>8</td>
<td>0.904</td>
<td>1.163</td>
</tr>
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<td>9</td>
<td>0.825</td>
<td>1.141</td>
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<td>0.730</td>
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<td>1.099</td>
</tr>
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<td>1.081</td>
</tr>
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<td>13</td>
<td>0.630</td>
<td>1.061</td>
</tr>
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<td>14</td>
<td>0.596</td>
<td>1.044</td>
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<td>15</td>
<td>0.565</td>
<td>1.029</td>
</tr>
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<td>1.010</td>
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<td>17</td>
<td>0.504</td>
<td>0.992</td>
</tr>
<tr>
<td>18</td>
<td>0.473</td>
<td>0.974</td>
</tr>
<tr>
<td>19</td>
<td>0.447</td>
<td>0.960</td>
</tr>
<tr>
<td>20</td>
<td>0.411</td>
<td>0.942</td>
</tr>
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<td>21</td>
<td>0.379</td>
<td>0.925</td>
</tr>
<tr>
<td>22</td>
<td>0.354</td>
<td>0.907</td>
</tr>
<tr>
<td>23</td>
<td>0.348</td>
<td>0.893</td>
</tr>
<tr>
<td>24</td>
<td>0.310</td>
<td>0.871</td>
</tr>
<tr>
<td>25</td>
<td>0.260</td>
<td>0.855</td>
</tr>
<tr>
<td>26</td>
<td>0.225</td>
<td>0.839</td>
</tr>
<tr>
<td>27</td>
<td>0.206</td>
<td>0.823</td>
</tr>
<tr>
<td>28</td>
<td>0.187</td>
<td>0.802</td>
</tr>
<tr>
<td>29</td>
<td>0.152</td>
<td>0.785</td>
</tr>
<tr>
<td>30</td>
<td>0.144</td>
<td>0.764</td>
</tr>
<tr>
<td>31</td>
<td>0.122</td>
<td>0.741</td>
</tr>
</tbody>
</table>

Note. Parallel Eigen values were produced using a random data set with the same number of responses and questions using a 95% probability. Notice that the study’s eigen value for the seventh factor is no longer larger than the parallel analysis results.
REFERENCES


