ASSESSING AND PREDICTING STUDENT-VETERANS’ USE OF MOTIVATIONAL REGULATION STRATEGIES WITHIN HIGHER EDUCATION

By

Bryan Prewitt
A Thesis
Submitted to the
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of
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in Partial Fulfillment of
The Requirements for the Degree
of
Master of Science
Educational Psychology

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George Mason University
Fairfax, VA
Assessing and Predicting Student-Veterans’ Use of Motivational Regulation Strategies within Higher Education

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Educational Psychology at George Mason University

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Dedication

I dedicate this thesis work to my family. To my daughter, Emma, you inspire me every day to be the best I can be. To my wife, Taylor, without your many sacrifices, dedications, and encouragements none of this would have been possible. To my mother, father, brothers, sisters, extended family and friends each one of you have provided me with support, motivation, encouragement, and mentorship to strive for and accomplish anything.

I would also like to dedicate this thesis to the men and women of the United States Armed Services those that serve, have served, and will service this great nation in uniform every day.
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Abstract

ASSESSING AND PREDICTING STUDENT-VETERANS’ USE OF MOTIVATIONAL REGULATION STRATEGIES WITHIN HIGHER EDUCATION

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George Mason University, 2019

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This investigation of student-veterans (n=131) use of motivational regulation strategies within higher education has two primary objectives. First, an examination of the measurement of motivational regulation using exploratory factor analysis. Second, an investigation of the relationships between motivational regulation strategies and self-regulated learning (e.g., motivational beliefs and learning strategies). Participants self-reported use of motivational regulation strategies, use of cognitive and metacognitive learning strategies, motivational beliefs, gender, and academic achievement. Results suggest a twelve-component measure of motivational regulation strategies within the student-veteran population. Findings indicated moderate relationships between these regulation components and self-regulated learning for student-veterans. Lastly, results from a series of multiple regressions suggest student-veterans use of motivational regulation is a component of their self-regulated learning.
Chapter 1: Introduction

Over the past decade and a half, the United States and its armed forces have been involved in conflicts spanning the globe; most notably the Global War on Terror centralized in Iraq (Operation Iraqi Freedom [OIF]) and Afghanistan (Operation Enduring Freedom [OEF]). Initial phases of such conflicts were focused on the increased volume of personnel within the armed forces in an effort to manage national defense as well as to coordinate operations within the area of responsibility (AOR) for both OIF and OEF. However, as the United States reduces international efforts and downsizes active duty military personnel one factor presents itself, a major influx of student-veterans transitioning into higher education on college and university campuses across the country. This increase of student-veterans is most notably due to the benefits afforded to service members that served on active duty following September 10, 2001 through the Post-9/11 Veterans Education Assistance Act of 2008 (most commonly titled the “Post-9/11 GI Bill”).

Statement of the Problem

According to the United States Department of Veteran Affairs (VA), there has been a significant increase in the volume of reported veterans transitioning into academia; more specifically, higher education over the past decade. Reporting indicates student-veterans have increased their educational pursuits from less than five hundred thousand in
2006 to over one million as of 2015 (Veteran Affairs, 2009; 2015). However, while the volume of student-veterans has increased the level of research into the subgroup has had little to no focused on educational factors dating past 1975 (excluding research focused on mental health issues and substance abuse studies).

Most educational research prior to the 1980s spot-lighting student-veterans focused on comparing academic performances between student-veterans and their traditional student population counterparts. Studies involving student-veterans from World War II and Vietnam Eras presented evidence that illustrate equal or greater academic performance when compared to traditional college students (Barry, Whiteman, & Wadsworth, 2014). However, current investigations present conflicting findings on student-veterans academic performance within the higher education setting (Barry et al. 2014).

While the literature presents conflicting findings on academic performance research, VA reports student-veterans illustrate a similar ratio for degree completion to traditional students (48% for student-veterans compared to 49% for traditional students) (Veteran Affairs, 2015). Additionally, VA report student-veterans typically require significantly more time for completing their educational requirements compared to the general population (Veteran Affairs, 2015). Ultimately, the lack of existing educational research on the subgroup within higher education makes investigating student-veterans a major necessity for greater depth of understanding the many different populations of students within higher education. Reviewing the commonalities of degree completion statistics along with the increased time requirements, age differences, and life scenarios
present many potential threats to a student-veterans motivational state, because of this developing a greater understanding of the strategies student-veterans employ in an effort to regulate their motivation can lead to many beneficial factors within academia for both the student-veteran as well as institutions of higher education.

**Motivational Regulation.** Across educational research, motivation has been identified as an essential component of the learning process. Research has presented evidence for relationships between a student’s motivational states and factors such as performance and academic achievement (Wigfield, 1994; Wigfield & Eccles, 1994; Pintrich, 2000, 2004). However, motivational states possess the potential to fluctuate over the course of time due to academic task conditions (e.g., difficulty) or personal conditions (e.g., emotions). Hence, students’ ability to regulate their motivation may provide insight into explaining students’ performance and achievements. Such a factor has presented theoretically as students’ ability to self-regulate, or self-control, their motivation for the purpose of achieving a goal within academia (Trang, 2015).

Several models within educational research have been influential in the conceptualization of regulation of motivation or motivational regulation (Boekaerts, 1996; Kuhl, 1985; Kuhl & Kraska, 1989; Pintrich, 2004; Wolters, 1998, 2003a). Across these models’ slight theoretical differences have presented; however, most definitions concur with Wolters’ (2003a) definition of motivational regulation. Wolters (2003a) defines motivational regulation as a student’s active management of their own motivational level or to purposefully sustain or improve their effort or persistence for academic tasks.
Wolters and colleagues (2003a; 2011; 2013) present a three-facet model of motivational regulation: knowledge of motivation (meta-motivation), motivational monitoring, and control of motivation (motivational regulation strategies). Knowledge of motivation is described as a student’s knowledge or beliefs about their own motivation. Motivational monitoring is defined as a student’s awareness or ability to recognize their motivational state. Finally, control of motivation is defined as the strategies or techniques students employ to influence their motivation. (Further discussion of each facet will be discussed in the literature review section of this paper).

To date, investigations of motivation regulation have centered on identifying or validating measures of regulation of motivational strategies (further discussion of strategies will be discussed in the literature review section of this paper). Motivational regulation strategies, identified by Wolters (1998), have been included in other empirical studies; while they may not have been distinguished as motivational regulation at the time of their initial investigations. At this time, investigations have been conducted on facets of self-consequating (Jackson & Malloy, 1983, 1985; Purdie & Hattie, 1996); goal-oriented self-talk (Schwinger et al., 2007, 2009); interest enhancement (Sansone, Weir, Harpster, & Morgan, 1992; Sansone, Wiebe, & Morgan, 1999); environmental structuring (Corno, 1986, 1993, 2001; Corno & Kanfer, 1993; Purdie & Hattie, 1996; Pintrich, 2000; Zimmerman & Martinez-Pons, 1986, 1988, 1990); self-handicapping (Berglas & Jones, 1978; Deppe & Harackiewicz, 1996; Eronen, Nurmi, & Salmela-Aro, 1998; Martin, Marsh, & Debus, 2001; Midgley & Urdan, 1995, 2001; Rhodewalt, 1994; Riggs, 1992; Urdan & Midgley, 2001; Zuckerman, Kieffer, & Knee, 1998); self-efficacy
management containing: proximal goal-setting, defensive pessimism, and efficacy self-talk (Bandura, 1997; McCann & Garcia, 1999; Pajares, 1996; Pajares & Miller, 1994; Usher & Pajares, 2008), proximal goal-setting (Schwinger et al., 2007, 2009, 2012a, 2012b), defensive pessimism (Cantor & Norem, 1989; Garcia & Pintrich, 1994; Martin et al., 2001; Norem & Cantor, 1986; Norem & Illingworth, 1993), efficacy self-talk (Bembenutty, 1999; McCann & Garcia, 1999); emotion regulation (Corno, 1993; Schutz & Davis, 2000; Spelberger & Vagg, 1995; Zeidner, 1998); and attribution control (Graham, 1991; Juvonen, 2000; Weiner, 1986; Zimmerman & Kitsantas, 1997, 1999) revealing evidence of links between students use of motivational regulation strategies and academic outcomes (e.g., performances). However, such findings are not without criticism, differing theoretical frameworks used for motivational regulation strategies, construct and findings may be viewed as differing throughout the research.

An underemphasized factor of educational research, motivational regulation has made recent progress. Latest efforts have been instrumental in progressing motivational regulation research through the development and revision of a scale measurement for many of the discussed facets of motivational regulation strategies. Initially conducted as a self-report open-ended exploratory study developed to identify strategies used to manage challenges to student’s motivation within academia Wolters (1998) reported students’ use of 14 distinct strategies. Wolters (1999; Wolters & Rosenthal, 2000) then developed a self-report assessment scale to investigate students’ regulation of motivation using five of the previously identified factors (mastery self-talk, performance self-talk, interest enhancement, self-consequating, and environmental control). Later, Wolters and Benzon
(2013); Schwinger and colleagues (2007, 2009); and Trang (2015) would continue to expand and revise the scope of the measurement.

Results have established motivational regulation as a valid and reliable facet of self-regulated learning; furthermore, illustrating the model as distinctly different from factors such as motivational beliefs, cognitive strategies, and metacognitive strategies (Wolters, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). Currently, motivational regulation strategy scale measurement has undergone two major revisions as well as being subjected to two translations: German and Chinese (Chow, 2011; Schwinger et al., 2007, 2009; Trang, 2015; Wolters & Benzon, 2013).

At this stage of the literature more investigation must be completed to establish a deeper understanding of what it means to be motivationally regulated. More specifically, to better understand what it means for someone to regulate their motivation, it is necessary to better understand what techniques or strategies students are employing to manipulate their motivation within the academic setting. Furthermore, investigation of student-veterans within education also requires modernization within the literature. Developing a deeper understanding of the student-veterans that are return to education either during or post military career at this period in time is different than previous generations due to VA benefits, experiences, as well as just the overall mass increase in population size compared to prior research.

**Significance of the Study**

This study is significant because it not only explores the development of additional scales of measurement for motivational regulation strategies, but the focus of
the study is on a population of students not yet researched within the motivational regulation literature. Furthermore, this study also presents evidence of student-veterans’ use of such motivational regulation strategies within higher education; focusing on general challenges to motivation. Moreover, evidence presents levels of core self-regulated learning factors such as motivational beliefs and learning strategies; however, these factors are not explored deeply within this study.

**Research Questions**

**Research Question 1:**

On average, which motivational regulation strategies are reported to be used most by student-veterans? Is there a difference in usage between the researched strategies?

**Research Question 2:**

What, if any, is the relation between student-veterans’ use of motivational regulation strategies and other aspects of self-regulated learning such as their motivational beliefs and their use of cognitive and metacognitive strategies? Additionally, does student-veterans’ motivational beliefs or their use of learning strategies predict their reported use of motivational regulation strategies?

**Research Hypotheses**

**Hypothesis 1:**

Student-veterans will exhibit high average use of four motivational regulation strategies (regulation of performance-approach goals, regulation of value, environmental structuring, and self-consequating) compared to the remaining motivational regulation strategies examined. The primary researcher suspects that student-veterans’ unique
experience with regards to training and real world applications have developed and hardened the researched population’s use of these four strategies over others within this study when they are faced with motivational challenges.

**Hypothesis 2:**

Motivational regulation strategies will correlate with other factors of self-regulated learning (motivational beliefs and learning strategies). Furthermore, motivational beliefs and learning strategies will present as statistically significant predictors of motivational regulation strategies.

**Definition of Terms**

For the purpose of this study, the following terms and definitions were identified; these terms were selected to assist in the reader’s understanding of the research from the field of educational psychology. Additionally, identifying and defining the research population of this study.

**Motivational regulation.** Can be defined as a student’s effort to govern their own motivation or purposefully maintain or improving their level of effort associated with academic tasks (Wolters and Benzon, 2013). Motivational regulation consists of three primary facets: knowledge or motivation, monitoring of motivation, and control of motivation.

**Knowledge of motivation.** Also known as, meta-motivation can be defined as knowledge or beliefs they have of their own motivation.

**Monitoring of motivation.** Refers to the student’s ability to recognize their motivational status at a given point during the academic task.
Control of motivation. Also known as, motivational regulation strategies, is the deliberate employment of techniques to manipulate their level or state of motivation.

Self-regulated learning. Social cognitive model purposes that for a student to be described as a self-regulated learner is based on the degree to which they are metacognitively, motivationally, and behaviorally engaged in their own learning (Zimmerman, 1989).

Metacognition. Known to have at least two theoretically distinguishable components including the regulation of cognition and knowledge of knowledge of cognition.

Regulation of cognition. Presented as the first step of metacognition, is defined as a student’s effort to manage cognitive processing while academic tasks and conditions vary in nature. Efforts include planning, selecting, monitoring, and evaluating cognitive strategies (rehearsal, elaboration, and organization) used throughout a student’s learning process.

Knowledge of cognition. Refers to a student’s knowledge, control, or regulation of one’s cognitive state; or the understanding and storage of information regarding the thinking and learning processes. Such knowledge consisting of three forms: declarative (factual knowledge), procedural (how to knowledge), and conditional (when and why knowledge).

Motivation. Within this study, the term motivation can be generally described as both a student’s level of motivation as well as the processes that account for it (Wolters, 2003a).
**Student-veteran.** United States Code of Federal Regulations defines a veteran as any individual that has served within one or more military service branches of the Armed Forces and was discharged from service with any status other than dishonorable (38 C.F.R § 3.1, 2008). However, this study expands that terminology to include any individual still currently serving within those military branches.

The purpose of this study is to address two broad factors within the field motivational regulation. Goal one, is to investigate an expanded measurement of motivational regulation strategies on an under-researched populous of higher education, student-veterans. To accomplish this task, a replication of Wolters and Benzon (2013) study was conducted using an expanded measurement of motivational regulation strategy use; incorporating three new scale measures. Goal two, is the examination of the motivational regulation’s relation to existing aspects of self-regulated learning (motivational beliefs, cognitive strategies, and metacognitive strategies). Additionally, an examination as to whether the same core factors of self-regulated learning could be used to predict their reported use of motivational regulation strategies.
Chapter 2: Literature Review

Student-Veterans

The United States Department of Veteran Affairs (VA) and Code of Federal Regulations (C.F.R.) defines a veteran as any individual that has served within one or more military service branches of the United States Armed Forces (Army, Navy, Marine Corps, Air Force, and Coast Guard, including their Reserve and National Guard components), and was discharged from service with any status other than dishonorable (38 C.F.R § 3.1, 2008). However, for the purpose of this study, a student-veteran will be given a broader terminology. Within this study, a student-veteran is defined as any individual that fits the definition of a veteran listed above, as well as any individual that is currently serving within any of the defined services whether they are members of Active Duty, National Guard, or Reserves.

According to a 2015 report, produced by the United States Department of Veteran Affairs (VA), the volume of veterans enrolled into higher education programs has significantly increased following the congressional approval of the Post-9/11 era GI Bill (see Definitions: Post-9/11 GI Bill). Between 2009 and 2012 was a reported average of 108,568 student-veterans enrolled into full-time educational programs, accompanied by another 17,021 part-time enrollments (Veteran Affairs, 2015). The following section will discuss the rates of enrollment and degree completion of student-veterans to establish an
understanding of the difference between the traditional-student population and veteran-students.

**Military Services**

Cumulatively, student-veterans exhibit nearly identical completion rates compared to the traditional student populous, differing only by a margin of 1% (48% student-veterans versus 49% traditional students) (Veteran Affairs, 2015 Veteran Economic Opportunity Report, 2015). However, other factors such as completion timing, gender, and age present evidence of differences between the two populations of higher learning.

**Institutional Enrollment**

The 2015 VA economic report indicates 79% of student-veterans have enrolled into public institutions of higher learning during the period of 2002 to 2013. However, private non-profit institutions were found to exhibit the highest completion rating at 60%; such ratings were 12% higher than public institutions (48%) and 22% higher than private for-profit institutions (38%). Additionally, degree distribution among student-veterans is as follows: (35.1%) associate degree, (34.6%) bachelor’s degree, (11%) graduate degrees, and (9%) certification programs (Veteran Affairs, 2015).

**Completion Statistics**

According to VA reporting completion ratings for all student-veterans attending higher education programs between the years 2002 to 2013 ranged between 40-50%; however, student-veterans associated with the Air Force (USAF) branch of service exhibited significantly greater rates of completion. Student-veterans associated with the
USAF illustrate an estimated 20% higher rate of completion (65%) compared to other branches of the United States Armed Forces (Veteran Affairs, 2015 Veteran Economic Opportunity Report, 2015) However, these findings do not represent individuals currently serving under Active Duty, National Guard, or Reserve status at the time of the VA report. This is primarily due to the fact that individuals are yet to be labeled veterans but as service members utilizing a different educational benefits program available during their service term.

Completion Timing. One factor of difference is the time completion rate for student-veterans. Generally, they tend to take a significantly longer time in completing academic programs. Student-veterans pursuing an associate degree program tend to take an additional 1.8 years, resulting in a length of 5 years, to complete; traditional-students have shown to complete the same degree in just 3.2 years. Comparatively, student-veterans take an estimated 6.3 years completing a bachelor’s degree compared to the traditional-students’ rate of just 4.3 years. Finally, certification programs exhibit the highest differential at 2.3 years (4.4 years for student-veterans and 2.1 for traditional-students) (Veteran Affairs, 2015).

Gender. The second differing factor between traditional-students and student-veterans is gender (Veteran Affairs, 2015). As many would assume the distribution of student-veterans is significantly skewed with 79% of the population identified as male, resulting in just 21% as female; comparatively the traditional-student population within this report is distributed nearly symmetrical at 49% female and 51% male. However,
student-veteran females tend to successfully conclude their educational pursuits nearly 10% more than their male counterparts (56% female/46% male).

**Age.** Age has also been highlighted as having a significant relation to the rate of degree completion for student-veterans. The distribution of traditional-student population age groups and their rate of completion are as follows: 14% (18-24 years old), 24% (25-35 years old), 24% (35-44 years old), 24% (45-54 years old), and 14% (55-64 years old); compared to student-veterans distribution of: 2% (18-24 years old), 13% (25-35 years old), 22% (35-44 years old), 30% (45-54 years old), and 32% (55-64 years old) (Veteran Affairs, 2015). Based on these grouping, student-veterans tend to differ greatly in age to their traditional-student counterparts. Additionally, evidence indicates as student-veterans increase in age so does their rate of degree completion between both male and female groupings. Males exhibit an increase from 44% (under 20 years old) to 50% (40-44 years old) and females 53% (under 20 years old) to 58% (40-44 years old) rate of degree completion as they progress in age. However, both genders do illustrate a decline in degree completion rate after 45 years of age (Veteran Affairs, 2015).

Understanding the differences between both traditional-students and student-veterans as well as the sub-groups of male and female student-veterans I have establish a reasonable need to investigate the properties of self-regulated learning; more specifically, the use of motivational regulation strategies within the student-veteran population.

**Self-Regulated Learning**

As discussed in the introduction, students’ motivation of regulation has become a focus for explaining students’ learning processes and academic outcomes. A general
introduction of self-regulated learning and an in-depth review of the research related to
the examination and development of motivational regulation and regulation of motivation
measurement are discussed in the following section of this study.

**Theoretical Framework**

Many contemporary models of self-regulated learning can be dated back to the
mid-80s; with their primary focus on developing a deeper understanding of students’
engagement and performance within academia (Corno, 1986; Pintrich & DeGroot, 1990;
Zimmerman & Martinez-Pons, 1986, 1988, Zimmerman, 2000); such models of self-
regulated learning have been developed based on a variety of theoretical perspectives.

Winnie (2011) centered on cognitive and metacognitive self-regulation.
Boekaerts’ (2011) model of self-regulation consists of a dual processing model use to
illuminate three needs for students to self-regulate; for example, preventing threats and
loss, protecting their commitments, and expanding their skills and knowledge. Corno
(1993) and Kuhl (1985) focus on volitional research, consisting of self-regulating
strategies such as cognitive (i.e., information-processing), emotional control (i.e., anxiety
reduction), environmental control, and self-consequating (i.e., use of rewards) that assist
in students’ implementation of specific actions (Wang, 2013).

However, for this study, the social cognitive conceptual framework of self-
cognitive self-regulated learning is described as a multi-dimensional faceted process were
students’ purposefully monitor, regulate, control, and reflect on their learning through
cognitive, behavioral, contextual, and motivational aspects of learning (Pintrich, 2000).
Motivational Regulation

For the past 30 years, factors of motivational regulation have appeared in many of the most prominent contemporary models for self-regulated learning (Boekaerts, 1996; Pintrich, 2000; Winne & Hadwin, 2008; Zimmerman, 1986, 1989, 2000). Furthermore, facets of motivational regulation are also present within more focused models such as: volition (Corno, 1986, 1993, 2001; Kuhl 1985; Kuhl & Kraska, 1989; McCann & Garcia, 1999; McCann & Turner, 2004), self-motivation (Cheng & Ickes, 2009; Dishman, Ickes, & Morgan, 1980), self-reinforcement (Heiby, Ozaki, & Campos, 1984), as well as self-regulation of explicit forms of motivational constructs (Sansone, 2009; Sansone & Thoman, 2005; Sansone, Wiebe, & Morgan, 1999). However, each of these models labelled the process that students take to regulate or increase their motivation differently; terms such as: meta-motivation, self-motivation, motivational regulation, and motivational control have all be used and defined differently throughout each model (Wolters, 2003a, 2011; Wolters & Benzon, 2013). For the purpose of this study, the work of Wolters and colleagues (1998, 2003a, 2011, 2013), which builds from theoretical advancements by Pintrich and colleagues (Pintrich, 2000; 2004; Garcia & Pintrich, 1994; Pintrich & DeGroot, 1990; Pintrich & Zusho, 2002; Wolters, Pintrich, & Karabenick, 2005) the process will be labelled and identified as self-regulation of motivation or motivational regulation.

**Knowledge of Motivation.** The first of three facets, knowledge of motivation or meta-motivation can be defined as a student’s meta-level comprehension of their knowledge or beliefs about their own motivation (Boekaerts, 1996; Cooper & Corpus, 2009; Wolters, 2003a, 2011, 2013). This knowledge may consist of information referring to their current motivation status (level), factors that affect their motivation in general, as well as any processes that may affect their motivation. Meta-motivation can be more broadly defined as a “students’ knowledge of the topics, domains, or tasks they identify as interesting, enjoyable, or intrinsically motivating (Wolters and Benzon, 2013, p. 200).” Furthermore, meta-motivation is an essential facet for students’ ability to monitor and control their motivation (Wolters, 2011). Additionally, this facet of motivational regulation consists of the declarative knowledge (recognizing motivational strategies), procedural knowledge (implementing motivational strategies), and conditional knowledge (infer outcome based on motivational strategies used) required for a student to employ motivational regulation strategies appropriately and efficiently (Trang, 2015). Finally, students lacking meta-motivation may be incapable of using specific motivational regulation strategies effectively or entirely.

**Monitoring of Motivation.** Discussed as the second necessary facet of motivational regulation, motivational monitoring refers to the student’s ability to recognize their level or state of motivation at any point during an academic task (Wolters, 2003a, 2011, 2013). That is, regulation of motivation can be dictated by a student’s ability to observe, gather, and process motivational feedback of academic tasks. Similar to models of meta-cognitive monitoring, students may be self-aware or self-assessing of
their motivation prior to academic tasks (prediction of motivation), during academic tasks (experience of motivation), and even post academic tasks (reflection of motivation) (Wolters, 2011). Hence, this self-awareness is necessary for students to recognize when motivational challenges take place; acting as a prerequisite to any interventions. Additionally, both a student’s level of motivation as well as the nature of their motivation is subject to motivational monitoring. A student’s level of motivation refers to the willingness, desire, or effort needed to finish an academic task, “Do I have enough motivation?” Whereas the nature of motivation refers to the type or form of motivation used, “Is this the right type of motivation for the task (Wolters, 2011, p. 270)?” Finally, this process may operate with little to no conscious effort unless a significant discrepancy arises (Wolters, 2003a, 2011; Wolters and Benzon, 2013).

Control of Motivation. The third facet of motivational regulation is the student’s deliberate intervention or regulation of their own motivation, effort, or persistence (Wolters, 2003a, 2011, 2013). Motivational control is the process in which students employ techniques (strategies) in an effort to manage either their level or state of motivation. Over the course of a student’s academic career they may learn, develop, and amend many differing motivational regulation strategies used to regulate the diverse nature of motivation. During an exploratory study, Wolters (1998, 2003a) produced the first trace of evidence of motivational regulation strategies used by students to regulate their motivations. Strategies consisted of regulating motivational beliefs that have been discussed throughout achievement motivation research, such as goal orientation, task value, interest in the task, and self-efficacy. According to Wolters and colleagues (2003a;
2011; 2013) and Boekaerts (1996), when controlling for effort and persistence, students’ management of affect, environment, and behavior may also be considered factors of motivational regulation. In a theoretical review, Wolters (2003a) presents a variety of motivational regulation strategies that students may implement in an effort to regulate their motivation.

**Assessment of Motivational Regulation Strategies**

**Instrument Development.** The purpose of this study employs the use of a measurement of motivational regulation strategies (scales); such scales are an adaptation from previous measurements within the literature of motivational regulation research. At the time of this review there have been ten empirical studies that have conducted investigations on the development or use of a motivational regulation strategies scale (Chow, 2011; Schwinger et al., 2007, 2009, 2012a, 2012b; Trang, 2015; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). This section provides a description of the development of the measurement of motivational regulation.

**Wolters’ qualitative probe.** In an initial investigation into the facet of motivational regulation, Wolters (1998) conducted an exploratory study to identify strategies used by undergraduate psychology students in an effort to overcome motivational challenges (e.g. difficult material) they may encounter while trying to complete academic tasks (e.g. studying for an exam). Using an open-ended questionnaire, participants were asked to read four scenarios followed by differing motivational challenges. Participant were then asked to report what they would do if they wanted themselves to continue the required task. Initial analysis modeling consisted of creating
categories from previous motivational and volitional research perspectives. Hence, early categories such as *attentional*, *environmental*, *emotional*, and *information-processing-strategies* were incorporated based on Kuhl (1985) and Corno (1986), as well as *extrinsic goals, mastery goals, efficacy*, and *value* categories from motivational research perspectives (e.g., Ames, 1992; Pintrich & DeGroot, 1990). However, an analysis of the 12 academic situations (4 scenarios * 3 motivational problems) produced 14 theoretically distinct categories. Such categories consist of *performance goals, extrinsic rewards, task value, interest, mastery goals, efficacy, cognition, help-seeking, environment, attention, willpower, emotion, other motivation, and other* (Wolters, 1998). These categories would be the bases of future scale development and usage (See Chow, 2011; Schwinger et al., 2007, 2009, 2012a, 2012b; Trang, 2015; Wang, 2013; Wolters, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013;).

**Wolters’ initial measure of motivational regulation.** An initial attempt at developing a scale for measuring students’ use of motivational strategies previously uncovered during his initial exploratory study, Wolters (1999) developed the first self-report measure of motivational regulation strategies. Administered to ninth and tenth grade students, Wolters’ (1999) measurement investigated the presence and frequency of five motivational regulation strategies (scales) through the use of 28 Likert-type items developed based on previous research findings. However, Wolters elected to remove 3 items due to factor loading issues. Such scales consisted of *mastery self-talk, performance self-talk, interest enhancement, self-consequating, and environmental control.*
**Wolters’ adapted measure of motivational regulation.** In an effort to develop additional reliability and validity for his measurement of motivational regulation, Wolters and Rosenthal (2000) conducted another study using a nearly identical version of the Wolters (1999) investigation to study a more contextually specific domain (mathematics versus general education habits) as well as a younger student population (eighth-graders). However, there were two minor amendments administered to the scales. Amendment one, incorporated the use of a previously dropped item from the mastery self-talk scale from Wolters’ (1999) study. Amendment two, consisted of two items being revised to reflect a focus on the specific educational domain being investigated; in this case the change consisted of changing the items from general education to mathematics (Wolters & Benzon, 2013).

**Wolters’ expanded measure of motivational regulation (Current).** Wolters and Benzon (2013) is the most recent edition of Wolters and colleagues (1998, 2000) assessment measure for motivational regulation strategies. Administered to primarily first- and second-year college students this measurement consists of 31 Likert-type items. However, this edition expands on the previous version through the addition of another scale as well as amending the existing scales titles. In this version the five renamed, and one new, scales are: regulation of performance-approach orientation (goals), regulation of mastery orientation (goals), regulation of situational interest, self-consequating, environmental structuring, and lastly the new regulation of value (2013).

**Schwinger’s German measure of motivational regulation.** Schwinger, von der Laden, and Spinath (2007) developed a German version of motivational regulation by
adapting Wolters’ (1999) measurement to conducted studies of German college and high school students. In their first study, Schwinger et al. (2007) administered the original 28 Likert-type items, as well as additional open-ended question of motivational regulation, to German college students. Following an analysis and revision researchers amended the assessment to include eight scales.

This new measurement incorporated an additional scale along with separating two other scales; creating two newly identified strategies. Based on previous research as well as findings within this study, researchers created an additional scale measurement for proximal goal setting. Using the same feedback and literature progress the scale of performance self-talk was separated into performance-approach self-talk and performance-avoidance self-talk. Finally, the last scale to be divided was interest enhancement becoming enhancement of situational interest and enhancement of personal significance. In two additional studies, Schwinger and colleagues (2007) conducted confirmatory factor analyses determining statistical credibility to the newly expanded eight scale assessment. The eight scales are designated as: enhancement of situational interest, enhancement of personal significance, mastery self-talk, performance-approach self-talk, performance-avoidance self-talk, environmental control, self-consequating, and proximal goal setting (Schwinger et al., 2007).

there are some factor differences. First is the addition of two new factors: *relevance enhancement* and *efficacy enhancement*; as well as an additional separation of an existing scale: *performance/relative ability self-talk*. Wang (2013) identifies relevance enhancement as an attempt to better investigation the motivational regulation strategies used by students to impact their motivation for useful and relevant tasks (task value) that may be experiencing motivation challenges. The second factor performance/relative ability self-talk is presented as students’ focus on performing better than their peers, more accurately this strategy has nothing to do with either mastering the material or achieving objective goals like the other forms of performance focused self-talk. Finally, the last new factor introduced within this assessment is the efficacy enhancement scale. This factor is described as a strategy of self-talk with the sole purpose of increasing a student’s self-efficacy for task engagement (Wang, 2013); while the other measurements of motivational regulation are adapted from Wolters’ (1998, 1999) works, efficacy enhancement was adapted by McCann & Garcia’s (1999) Academic Volitional Strategy Inventory.

*Trang’s expanded measure of motivational regulation.* Trang’s (2015) investigation of motivational regulation is the most recent study conducted. While other researchers attempted to expand the spectrum of scales for assessing motivational regulation, Trang (2015) set out to create a more comprehensive measurement. Combining items from Wolters and Benzon (2013), Schwinger et al., (2007), and McCann and Garcia (1999) this new 39 item measurement was administered to nearly 300 graduate and undergraduate students for the purpose of determining a more
appropriately fitting model (six factors to eight). However, results provided evidence of
the measurement fitting more appropriately within a nine-factor model.

**Psychometric Analysis of Measures for Motivational Regulation Strategies.**

This section reviews the psychometric evidence produced by the various editions of
assessing motivational regulation strategies within the academic domain. At the time of
this review there were ten empirical studies discovered that directly investigated the
properties of motivational regulation in academia; ultimately leading to scale
development or modifications (Chow, 2011; Schwinger et al., 2007, 2009, 2012a, 2012b;
Trang, 2015; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon,
2013).

**Internal Structuring.** At the time of this review there have been five empirical
investigations into the internal structuring of motivational regulation strategy scales. Two
studies have used exploratory factor analysis (EFA; Wolters, 1999; Wolters & Benzon,
2013) and three studies have used confirmatory factor analysis (CFA; Schwinger et al.,
2007; Trang, 2015; Wang, 2013). In addition to factor analyses many other studies
provide additional evidence of internal structuring through inter-correlation evidence
(Schwinger et al., 2009; Wolters & Rosenthal, 2000)

**Wolters.** Following Wolters’ (1998) study investigating the potential motivational
strategies students enlisted to regulate their motivation, Wolters (1999) conducted the
first study using a primitive version of a measurement for motivational regulation. In this
study, Wolters administered a 28-item scale assessment to ninth- and tenth-grade high
school students (N =88). Exploratory factor analysis based on minimum eigenvalue
criteria and skree [sic] plot analysis (Kim & Mueller, 1978) revealed five distinct factor loadings: mastery self-talk, performance self-talk, self-consequating, interest enhancement, and environmental control. Such factor loadings were found to resemble theoretical modeling, produced high individual items loadings, and accounted for roughly two-thirds of the variance amongst scale items. However, items presented unexpected loadings and cross-loadings leading to the removal of three items (one from factors: performance self-talk, self-consequating, and mastery self-talk) for all future analysis within this study (Wolters, 1999). Lastly, Cronbach alphas were established for the scales and their associated remaining items: interest enhancement (α = 0.90), self-consequating (α = 0.87), mastery self-talk (α = 0.85), performance self-talk (α = 0.84), and environmental control (α = 0.73).

Interest enhancement, the first factor, consisted of eight items depicting students’ efforts to turn the academic task into a game, or more generically for them to find the task immediately relevant, enjoyable, or fun. Factor two, performance self-talk, consisting of five items reflects students use of sub-vocal or internal thought to produce increased desire for task completion through intensifying importance on performance goals. Self-consequating, labeled factor three, contained four items reporting students use of extrinsic rewards or punishments to reinforce the desire to complete a task. The four items from factor four, labeled mastery self-talk, reflected students’ efforts or desires to master the task material to assist in increasing their motivation levels. Finally, the last factor, environmental control consisted of four items used to indicate students’ efforts to avoid or reduce distractions to ensure task completion (Wolters, 1999). Overall, the
results within Wolters (1999) established initial evidence of internal consistency of the motivational regulation measure.

In a secondary study, Wolters and Rosenthal (2000) conducted a study using an amended version of the motivational regulation scale conducted by Wolters (1999); however, this study was conducted on a younger population (eighth-grade students). The scale used within this study had two minor adjustments to the original scale. First, Wolters and Rosenthal (2000) elected to re-administer the mastery self-talk item that was removed from Wolters’ (1999) following inconsistent cross-loadings. Second, items were also adjusted to reflect a focus on mathematics within this study compared to general education during the previous study. Correlation coefficients once again provided evidence of internal consistency between scales: self-consequating (4 items, $\alpha = 0.74$), environmental control (4 items, $\alpha = 0.74$), mastery self-talk (5 items, $\alpha = 0.85$), performance self-talk (5 items, $\alpha = 0.79$), and interest enhancement (8 items, $\alpha = 0.86$) (Wolters & Rosenthal, 2000).

Wolters and Benzon (2013) provided additional evidence of internal structuring in a study of primarily first- and second-year college students participating in either a human development or history course. Addition of another scale in conjunction with revision of scale labels resulted in six scales: regulation of value, regulation of performance goals, self-consequating, environmental structuring, regulation of mastery goals, and regulation of situational interest. An exploratory factor analysis presented an acceptable model of the now 31-item measurement based on a minimum eigenvalue and scree plot analysis; ultimately accounting for approximately 69% of the total variance.
Three items were subjected to additional analysis due to cross-loadings above 0.35. “One of the items was deemed in differentiable between the regulation of mastery and performance goals scales due to wording (i.e., “to do well”) (Wolters, 2013, p. 209).” The other two items reflected close association between regulation of mastery goals and regulation of value scale; separated by 0.7 or less. Ultimately, all three items were retaining based on strong loadings to at least one theoretically sound factor. However, one other item was dropped from further analysis based on failing to load above the 0.40 cut-off (Wolters, 2013). Finally, internal consistency for the 30-item, six scale motivational regulation measurement was as follows: regulation of value (6 items, $\alpha = 0.91$), regulation of performance goals (5 items, $\alpha = 0.84$), self-consequating (5 items, $\alpha = 0.91$), environmental structuring (4 items, $\alpha = 0.77$), regulation of mastery goals (5 items, $\alpha = 0.88$), and regulation of situational interest (5 items, $\alpha = 0.88$).

Schwinger and colleagues. Schwinger, von der Laden, and Spinath (2007) conducted multiple investigations using a German translated version of Wolters’ (1999) motivational regulation measurement. Employing confirmatory factor analysis (CFA) on the original five scale assessment presented evidence for Schwinger and colleagues to reject the five-factor model ($\chi^2(265, N = 106) = 690.852, p \leq 0.00; CFI = 0.77; RMSEA = 0.12$) in favor of separating two of the factors within the measurement of motivational regulation. Schwinger et al., (2007) also added an additional factor at this time to increase the total hypothesized factors to eight. The first factor separated was performance self-talk, transitioning into performance-approach self-talk and performance-avoidance self-talk. The other measurement to be separated was interest
enhancement becoming *enhancement of situational interest* and *enhancement of personal significance*. Additionally, incorporating findings from the self-report measure administered during the initial study an eighth factor was added to the motivational regulation scale. The third study within this work produced a confirmatory factor analysis that provided evidence that the eight-factor model had significance ($\chi^2(375, N = 168) = 556.32, p \leq 0.00; CFI = 0.93; RMSEA = 0.05$) (Schwinger et al., 2007). Information from this study is limited because Schwinger et al., (2007) has only been published in German.

Wang. Similar to the process conducted by Schwinger et al., (2007) a Chinese version of Wolters’ (1999) motivational regulation scale was translated to Chinese for the purpose of a doctoral dissertation; however, a major difference between the German translated version and this version is the researchers re-translation of the Chinese measurement back to English. Furthermore, Wang (2013) also enlisted two subject matter experts in the field of both Chinese and English language to provide additional validity to the Chinese translated version. However, the Chinese version was amended to consist of six scales; efficacy management was an additional measurement added based on previous research and theoretical modeling. Furthermore, the original five factors were re-labeled as well; this version of motivational regulation strategy assessment consisted of *mastery self-talk, performance/extrinsic self-talk, performance/relative ability self-talk, interest enhancement, relevance enhancement, and efficacy enhancement*. Using a confirmatory factory analysis presented evidence that a six-factor model had an adequate fit even though item correlations were observed to be medium to high amongst each other
\(\chi^2(419) = 2662.1, RMSEA = 0.07, CFI = 0.88, TLI = 0.87, SRMR = 0.05\) (Wang, 2013). Inter-correlation coefficients for this version were: mastery self-talk (6 items, \(\alpha = 0.85\)), performance/extrinsic self-talk (5 items, \(\alpha = 0.88\)), performance/relative ability self-talk (4 items, \(\alpha = 0.83\)), interest enhancement (5 items, \(\alpha = 0.89\)), relevance enhancement (6 items, \(\alpha = 0.87\)), and efficacy enhancement (5 items, \(\alpha = 0.82\)) (Wang, 2013).

Trang. The most current measurement of motivational regulation comes from Trang’s (2015) Master’s thesis in which the purpose of the study was to develop a comprehensive assessment scale combing works from Wolters and Benzon (2013), Schwinger et al., (2007), as well as scales from McCann and Garcia’s (1999) Academic Volitional Strategy Inventory. Using confirmatory factor analysis, Trang (2015) failed to present viable evidence of his hypothesized eight-factors model(\(\chi^2(673) = 1632.77, p < 0.01, RMSEA = 0.07, CFI = 0.95, TLI = 0.94\)); ultimately leading to an expanded nine-factor model(\(\chi^2(665) = 1551.54, p < 0.01, RMSEA = 0.07, CFI = 0.95, TLI = 0.95\)). While evidence presented appropriate use of a nine-factor model for the items, the scales themselves have much less significant results when it came to inter-correlations: regulation of value (\(\alpha = 0.88\)), regulation of performance goals (\(\alpha = 0.86\)), self-consequating (\(\alpha = 0.80\)), environmental structuring (\(\alpha = 0.73\)), regulation of situational interest (\(\alpha = 0.88\)), regulation of performance-avoidance goals (\(\alpha = 0.80\)), self-efficacy enhancement (\(\alpha = 0.62\)), regulation of mastery goals (\(\alpha = 0.91\)), and proximal goal setting (\(\alpha = 0.64\)) (Trang, 2015).
Among the results from both the exploratory factor analyses (Wolters, 1999; Wolters & Benzon, 2013) and confirmatory factor analyses (Schwinger et al., 2007; Trang, 2015; Wang, 2013) provide evidence of a valid and reliable measurement with distinct structural dimensionality; strategy scales measure distinctly different facets of motivational regulation. However, limitations are present within these analyses that prevent generalizability. Firstly, many of the studies conducted were administered to either minor aged adolescents or young adults, many within their first few years of higher education. Secondly, the application of confirmatory factor analysis on an expanded and amended edition of a motivational regulation strategies assessment (Trang, 2015) that consists of newly added items of distinctly different scales fails to identify potential cross-loadings of items not previously determined as statistically distinct from other scale items. Hence, as this measurement continues to expand within this study an exploratory factor analysis was conducted to provide initial steps of validity and reliability standardization for the measurement of motivational regulation strategies. This was accomplished through the use of implementing all scale items previously introduced throughout the measurement development life cycle to include the most recent assessment scales; which is a consolidation and re-labelling of the previous scales, produced by Trang (2015) and re-worded previously excluded items, then subjecting the results to an exploratory factor analysis to identify factor cross-loadings and scale/item adherence to the theoretical model identified by Wolters (1998).
Relation of Motivational Regulation to Self-Regulated Learning/Academic Achievement

A central focus in the study of motivational regulation is the examination of how the construct relates to other aspects of self-regulated learning. Hence, the objective of this study is to examine the relations of student-veterans’ use of motivational regulation strategies with other aspects of self-regulated learning. More specifically, an examination of the relations between student-veterans’ motivational beliefs (goal orientation, task value, control of learning beliefs, and self-efficacy) and their use of learning strategies (cognitive and metacognitive strategies) to their use of motivational regulation strategies. Additionally, an examination of the relation between student-veterans’ use of motivational regulations strategies and achievement in academia (general grade point average). However, while this study has many first, this is not the first study to research such factors. To date, there have been six empirical studies investigating the relation between students’ use of motivational regulation strategies and constructs of self-regulated learning (Chow, 2011; Trang, 2015; Wang, 2013; Wolters, 1999; Wolters & Benzon, 2013; Wolters & Rosenthal, 2000). Bivariate analyses produced evidence indicating correlations between the constructs of self-regulated learning and motivational regulation strategies.

Relation to Motivational Beliefs. As one of the essential constructs of self-regulated learning, an examination of students’ expressed use of motivational regulation strategies and the relation of their motivational beliefs was conducted within this section. According to Wolters (2003a, 2013), the relationship between motivation and
motivational regulation strategy use can be considered extremely complex and difficult to detect. Furthermore, explaining that students that exhibit high-level motivation within a specific academic domain, context, or tasking are expected to require less need for motivational regulation strategies compared to their lower motivated student counterparts. Because they already have enough motivation, they have no need to incorporate more strategies in an effort to boost it; ultimately indicating no additional effort needed. However, similar inferences can be made of students that illustrate a low-level of motivation within a given domain, context, or tasking. Such students are expected to not employ motivational regulation strategies based on the increased effort requirement for such incorporation. Compared to the highly motivated students, low motivated students may have a willingness or desire to complete a task; however, the increased effort requirement may be significant enough to prevent students from enacting motivational regulation strategies to complete such tasks (Wolters & Benzon, 2013). At the time of this review, there have been four studies to have investigated the relation of students’ use of motivational regulation strategies and their existing levels of motivation beliefs (Chow, 2011; Wang, 2013; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013).

An initial investigation into this construct of self-regulated learning was conducted by Wolters (1998). In this study, college students reported their employment of behaviors that established, maintained, or increased their willingness to contribute effort to complete an academic task; more notably when such willingness is declining. Wolters (1998) initial study presents early evidence of college students’ use of
motivational regulation strategies when students focused on goal orientation. However, results were preliminary requiring a need for an assessment measure to better understand the relation.

In a more focused study, Wolters & Rosenthal (2000) conducted the first study designed to examine students’ use of motivational regulation strategies and their motivational beliefs. Eighth-grade mathematics students were asked to self-report their motivational beliefs and use of motivational regulation strategies. Motivational beliefs were assessed as: task value (belief about task importance), learning goal orientation (tendency to adopt goals related to mastery or competence), performance goal orientation (focus on getting good grades), and self-efficacy (perception of ability to successfully complete course work). Whereas the five motivational regulation strategies were measured as: mastery self-talk, interest enhancement, performance self-talk, self-consequating, and environmental control. Overall, bivariate evidence between the motivational regulation strategies and students’ motivational beliefs were low to moderate (rs ranged from 0.04 to 0.59). One correlation presented as stronger than desired, learning goal orientation (items focusing on mastering material) and mastery self-talk (challenging one-self to acquire mastery of material) (r = 0.73) (Wolters & Rosenthal, 2000). Such a correlation suggests overlapping of the two constructs, however, conceptually learning goal orientation is a belief whereas mastery self-talk is a strategy. Ultimately, Wolters and Rosenthal (2000) presented the first empirical evidence of distinction between motivational beliefs and motivational regulation strategies. Unfortunately, this study has limitations. First, the small sample size (N = 88) makes
generalizability difficult. Second, the limited number of strategies within this study reduces understand of all potential strategy usages and frequency within motivational regulation.

Additional research conducted by Wolters and Benzon (2013) examined the potential relations between motivational beliefs and an expanded version of the Wolters (1999) and Wolters and Rosenthal (2000) motivational regulation strategies measurement. In this study, college students reported their motivational beliefs and use of six motivational regulation strategies. Motivational beliefs constructs, value and self-efficacy, remained consistent with the earlier study conducted by Wolters and Rosenthal (2000); however, keeping with achievement goal theory research (Anderman & Wolters, 2006), learning goal orientation and performance goal orientation were revamped. Learning goal orientation was re-titled mastery orientation and performance goal orientation was split into -approach and -avoidance factors. However, this study only relied on examining the performance-approach facet (students focus on getting good grades). The six motivational regulation strategies were measured as: regulation of mastery goals, environmental structuring, self-consequating, regulation of performance goals, regulation of value, and regulation of situational interest. Factor analysis evidence resulted in Wolters (1999) and Wolters and Rosenthal (2000) scale of interest enhancement being separated into the scales of regulation of value and regulation of situational interest respectfully. Bivariate analyses presented correlation evidence of distinct differences between motivational regulation strategies and motivational beliefs;
correlations ranged from 0.02 to 0.62. All but five correlations were significant at the ($p < 0.05$ or $p < 0.01$) range (Wolters & Benzon, 2013).

In a study examining factors of personal epistemic beliefs, goal orientations, and motivational regulation strategies, Chow (2011) conducted a pre-/post- investigation of business students within their final two years of college. Chow’s (2011) study differed greatly to all other investigations of motivational regulation. First, the assessment was administered during both pre- (start of) and post- (end of) term. Second, students were placed into dichotomous groups based on course formatting: control and treatment groups. Treatment group participants were subjected to course activities such as case presentations as well as both small and large group discussions; whereas the control group had traditional lectures and homework assignments. Following Wolters and Rosenthal’s (2000) experimental design goal orientation only focused on performance goals and mastery goals. Additionally, motivational regulation strategies were expanded to include mastery self-talk, performance self-talk, self-consequating, environmental structuring, interest enhancement, relevance enhancement, and extrinsic self-talk; relevance enhancement and extrinsic self-talk were scales added to Wolters’ (1999) original measurement of motivational regulation strategies. Results of the relations between students’ use of motivational regulation strategies and motivational beliefs were presented through two correlation analyses (pre- and post- term administrations of measurement scales). First, pre-term correlations ranged from 0.06 to 0.61. Second, post-term correlations ranged from 0.07 to 0.62. However, not many were significant at the 0.05 or 0.01 level (Chow, 2011).
In a cross-sectional study on Chinese tenth graders, Wang (2013) found results consistent with previous research studies. Similar to Wolters and Benzon (2013) study, Wang (2013) explored the relation of motivational regulation strategies and achievement goals; however, in this study performance goal orientation held both the avoidance (students focus on avoiding incompetence) and approach (students focus on getting good grades) facets. The six motivational regulation strategies measured were: mastery self-talk, performance/extrinsic self-talk, performance/relative ability self-talk, interest enhancement, relevance enhancement, and efficacy enhancement. Bivariate analyses provided additional evidence of distinct separation between the constructs of motivational beliefs and motivational regulation factors. Wang (2013) found correlations ranging from 0.09 to 0.52. More importantly, this study presents the first and only study with all correlations between motivational regulation strategy use and motivational beliefs as significant at either \( p < 0.05 \) or \( p < 0.01 \) (Wang, 2013).

Ultimately, the four studies discussed above present sufficient evidence to describe motivational regulation as a distinctly separate facet of self-regulated learning in contrast to motivational beliefs (Chow, 2011; Wang, 2013; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). Furthermore, these results indicate support for Wolters’ (2003a, 2011) model of motivational regulation as a conscious and deliberate process students’ employ to influencing their motivation in a particular task or domain. Moreover, strengthening the notion that motivational regulation and motivation are reciprocal constructs of self-regulated learning. Students’ motivation affects the use of
regulation of motivation strategies, while strategy usage influences the level of students’ motivation.

**Relation to Cognitive and Metacognitive Strategies.** Models of self-regulated learning describe metacognition (learning strategies; aka: cognitive and metacognitive strategies) as consisting of at least two distinct and distinguishable components: knowledge of cognition and regulation of cognition (Pintrich et al., 2000; Schraw & Moshman, 1995). Regulation of cognition, the first component of metacognition, is described as the students’ efforts to manage their cognitive processes as academic tasks and conditions fluctuate. Management efforts typically include planning, selecting, monitoring, and evaluating cognitive strategies used throughout the learning process, primarily when issues arise (Wolters, 2003a). Regulation of cognition strategies influence students’ use of cognitive strategies (rehearsal, elaboration, and organization) with the material which they are interacting with. Theoretically, regulation of cognition strategies and motivational regulation strategies are interdependent and may work in tandem with each other (Boekaerts, 1997). For example, a student experiencing an issue with memorization may elect to switch to outlining. Such a change can be viewed as a metacognitive processing change; at the same time the same student may regulation their motivation to accommodate the increased need in effort to sustain the change in cognitive strategy use. A second component of metacognition, knowledge of cognition, consists of students’ comprehension or processing of information regarding the learning and thinking processes. More specifically, knowledge of cognition can be differentiated based on the knowledge connection to the person, task, or strategies (Wolters, 2003a). Knowledge of
cognition consists of students’ knowledge of their own cognition or cognition in the general terminology. More importantly, knowledge of cognition typically consists of three forms of metacognitive awareness: declarative, procedural, and conditional. Declarative knowledge includes a students’ knowledge “about” things, such as one’s performance or themselves as a learner (Schraw & Moshman, 1995). Procedural knowledge refers to students’ knowledge about executing procedural skills. Finally, conditional knowledge is a students’ understanding of when and why a specific cognitive strategy should be applied (Schraw & Moshman, 1995). More plainly, metacognitive strategies affect and increase cognitive processing similar to how motivational regulation strategies affect and increase motivational properties (Trang, 2015). Four studies have examined the relation between motivational regulation and the facets of metacognition (Trang, 2015; Wang, 2013; Wolters, 1999; Wolters & Benzon, 2013).

In the first study designed to investigate the relation between motivational regulation and metacognition, Wolters (1999) conducted an investigation of five motivational regulation strategies and seven cognitive and metacognitive strategies. These seven strategies consisted of: rehearsal (use of repetition or memorization), elaboration (connecting new material to existing knowledge), organization (employing methods to organize study material; i.e., outlining or diagrams), planning (developing task goals prior to beginning tasks), monitoring (assessed effectiveness of enlisted strategies), regulation (frequency of strategy changes), and effort management (effort or persistence to the task). Bivariate analysis results illustrate a moderate strength between factors of motivational regulation strategies, cognitive strategies, and metacognitive
strategies; correlations ranged from 0.11 to 0.47. Many of the motivational regulation strategies were significantly related to more than three cognitive and metacognitive strategies ($ps < 0.05$).

Furthermore, all significant correlations between students’ use of motivational regulation strategies and learning strategies presented as positive; indicating a trend of increased motivational regulation strategy use tended to also illustrate a greater use of cognitive and metacognitive strategy use as well. Additionally, effort presented as positively related to the five factors of motivational regulation strategies ($0.25 < rs < 0.43$, $ps < 0.01$) too illustrating an increase in motivational regulation strategy use tended to indicate an increase in effort and persistence among students within this study (Wolters, 1999). Hence, results provide initial evidence to indicate distinguishable distinction between motivational regulation and cognitive and metacognitive strategy use based on the moderate level of the correlations between factors.

Wolters and Benzon (2013) also incorporated measurements of cognitive and metacognitive strategies during their study of college students’ use of motivational regulation strategies. Nine items derived from Pintrich et al. (1993) were used to examine cognitive strategy use; cognitive strategies reported students’ use of rehearsal, elaboration, and organization strategies while completing academic coursework. An additional nine items were also used from the same Pintrich works to investigate students’ use of metacognitive strategies (planning, monitoring, and regulation strategies) (Wolters, 2013). Pearson product-moment correlations presented evidence of moderate to strong relation between metacognition and motivational regulation strategy use ($0.40 \leq rs$...
≤ 0.61, ps < 0.01). More specifically, cognitive strategy use (0.40 ≤ rs ≤ 0.60, ps < 0.01) and motivational regulation strategy reflected a slightly weaker relation than metacognitive strategy use (0.44 ≤ rs ≤ 0.61, ps < 0.01) (Wolters & Benzon, 2013). Similar to previous findings, the strength of correlations between both cognitive and metacognitive strategy use and motivational regulation is distinctly differentiated; however, related enough to determine conceptually different facets of a larger construct of self-regulated learning.

In a study less focused on the investigation of relations between students’ use of motivational regulation strategies and metacognition, Wang (2013) only incorporated two factors of cognitive strategies. The two strategies examined within this study were rehearsal and elaboration strategies. Pearson product-moment correlation presents as moderately strong between the six motivational regulation strategies and the cognitive strategy factor rehearsal (0.38 < rs < 0.50, ps < 0.01). Under slightly lower results elaboration also presented as moderately related to students’ regulation of motivation (0.38 < rs < 0.48, ps < 0.01). Additional inspection of correlation results indicates the highest frequency of reported use of both cognitive strategies when employed in tandem with the mastery self-talk strategy. In contrast, both performance self-talk strategies of motivational regulation were least likely to relate to cognitive strategy use (Wang, 2013). Ultimately, these results provide additional evidence of the distinguishability of motivational regulation strategies from cognitive strategies of self-regulated learning.

Trang’s (2015) investigation of an eight-scale measurement of motivational regulation and metacognitive strategies presented the most recent evidence for
distinguishing relation between the two factors. In this study, Trang (2015) incorporated the metacognitive strategies scales from the Motivated Strategies for Learning Questionnaire (MSLQ) derived by Pintrich et al., (1991). Metacognitive strategies measured students’ ability to plan, monitor, and regulate their cognition throughout academia. Bivariate analysis results presented relatively moderate strengthened correlations between the eight scales of motivational regulation and the metacognitive strategies scale (0.24 < \(r_s\) < 0.67, \(p_s\) < 0.01). There was one exception, the relation between performance-avoidance (avoiding incompetence) and metacognitive strategies presented weak evidence of relation (\(r = 0.10, p > 0.05\)) (Trang, 2015). Similar to previous study findings, students’ that focus on performance related motivational regulation strategies tend to report less frequent use of metacognitive strategies. This study provided additional evidence that motivational regulation strategies and metacognitive strategies are distinctly different factors of a larger measure of self-regulated learning.

In summary, the four studies review within this section produce evidence of motivational regulation strategies related, but distinguishably separate factors, in this case, these factors are cognitive and metacognitive strategies (Trang, 2015; Wang, 2013; Wolters, 1999; Wolters & Benzon, 2013). This evidence presents statistical credibility to Wolters’ (2003a, 2011) model of motivational regulation. The moderate to high correlations between the two components also provide evidence to suggest a connection to a larger concept of learning; self-regulated learning.
Relation to Academic Achievement. One of the highest priorities within educational psychology research is the investigation of how constructs affect students’ academic performance. Hence, this section reviews four studies that examine the relationship between students’ use of motivational regulation strategies and academic achievement (Schwinger et al., 2009; Schwinger et al., 2012a; Schwinger et al., 2012b; Wolters, 1999). Unlike other factors discussed within this section of the review academic achievement can be defined in many different formats. For the purpose of this studies, researchers use general grade point averages, course specific grade point averages, and even examination scores to distinguish academic achievement. The use of such methods of measurement result in bivariate analyses and, in some cases, latent profile analyses producing inconsistent evidence of direct relationships between factors. However, in most cases results still produce sufficient evidence to indicate an indirect relationship between students’ use of motivational regulation strategies and academic achievement.

In his first study, Wolters (1999) investigated the relation between students’ use of motivational regulation strategies and academic performance. Academic performance was operationalized as a high school students’ grade point average (GPA) during the administration of the assessment measures. Much like many high schools, the grade point average was based on the modified to account for advanced and honors level course. The school system within this study modified their scale to range from 0.0 to 6.0. An A+ in honors courses would dictate a 6.0, whereas the same grade would result in a 5.0 for regular courses and 4.0 for remedial course (Wolters, 1999). Overall, bivariate analyses illustrated mix support for relations between motivational regulation strategy use and
academic achievement. Most notably, extrinsic forms of motivational regulation (performance self-talk and self-consequating) were identified as having any positive impact on high school students’ GPA. More specifically, students’ use of performance self-talk, or the strategy of using sub-vocal statements or thoughts centered around performance goals such as obtaining good grades, was found to be the only statistically significant measure of illustrating a relation to students’ likelihood of achieving a higher academic performance \( r = 0.26, p < 0.05 \) (Wolters, 1999). However, the variance (about 16%) of students’ use of motivational regulation strategies, as a group, presented significant evidence to support the conceptual relation between the two factors (Wolters, 1999).

Wolters’ (1999) version of motivational regulation was translated to German, revised by Schwinger and Colleagues (2007), then used by Schwinger, Steinmayr, and Spinath (2009) to investigate the relation of motivational regulation and academic achievement when mediated by effort management. In this study, longitudinal data was obtained by 11th and 12th grade German students; of which self-reported on measures of intelligence (German version of Cattel’s Culture-Fair-Test 3), effort management (German version of MSLQ; students willingness to invest effort into academia), and motivational regulation strategies. Additionally, participants’ mid-year grade point average (GPA), excluding sports, music, and art courses, was provided to Schwinger et al. (2009). Unlike American grade scales, German grades range from 1 (outstanding) to 6 (insufficient performance). However, grades were presented as higher values indicated higher achievement (Schwinger et al., 2009). Bivariate analysis of motivational strategy
use and academic achievement failed to provide any statistically significant positive correlations; however, enhancement of situational interest (a sub-construct of Wolters’ (1999) scale for interest enhancement) was found to be negatively related to students’ academic achievement ($r = -0.16, p < 0.05$). Additional analyses of motivational regulation strategies were conducted by the authors during their mediation analysis. Schwinger et al (2009) created a measure of all eight strategies scales as an index measure (formally titled Motivation Strategies Index). Mediator analyses produced a statistically significant correlation between the index and effort management ($\beta = 0.58, p < 0.01$) and effort management and students’ GPA ($\beta = 0.29, p < 0.01$); however the direct correlation between motivational strategies index and GPA was negative and not significant ($\beta = -0.14, p < 0.01$) (Schwinger et al., 2009). Ultimately, the results of the bivariate and mediation analyses provide evidence that motivational regulation strategy use has an innate relationship to academic achievement.

Using the same mediation model for investigating the properties of motivational regulation, effort management, and academic achievement, Schwinger and Stiensmeier-Pelster (2012a) conducted another study on high school students. However, this study had many differences to its predecessor. First, students within this study were all 12th grade students within the highest track of the German education system (Gymnasium). Schwinger et al. (2012a) describes the Gymnasium track as consisting of the most gifted students; preparing students for college studies. Second, as part of the Gymnasium track students were authorized to enroll in two advanced-level courses (42.6% mathematics, 26.9% German, 15.9 English, and 14.6 History); for the purpose of this study, students
were only assessed during one of the courses. Third, academic achievement was reported using two differing methods: previous grade (final subject grade from previous year) and exam grade (grade from an exam administered during the current study’s time frame). Previous grades were scaled consistent with Schwinger et al. (2009); grades for exams ranged from 0 (poor) to 12 (best). Fourth, an assessment of each students' effort management was administered at three different periods (1- two weeks before exam, 2- class prior to examination, and 3- two weeks following examination); during the second assessment of effort management researchers also administered the eight motivational regulation scales used in Schwinger et al., (2007, 2009).

Bivariate analysis between previous grades and use of motivational regulation strategies produced two statistically significant correlations. Proximal goal setting was negatively related to previous grade ($r = -0.12, p < 0.05$) and enhancement of situational interest was also negatively correlated to previous grade ($r = -0.17, p < 0.01$) (Schwinger et al., 2012a). During an analysis of motivational regulation strategy use and exam grades, two correlation analyses were conducted using partial correlation (controlling for previous grade) and zero-order correlation (no controlling factor). Partial correlation analyses illustrated no significant relation between the two facets. However, zero-order analyses produced evidence of three relations. Performance-avoidance self-talk ($r = -0.14, p < 0.05$), mastery self-talk ($r = -0.12, p < 0.05$), and enhancement of situational interest ($r = -0.16, p < 0.01$). Ultimately, correlation analysis failed to produce a direct relation between motivational strategy use and academic achievement; however, evidence for indirect relation was again achieved using the mediation model developed by
Schwinger et al. (2009). Consistent with the previous studies findings motivational regulation was found to indirectly relate to students’ academic achievement (this will be discussed more in the prediction section).

Schwinger, Steinmayr, and Spinath (2012b) produced research on the relations between motivational regulation strategy use, effort management, and academic achievement using latent profile analysis (LPA). Schwinger et al. (2012b) consisted of two studies; the first was a continuation of their previous 2009 study, whereas the second involved German college students. Participants of the second study completed an assessment of their effort management and motivational regulation strategy use during an initial phase followed by a second assessment (4 months later) of effort management and the self-report of their last two exam grades from their main study subject. The two exam grades were then averaged and labelled study performance.

Using latent profile analysis, Schwinger et al. (2012b) product participant grouping based on their express use of motivational regulation strategies. During the LPA of the 2009 data five groupings were introduced: high profile (16.8%; high reported use of motivational regulation strategies), medium profile (32.4%; average reported strategy use), low profile (5.6%; reported infrequent use of motivational regulation strategies), goal-focus (31.6%; reported high use of goal-orientated self-talk strategies), and interest-focused (13.4%; reported higher use of both interest enhancement strategies). However, researchers found no significant differences between groups when regarding students’ academic achievement (Schwinger et al., 2012b).
Bivariate analyses and Latent profile analyses were conducted on Study two of this research. LPA also produced five profile groupings based on motivational regulation strategy use reporting: high profile (15.9%; overall high reported use of strategies), low profile (7.3%; low frequency of strategy use reporting), goal-focused (31.7%; high reported use of goal-orientated self-talk strategies), performance self-talk (14.3%; reported high use of only performance-approach and performance-avoidance self-talk strategies, all other strategies were reported as infrequent usage), and interest-focused (30.5%; reported high use of interest enhancement strategies and low use of goal-orientated self-talk strategies). High profile students were found to produce evidence of significantly high academic performance compared to low and performance self-talk profiles; also resulting in the highest overall academic achievement score among all profiles. Additionally, goal-focused and interest-focused profiles illustrated slight difference from other groups; however, this evidence was not statistically significant (Schwinger et al., 2012b). Evidence produced through bivariate analyses produced four significant positive relations between motivational regulation strategies and academic performance. Mastery self-talk was found to have the highest correlation ($r = 0.15, p < 0.05$); whereas enhancement of situational interest, performance-approach self-talk, and self-consequating all produced the same correlation measurement ($r = 0.12, p < 0.05$) (Schwinger et al., 2012b). Ultimately, evidence within this study provides support for the relation of motivational regulation strategy use and academic performance. Additionally, the low value associated with the correlations aids in the suggestion that these relations are indirect.
In summary, the four studies discussed above produce sufficient evidence to suggest motivational regulation strategies are indirectly related to academic achievement measures. Additionally, these studies illustrate the strategies are distinguishable facets of motivational regulation. More importantly, these studies provide support for the self-regulated learning literature illustrating self-regulated learning strategies are positively associated with factors of academic achievement (Pintrich & DeGroot, 1990; Zimmerman, 1986, 1989, 1990) as well as the differences in use of such learning strategies (Zimmerman & Martinez-Pons, 1990).

Predictability of Motivational Regulation Strategies

An additional method of determining relation of motivational regulation strategy use to facets of self-regulated learning or academic achievement has been researched through the use of multiple regression analyses. Multiple regressions have been implemented to help explain students’ use of motivational regulations strategies as direct predictors of students’ use of learning strategies and academic performance (Wolters, 1999) and indirect predictors (Schwinger et al., 2009, 2012a). Additionally, researchers have also used motivational beliefs to predict students’ use of motivational regulation strategies and learning strategies through a two-step multiple regression analysis (Wolters & Rosenthal, 2000; Wolters & Benzon, 2013).

Wolters (1999) conducted a hierarchical multiple regression analysis using students’ reported use of five motivational regulation strategies to predict the use of learning strategies (cognitive and metacognitive) and academic performances. (Factors are defined in sections above). All five motivational regulation strategies are entered as a
single group during the initial step of this process, resulting in the $R^2$ explaining the variance associated with all five motivational regulation strategies as a single grouped measure. This method affords the standardized regression value to indicate the variance of a single motivational strategy following its account for the remaining motivational regulation strategies. Overall, motivational regulation explains a significant portion of the variance among all of the learning strategies excluding elaboration. Using varying levels of significance, the explained variance of the five learning strategies range from 22% (Organization) to 32% (Regulation). The amount of variance explained by the motivational regulation strategies for academic achievement is 16%.

Individually, three of the five motivational regulation strategies predict the use of four learning strategies and academic achievement. More specifically, mastery self-talk was found to be a positive predictor of all strategies. However, only planning ($\beta = 0.30, p < 0.05$) and monitoring ($\beta = 0.38, p < 0.01$) were evident to be statistically significant (Wolters, 1999). This illustrates students that focused on their development of mastering the material tended to report a great use of planning and monitoring their academic activities compared to less motivated students. Performance self-talk and self-consequating were found to also statistically predict the use of both rehearsal and regulation strategies. Illustrating students that focused on getting good grades or obtaining extrinsic rewards were more likely to memorize material as an effort to maintain their motivation. Additionally, students that used these types of strategies to maintain their motivation were also found to report control of their control of their cognitive strategy use. Performance self-talk was also determined to be a significant
predictor of academic achievement ($\beta = 0.32, p < 0.05$). Hence, students that focused on getting good grades as a method of controlling their motivation were found to obtain higher academic achievement. Environmental control and interest enhancement were the only motivational regulation strategies found to have no significant predictability of learning strategies or academic achievement.

Wolters and Rosenthal (2000) illustrated students’ motivational beliefs (task value, learning goal orientation, performance goal orientation, and self-efficacy) and academic achievement (standardized mathematics achievement) explains a significant portion of variance of students’ use of motivational regulation strategies; variances ranged from 0.17 (self-consequating) to 0.58 (mastery self-talk). More specifically, students’ use of motivational regulation strategies intended to increase effort and persistence in academia can be accounted for by students’ motivational beliefs, even when there is a fluctuation in academic achievement levels (Wolters & Rosenthal, 2000). After accounting for academic achievement and the other three motivational beliefs, students’ that reported a high frequency of performance goal orientation (getting good grades) were found to significantly use self-consequating strategies more often ($pr = 0.27, p < 0.01$). Additionally, students that reported higher motivational beliefs for learning goal orientation ($pr = 0.21, p < 0.05$), task value ($pr = 0.20, p < 0.05$), and academic achievement ($pr = 0.22, p < 0.05$) were all found to be significant predictors of students’ use of self-consequating strategies. However, self-efficacy was not found to be a significant predictor for self-consequating (Wolters & Rosenthal, 2000). Using the same methodology to account for motivational beliefs and academic achievement, learning
goal orientation was found to be the sole significant predictor for students’ use of environmental control strategies ($pr = 0.43, p < .001$). More specifically, students that reported higher focus on mastering the learning material tended to report managing their environments more frequently than their non-learning goal orientation student counterparts.

After accounting for the other facets of motivational beliefs and academic achievement, performance goal orientation was found to be a significant predictor of students’ use of the performance self-talk motivational regulation strategy ($pr = 0.35, p < .001$). Additionally, students that reported high frequency of learning goal orientations also tended to use performance self-talk strategies ($pr = 0.33, p < .001$). Hence, students that report high focus on both getting good grades and gaining mastery of the learned material both report high use of sub-vocal statements that reminded themselves continued work or studying was required to achieve academic success. As discussed above, mastery self-talk strategy holds the highest explanation of variance when accounting for motivational beliefs among the five motivational regulation strategies within this study at 58%. As expected, students’ who identify as learning goal orientation (focus on learning task mastery) also tend to report high frequency of mastery self-talk strategies ($pr = 0.56, p < .001$). Additionally, students with high task value report to also employ frequent use of mastery self-talk strategies ($pr = 0.26, p < 0.01$). Hence, students that either value the learning material (in this study mathematics) or desire to mastery the learning material tended to use sub-vocal statements that influence their mastery of the material (Wolters & Rosenthal, 2000). Finally, students’ that tended to use interest enhancement strategies to
influence their effort and persistence in academia report having high levels of three motivational beliefs (task value, learning goal orientation, and performance goal orientation). More specifically, students that value the material being learned ($pr = 0.39, p < .001$), had a strong focus on mastering the material ($pr = 0.42, p < .001$), or focused on achieving good grades ($pr = 0.26, p < 0.01$) were more likely to report frequent use of strategies that increase their situational interest or relevance to the material (Wolters & Rosenthal, 2000). Evidence from Wolters & Rosenthal (2000) presents additional evidence that motivational regulations are related to factors of self-regulated learning and academic achievement. For example, students found to have a learning goal orientation were found to be a significant predictor of students’ use of the five motivational regulation strategies within this study, similar results have been seen with cognitive and metacognitive strategies (Ames, 1992; Anderman & Maehr, 1994).

Wolters and Benzon (2013) also set out to investigate the predictability of use of motivational regulation strategies based on students reported four motivational beliefs; gender was also factored into this analysis. Similar to Wolters and Rosenthal’s (2000) results the four motivational beliefs, gender, and students course resulting in statistically explained variance levels for each of the six regulations of motivation strategies. The amount of variance ranged between 21% (regulation of situational interest) to 44% (regulation of performance-approach orientation). Accounting for all motivational beliefs, gender was found to present as a significant predictor of a single facet of motivational regulation. More specifically, females were found to report the tendency to use regulation of performance-approach orientation strategies more frequent than their male
counterparts ($\beta = -0.22$, $p < .001$). Hence, females expressed their need to focus on achieving good grades as a method of improving their motivation (Wolters & Benzon, 2013). Consistent with previous findings, mastery orientation was found to be a significant predictor of five of the six motivational regulation strategies; regulation of performance-approach orientation was the only regulation of motivation strategy to not reach significance. Students’ motivational belief value was also found to be a significant predictor of four motivational regulation strategies (regulation of performance-approach orientation, self-consequating, regulation of mastery orientation, and regulation of value). Inconsistent with Wolters & Rosenthal (2000), self-efficacy was also found to be a significant predictor of three motivational regulation strategies (regulation of performance-approach orientation, environmental structuring, and regulation of situational interest). One explanation for the inconsistent findings may come from the difference in study populations between both studies; Wolters & Benzon (2013) examined college students whereas the previous study relied on 11th and 12th grade students.

Adding metacognitive strategies as a secondary step within the multiple regression analysis produced an additional 5 to 12 percent increase to the explained variance for the six motivational regulation strategies. In addition, metacognitive strategy use presented as a strong and statistically significant predictor for each of the motivational regulation strategies. Accounting for students’ motivational beliefs, gender, and course attended students that reported greater metacognitive strategy use tended to also report greater use of value ($\beta = 0.44$, $p < .001$), mastery goals ($\beta = 0.42$, $p < .001$),
performance goals ($\beta = 0.37, p < .001$), situational interest ($\beta = 0.39, p < .001$), self-consequating ($\beta = 0.28, p < .001$), and environmental structuring ($\beta = 0.36, p < .001$) (Wolters & Benzon, 2013).

Using the combined measure of the eight motivational regulation strategies, Schwinger et al., (2009) produced evidence of motivational regulation strategies predictability of academic achievement through indirect affect. As discussed in the above relation section, all eight motivational regulation strategies are merged into a motivational strategies index. Using path diagram motivational strategies index was found as a significant path to effort management ($\beta = 0.58$, path a), and a significant path from effort management to grade point average ($\beta = 0.29$, path b). However, a direct path from motivational regulation strategy to GPA was not found to be significant ($\beta = -.14$). Because the direct path between motivational regulation strategies and GPA was found not significant an additional analysis using the Sobel test was required to determine the significance of the mediation pathway. Evidence from the Sobel test determined A and B as mediating pathways for motivational regulation strategies, effort management, and grade point average (Schwinger et al., 2009).

During a second study examining the effects of motivational regulation on students’ effort management and academic achievement, Schwinger et al., (2012a) conducted a path analysis of all eight motivational regulation strategies. Initial path analysis produced no direct predictability of motivational regulation strategies on students’ academic achievement. However, mastery self-talk ($\beta = 0.02$, 90% CI (0.003, 0.44), $p < 0.05$) and proximal goal-setting ($\beta = 0.01$, 90% CI (.00, 0.39), $p < 0.05$) were
found to produce significant indirect predictability of academic achievement using a bootstrapping method of analysis within AMOS 20 statistical software. The observed path consists of an A and B pathway. The motivational regulation strategies (path A) predicts current effort (study’s second measure of effort management), then effort management predicts academic achievement (path B) (Schwinger et al., 2012a).

A secondary path analysis was conducted to investigate the predictability of the motivational strategies index pathway observed during the Schwinger et al. (2009) study. Consistent with previous findings motivational strategies index (path a) was a significant path to current effort ($\beta = 0.29$) and current effort was a significant path to academic achievement ($\beta = 0.12$). Keeping with consistent findings, the direct path from motivational strategies index to academic achievement was not found to be a significant path. However, using the same bootstrapping method from the first analysis, there was evidence of a significant indirect effect from motivational strategies index on academic performance ($\beta = 0.04$, 90% CI (.01, .07), $p < 0.05$) (Schwinger et al., 2012a).

**Research Purpose**

This study consists of two major objectives. One, to investigate an expanded measurement of motivational regulation strategies on student-veterans within higher education; identifying the factor structure and examining the bivariate relations and mean level differences amongst the strategies. Two, investigate the relation between motivational regulation and other core factors of self-regulated learning (motivational beliefs and learning strategies); focusing on the student-veteran population. Additionally,
examining if those same core factors of self-regulated learning could be used to predict motivational regulation strategies.
Chapter 3: Methods

Participants

Participants for this study were 131 student-veterans currently enrolled in higher education courses at the time of data collection from over 85 differing educational institutions; 83 uniquely identified, 2 participants did not identify an institution, and 2 providing multiple institutions (Table 1).

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Note: Unidentified – Participant failed to provide an institution; Multiple – Participant provide one or more institutions
**Demographics.** In keeping with reported Veteran Affairs demographics (Veteran Affairs, 2015 Veteran Economic Opportunity Report) males were the larger group within this study consisting of 78 (59.5%) of the sample population compared to 53 (40.5%) female. Utilizing a force-choice item for race/ethnicity identification, student-veterans reported to identify as: “White” (71.0%), “Black or African American” (3.8%), “Hispanic” (13.7%), and “Other Race” (11.5%).

Student-veterans ranged in age \( (M = 34.97, SD = .83) \) from 19 to 57; following the removed of the 500-year outlier provided in the response data. Student-veterans within this study identified as: Undergraduate (58%; “Freshman” - 8.4%, “Sophomore” - 11.5%, “Juniors” - 15.3%, “Seniors” - 22.9%), and “Graduate” (39.7%) students. Student-veterans undergraduate to graduate status were tested to determine if there was a significant difference in the mean age, an independent samples \( t \)-test was performed. Evidence presents a significant difference, \( F(125) = .813, p = .369 \); independent samples \( t \)-test \( t(125) = -3.04, p = .003 \), in mean age when associated with adjusted status; undergraduates age \( (M = 32.76, SD = 9.28) \) compared to graduates \( (M = 37.71, SD = 8.54) \). Cohen’s \( d \) was estimated at .54, which is reflective of a moderate effect size.

Student-veterans reported current course load in hours \( (M = 9.77, SD = 5.22) \) as well as a completion toward their degree program \( (M = 58.57, SD = 46.20) \); completion credits toward degree programs as well as current credits were computed post removal of the reported 416 current credit hours and 420 total credit hours outliers.

Student-veterans were asked to identify which DOD service branch they were associated with; Army (43.5%) had this highest compared to Marine Corps (20.6%), Air
Force (18.3%), Navy (16.8), and Coast Guard (.8). There was an overwhelming majority of participants that identified as veterans (82.4%) compared to Active Duty (9.2%), Reserve (5.3%), and National Guard (3.1%). Additionally, Post 9/11 Veterans Educational Assistance Program was the highest reported benefit program utilized at 65.6%, followed by “no education benefit used/available” at 15.3%, then Tuition Assistance 9.9%, Montgomery GI Bill – Active Duty (6.1%), and Montgomery GI Bill Selected Reserve (3.1%) respectively.

**Sampling Method**

Title 38 of the United States Code of Federal Regulation defines a veteran as any individual that has completed at least one term of service within the United States Armed Forces (Army, Navy, Marines, Air Force, and Coast Guard). Furthermore, individuals must also hold any discharged status excluding dishonorable (38 Code of Federal Regulations § 3.1, 2008). For the purpose of this study the term included a broader terminology. Student-veterans, for this study, are described as any individual fitting the definition of a veteran listed above, as well as any individual that is currently serving within defined military service branches of the DOD regardless of the members of duty status (Active Duty, National Guard, or Reserves). However, this study collected participants’ demographic information which identified each participant’s duty status, branch of service, as well as their Veteran Affairs Benefit Program for additional analyses. This broader term for student-veteran was utilized to afford for a larger participation pool within this study to help strengthen the results for analyses such as exploratory factor analysis of the motivational regulation strategies scales administered.
For the purpose of this study the targeted population was student-veterans participating in higher education course at George Mason University. However, student-veterans from other institutions were afforded the opportunity to participate voluntarily through networking sample techniques via social media, community events, and word of mouth; all participants were sampled via the online data collection tool Qualtrics.

Measures

Student-veterans were asked to complete a 137-item, self-report Likert-scale survey. The survey was partitioned into 4 major sections consisting of instruments for demographics and academic achievement, motivational beliefs, learning strategies, and motivational regulation strategies.

Items from sections two and three enlisted a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me). Section four utilized a 7-point Likert scale as well; however, response labels differed for this measurement. Motivational regulation strategies Likert scales consisted of 1 (strongly disagree) to 7 (strongly agree). Furthermore, items within all scales were modified to refer to school in a more generalized sense, instead of a course specific focus. For example, “I am very interested in the content area of this course;” was adjusted to “I am very interested in the content area of my degree.”

Achievement. Participants were asked to provide their current cumulative grade point average (GPA) in section one (see demographics). However, if the student-veteran is a newly transferred student with no completed credit hours at their current institution their previous cumulative grade point average (GPA) was collected. Additionally, if the
participant had not completed any higher education courses then they recorded their designate their cumulative grade point average (GPA) as N/A (not applicable), zero, or left it blank. For the purpose of this study, the grade point average was standardized to the 4.0 scale. Student-veterans reported an average GPA of 3.38 (SD = .745).

**Motivational beliefs.** Using scales from the revised PALS (Patterns of Adaptive Learning Scales) by Midgley, Maehr, Hruda, Anderman, Anderman, Freeman, Gheen, Kaplan, Kumar, Middleton, Nelson, Roeser, and Urdan (2000) measurement as well as scales from Pintrich et al. (1991, 1993) Motivated Strategies for Learning Questionnaire (MSLQ); six scales for assessing students’ motivation were administered within this study. Items derived the revised PALS measurement assessed student-veterans’ personal achievement goal orientation by investigating three distinct facets of motivation: mastery goal orientation, performance-approach goal orientation, and performance-avoid goal orientation. Items from these scale assessments complied with the same theoretical framework of the previous PALS measurement, however, to remove inadvertent assessment of intrinsic value and referencing to students’ behaviors the items were revised (Midgely et al., 2000). Pintrich et al. (1991, 1993) MSLQ measurement was used to assess student-veterans’ task value, beliefs about learning, and self-efficacy.

**PALS: Personal Achievement Goal Orientation.** Mastery goal orientation (revised) scale (α = .86), consisting of five items, assessed the degree to which students-veterans’ purpose or goal is to develop their competence; seeking to improve their mastery and understanding of the material. Furthermore, mastery goal-oriented students’ attention is focused on the task (Midgely et al., 2000). “It’s important to me that I learn a
lot of new concepts this year;” is an example of an item from within this scale.

*Performance-approach goal orientation (revised) scale (α = .92)*, five items, reflects the degree to which students-veterans’ purpose or goal is to validate their competence; seeking to get high grades, extrinsic rewards, or approval from others. Additionally, performance-approach oriented students’ focus their attention on themselves (Midgley et al., 2000). For example, “One of my goals is to show others that class work is easy for me.” *Performance-Avoidance Goal Orientation (Revised) Scale (α = .86)*, employs four items, representing student-veterans’ purpose or goal to avoid demonstration of incompetence. Similar, to the approach version, performance-avoid oriented students’ attention is focused on themselves (Midgley et al., 2000). “One of my goals in class is to avoid looking like I have trouble doing the work;” is reflective of one of the four items within this measurement.

*Motivated Strategies for Learning Questionnaire: Motivation. Task Value (α = .91)*, contained 6 items, referring to how the student-veteran evaluates the importance, usefulness, or personal relevance the material learned is for themselves (Pintrich et al., 1991). Task value is a student-veterans’ analysis of how and what benefits they will experience from learning compared to goal orientations why they will benefit. For example, “I think I will be able to use what I learn in this course in other courses.”

*Control of learning beliefs (α = .68)* is described as student-veterans’ beliefs the efforts they put into learning will result in a given outcome; typically indicated by a positive outcome (Pintrich et al., 1991); 5 items. Additionally, these beliefs are centered on the intrinsic self and not extrinsic factors. “It is my own fault if I don’t learn the material in
“this course,” is an example of the four items within this scale. *Self-efficacy* ($\alpha = .92$), included 8 items, reflected the degree to which student-veterans appraised their abilities to successfully accomplish academic tasks such as: learn course material or complete coursework.

**Learning Strategies.** Students-veterans’ uses of cognitive and metacognitive strategies were assessed through items from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991, 1993). The learning strategies section of the MSLQ consists of three types of scales: cognitive, metacognitive, and resource management; all of which are derived from a cognitive model of learning and information processing (Pintrich et al., 1993). However, remaining consistent with Wolters and Benzon (2013), for the purpose of this study only the cognitive and metacognitive strategies scales were enlisted.

**Motivated Strategies for Learning Questionnaire: Cognitive Strategies Scale.**

*Cognitive strategies* ($\alpha = .88$) consisting of items designed to assess student-veterans’ use of strategies for information processing of written text and/or lectures. Furthermore, these strategies can be either basic (one scale) or complex (two scales). *Rehearsal*, the basic cognitive strategy, consists of students’ rehearsal of information for the purpose of learning (e.g., a student may repeat a spelling word over and over until they memorize it); this scale consists of four items. For example, “I memorize key words to remind me of concepts in this class.” The more complex scales *elaboration* (e.g., paraphrasing) and *organization* (e.g., outlining) consist of six and four items respectively. An example of elaboration, “I try to apply ideas from course readings in other class activities such as
lecture and discussion;” whereas, organization, “I make simple charts, diagrams, or tables to help me organize course material.”

**Motivated Strategies for Learning Questionnaire: Metacognitive Strategies Scale.** Metacognitive strategies ($\alpha = .75$) consist of a single scale measurement developed to assess students’ planning, monitoring, and regulating of their cognition. “If course readings are difficult to understand, I change the way I read the material;” is an example of the metacognitive scale within the MSLQ. All together there are twelve items within the metacognitive strategies scale, each measured on a 7-point Likert-scale just like the cognitive strategies scale above (Pintrich et al., 1993).

**Motivational Regulation Strategies.** Section four of the self-report survey contained items to assess student-veterans’ use of different motivational regulation strategies. All scale items for this study were adapted from previous investigations of motivational regulation strategies (McCann & Garcia, 1999; Schwinger et al., 2007, 2009; Trang, 2015; Wolters, 1999; Wolters & Benzon, 2013; Wang, 2013); excluding ten items, adapted and repurposed from McCann & Garcia (1999) Academic Volitional Strategies Inventory (ASVI), employed to initially assess student-veterans’ emotion control; which were later determined to distribute amongst three new scales (see results and discussion sections for further clarification). All motivational regulation strategy scales were adapted from Wolters’ (1998, 2003a) work on motivational regulation. However, the ten newly adapted ASVI items were an initial effort to assess emotion control within Wolters’ model of motivational regulation, but were later found to assess three distinctly different factors of motivational regulation that had not yet been
researched; help seeking (four items), attention (four items), and emotion control (2 items).

**Procedures**

A core factor of this study was to replicate Wolters and Benzon (2013) study focusing on the population of student-veterans. Institutional Review Board (IRB) approval was obtained at George Mason University (GMU) located in Fairfax, Virginia. Participation within this study was voluntary, affording student-veterans the ability to rescind all responses and exit the study at any point of the investigatory process. Additionally, there were no incentives provided to participants at any point within this study for the purpose of recruitment and completion of the study. Distribution of study materials were provided using two methodologies. First, an electronic version was implemented, utilizing the Qualtrics survey system, providing participants the ability to participate via electronic media devices through an internet connection. All data was housed on Qualtrics internal system, utilizing their internal cybersecurity measures for data safeguarding, and protected passcode only the principal investigator has knowledge of. Secondly, a physical paper version was made available to participants, if preferred; however, participants were informed their responses would be added to the Qualtrics system via the researcher for data safeguarding and future analysis. No physical versions were utilized by participants due to the accessibility of the online Qualtrics system and its ability to be utilized on media devices through an internet connection. Regardless of response actions participants received an informed consent brief and we required to authorize their participation prior to access to assessment materials (demographics and
scale measurements). Participation discontinued automatically if participants failed to authorize their consent, failed to have an age equal or greater than 18 years old, or failed to identify as a veteran.

One such instance occurred during data collection that resulted in a participant electing to remove themselves from the study on the bases that the demographics question relating to Veteran Affairs Benefit Program usage did not provide the Vocational Rehabilitation (Chapter 31) benefit listed within the forced-choice item selections (see Limitations). The principal researcher provided such choice was left off due to oversight and that this limitation would be addressed within the paper. However, the participant elected to discontinue further progress of the study.

Four methods for which student-veterans were recruited to participate within this study. First student-veterans within the Office of Military Services (OMS), Mason Veteran Patriots (MVP), George Mason University’s member chapter of the Student-Veterans of America (SVA; national for-profit student organization), and local military installations education centers were contacted to request participation within this study. Utilizing the networking sampling technique, the other three methodologies for recruitment, were administered. Second, members of OMS and MVP were asked to recommend potential participants fitting the parameters for participation as well. Third, student-veterans in attendance at community meetups were recruited to participate as well as recommend others for participation providing, they too meet the standards for participation. Finally, student-veterans social media pages were contacted with requests for participants. Participants were recruited between the periods of June 2017 and April
2019; a total of 257 participants attempted to complete the electronic measure hosted by Qualtrics. However, 126 were ultimately excluded from analysis because they had missing data on more than 10 percent of the self-report items resulting in a final sample size of 131 student-veterans.
Chapter 4: Results

Statistical Analysis

The purpose of this study consisted of two main goals. One, examine an expanded measure for motivational regulation strategies; identifying the factor structure as well as examining the bivariate and mean level differences amongst the strategies. Two, investigate the relation motivational regulation has with other core aspects of self-regulated learning. Ultimately, this study was designed to replicate Wolters and Benzon (2013) investigation of students’ use of motivational regulation strategies combating motivational challenges within education. However, compared to the original, this study elected to investigate the under-researched populous of student-veterans within higher education.

Results of this study have been partitioned into three distinct sections. Consistent with the original study statistical measures were commissioned to develop a deeper understanding of motivational regulation, more specifically, motivational regulation strategy usage as well as grow the body of research associated with student-veterans. First, efforts to accomplish the first goal of this study which was to examine an expanded measurement as well as to test the internal structure of the previously administered scales of motivational regulation strategies subjecting all items to an exploratory factor analysis (EFA). Second, in order to address the first research question of which motivational
regulation strategies are reported to be used most frequently by student-veterans was completed through descriptive and bivariate analyses of the administered motivational regulation strategies scales. Third, addressing the second research question of what, if any, relation does student-veterans use of motivational regulation strategies relate to other facets of self-regulated learning was examined through bivariate analyses. Additionally, identifying the predictability of such motivational regulation strategies based on their motivational belief and reported learning strategy usage is presented through multiple regression analyses.

**Exploratory Factor Analysis**

Striving to examine all previously administered items developed for the assessment of motivational regulation strategies as well as the re-purposing of some of the AVSI items to potentially introduce a new expanded measurement, 67 items were administered to student-veterans then subjected to exploratory factor analysis (EFA) using Principal Components Analysis with a Varimax rotation. An exploratory factor analysis was enlisted to determining if existing scales joined with the newly added items formed a distinct and reliable scale measurement of motivational regulation. Exploratory factor analysis was determined the appropriate analysis instead of confirmatory factor analysis for multiple reasons. One, the increase of items within this measurement may lead to items previously identified as inconsistent or inconclusive to be more definitive to a specific modeling of motivational regulation prescribed by Wolters’ (1998) initial investigation. Two, items within this study were modified through two different methods: A) one of the items administered had modified wording compared to previous
investigations (Wolters, 1999b) and B) items were modified to investigate academia in
general compared to previous studies focusing on specific subjects; however, this
modification has been used in other motivational regulation studies, but such
modification were applied to a younger population (Wolter & Rosenthal, 2000). Three,
additional items were adapted from McCann and Garcia’s (1998) volitional research,
Academic Volitional Strategy Inventory (AVSI), that were suspected of fitting within the
regulation of motivation model. Four, previously introduced items were not subjected to
the analysis for cross-loading examination by other researchers. Five, previous measures
were all administered to either younger minor students or early adults; based on the
average age of the population of student-veterans reported within this study there is a
need to evaluate the administered scales to better understand how the measure responds
from an older more seasoned participant sampling. Finally, items presented by Trang
(2015) from the McCann and Garcia’s (1999) AVSI measure were subjected to a
confirmatory factor analysis before being subjected to EFA with regards to being
identified as motivational regulation strategies. On this basis, a minimum eigenvalue,
screed-plot criteria, and theoretical meaningfulness were used to determine the most
appropriate factor-modeling of the measurement within this study. Furthermore, total
variance and loadings were calculated. Cross-loadings were determined using a cut-off of
.35; whereas, items failing to load on a single factor were identified as any items with
lower than .40 on a single factor.

Through theoretical meaningfulness (also known as construct validity), a
minimum eigenvalue, and scree plot criterion a twelve (12) factor solution was deemed
most acceptable. In an effort to remain consistent with current models of achievement motivational and scale growth, this study elected to label the twelve scales accordingly: self-consequating, regulation of value, regulation of performance-approach goals, regulation of performance-avoidance goals, regulation of mastery goals, regulation of situational interest, regulation of efficacy, environmental structuring, help seeking, proximal goal setting, attention, and emotion control. Results of such analyses to include the eigenvalue and individual factor loadings from the rotated component matrix are presented (Table 2). Cumulatively, the twelve factor model accounts for approximately 75.90% of total variance. More significantly, nearly all items loaded within their previously identified scales. In total only three items loaded onto new factors compared to previous administrations (identified on Table 2). Furthermore, neither of these three items cross loaded onto another factor.

Ultimately, three items were removed from for failing to either load above the loading cut-off of .4, adhere theoretically to a factor, or would not load together with another item (Table 2). Additionally, ten items were examined to cross-load on another factor; however, only half of those cross-loadings were above the .4 cut-off and of those that cross-loaded they loaded higher on their primarily identified factor in comparison to their cross-loading factors. Moreover, each of the cross-loadings secondary values made adequate theoretical sense on why they loaded as such.
### TABLE 2
Summary of Exploratory Factor Analysis of Motivation Regulation Items

<table>
<thead>
<tr>
<th>Item text</th>
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<tr>
<td>1. I promise myself some kind of reward if I get the assignment done.</td>
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<td>2. I promise myself some kind of reward if I get my reading or studying done.</td>
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<td>3. I promise myself I can do something I want later if I finish the assigned work now.</td>
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<td>4. I make a deal with myself that if I get a certain amount of work done I can do something fun afterwards.</td>
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<td>5. I set a goal for how much I need to study and promise myself a reward if I reach that goal.</td>
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<td>6. I tell myself I can do something I like later if right now I do the work I have to get done.</td>
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<td>7. I reward myself each time I get a portion of the work done until I'm finished.</td>
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<td></td>
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<tr>
<td>1. I try to find ways that the material relates to my life.</td>
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<td></td>
<td></td>
<td></td>
<td>.86</td>
<td></td>
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<td>*</td>
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<tr>
<td>2. I make an effort to connect what I'm learning to my own experiences.</td>
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<td>.85</td>
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<td>3. I try to make the material seem more useful by relating it to what I want to do in my life.</td>
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<td>.80</td>
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<td>4. I make an effort to relate what we're learning to my personal interests.</td>
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<td></td>
<td>.80</td>
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<td>5. I try to make myself see how knowing the material is personally relevant.</td>
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<td></td>
<td>.73</td>
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<tr>
<td>6. I try to connect the material with something I like doing or find interesting.</td>
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<td></td>
<td></td>
<td></td>
<td>.69</td>
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<tr>
<td>7. I tell myself that it is important to learn the material because I will need it later in life.</td>
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<td></td>
<td>.58</td>
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<tr>
<td>8. I think up situations where it would be helpful for me to know that material or skill.</td>
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<td></td>
<td></td>
<td></td>
<td>.47</td>
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<td>.36</td>
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<tr>
<td>1. I try to make myself work harder by thinking about getting good grades.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.79</td>
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<tr>
<td>2. I remind myself about how important it is to get good grades.</td>
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<td></td>
<td></td>
<td></td>
<td>.77</td>
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<tr>
<td>3. I remind myself how important it is to do well on tests and assignments in this course.</td>
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<td></td>
<td>.77</td>
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<tr>
<td>4. I remind myself how my grades will be affected if I don't do my reading or studying.</td>
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<td></td>
<td>.75</td>
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<tr>
<td>5. I convince myself to keep working by thinking about getting good grades.</td>
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<td></td>
<td></td>
<td></td>
<td>.65</td>
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<tr>
<td>6. I tell myself that I need to keep studying to do well in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.63</td>
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<td></td>
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</tbody>
</table>
7. I tell myself, “Get to it and concentrate, this is an important exam/paper/assignment.” .48  *
8. I push myself to see if I can do better than I have done before. .43
   1. I think about doing better than other students in my class. .86
   2. I keep telling myself that I want to do better than others in my class. .79
   3. I think about how unpleasant it is to perform worse than others. .78
   4. I make myself work harder by comparing what I'm doing to what other students are doing. .77
   5. I tell myself that I should work at least as hard as other students. .64
   6. I tell myself that I have to push myself more so I won't be made fun of. .58
   7. I imagine that my classmates make fun of my poor performance. .58 .42
      1. I tell myself that I should keep working just to learn as much as I can. .86
      2. I tell myself that I should study just to learn as much as I can. .82
      3. I persuade myself to keep at it just to see how much I can learn. .82
      4. I convince myself to work hard just for the sake of learning. .81
      5. I challenge myself to complete the work and learn as much as possible. .62
         1. I try to make a game out of learning the material or completing the assignment. .81
         2. I make studying more enjoyable by turning it into a game. .81
         3. I try to get myself to see how doing the work can be fun. .74
         4. I make doing the work enjoyable by focusing on something about it that is fun. .36 .70
         5. I think of a way to make the work seem enjoyable to complete. .60

1. I tell myself I am a competent person. .78
2. I tell myself that I will be able to understand and remember this course material. .75
3. I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying. .68
4. I tell myself, "You can do this!" .62
5. I think about my strengths and the resources that I can draw upon to help me with difficult course material.

1. I schedule regular studying hours with classmates so that I won’t get behind in my course work and feel guilty for putting studying off.

2. I schedule regular studying hours with classmates so that I won’t get behind in my course work and feel stressed for putting studying off.

3. I call a friend from class and discuss the assignment or material with them.

4. When I have difficulty getting started on an academic task or become distracted, I count to 10 and then begin to study again.

1. I try to get rid of any distractions that are around me.

2. I make sure I have as few distractions as possible.

3. I change my surroundings so that it is easy to concentrate on the work.

4. I try to study at a time when I can be more focused.

1. I break down the work load into small segments so I get the feeling that I can handle it easier.

2. In order to feel capable of handling the learning material, I break it into small chunks.

3. In order to feel like I proceeded well, I approach the study material one step at a time.

4. I tell myself that I can master the tasks if I set myself sub-goals.

5. To feel like I am capable of mastering the material, I set short-term goals.

1. When I have difficulty maintaining focus or beginning studying, I concentrate on my breathing, taking deep, slow steady breaths.

2. I usually meditate or use some form of relaxation technique so I am better able to concentrate on my studies.

3. In order to begin or resume studying, I take 5 to 10 minutes to clear my thoughts, and then begin studying.

4. I exercise for about a half hour before I begin studying to clear my head and help me get relaxed.

1. When frustrated about what I need to get done for my courses, I think about things that make me feel better.

2. When I get stressed about what I need to get done for my courses, I think about things that make me feel better.
Note. Item loadings below .35 are not shown. 1 = Factor 1/Self-Consequating; 2 = Factor 2/Regulation of Value; 3 = Factor 3/Regulation of Performance-Approach Goals; 4 = Factor 4/Regulation of Performance-Avoidance Goals; 5 = Factor 5/Regulation of Mastery Goals; 6 = Factor 6/Regulation of Situational Interest; 7 = Factor 7/Regulation of Efficacy; 8 = Factor 8/Help Seeking; 9 = Factor 9/Environmental Structuring; 10 = Factor 10/Proximal Goal Setting; 11 = Factor 11/Attention; 12 = Factor 12/Emotion Control.

*Indicates factor loading from previous studies. Items not listed within this table compared to mastery list failed to load appropriately on a theoretical factor.

The first factor, which consisted of 7 items, was labeled self-consequating (α = .96) and indicated student-veterans’ use of positive extrinsic rewards to increase the time and effort they give for completing academic tasks. One of the items that loaded on this factor was “I reward myself each time I get a portion of the work done until I’m finished.” In addition to this item loading relatively well with a loading of .69, this item can be identified from previous studies as being removed from further analyses for failing to meet minimum loading scores; loading at this time may be attributed to the revise of this item from: “…part of the work…” to “…portion of the work…” however, additional assessments are required to validate this finding.

Regulation of value (8 items, α = .92), reflected student-veterans’ efforts of learning coursework by making the material more useful, interesting, or personally relevant to their life or career, was factor two. “I try to find ways that the material relates to my life” is an example of an item that loaded on this factor. Moreover, this specific item is one of the three items (two of three loaded on this factor and previously loaded together on a different factor, situational interest, in previous studies) that previous loaded onto a differing factor than where it loaded in this study. However, this specific
item loaded highest (.86) on this new scale and did not cross load during this study to its previous factor.

The third factor included eight items illustrating student-veterans’ use of strategies that focus on the importance of getting good grades or doing well in academia. This factor received the label regulation of performance-approach goals ($\alpha = .92$). A representative item from this scale is “I tell myself, get to it and concentrate, this is an important exam/paper/assignment;” loaded at .48. Additionally, this item is another item that previously loaded on another factor but failed to even cross-load onto the original factor this administration.

Loading fourth on the list was regulation of performance-avoidance goals ($\alpha = .90$) with a total of 8 items, measuring student-veterans’ use of strategies that focus on avoiding failure or displays of incompetence. “I think about doing better than other student in my class” is an item representative this factor. One factor presented a cross loading of .42 onto the help seeking factor, which may be attributed to the reference to classmates within that item causing such cross loadings to occur; however, the loading weight (.58) and theoretical relevance to this factor guided the decision to retain this time within this scale.

Regulation of mastery goals ($\alpha = .91$), 5 items, loaded fifth and measures student-veterans’ effort to improve their understanding or develop mastery of the material being learned. The following item example display this factor, “I tell myself that I should keep working just to learn as much as I can.”
Factor six, which has five items, was labeled *regulation of situational interest* ($\alpha = .92$). One of the five items within this factor is “I try to make a game out of learning the material or completing the assignment.” This factor measures student-veterans’ use of strategies that tap into reported efforts to make learning seem more enjoyable, interesting, or game-like.

Consisting of five items and loading as the seventh factor, *regulation of efficacy* ($\alpha = .88$), reports student-veterans’ use of strategies that focus on their ability to regulate their expectations, perceptions of competency, and thoughts or sub-vocal statements influencing their self-efficacy for completing academic tasks. On such example of this factor is “I tell myself I am a competent person.”

*Environmental structuring* ($\alpha = .88$) has four items and assesses student-veterans’ efforts to control their environment to increase their potential for academic task completion; such factor loaded ninth. “I schedule regular studying hours with classmates so that I won’t get behind in my coursework and feel guilty for putting studying off.”

Factor ten, *Proximal goal setting* ($\alpha = .90$), contains five items measuring student-veterans’ strategy for compartmentalizing academic tasks to manage their perception of the difficulty or complexity within a given task. Initial measures of this factor resulted in some of the items within this factor loading on the scale for regulation of self-efficacy; however, multiple studies (Schwinger, 2007; Trang 2015) presented empirical evidence such items belong to their own stand-alone distinct strategy within motivational regulation. Such findings remain consistent within this study providing an argument that these items may have a high test-retest compacity for this factor. Moreover, two of the
five items exhibited cross-loading in connection to both regulation of efficacy as well as self-consequating; however, all loadings, with the exclusion of one, were below the cut-off indicating such items, and more so, the factor has a connection to the other measures of motivational regulation. An item representation for this scale is “I break down the workload into small segments so I get the feeling that I can handle it easier.”

The following three factors were initially introduced as a potential measure for the unresearched factor of emotion control, identified by Wolters (1998) in his initial research of motivational regulation strategies, through the adaption of ten items from the ASVI scale. However, through the course of exploratory factor analysis and theoretical deliberation such measure was found to load relatively strongly to three distinctly different factors: help seeking, attention, and emotion control.

Loading as the eighth factor, Help seeking (α = .83) consisting of four items, was found to measure student-veterans’ indicated use of seeking help or assistance from others, such as professors, teachers, teaching assistance, or classmate/friends, or oneself in an effort to help processing the academic materials or tasks. “I call a friend from class and discuss the assignment or material with them” is one representative of the items within this scale. One such item from this factor did present a cross loading onto the attention factor but was determined to load stronger on the current factor while being more theoretically aligned with its relatively close loading cross loading factor; one such recommendation for this item moving forward would be to re-code the item to reduce such findings.
The four item eleventh factor was labelled *attention* ($\alpha = .75$). This factor was found to exhibit student-veterans’ purposeful effort in managing or intensifying their level of attention within academia. “When I have difficulty maintaining focus or beginning studying, I concentrate on my breathing, taking deep, slow stead breaths” was found to be the highest loading item of the four items within this factor. However, one item was found to have a weak (.40), but above the cut-off, cross loading to the factor regulation of situational interest. Such item was determined more theoretically aligned to the current factor as well as having a greater factor loading. Suggestion for future administration of this item is that this item should undergo re-coding to more clearly articulate what activities are being utilized within the item.

Finally, the twelfth factor, labelled *emotion control* ($\alpha = .90$) contains two items. Emotion control measures student-veterans’ resolution to maintain aspects of their emotions to accomplish academic tasks. “When frustrated about what I need to get done for my courses, I think about things that make me feel better” exhibits one of the two items within this factor. Moreover, both items within this scale were found to have cross loadings about the .35 level, but below the cut-off of .4 in connection with the factor help seeking. This can be discussed as the individual is seeking internal help when regulating their emotion within the academic domain.

**Descriptive and Bivariate Analyses**

Descriptive statistics of all primary variables associated within this study are presented within Table 3. Review of the means and standard deviations amongst the
twelve motivational regulations strategies suggests variability in how often student-veterans reported utilizing each strategy.

**Frequency and differences.** Preliminary inspection of the means for all twelve motivational regulation strategies proposes a variance in how often each of the twelve strategies were employed. A repeated measures one-way analysis of variance (ANOVA) further confirmed difference in means (Wilks’ lambda = .16, F (11, 118) = 57.28, p < .001, partial η² = .84) were statistically significant. Furthermore, addressing the first research question: On average, which motivational regulation strategies are reported to be used mostly by student-veterans and is there any difference between those strategies? Post-hoc follow-up paired samples t-tests were conducted and interpreted using an alpha of .0008, (= .05/66 comparisons) based on a Bonferroni adjustment. These comparisons present evidence that participants reported utilizing regulation of value (M = 5.82, SD = 1.00) more often compared to all other motivational regulation strategies (ts > 5.35, ps < .001; see Table 3 for cohen’s d); while also reporting help seeking as the most infrequent strategy called upon (M = 2.65, SD = 1.53) when facing motivational challenges in academia (ts > 4.15, ps < .001; see Table 4). Student-veterans reported then using of regulation of performance-approach goals (M = 5.53, SD = 1.20), environmental structuring (M = 5.53, SD = 1.33), and regulation of efficacy (M = 5.52, SD = 1.29) at nearly the same frequency; furthermore subsequent paired samples t-test analyses between the three variables produced no significant difference among the means (ts < .10, ps > .001). Proximal goal setting (M = 5.17, SD = 1.42) was reported to be used more often than regulation of mastery goals (M = 4.76, SD = 1.46, t = 2.97, p < .01), self-
consequating ($M = 4.61, SD = 1.88, t = 3.61, p < .001$), emotion control ($M = 4.10, SD = 1.88, t = 6.57, p < .001$), regulation of situational interest ($M = 4.00, SD = 1.65, t = 8.38, p < .001$), attention ($M = 3.18, SD = 1.49, t = 14.79, p < .001$), then regulation of performance-avoidance goals ($M = 3.13, SD = 1.61, t = 12.42, p < .001$).

### TABLE 3

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>d</th>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>α</th>
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<td>Self-Consequating</td>
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<td>.65b</td>
<td>Metacognitive Strategies</td>
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<td>Performance Approach Goal Orientation</td>
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<td>Regulation of Mastery Goals</td>
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*Note.* Cohen’s $d$ indicated as $d$, are $t$-test are comparing regulation of value to the corresponding variable. Effect size: small$^a$, medium$^b$, and large$^c$
Evidence of difference in means confirms the first hypothesis, student-veterans will exhibit high average use of four motivational regulation strategies (regulation of performance-approach, regulation of value, environmental structuring, and self-consequating) compared to the remaining motivational regulation strategies. Suggesting that student-veterans purposefully control their motivation with motivational regulation strategies (regulation of value, regulation of performance-approach goals, environmental structuring, and self-consequating) when faced with challenges within higher education; The aforementioned four strategies when compared to each of the remaining eight strategies examined were found to, on average, be used more frequently. Furthermore, three of the four identified strategies were reported to be the highest enlisted strategies amongst the twelve investigated; self-consequating being identified as the sixth most used strategy.

**Relation of motivational regulation, self-regulated learning, and GPA.**

Bivariate correlations between motivational beliefs, learning strategies, grade point average (GPA), and motivational regulation strategies are can be found on Tables 3 and 4. Thus, findings listed below have provided statistical evidence to suggest that these factors are not only related but many are found to have a moderately positive relation with the measures of self-regulated learning. Like previous studies of motivational regulation strategies, all variables were found to be positively correlated to each other (Chow, 2011; Trang, 2015; Wang, 2015; Wolters, 1999, Wolters & Rosenthal, 2000; Wolters & Benzon, 2013).
**Relation among motivational regulation scales.** Regulation of performance-approach goals and proximal goal setting were found to have a moderately strong relationship ($r = .55$, $p < .01$), regulation of performance-approach goals and regulation of efficacy ($r = .60$, $p < .01$); lastly, regulation of efficacy and proximal goal setting were found to correlate moderately strongly ($r = .65$, $p < .01$). Furthermore, illustrating consistency between this study and previous investigations into the relation of students’ usage of intrinsically focused forms of motivational (i.e., regulation of mastery goals, regulation of situational interest, and regulation of value) were reported as moderately strong as well; $rs > .42$, $ps < .01$ (Chow, 2011, Trang, 2015; Wang, 2013; Wolters, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013) In regards to the scales that were initial thought to have been a single measure of emotion control that were later identified as three distinctly differing scales of measurement for emotion control, attention, and help seeking correlations findings also indicated a moderate relation ($rs > .40$, $ps < .01$) lending additional validity that such scales are distinctly different, yet related measures of motivational regulation.

**Relation among factors of self-regulated learning.** Research question two part one asks: “what, if any, are the relations between student-veterans’ use of motivational regulation strategies and other aspects of self-regulated learning such as their use of motivational beliefs and their use of cognitive and metacognitive strategies. Furthermore, hypothesis two part one states that motivational regulation strategies will correlate with other factors of self-regulated learning. The following evidence presents that both
motivational beliefs as well as learning strategies are correlated with motivational regulation strategies.

*Relation to motivational beliefs.* Consistent with previous investigations measures of motivational regulation strategies and motivational beliefs among student-veterans resulted in weak to moderate correlations between all variables (Chow, 2011; Wang, 2013; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013); excluding the relationship between help seeking and control learning beliefs (r = .00). More importantly, help seeking failed to provide any significant relation with any of the motivational beliefs other than mastery goals (r = .17, p < .05). However, correlations between regulation of mastery goals and mastery goal orientation (r = .49, p < .01), regulation of performance-approach goals and performance goal orientation (r = .21, p < .05), regulation of performance-avoidance goals and performance goal orientation (r = .49, p < .01), regulation of value and task value (r = .37, p < .01), and regulation of efficacy and self-efficacy (r = .50, p < .01) were all to be found positively correlated to each other indicating they are similar yet distinctly different measures of within self-regulated learning.

*Relations to learning strategies.* Correlations between student-veterans’ reported use of each of the twelve motivational regulation strategies and learning strategies were found to be positively correlated at the p < .01 value (.26 > r > .57); with the only exception being the relation between regulation of performance-avoidance goals and metacognitive strategies (r = .20, p < .05). Lending statistical evidence that facets of motivational regulation are related yet distinctly different than the cognitive (Wang,
2013) and metacognitive (Trang, 2015) factors of self-regulated learning; a finding concurrent with previous examinations between the two measures (Wolters, 1999; Wolters & Benzon, 2013). Furthermore, the lowest correlation amongst all these factors was reported to be between metacognitive strategies and regulation of performance-avoidance goals (r = .20, p < .05); whereas, Proximal goal setting and metacognitive strategies are found to have produced the highest correlation, .57, p < .01).

**Relation to Grade Point Average.** While measures of motivational beliefs as well as cognitive and metacognitive learning strategies saw largely moderate positive correlation coefficients when analyzed with factors of motivational regulation strategies, grade point average (GPA) did not produce the same results; such results continuing to present as inconsistent within the literature (Schwinger et al., 2009; Wolters, 1999; Wolters & Rosenthal, 2000). Overall, GPA was found to only have a statistically significant relationship with two factors of motivational regulation strategies. Regulation of mastery goals and GPA were found to be weakly correlated, r = .19, p < .05; whereas proximal goal setting and GPA were found to also be weakly correlated, r = .20, p < .05. However, while the relationship was not found to be significant, emotion control (r = -.03, p > .05), was found to be the only relationship that had a negative relationship.
**TABLE 4**
Bivariate Correlations

| Variable                                          | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|--------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1. Self-Consecuating                             | 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2. Regulation of Value                           | .31**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 3. Regulation of Performance-Approach Goals      | .46**| .51**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4. Regulation of Performance-Avoidance Goals     | .37**|      | .46**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5. Regulation of Mastery Goals                   | .23**|      | .48**| .38**| .27**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6. Regulation of Situational Interest            | .46**|      | .49**| .33**| .38**| .42**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7. Regulation of Efficacy                        | .41**|      | .47**| .60**| .23**| .44**| .36**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8. Environmental Structuring                     | .21* |      |      | .09  | .37**| .01  | .15  | .15  | .25**| 1    |      |      |      |      |      |      |      |      |      |      |      |      |
| 9. Help Seeking                                  | .27**|      |      | .19**|      | .17  | .40**| .15  | .37**| .14  | .11  | 1    |      |      |      |      |      |      |      |      |      |      |      |
| 10. Proximal Goal Setting                        | .48**|      |      | .39**|      | .55**| .22**| .40**| .47**| .65**| .40**| .12  | 1    |      |      |      |      |      |      |      |      |      |
| 11. Attention                                    | .33**|      |      | .28**|      | .31**| .34**| .40**| .54**| .33**| .21**| .53**| .45**| 1    |      |      |      |      |      |      |      |      |
| 12. Emotion Control                              | .42**|      |      | .24**|      | .29**| .29**| .30**| .42**| .33**| .15  | .40**| .40**| .53**|      | 1    |      |      |      |      |      |      |
| 13. Metacognitive Strategies                     | .43**|      |      | .43**|      | .48**| .20**| .52**| .52**| .46**| .33**| .33**| .57**| .48**| .29**|      | 1    |      |      |      |      |      |
| 14. Cognitive Strategies                         | .43**|      |      | .45**|      | .44**| .33**| .48**| .46**| .32**| .26**| .38**| .49**| .47**| .46**| .60**|      | 1    |      |      |      |      |
| 15. Mastery Goal Orientation                     | .20**|      |      | .50**|      | .34**| .14  | .49**| .27**| .29**| .05  | .17**| .30**| .22**| .22**| .47**| .48**| 1    |      |      |      |      |
| 16. Performance Approach Goal Orientation        | .11  |      |      | .06  |      | .21**| .53**| .26**| .17**| .18**| .08  | .13  | .12  | .08  | .08  | .13  | .15  | .68**| 1    |      |      |      |
| 17. Performance Avoidance Goal Orientation       | .10  |      |      | .06  |      | .30**| .49**| .18**| .05  | .12  | .11  | .02  | .08  | .06  | .04  | .05  | .10  | .15  | .21**| 1    |      |      |      |
| 18. Task Value                                   | .07  |      |      | .37**|      | .25**| .03  | .33**| .06  | .11  | .05  | .04  | .19**| .01  | .02  | .25**| .30**| .67**| .15  | .21**| 1    |      |      |
| 19. Control Learning Beliefs                    | .18**|      |      | .24**|      | .21**| .31**| .14  | .15  | .38**| .01  | .00  | .21**| .06  | .19**| .15  | .12  | .26**| .27**| .24**| .25**| 1    |      |      |
| 20. Self-Efficacy                                | .20**|      |      | .17  |      | .21**| .06  | .34**| .18**| .50**| .13  | .03  | .29**| .20**| .09  | .41**| .08  | .30**| .20**| .06  | .26**| .43**| 1    |
| 21. Grade Point Average                         | .13  |      |      | .10  |      | .15  | .02  | .19**| .04  | .14  | .09  | .05  | .20**| .06  | .03  | .24**| .05  | .19**| .13  | .07  | .25**| .20**| .36**|

*Note.* **p < 0.01. *p < 0.05.*
Multiple Regressions

Six motivational beliefs were used in a series of regressions (see Table 5) to determine predictability of the twelve motivational regulation strategies; addressing part two of the second research question, does student-veterans’ motivational beliefs predict their use of motivational regulation strategies? Furthermore, gender, a dichotomous variable, was incorporated into the analysis due to the inclusion of such measure within prior studies (Wolters and Benzon, 2013); illustrating potential differences between male and females regarding facets of self-regulated learning (Meece & Painter, 2008). Furthermore, the difference in rate of degree completion between genders reported by the VA suggested the variable may present as a predictor amongst the twelve motivational regulation strategies (Veteran Affairs, 2015). Eight of twelve variables were found to be statistically significant in explaining the amount of variance predictors had on each of the motivation regulation strategies; ranging from 14% to 37%.

<table>
<thead>
<tr>
<th>Predictor</th>
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<th>Regulation of Value</th>
<th>Regulation of Performance-Approach Goals</th>
<th>Regulation of Performance-Avoidance Goals</th>
<th>Regulation of Mastery Goals</th>
<th>Regulation of Situational Interest</th>
<th>Regulation of Efficacy</th>
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<th>Proximal Goal Setting</th>
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<th>Emotion Control</th>
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<td>.24*</td>
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TABLE 5

Standardized Beta Coefficients from Initial Regressions Predicting Student-Veterans’ Use of Motivational Regulation Strategies
Gender as a predictor. Much like preliminary findings for gender; this study found that gender was not statistically significant at predicting any of the motivational regulation strategies utilized by student-veterans to combat motivational challenges within higher education (Wolters & Benzon, 2013).

Motivational beliefs as predictors. While not all motivational beliefs were found to be significant predictors to each of the twelve motivational regulation strategies, evidence confirms this study’s second hypothesis that they will present as predictors to student-veterans’ use of motivational regulation strategies. Evaluation of standardized coefficients of the six motivational beliefs indicated mastery goal orientation as the strongest individual predictor for each of the twelve motivational regulation strategies; finding statistical significance in nine of the twelve strategies reported; regulation of mastery goals ($\beta = .70, p < .001$), regulation of value ($\beta = .48, p < .001$), regulation of situational interest ($\beta = .68, p < .01$), attention ($\beta = .61, p < .01$), regulation of efficacy ($\beta = .38, p < .01$), emotion control ($\beta = .24, p < .01$), environmental structuring ($\beta = .45, p < .05$), proximal goal setting ($\beta = .38, p < .05$), and regulation of performance-approach goals ($\beta = .34, p < .05$). On average, student-veterans who reported higher focus on learning and improving their knowledge for intrinsic purposes tended to enlisted
strategies that centered around making the material personally relevant, enjoyable, and masterful all while striving to make good grades through controlling their study environment and compartmentalizing their goals to manageable tasks; all of this while controlling their emotions in an academic setting. In other words, student-veterans that strive to master their learning employee motivational regulation strategies that do not focus on not looking incompetent, extrinsic rewards, or seeking help from others.

Similarly, student-veterans with a higher level of aptitude to successfully appraise their ability to accomplish academic tasks, self-efficacy learners, were found to predict three motivational regulation strategies to regulate their focus on regulating their academic expectations (regulation of efficacy; $\beta = .52, p < .001$), mastering the learning material (regulation of mastery goals; $\beta = .35, p < .01$), and compartmentalizing their learning goals (proximal goal setting; $\beta = .33, p < .05$). Performance-approach goals orientation was found to be a significant predictor to two motivational regulation strategies: regulation of performance-avoidance goals ($\beta = .34, p < .01$) and regulation of mastery goals ($\beta = .19, p < .05$). Whereas, the motivational belief that endorses avoiding demonstrating incompetence, performance-avoidance goals orientation, were found to predict student-veterans use of regulation of performance-approach goals ($\beta = .18, p < .05$) and regulation of performance-avoidance goals ($\beta = .21, p < .05$) motivational regulation strategies.

Whereas, control learning beliefs, student-veterans who expressed beliefs about the efforts they put into learning would result in a given outcome, was an individual predictor for two of the motivational regulation strategies; regulation of performance-
avoidance goals ($\beta = .36, p < .001$) and regulation of efficacy ($\beta = .24, p < .05$) strategies. Task value, the benefits received from learning, was found to be a positive predictor to one motivational regulation strategies; emotion control ($\beta = .24, p < .05$). However, it was found to be a negative predictor for two others; regulation of efficacy (regulating the expectations of academic tasks; $\beta = -.33, p < .05$) and attention (regulation of the intensity of their emotion; $\beta = -.43, p < .05$).

**Learning strategies as predictors.** To further investigate the predictability of motivational regulation strategies using learning strategies as predictors (part two of research question two); a series of sequential stepwise regressions were conducted (Table 6). Utilizing the six factors of motivational beliefs (mastery goal orientation, performance-approach goal orientation, performance-avoidance goal orientation, task value, control learning beliefs, and self-efficacy) as well as gender for the first step (also known as block), followed by the learning strategies, cognitive and metacognitive strategies, being introduced in the second step (block two) of the sequential stepwise regression analyses predicting each of the twelve motivational regulation strategies student-veterans reported to enlist when combating motivational challenges within higher education. Such analyses afford for a more rigorous test of the relation between the strategies of self-regulated learning and the motivational regulation strategies when controlling for covariation based on their common relation to motivational beliefs (Wolters and Benzon, 2013). Injection of cognitive and metacognitive strategies were found statistically significant in predicting student-veterans use of motivational regulation strategies; confirming part two the study’s second hypothesis. Introduction of
both cognitive and metacognitive strategies was found to increase the accounted variance amongst the twelve strategies of motivational regulation by as low as 11 and as high as 40 percent. While both predictors were found to be statistically significant predictors when they were included during the second step of the sequential stepwise multiple regression analyses, they were found to be individually excluded from others. Cognitive strategies were found as an excluded predictor for both regulation of efficacy and environmental structuring; whereas, metacognitive strategies were found to an excluded predictor of regulation of value, regulation of performance-avoidance goals, help seeking, and emotion control. Furthermore, all motivational regulation strategies were found to include at least one predictor from the first step excluding environmental structuring that was found to only include metacognitive strategies as the only significant predictor.

**TABLE 6**
Beta and Unstandardized Coefficients from Sequential-Stepwise Regression Predicting Student-Veterans’ Reported Use of Motivational Regulation Strategies

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### Regulation of Mastery Goals

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94
Help Seeking | Proximal Goal Setting
---|---
**Predictor** | **Model 2** | **Predictor** | **Model 4**
Mastery Goal Orientation | B | β | Master Goal Orientation | B | β
Cognitive | .54*** | .39*** | Cognitive | .38** | .29**
R² | .14*** | Adjusted R² | .13*** | R² change | .05**
Adjusted R² | .11*** | R² change | .05** |

Attention | Emotion Control
---|---
**Predictor** | **Model 4** | **Predictor** | **Model 3**
Mastery Goal Orientation | B | β | Mastery Goal Orientation | B | β
Task Value | -.36* | -.23* | Task Value | -.57** | -.28**
Metacognitive | .50** | .32** | Cognitive | .79** | .46***
Cognitive | .42** | .31** | Cognitive | .79** | .46***
R² | .31** | R² | .26***
Adjusted R² | .29** | Adjusted R² | .24***
R² change | .05** | R² change | .16***

**Note.** Motivational Beliefs and Gender were entered as first step; Metacognitive and Cognitive Learning Strategies entered as second step for all analyses.
Model number presents number of steps for all significant predictors to be included within analysis.
All predictors excluded from analysis not displayed.
All predictors listed are in the order they loaded within analysis.

***p < .001. **p < 0.01. * p < .05

Self-efficacy (β = .09, p > .05), step-one, along with cognitive (β = .29, p < .01) and metacognitive strategies (β = .22, p < .01), step-two, in this order, were found to be included predictors of the motivational regulation strategy self-consequating. Ultimately, the inclusion of cognitive and metacognitive strategies accounts for 3 percent of the variance when the second step is added; resulting in an overall unique variance of 23
percent. Cognitive strategies illustrate the strongest predictor (unstandardized $B = .49$; designated hence forth as $B$), followed by metacognitive strategies ($B = .44$), finally by self-efficacy ($B = .17$) for self-consequating. Suggesting one-point increase in cognitive strategies usage will on average associate with a .49-point increase in self-consequating strategy usage; that same one-point increase in metacognitive strategy use would account for a .44-point increase; additionally, for every one-point increase in self-efficacy would suggest a .17-point increase in student-veterans’ reported use of self-consequating when employed to combat motivational challenges within higher education.

Regulation of value was found to include two predictors; consisting of master goal orientation ($\beta = .37, p < .001$; step-one) and cognitive strategies ($\beta = .27, p < .001$; step-two). Overall, both predictors account for 30 percent of the unique variance of the motivation regulation strategy regulation of value; inclusion of cognitive strategies was found to account for 6 percent of the variance when implemented in the second step. Mastery goal orientation was found to be the strongest of the two predictors ($B = .40$) followed by cognitive strategies ($B = .24$) was found to be nearly half the weight.

Suggesting as student-veterans’ increase their mastery goal orientation by one-point their usage of the regulation of value strategy will increase .40-points; furthermore, a one-point increase in cognitive strategies is suggested to increase the same motivational regulation strategy by .24-points.

A sequential stepwise regression was calculated to predict student-veterans’ use of the strategy regulation of performance-approach goals based on motivational beliefs (step-one) and learning strategies (step-two). Mastery goal orientation ($\beta = .04, p > .05$; B
performance-avoidance goal orientation ($\beta = .26, p < .01; B = .22$), metacognitive ($\beta = .33, p < .01; B = .18$), and cognitive strategies ($\beta = .20, p > .05; B = .05$) were all found to be included predictors. The above-mentioned variables were found to account for a third ($R^2 = .34$) of the variance unique to the motivational regulation strategy regulation of performance-approach goals; with the addition of metacognitive and cognitive strategies accounting for a portion of that variance ($R^2 \text{ Change} = .02$).

Performance-approach goal orientation ($\beta = .28, p < .01; B = .27$), performance-avoidance goal orientation ($\beta = .24, p < .01; B = .24$), and control learning beliefs ($\beta = .15, p < .01; B = .25$) were the three motivational beliefs not excluded from analysis during step-one of the sequential stepwise regression to predict student-veterans’ use of performance-avoidance goals; whereas, cognitive strategies ($\beta = .23, p < .01; B = .33$) made up step-two. Overall, the three motivational beliefs and one learning strategy illustrate 39 percent of the unique variance associated with the regulation of performance-avoidance goal strategy; moreover, cognitive strategies was found to account for 5 percent of the variance when added to the analysis via the second step.

Accounting for an overall unique variance of 40 percent of the motivational regulation strategy regulation of mastery goals, both learning strategies present a minute, yet statistically significant, amount of the influence on this variance ($R^2 \text{ Change} = .02$). Mastery goal orientation ($\beta = .24, p < .01$), self-efficacy ($\beta = .13, p > .05$), performance-approach goal orientation ($\beta = .13, p > .05$) were calculated within the first step; metacognitive ($\beta = .22, p > .05$) and cognitive ($\beta = .19, p > .05$) in the second in an effort to predict student-veterans’ use of the regulation of mastery goals strategy when facing
challenges to their motivation within the higher education setting. Mastery goal orientation (B = .37) was found to be the highest predictor followed by metacognitive strategies (B = .33), Cognitive strategies (B = .26), self-efficacy (B = .20), and performance-approach goal orientation (B = .12) for the regulation of mastery goals strategy.

Situational interest was found to have one motivational belief (step-one) and both learning strategies (step-two) predictors. Mastery goal orientation (β = -.04, p > .05; B = -.06) was found to be a negative predictor of situational interest; whereas metacognitive (β = .39, p < .001; B = .68) and cognitive (β = .24, p < .05; B = .36) strategies were found to be positive predictors of the motivational regulation strategy. Suggesting student-veterans use of situational interest would increase by .39-points and .24-points for a one-point increase to metacognitive or cognitive strategies use; however, with everyone one-point increase to mastery goal orientation student-veterans’ reported usage of situational interest can be expected to decrease by .06-points.

Three variables were included in the analysis effort to predict regulation of efficacy. Self-efficacy (β = .28, p < .01; step-one), control learning beliefs (β = .22, p < .05; step-one), and metacognitive strategies (β = .31, p < .001); accounting for over a third of the unique variance (R² = .37); with an R² change of .08 presenting from metacognitive strategies alone. A one-point increase to self-efficacy, control learning beliefs, or metacognitive strategies can be expected to result in an increase of .36-points, .27-points, or .42-points of reported regulation of efficacy strategy usage by student-veterans.
The following stepwise regression analysis was found to only retain a single variable to predict student-veterans’ use of the environmental structuring motivational regulation strategy. Metacognitive strategies ($\beta = .33, p < .001; B = .46$) was found to be the only variable not excluded from the two-step regression analysis. Accounting for 11 percent of the unique variance associated with environmental structuring.

Predicting the motivational regulation strategy help seeking was found to present evidence of two predictors, mastery goal orientation ($\beta = -.02, p > .05$) and cognitive strategies ($\beta = .39, p < .001$), following the two-step analysis. Overall, both variables present 14 percent of the variance within help seeking; with a majority presenting from the second step ($R^2$ Change = .11). As the reported motivational belief, mastery goal orientation, is increased by one-point student-veterans reported usage of the help seeking can be expected to be decreased by .04-points; whereas, that same one-point increase for student-veterans’ use of cognitive strategies can be expected to also increase the motivational regulation strategy by .54-points.

Mastery goal orientation ($\beta = -.06, p > .05; B = -.09$) and self-efficacy ($\beta = .13, p > .05; B = .18$) were the two motivational beliefs not excluded from the first-step of the stepwise regression to predict student-veterans’ use of proximal goal setting; whereas, metacognitive ($\beta = 373, p < .001; B = .54$) and cognitive strategies ($\beta = .29, p < .01; B = .38$) were included in the second-step. Two motivational beliefs and two learning strategy illustrate 37 percent of the unique variance associated with the proximal goal setting; moreover, learning strategies were found to account for 5 percent of the variance when added to the analysis via the second step.
Attention was found to have four predictors accounting for 31 percent of the variance; within just 5 percent presenting from the second step. Mastery goal orientation \((\beta = .06, p > .05; B = .10)\) and task value \((\beta = -.23, p < .05; B = -.36)\) were included in step-one; step-two consisted of both metacognitive \((\beta = .32, p < .01; B = .50)\) and cognitive \((\beta = .31, p < .01; B = .42)\) strategies.

Finally, the last stepwise regression was calculated to predict student-veterans’ use of emotion control. Included within the first step of the analysis was mastery goal orientation \((\beta = .17, p > .05; B = .35)\) and task value \((\beta = -.28, p < .01; B = -.57)\); with cognitive strategies \((\beta = .46, p < .001; B = .79)\) included in the second step. Over a quarter of emotion controls unique variance is found to be associated with these three variables \((R^2 = .26)\); with majority of it presenting via the second step \((R^2 \text{ Change} = .16)\).

Overall, mastery goal orientation was found to be an included predictor for eight of the twelve motivational regulation strategies; three as negative predictors. Findings suggest that five motivational regulation strategies may be predicted to increase if the student-veteran increases their motivational belief regarding mastering their knowledge. Performance-avoidance goal orientation presented evidence of only being included as a predictor within motivational regulation strategies focused on performance. This finding is not surprising due to the nature of performance-avoidance goal orientation; one would expect a desire to not look incompetent would call on an increased usage of strategies to do just that. However, the motivational belief performance-approach goal orientation was not found to be included as a predictor for the strategy focused on getting good grade. This belief was found to be an included predictor of strategies focused on not looking
incompetent and mastering the materials. Task value was found to be excluded from all but two motivational regulation strategies, but when it was included as a predictor it presented as a negative predictor. However, both results make logical sense. When a student-veteran believes the usefulness, importance, or personal relevance of the material being learned one can expected they would call on strategies used to help focus their attention or control their emotions less. Such like task value, control learning beliefs was found to be an include predictor of two motivational regulation strategies regulation of performance-avoidance goals and regulation of efficacy. Control learning beliefs focus on a student-veterans’ belief that the effort they expend on learning will result in each outcome; making it a relevant predictor of motivational regulation strategies focused on regulating their beliefs about themselves and the outcomes they wish to achieve. Self-efficacy, or the degree to which student-veterans assess their ability to succeed academically was found to be a predictor to four motivational regulation strategies: self-consequating, regulation of mastery goals, regulation of efficacy, and proximal goal setting. While each of the motivational beliefs were found to be included within at least one stepwise regression analysis, gender was found to be excluded from all twelve analyses for failing to contribute significantly to the included predictors. More plainly stated, the gender of the student-veteran was not found to be a predictor for any of the twelve strategies researched.

As mentioned earlier, cognitive strategies were found to be included within all, but two analyses, as a significant predictor of motivational regulation strategies. Providing compelling evidence that as student-veterans’ report increasing the
employment of the learning strategy an increase in the ten identified motivational regulation strategies can be expected as well. Much of the same can be said for the eight motivational regulation strategies that present evidence that metacognitive strategies are included as predictors.

Like the evidence presented within the correlations between motivational regulation strategies and facets of self-regulated learning the predictability of such factors also adds to the discussion of motivational regulation’s connection to self-regulated learning. Motivational beliefs and learning strategies have been found to be influencers of motivational regulation strategies based on the evidence presented above. At least one facet of self-regulated learn has been linked to the unique variance and predictability within each of the motivational regulation strategies; these findings present additional credibility that motivational regulation is a related yet distinctly different facet of the over-arching construct of self-regulated learning.

**Motivational regulation strategies predictiveness of grade point average.** In a subsequent supplemental analysis, Student-veterans’ reported grade point average (GPA) was used to identify the predictability of the twelve motivational regulation strategies and reported gender through a multiple linear regression analysis. Similar to the above multiple regression analyses except for one major deviation in this analysis motivational regulation strategies and gender were used to predict student-veterans’ GPA compared to the above analyses that used measures of self-regulated learning to predict usage of motivational regulation strategies. Overall, the twelve motivational regulation strategies as well as gender were found to be non-significant in predicting student-veterans’ GPA; F
(13, 115) = 1.02, \( p > .44 \), with an \( R^2 \) of .10; \(-.13 > \beta > .13, p > .06\). Furthermore, all twelve scales were found to only account for just 10 percent of the variance associated with student-veterans’ reported GPA (Table 7); however, this value was also identified as non-significant. Bivariate analysis conducted present evidence that regulation of mastery goals (\( \beta = .11, p = .06 \)) and proximal goal setting (\( \beta = .13, p = .10 \)) were found to be the closet measures of significance amongst the twelve strategies.

### Table 7

<table>
<thead>
<tr>
<th>Predictor</th>
<th>GPA</th>
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<tbody>
<tr>
<td>Self-Consequating</td>
<td>.05</td>
</tr>
<tr>
<td>Regulation of Value</td>
<td>-.02</td>
</tr>
<tr>
<td>Regulation of Performance-Approach Goals</td>
<td>.60</td>
</tr>
<tr>
<td>Regulation of Performance-Avoidance Goals</td>
<td>-.04</td>
</tr>
<tr>
<td>Regulation of Mastery Goals</td>
<td>.11</td>
</tr>
<tr>
<td>Regulation of Situational Interest</td>
<td>-.05</td>
</tr>
<tr>
<td>Regulation of Efficacy</td>
<td>-.05</td>
</tr>
<tr>
<td>Environmental Structuring</td>
<td>-.01</td>
</tr>
<tr>
<td>Help Seeking</td>
<td>.06</td>
</tr>
<tr>
<td>Proximal Goal Setting</td>
<td>.13</td>
</tr>
<tr>
<td>Attention</td>
<td>-.02</td>
</tr>
<tr>
<td>Emotional Control</td>
<td>-.08</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note.* All variables found as non-significant predictors of Grade Point Average (GPA)

*** \( p < .001 \); ** \( p < .01 \); * \( p < .05 \)
Chapter 5: Discussion

The present study was designed with two broad research objectives; ultimately, setting out to replicate Wolters and Benzon (2013) investigation on assessing and predicting student’s use of strategies for motivational regulation. The first objective of this study was to expand the measurement of motivational regulation strategies enlisted by student-veterans within higher education. The second was to identify the relationships of motivational regulation to other facets of self-regulated learning such as motivational beliefs, cognitive and metacognitive strategies. Additionally, researching the predictability of twelve motivational regulation strategies using the facets of self-regulated learning as predictors. Ultimately, presenting evidence that motivational regulation is a plausible factor of self-regulated learning amongst the student-veteran community.

Motivational Regulation Strategies Assessment

Instrument Exploration. One inference supported by the evidence within this study and in conjunction with the first objective is that instrument developed, administered, and analyzed within this study presents a viable measure for assessing self-reported usage of twelve motivational regulation strategies by student-veterans within higher education. Initially 67 self-report items were presented to student-veterans that were asked to think about how they combat general motivational challenges within their
higher learning. Of the initial 67 items administered 64 of those items were retained through exploratory factor analysis (EFA) where they were found to load onto twelve individual factors. Additional, examination for theoretical meaningfulness identified such loadings represented related, yet conceptually distinct facets of motivation regulation strategies. Of the 64 remaining items, 54 were derived from earlier works (Chow, 2011; Schwinger et al., 2007; Trang, 2015; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013) where participants were afforded the ability to self-report on a vast range of strategic behaviors previously identified as the initial nine scale measures of motivational regulation (Trang, 2015). Whereas the introduction of the ten newly added, re-purposed ASVI items (McCann & Garcia, 1998), items were found to load onto three new scales, measuring attention, help seeking, and emotion control, indicating a connection between the items and Wolters (1998) initial exploration of motivational regulation. Furthermore, each of the twelve scales were found to demonstrate the appearance of both content and face validity.

Moreover, bivariate correlations amongst the twelve strategies were found to have a positive and moderately strong relation amongst the scales; indicating high internal reliability. Evidence suggest that as student-veterans report to using one of the motivational regulation strategies they also tended to report using another motivational regulation strategy. One interpretation of these results is that each motivational regulation strategy scale indicates a connected measurement for a given strategy; however, the correlations were found to be low enough to indicate the presence of discriminate validity among the scale, suggesting that each measure is drawing from differing aspects of
motivational regulation. Therefore, the instrument utilized and evaluated within this study appears to be an acceptable measure for assessing student-veterans self-reported use of the twelve motivation regulation strategies. As such, one could infer that this instrument would be a viable tool used to further investigate motivational regulation within the student-veterans populous. Furthermore, based on the unique demographics the student-veteran populous presents this instrument may also be utilized for both the non-traditional student population as well as a higher mean age population within academia compared to all other studies of motivational regulation to date (Chow, 2011; Schwinger et al, 2007, 2009, 2012a, 2012b; Wang, 2013; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013).

Consistent with prior research the distinct strategies found remain constant with prior works investigating the connection of motivational regulation with aspects of self-regulated learning (Corno, 2001; Sanson & Thoman, 2005; Wolters, 2003b; Zimmerman & Martinez-Pons, 1986). Moreover, such strategies were found to not only be consistent with Wolters’ initial probe (Wolters, 1998), but also studies using similar item scales for both German and Chinese students (Schwinger et al., 2007; Wang, 2013) as well as various age groups such as young adolescents to early adults, also identified as traditional college students (Schwinger et al., 2009, 2012a, 2012b; Wolters 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). Wolters (1998) initial findings, utilizing a portion of the items within this study, were first found to load on five unique factors (Wolters, 1999); yet they were later expanded to six factors in his most recent study (Wolters & Benzon, 2013). Furthermore, additional investigations grew the measure to a
nine-factor model (Chow, 2011; Schwinger et al., 2007; Trang, 2015; Wang, 2013). Amongst these strategies’ regulation of mastery goals, regulation of performance-approach goals, self-consequating, and environmental structuring remained structurally the same; however, they have received new labels to remain consistent with the current literature (Chow, 2011; Schwinger et al., 2007, 2009, 2012a, 2012b; Wang, 2013; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013).

Initially identified as interest enhancement, during Wolters’ (1998, 1999) early examinations of motivational regulation, reflecting students’ efforts to make academics more relevant to their own lives or interest as well as more enjoyable, and remaining consistent within the investigations by Chow (2011), and Wang (2013) were found to split into two distinctly different factors of motivational regulation by Schwinger et al. (2007, 2009, 2012a, 2012b), Trang (2013), and Wolters and Benzon (2013). Such factors becoming regulation of value and regulation of situational interest. This pattern continued within the current study on student-veterans; however, two items that consistently loaded onto the regulations of situational interest factor were found to shift onto the regulation of value scales as the two highest loading items associated within the factor. Due to the average age of the participants within this study, these findings provide compelling evidence that older students present the ability to differentiate between factors such as personal significance and personal interest (Wigfield, Eccles, & Rodriguez, 1998); affording themselves the capability to utilize strategies to regulate their motivation appropriately.
Initially presented by Schwinger et al. (2007) proximal goal setting was identified as a strategy that students utilize to emphasize their goals in education; going as far as to say that students use this strategy as a combination with self-consequating. Remaining consistent with Schwinger et al. (2007) findings these items have been again found to load onto their own factor of motivational regulation. Whereas, self-consequating is the behavioral self-reinforcement a student applies to themselves on a given academic task, proximal goal setting is taking an extensive and complex task and making it many small goals (Schwinger et al. (2009). Evidence presented within the current study suggest student-veterans are capable of evaluating an academic task and breaking it down into more manageable components; affording themselves the opportunity to manipulate their motivation into a higher state by keeping the perspective that the goals are easily reachable goals (Bandura & Shunk, 1981; Wolters, 2003a).

In another study, Wang (2013) presented items as factors of efficacy enhancement, which were originally represents by McCann and Garica (1999) AVSI; they were re-named regulation of efficacy within the current study. identified as a strategy for focusing on their ability to regulate their thoughts influencing their self-efficacy for academic success. Evidence suggests that student-veterans not only regulated their goals through proximal goal setting, but they also employee techniques to manage their beliefs about their potential academic success.

In direct reflections of the first object of this study to examine an expanded measure for motivational regulation; help seeking, attention, and emotion control have all been referenced by Wolters (1998, 2003a) as factors of motivational regulation strategies;
however, the current study is the first empirical investigation attempting to assess and predict the factors as techniques students utilize to manipulate their motivational status. Help seeking, reflected as student-veterans strategy of seeking help or assistance from others in an effort to help process academic tasks or materials, was found to be the least utilized motivational regulation strategies. With respect to Karabenick (2003) students’ use of help seeking strategies has as many as five confounding factors related to the application of help seeking (instrumental/adaptive help seeking goal, formal versus informal help seeking target, help-seeking threat, avoidance of help seeking, and executive help seeking goal) by a student. Due to the broad nature of asking student-veterans to report their use of help seeking, within the general sense of education, as a strategy to regulate their motivation there may not have been enough information to make a connection to each of the differing facets of help seeking causing student-veterans to report reduced applications of the strategy within this study. Furthermore, the same lack of ambiguity may have caused student-veterans to not make self-judgements or self-reactions (Shunk & Zimmerman, 2012) To develop a deeper understanding of this strategy examination of specific motivational challenges is required.

Continuing to expand on the measurement of motivational regulation as described in the first goal of this study, emotion control, reflects student-veterans manipulation their emotional experiences in an effort to complete tasks in academia (Wolters, 1998, 2003a). Emotion control has consistently been investigated within the literature as being a necessity for countering negative properties in relation to performance (Spielberger & Vagg, 1995; Zeidnre, 1998); however, strategies used to manage one’s motivation in
relation to emotion’s has been less researched (Wolters, 1998, 2013a). Based on emotion control’s high internal reliability and weak to moderate correlations with all but one motivational regulation strategy (non-significant to environmental structuring) evidence suggests student-veterans are capable of manipulating their emotions and emotional reactions when facing motivational challenges.

Finally, the last of the new scales for motivational regulation, attention, accompanies the completion of the first goal. Attention, defined by Wolters (1998), entails a student’s effort to manipulate their attention level to allow the learner the ability to accomplish their academic task. Corno (1986) posits that one’s control over their attention when dealing with multiple and compete stimuli those that have effective manipulation of their attention are likely to succeed in accomplishment of their academic goals, even if measure of academic achievement doesn’t reflect perfection. Evidence present attention has connection with each of the remaining motivational regulation strategies; suggesting that as student-veterans call on strategies to regulation their motivation they are at the same time regulating their attention intensity in an effort to accomplish their academic goals.

**Scales Conceptual Link to Self-Regulated Learning.** This study would be remiss if it failed to note the motivational regulation strategy scales inherent connection to what it means to be a self-regulated learner. According to Zimmerman (1986, 1989) a self-regulated learner must metacognitively, behaviorally, and motivationally earnest in their learning process. More clearly explained to be a self-regulated learner a student-veteran must personally manage their own learning without the help of others. Many of
the presented motivational regulation strategies are found to have a conceptual link with social cognitive models of self-regulated learning. Environmental structuring, self-consequating, proximal goal setting, help seeking, regulation of mastery goals, regulation of performance-approach goals, and regulation of performance-avoidance goals all have a conceptual connection to the social cognitive model of self-regulated learning. Environmental structuring, self-consequating, proximal goal settings are all presented as motivational regulation strategies that aid in the commitment to accomplish academic goals (Wolters, 2003a; Zimmerman, 1989); regulations of mastery, performance-approach, and performance-avoidance goals all have a connection to the sub-process self-judgment; affording student-veteran the ability to determine their willingness to continue with the learning tasks.

**Motivational Regulation Strategies Differences**

Much like previous investigations, student-veterans were found to not employ or deploy all motivational regulation strategies on an equal basis. This study examined a repeated measures ANOVA that identified there were significant differences in the reported usage of the twelve motivational regulation strategies; paired samples t-tests were then conducted to better identify were the significant differences were. Student-veterans were found to utilize strategies that influenced their level of personal relevance, managing their environment, getting good grades, and their personal expectations most often; whereas, they would least often call on strategies that involved seeking out help from others (professors, teaching assistance, etc.), avoiding looking incompetent compared to their fellow classmates or faculty, and their intensity of attention when
facing motivational challenges. Further comparison of the frequency of usage of strategies that focused on the importance of performance versus mastery of course material was also found to have significant differences.

To address the first research question, which motivational regulation strategies are reported to be used most frequently by student-veterans, and the second part of the first hypothesis, student-veterans will exhibit high frequency use of four motivational regulation strategies (regulation of performance goal, regulation of value, environmental structuring, and self-consequating). Review of both the descriptive analyses as well as the paired samples t-tests indicate that student-veterans called on regulation of value, regulation of performance-approach goals, and environmental structuring the highest, in that order. Self-consequating was found to be the seventh most frequently used strategy of the twelve. Such findings suggest that student-veterans do exhibit a strong control over their motivation when challenged. Furthermore, these findings suggest that purposeful training to focusing on such strategies may indicate a potential increase in degree completion and course satisfaction by student-veterans.

Differences amongst the mean levels within this study were expected on the basis that student-veterans were not expected to utilize each of the investigated strategies with the same intensity. Much to the same degree that student-veterans were not expected to reported using all the learning strategies equally or that their reported motivational beliefs were equally distributed amongst the facets they were investigated on.

One explanation as to why student-veterans reported calling on strategies that focused on the regulation of value most frequently, while also calling on strategies such
as help seeking and regulation of performance-avoidance goals least frequently, may come from student-veterans being taught how to adapt to a situation and to utilize the resources around them to accomplish their mission. Student-veterans receive extensive training on focusing on muscle memory and training when facing potentially lethal situations in the field, illustrating an extremely personal relevance to why their training and preparation must be beyond reproach to ensure the safety of themselves and others around them (Angello & Smith, 2010). Such training focusing on the significance of adaption while in the field is the understanding that they may not have the ability to call upon others for assistance, leading to why student-veterans were found to utilize help seeking overwhelmingly less than any other strategies within this study. Furthermore, many times missions don’t progress as planned further indicating that completion of the task is more important than how it looks to others once the task is complete.

Another explanation as to why student-veterans may have reported calling on strategies that focus on personal relevance, getting good grades, or environmental considerations more often than other strategies may come from an increased understanding of procedural knowledge compared to declarative knowledge. Four of the top strategies reported all incorporate a knowledge of how to complete a task compared to much lesser reported strategies focusing on factual knowledge such as performance-avoidance goals. Unlike their traditional student counterparts, student-veterans are trained to have a hyper focus on task completion/accomplishment as a high priority; one could go as far as to say that student-veterans taking on completing their education as their new mission and failure of that mission is not an option.
A third explanation for the mean differences in reported strategies use is that student-veterans may call on experience or longevity when incorporating motivational regulation strategies during academics. Student-veterans may be knowledgeable about each of the twelve strategies within this study but have differing experiences of results associated given a strategy or grouping of strategies causing them to increase or decrease the frequency of use of such strategies. Put differently, student-veterans may rely on their conditional knowledge of each strategy when electing to incorporating them in their battle of motivational challenges. More specifically, student-veterans may determine the use of strategies such a proximal goal setting or regulation of mastery goals are more equipped at completing a motivational challenging academic task than strategies like emotion control or self-consequating. Furthermore, their conditional knowledge may aid in the understanding that certain strategies are more effective than others resulting in an increase in frequency of use overall. One facet that must be discussed is that not all conditional knowledge relating to these strategies’ effectiveness has to be based in accuracy or fact for it to take effect; student-veterans’ actual implementation of these twelve strategies may not come from a sensible belief, but should vary based on how effective one such strategy may be in the given situation.

A fourth explanation for the mean differences reported within this study is that student-veterans were asked to report their usage of strategies in the general context of motivational challenges within higher education. Student-veterans may have been found to call on various strategies differently if the education program were focused more on high risk/high fidelity contexts such as medical school, law enforcement academies, or
even their career trainings associated with their branch of service. In other words, student-veterans may have reported vastly different strategy use if the study investigated students involved in programs that could result in the catastrophic results if mistakes are experienced.

Finally, the last explanation for the mean differences reported within this study is that student-veterans may believe certain strategies (e.g., regulation of value) are easier to employ or more effective than other strategies (e.g., help seeking) when dealing with motivational challenges in a non-specific academic setting that was presented within this study. From this perspective, student-veterans focus on the connection to personal relevance compared to seeking assistance from professors, teaching assistances, or classmates because these strategies are believed to have a greater effectiveness on influencing their effort or persistence for accomplishing a generic academic task.

Unfortunately, the present study cannot address the plausibility of the provided explanations; such questions must be addressed in future examinations to determine if the finding of this study is indicative of a generalized pattern within motivational regulation. Furthermore, future investigations on motivational regulation, as well as student-veterans, should examine a more controlled academic setting such as: the academic situation, the motivational challenge, and the goal or task.

Motivational Regulation Strategies Relation to Other Factors of Self-Regulated Learning

Motivational Beliefs. In line with the second research goal of this study, is there a relationship between student-veterans use motivational regulation strategies and facets
of self-regulated learning such as motivational beliefs? Evidence presents a relationship between motivational regulation and factors within self-regulated learning. In addition to correlation coefficients, each of the six motivational beliefs within this study present evidence of statistically significant predictors of motivational regulation strategies; however, not always positively. Confirming the second research hypothesis that motivational regulation strategies correlate with motivational beliefs. One inference, supported by the evidence and existing research (Chow, 2011; Wang, 2013; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013), is that while motivational regulation strategies intent is to manage or manipulate a student’s motivation the use of such strategies is entrenched in their motivational beliefs.

Correlation coefficients provide evidence mastery goal orientations were found to have a statistically significant weak to moderate positive relationship with ten of the twelve strategies. Mastery goals orientation was found to be a predictor to nine of twelve motivational regulation strategies: regulation of value, regulation of performance-approach goals, regulation of performance-avoidance goals, regulation of mastery goals, regulation of situational interest, regulation of efficacy, environmental structuring, proximal goal setting, attention, and emotion control. One inference of the evidence and supported by previous investigations (Chow, 2011; Wang, 2013; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013) is that student-veterans that are more focused on mastering their education are more likely to utilize nearly any method they can to combat their motivational challenges.
Evidence presented within this study and previous investigations that focus on motivational beliefs centered on performance are not as easy to tease out. More specifically, due to changes within contemporary models of achievement motivation there has been a split of a single performance goals into two distinct factors performance-approach goal orientation (previously labeled performance goal orientation; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013) and performance-avoidance goal orientation (Anderman & Wolters, 2006). The current study is the first examination utilizing the most updated model for assessing student-veterans performance based motivational beliefs (Midgley, et al., 2000) on factors of motivational regulation strategies; Performance-approach goal orientations were found to be positively correlated to five strategies of motivational regulation. Furthermore, performance-avoidance goal orientations were only found to be correlated with three of the strategies for motivational regulation. Performance-approach goals orientation and performance-avoidance goals orientation present evidence as to be a significant predictor to two of the twelve motivational regulation strategies. Student-veterans that reported beliefs centralized on performance were found to only call on two motivational regulation strategies when they face challenges to their motivation. Individuals with higher performance-approach belief were found to call most often on regulation of mastery goals and, ironically, regulation of performance-avoidance goals. Whereas high level of performance-avoidance was found to relate to higher strategies for regulation of performance-approach goals and, unsurprisingly, regulation of performance-avoidance goals. Ultimately, student-veterans that were found to focus on validating their competence, or hiding it from others, were
found to call on motivational regulation strategies that focused on not looking incompetent and either getting good grades or improving their understanding of the material to master it. More specifically, student-veterans that reported a tendency to focus on getting good grades or validating their competences supported all previous investigations findings, excluding Wolter and Benzon (2013), that performance-approach goal orientation is positively related to many motivational regulation strategies; however, all studies, including this study, present evidence that performance focused motivational beliefs are not consistent measures of predictability for motivational regulation strategies (Chow, 2011; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). Evidence suggests that students-veterans that have performance focused motivational beliefs will only call on motivational regulation strategies that will help them either master the material, validate their competency of the material, or avoid displaying their incompetence’s.

Student-veterans perceptions of the value received through course content was found to have a weak to moderate relationship to four motivational regulation strategies. Student-veterans that were found to report high task value were also found to have a weak to moderate relation to three motivational regulation strategies; regulation of value, regulation of performance-approach goals, and regulation of mastery goals. Furthermore, task value was found to be a moderate predictor of three motivational regulation strategies. Unlike previous investigations (Wolters & Rosenthal, 2000; Wolters & Benzon, 2013), this study did not produce evidence that task value was a positive predictor; however, the negative beta coefficients present on two of the newly developed motivational regulation strategies; attention and emotion control. Illustrating that student-
veterans that believe focusing on the benefits they will experience from academia they are less likely to enlist strategies that regulate their academic expectations and their attention intensity but are more likely to call on emotional controls when facing motivational challenges.

Self-efficacy was found to have a weak to moderately positive relation with seven motivational regulation strategies. Evidence suggests, concurring with previous studies (Wolters & Rosenthal, 2000; Wolters & Benzon, 2013), student-veterans that evaluate their academic abilities and how they relate to their potential of accomplishing an academic task were found to report greater use of strategies that focus on their efforts to improve their mastery of the material they are learning, regulating their academic expectations, and regulating their goals. Furthermore, self-efficacy was found to be a significant predictor to the same three motivational regulation strategies.

Findings also provide some initial evidence in support of the relation between student-veterans’ motivational regulation and their belief that an academic outcome is tangent to their level of effort placed on that academic tasking (Pintrich & DeGroot, Motivational and self-regulated learning components of classroom academic performance, 1990). Control learning beliefs were found to have statistically weak to moderately positive relations with seven motivational regulation strategies. Furthermore, presenting evidence as a significant predictor to two of the twelve motivational regulation strategies. Student-veterans that have higher belief that the amount of effort they put into learning the academic task will resulting in a given outcome were found to report greater use of motivational regulation strategies that prevent themselves from looking
incompetent to others as well as regulating their expectations within the educational domain.

**Learning Strategies.** Also, in line with the second research objective, evidence presented highlights a relationship between motivational regulation and the learning strategies associated with self-regulated learning (Pintrich et al., 1991; 1993). In relation to both volitional (McCann & Turner, 2004) and self-regulated leaning perspectives (Zimmerman, 1986), students are expected to use learning strategies more frequently if they actively regulating their motivation compared to those students that fail to regulate their motivation within academia.

Bivariate correlations suggest student-veterans who reported more frequent usage of learning strategies (cognitive and metacognitive) were found to also report higher levels of all twelve motivational regulation strategies; such evidence remains consistent with previous investigations (Wolters, 1999; Wolters & Benzon, 2013). Presenting as strong positive correlation coefficients between these variables, the magnitude of the correlations was not so strong as to suggest a singular underlying construct; they are identified as related, yet conceptually distinct, facets of a broader self-regulated learning. Overall, these findings support the conceptual design that student-veterans found to report using learning strategies are also actively and purposefully working to sustain and manage their efforts and persistence for academic tasks.

Additionally, evidence presented addresses the research question as to whether learning strategies can predict motivational regulation strategies. Evidence presented via stepwise multiple regression analyses, resulted in cognitive strategy being included as a
predictor for ten of the twelve motivational regulation strategies. Whereas, metacognitive strategies were included in eight. Evidence presented was nearly identical to Wolters and Benzon (2013) results illustrating which motivational regulation strategies were predicted using metacognitive strategies. Moreover, each of the second steps were also found to account statistically significant to the unique variance increase when either one or both learning strategy was included in the analyses. However, based on the results of the regression analyses neither strategy was found to be a complete and total predictor of all the motivational regulation strategies examined in this study; this is due to the exclusion of the variable from analysis for failing to present as a statistically significant contributor to the unique variance of the motivational regulation strategy. All twelve motivational regulation strategies were found to have at least one of the two predictors included. Furthermore, confirming the second research hypothesis that motivational regulation strategies do in-fact correlate with factors of the over-arching concept of self-regulated learning. Additionally, evidence suggest student-veterans found reporting usage of learning strategies were also found regulating their motivational beliefs.

Student-veterans that utilized strategies for rehearsal, elaboration, and organization were found to be significant predictors of ten motivational regulation strategies; failing to predict on strategies for regulating efficacy and environmental structuring. Whereas, student-veterans that utilized metacognitive strategies were a predictor of eight of the twelve motivational regulation strategies; regulation of value, regulation of performance-avoidance goals, help seeking, and emotion control. Ultimately, these findings present a viable argument that motivational regulation is
distinctly different, yet a related facet of self-regulated learning. Not only do student-veterans have the skills to plan, monitor, and control their cognitive engagements within higher education they also present evidence that they enlist strategies to help actively manage their own motivational levels or to purposefully sustain or improve their effort or persistence within academia.

In a more general sense, current evidence supports the conceptual notion that motivational regulation fits as an important facet of self-regulated learning. Therefore, current models of self-regulated learning many need to undergo a conceptual revision to incorporate the inception of purposeful control or management affecting the effort and persistence one takes within academia.

**Motivational Regulation Strategies Relation to Academic Achievement**

**Academic Achievement.** Akin to many other studies conducted to evaluate the affects constructs have on academic achievement this study set out to identify if and what the relationship was between student-veterans reported usage of twelve motivational regulation strategies and their reported overall grade point average (GPA) within higher education. In addition to self-regulated learning factors, it is reasonable to suggest that students known to regulate their motivation would be expected to achieve higher levels of academic success compared to those that do not (Wolters, 1999; Zimmerman, 1990; Zimmerman & Martinez-Pons, 1986). However, much like other investigations of motivational regulation and academic achievement, evidence presented within this study (Table 4) provides conflicting support for this suggestion (Schwinger et al., 2009; Wolters, 1999; Wolters & Rosenthal, 2000). Bivariate coefficients were found to only
identify two motivational regulation strategies (regulation of mastery goals and proximal goal setting) as having any significant relationship to student-veterans academic achievement.

A multiple linear regression was calculated to predict student-veterans’ reported GPA based on the twelve motivational regulation strategies. However, not a single predictor was found to be statistically significant (Table 7). Moreover, regulation of mastery goals and proximal goal setting were the only two motivational regulation strategies close to loading statistically significant. However, these findings are not surprising when compared to a previous examination, Wolters (1999) found only one motivational regulation strategy as a predictor of students’ GPA. While not significant, one can still infer that student-veterans that value mastering the material they are learning as well as establishing specific goals within academia are important facets of helping a student-veteran regulate their motivation when facing challenges in higher education. Furthermore, these findings might suggest that student veterans knowledge regarding their academic achievement may not carry the same weight that it does compared to their more traditional counterparts. Hence, future research to further examine this relation should come in the form of collecting measures of student-veterans motivational regulation strategies and academic achievement through various stages of their academic career. Similarly, the significance of the program focused may also lead to greater understanding of the predictability GPA has on student-veterans. In other words, investigations centered around more course or degree program specific measures may
indicate a different level of predictability within the twelve motivational regulation strategies.

Limitations

The conclusions and implications of the results within this study must be considered while also acknowledging the limitations. The findings within this study are deemed as preliminary findings for many reasons such as sampling size, age of participants, instrumentation, assessment distribution methodology (digitally via social media versus physical form), scope of educational program, and motivational challenges presented within the study. Discussed in this section is the limitations identified within this study.

First, overall size of the sampling which only consists of 131 participants, that completed greater than 90 percent of the entire assessment, were subject to analyses. This is significant because 126 participants were identified as either not completing or missing greater than ten percent of their responses. Furthermore, 176 participants were identified as completing all but the fourth section; which consisted of the instrument for assessing motivational regulation strategies. In conjunction with the sample size, this study was the first to examine, on average, a much older student population than previous investigations on the construct of motivational regulation. Future investigations that can increase their sample size may lead to greater generalizability and the impact it has for the field of study. Furthermore, a larger sample size may also lead to analyses involving the impacts of factors such as branch affiliation, veteran education plan benefit, and education program to name a few. Furthermore, greater generalizability may lead to future
examinations of treatment methods developed and implemented to help students manage their motivation when facing challenges to it.

Second, data collection for this study was conducted at one single point in time instead of across multiple settings. This can be a limitation for multiple reasons. One, collecting student-veterans self-reported usage of the motivational regulation strategies, learning strategies, and their motivational beliefs only identifies their perspectives at that given time, whereas collection of these variables overtime affords for test-retest ability of the measures within this study. More specifically, data collected within this study does not identify if these strategies are used by student-veterans consistently overtime. Furthermore, data collection at a single point in time makes identifying changes within the sampling difficult to measure. Additionally, single point data collection makes it difficult to determine cause and effect; for example, does a differing level of student-veterans motivational beliefs cause them to use a differing amount of regulation strategies? Furthermore, collecting data at a single point in time prevents the examination of the internal validity of the measurements for motivational regulation strategies; which has yet be subjected to a study examining the test-retest reliability throughout the literature (Chow, 2011; Schwinger et al., 2007, 2009, 2012a, 2012b; Trang, 2015; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). Third, all measures distributed to assess and predict student-veterans’ use of motivational regulation strategies, motivational beliefs, learning strategies, and academic achievement were all based on self-reported data provided by participants within this study. Future examinations of motivational regulation may provide additional significance to the
findings if conducted through differing methodologies; such as focusing on differing time intervals, controlling for specific factors, or concentrating on specific educational tasks or programs. Think aloud protocols and unstructured interviews may affords the student to voice their mental status and analytic processes for decision making with regards to their use of motivational regulation strategies either concurrently while they take place or retrospectively (Winne, 2010).

In conjunction with the factor that all assessment materials were self-reported, the method to which all participants used to respond to the assessment should also be identified as a limitation; in this case the fourth limitation. All participants within this study responded through media platforms such as cell phones, tablets, laptops/computer, etc. that were able to access the measure via an online website (Qualtrics) compared to more traditional data collection methods such as physical forms. While this method of distribution was employed to afford potential participation from subjects that were geographically distant to the principal researcher as well as those that requested to participate at a later date; this method of data collection has to address the potential for response bias by participants. While this remains true for in-person physical forms, such bias’s may come in the form of responses that do not truly align with their true actions or beliefs related to the measure. In addition to response bias’s this methodology might explain the large number of participants that failed to complete the measurement. Nearly all participants that failed to complete, 90 percent or more, the study materials stopped at the beginning of the motivational regulation strategies instrument (section four).
A fifth limitation to this study may be test fatigue. All participants were distributed the assessment with all items in the same order, potentially leading to participants to loss focus later in the assessment as well as this may account for such a large attrition rate of participants in this study as they progressed from the measures of self-regulated learning (section three) onto the measures of motivational regulation strategies (section four). One suggestion for future investigations of motivational regulation is to implement randomization of the items to eliminate potential test fatigue of participants. Additionally, the implementation of multiple data collection points may also reduce the potential for test fatigue in future examinations.

In reference to current models of motivation an important limitation (sixth) to the findings in this study are that the instrument studied here cannot be viewed as assessing all potential facets of motivational regulation. Much like earlier investigations, attempts to expand Wolter’s (1998) earlier works on motivational regulation, suggest there are still remaining strategies that have not yet been examined by investigators. For example, none of the strategies present in this study reflect student-veterans’ actions to manage or intensify their determination to complete academic tasks, better known as willpower. While this investigation does grow the number of strategies examined to a total of twelve additional research is required to not only account for the remaining strategies first identified in Wolters’ (1998) early works, but also to attempt to unveil any latent factors of motional regulation that may not have been clear or evident in earlier studies.

Seventh, focusing on the circumstances surrounding motivation and the impact or influence motivational regulation strategies have on student-veterans. The nature of this
study was to focus on student-veterans self-reporting of strategy use while reflecting on higher education in general with no focus on course specifications, degree difficulty, or even risk factors. In this general sense of higher education, the climate and culture may not be as demanding as programs that focus on educating students that are going into high risk careers or have high stakes of competitiveness to move onto the next level of education. While previous researchers have identified the need to focus future research of motivational regulation on differing types of courses such as size differences or course levels (Wolters & Benzon, 2013). Additional research should also be focused on determining the strategies usage of student and student-veterans when they are involved in high risk (potential harm to self or others) or high stakes (high attrition) educational programs within and outside of the traditional higher education domains; for example, medical school student, first responder schools, aircraft maintain and operations schools, etc.). Investigations that not only examine a student’s motivation within the educational domain but also the effect of what they are learning may help better understand the construct of motivational regulation as well as self-regulated learning. Stated differently, the above-mentioned programs may pose differing threats to the student’s motivation which may highlight a potential shift in which motivational regulation strategies are called upon.

The eighth limitation to this study involves the lack of inclusion of another educational program provide through the Department of Veteran Affairs (VA) known as Chapter 33: Vocational Rehabilitation (more commonly known as: Voc Rehab). While Voc Rehab is a lessor used benefit than its Chapter 31: Post-9/11 GI Bill counterpart, this
benefit allows disabled student-veterans to attend higher education courses to assist them in becoming more gainfully employed. While many student-veterans utilize the Post 9/11 GI Bill student-veterans must be deemed disabled by the VA as well as determined either under-employed or unemployed to qualify for such benefits. A discussed previously (see Results), failure to incorporate this benefit was due to oversight; however, excluding the one example listed above no other participants within this study presented as having difficulty in continuing once they were informed to select “no benefit available or used” on the bases that the benefit was not listed during data collection. While this limitation did not prevent any participants from participating it prevented the potential for greater analyses to be conducted to determine if specific benefits had any effect on student-veterans measures of motivational regulation or self-regulated learning.

To accompany the focus on the significance of the education program being investigated a focus on specific motivational challenges would also be beneficial to the field of research. This study directed student-veterans to focus on the general factors of motivational challenges within higher education; these same findings may present themselves differently if the participants were required to think of a specific instance of when they faced motivational challenges and how they reacted to counteract it.

**Implications**

Findings within this study not only developed a deeper understand of how motivational regulation strategies related to facets of motivation and self-regulated learning, but they also exposed invaluable information regarding the student-veteran
population. This section will discuss the potential implications associated with findings as well as identify future directions these findings may go.

First, presented within this study is the mean usage for the motivational regulation strategy regulation of value; not only was it the most often reported of the strategies it was also found to be significantly correlated with most of the motivational and learning strategies factors recorded. What makes this finding so significant is that it reveals that student-veterans are found to focus on the importance of the material they are learning and how it effects themselves within academia. Furthermore, they put a high level of emphasis on learning because they understand the value that it can lead to in future endeavors. One explanation for why student-veterans utilize strategies that focus on the significance of the material they are learning may come from the fact that they have purposefully selected their degree programs because they see some form of value from the outcome; indicating they have a stronger sense of declarative, procedural, and conditional knowledge of their educational goal (Schraw & Moshman, 1995). Put another way, student-veterans tend to come to higher education with a specific degree or goal to accomplish either to further progress in their current career or to begin a new career direction. Whereas traditional students may not put as significant a value on course material if they are still trying to determine their life and educational goals. Furthermore, confounded with the increase in age; student-veterans may have gained conditional knowledge that connects the course, degree, or educational domain they are pursing as personally relevant causing them to utilize the regulation strategy more often than any other strategy of motivational regulation discussed in this study. To better understand if
this is the case additional investigations centered around this concept may help to lead to a clearer understanding; one such way to highlight and tease out this factor may be to focus on programs of education specifically as well as incorporating a component that examines the why a student-veteran has elected such program and what the value they see within it is. Development of a stronger understanding of why student-veterans put a significance on the relevance of the material may lead to potential intervention trainings to help influence their purpose for completing academic tasks when they face motivational challenges.

A second significant finding within this study was the reported average use student-veterans had on the motivational regulation strategy environmental structuring. While this strategy is tied for the second most often used strategy with regulation of performance-approach goals; environmental structuring centers on how the environment is controlled so that motivation can be manipulated to complete academic tasks. The importance with this finding is that it exposes that student-veterans are not only capable of identifying issues within their environment, but they may seek out ways to rectify them so they can accomplish their objective (Chow, 2011; Zimmerman & Martinez-Pons, 1986). How does this finding effect the student-veteran population? Identifying that student-veterans utilize strategies such as environmental structuring to accomplish their educational goals presents a compelling argument for the incorporation of environments conducive to learning. One recommendation that may be inferred from these findings is that institutions of higher learning may afford student-veterans more opportunity of
academic success if they designate or develop learning spaces that student-veterans can utilize when motivational challenges present themselves.

Finally, evidence presented within this study addresses a factor not having been addressed within the literature prior; the inclusion of students with the graduate school level (Chow, 2011; Schwinger et al, 2007, 2009, 2012a, 2012b; Wang, 2013; Wolters, 1998, 1999; Wolters & Rosenthal, 2000; Wolters & Benzon, 2013). While not explicitly tease out over the course of this study, data collected and analyzed presents findings that graduate level students are found to employ the same motivational regulation strategies compared to their primary and entry level college student counterparts.

Even though all twelve motivational regulations strategies were found to fall short of statistical significance in explain the variance with student-veterans academic achievement, this finding should still be discussed. Overall, the twelve motivational regulation strategies were found to account for 10 percent of student-veterans reported academic achievement scores; with all but one strategy resulting in a positive relation. Furthermore, student-veterans that centered on strategies associated with setting goals and mastering their learning material were found to have the strongest relationship with GPA. One may be able to infer that while the significance of the impact of how motivational regulation strategies impact student-veterans’ GPA is not overwhelming there is evidence to support that purposefully regulating their motivation can lead to a better academic achievement score (Shwinger et al., 2012a). More precisely presented, bivariate analyses expose a potentially innate relationship between strategies of motivational regulation and measures of academic achievement. Based on this notation,
development and implementation of training to assist student-veterans in the identification and usage of motivational regulation strategies may also lead to more academic success within the higher education domain.

Presiding evidence within this study not only identifies compelling evidence that student-veterans regulate their motivation, but that they are also self-regulated learners. Such findings indicate that student-veterans actively participate in their own learning processes within higher education. More descriptively student-veterans are found to be more adapt at initiated, monitoring, and then directing their education. Descriptive statistics and bivariate analyses presented within this study display evidence that student-veterans display traits of self-regulated learning (Pintrich et al. 1991, 1993; Zimmerman, 1990).

One example of evidence identified within this study is student-veterans’ use of learning strategies; not only were these strategies found to be related to significantly to all twelve motivational regulation strategies, but there were found to be significantly related amongst other facets of self-regulated learning (motivational beliefs). Identifying that student-veterans call upon learning strategies an in effort to influence their learning is significant, because it illustrates student-veterans have a purposeful control of their learning in this case through information processing (Wolters, 2003a). Furthermore, evidence within this study was found to identify student-veterans’ various levels of motivational beliefs. Much like the learning strategies, the measures associate with identifying student-veterans’ goal orientations, task value, control of learning, and self-efficacy were found to be related to each other and statistically significant in many cases.
One implication of these findings is that student-veterans present an argument that they purposefully responsible for the reciprocal nature amongst their goals and the feedback they receive during the learning process.
Appendix A-Motivational Beliefs and Learning Strategies (Administered)

Patterns of Adaptive Learning Scales
(Midgely et al., 1998, 2000)
Personal Achievement Goal Orientation

Mastery Goal Orientation (Revised) - 5 items
1. It’s important to me that I learn a lot of new concepts this year.
2. One of my goals in class is to learn as much as I can.
3. One of my goals is to master a lot of new skills this year.
4. It’s important to me that I thoroughly understand my class work.
5. It’s important to me that I improve my skills this year.

Performance-Approach Goal Orientation (Revised) - 5 items
6. It’s important to me that other students in my class think I am good at my class work.
7. One of my goals is to show others that I’m good at my class work.
8. One of my goals is to show others that class work is easy for me.
9. One of my goals is to look smart in comparison to the other students in my class.
10. It’s important to me that I look smart compared to others in my class.

Performance-Avoid Goal Orientation (Revised) – 4 items
11. It’s important to me that I don’t look stupid in class.
12. One of my goals is to keep others from thinking I’m not smart in class.
13. It’s important to me that my teacher doesn’t think I know less than others in class.
14. One of my goals in class is to avoid looking like I have trouble doing the work.

MSLQ Learning Strategies Scales
(Pintrich et al., 1991; 1993)
Motivation Scale

Task Value – 6 items
15. I think I will be able to use what I learn in my courses in other courses.
16. It is important for me to learn the course material in my classes.
17. I am very interested in the content area of my courses.
18. I think the course material in my classes are useful for me to learn.
19. I like the subject matter of my courses.
20. Understanding the subject matter of my courses is very important to me.

Control of Learning Beliefs- 4 items
21. If I study in appropriate ways, then I will be able to learn the material in my courses.
22. It is my own fault if I don’t learn the material in my courses.
23. If I try hard enough, then I will understand the course material.
24. If I don’t understand the course material, it is because I didn’t try hard enough.

**Self-Efficacy – 8 items**
25. I believe I will receive an excellent grade in my classes.
26. I’m certain I can understand the most difficult material presented in the readings for my courses.
27. I’m confident I can understand the basic concepts taught in my courses.
28. I’m confident I can understand the most complex material presented by the instructor in my courses.
29. I’m confident I can do an excellent job on the assignments and test in my courses.
30. I expect to do well in my classes.
31. I’m certain I can master the skills being taught in my classes.
32. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in my classes.

**MSLQ Learning Strategies Scales (Administered)**
(Pintrich et al., 1991; 1993)
Learning Strategies Scale

**Rehearsal – 4 items**
33. When I study for classes, I practice saying the material to myself over and over.
34. When studying for my courses, I read my class notes and the course readings over and over again.
35. I memorize key words to remind me of concepts in class.
36. I make lists of important items for my courses and memorize the lists.

**Elaboration – 6 items**
37. When I study for class, I pull together information from different sources, such as lectures, readings, and discussions.
38. I try to relate ideas in one subject to those in other courses whenever possible.
39. When reading for class, I try to relate the material to what I already know.
40. When I study for my courses, I write brief summaries of the main ideas from the readings and my class notes.
41. I try to understand the material in class by making connections between the readings and the concepts from the lectures.
42. I try to apply ideas from course readings in other class activities such as lecture and discussion.

**Organization – 4 items**
43. When I study the readings from my courses, I outline the material to help me organize my thoughts.
44. When I study for my courses, I go through the readings and my class notes and try to find the most important ideas.
45. I make simple charts, diagrams, or tables to help me organize course material.
46. When I study for my courses, I go over my class notes and make an outline of important concepts.

**Metacognitive Self-Regulation – 12 items**

47. During class time I often miss important points because I’m thinking of other things. **(Reverse Coded)**

48. When reading for my courses, I make up questions to help focus my reading.

49. When I become confused about something I’m reading for class, I go back and try to figure it out.

50. If course readings are difficult to understand, I change the way I read the material.

51. Before I study new course material thoroughly, I often skim it to see how it is organized.

52. I ask myself questions to make sure I understand the material I have been studying in class.

53. I try to change the way I study in order to fit the course requirements and the instructor’s teaching style.

54. I often find that I have been reading for class but don’t know what it was all about. **(Reverse Coded)**

55. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for my courses.

56. When studying for my courses I try to determine what concepts I don’t understand well.

57. When I study for class, I set goals for myself in order to direct my activities in each study period.

58. If I get confused taking notes in class, I make sure I sort it out afterwards.
Appendix B - Motivational Regulation Strategies (Administered)

Motivational Regulation Strategies Scales
(McCann & Garcia, 1999; Trang, 2015; Wolters, 1999; Wang, 2013)

Self-Consequating – 7 items
1. I make a deal with myself that if I get a certain amount of work done I can do something fun afterwards.
2. I promise myself some kind of reward if I get my reading or studying done.
3. I promise myself some kind of reward if I get the assignment done.
4. I promise myself I can do something I want later if I finish the assigned work now.
5. I tell myself I can do something I like later if right now I do the work I have to get done.
6. I set a goal for how much I need to study and promise myself a reward if I reach that goal.
7. I reward myself each time I get a portion of the work done until I’m finished.

Regulation of Mastery Self-Talk – 7 items
8. I tell myself that I should study just to learn as much as I can.
9. I tell myself that I should keep working just to learn as much as I can.
10. I persuade myself to keep at it just to see how much I can learn.
11. I convince myself to work hard just for the sake of learning.
12. I challenge myself to complete the work and learn as much as possible.
13. I think about trying to become good at what we are learning or doing.
14. I eat or drink something to make myself more awake and prepared to work.

Regulation of Efficacy – 9 items
15. I tell myself, “Get to it and concentrate, this is an important exam/paper/assignment.”
16. To feel like I am capable of mastering the material, I set short-term goals.
17. I tell myself that I will be able to understand and remember this course material.
18. I tell myself, “You can do this!”
19. In order to feel like I proceeded well, I approach the study material one step at a time.
20. In order to feel capable of handling the learning material, I break it into small chunks.
21. I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying.
22. I think about my strengths and the resources that I can draw upon to help me with difficult course material.
23. I tell myself I am a competent person.
24. I break down the work load into small segments so I get the feeling that I can handle it easier.
25. I tell myself that I can master the tasks if I set myself sub-goals.

**Regulation of Situational Interest – 8 items**
26. I think of a way to make the work seem enjoyable to complete.
27. I try to get myself to see how doing the work can be fun.
28. I try to make a game out of learning the material or completing the assignment.
29. I make studying more enjoyable by turning it into a game.
30. I make doing the work enjoyable by focusing on something about it that is fun.
31. I make an effort to connect what I’m learning to my own experiences.
32. I try to find ways that the material relates to my life.

**Environmental Structuring – 4 items**
33. I make sure I have as few distractions as possible.
34. I try to get rid of any distractions that are around me.
35. I change my surroundings so that it is easy to concentrate on the work.
36. I try to study at a time when I can be more focused.

**Regulation of Value – 6 items**
37. I try to make the material seem more useful by relating it to what I want to do in my life.
38. I tell myself that it is important to learn the material because I will need it later in life.
39. I try to connect the material with something I like doing or find interesting.
40. I make an effort to relate what we’re learning to my personal interests.
41. I try to make myself see how knowing the material is personally relevant.
42. I think up situations where it would be helpful for me to know the material or skill.

**Regulation of Performance Goals Self-Talk – 7 items**
43. I convince myself to keep working by thinking about getting good grades.
44. I tell myself that I need to keep studying to do well in this course.
45. I remind myself how important it is to do well on tests and assignments in this course.
46. I remind myself about how important it is to get good grades.
47. I remind myself how my grades will be affected if I don’t do my reading or studying.
48. I try to make myself work harder by thinking about getting good grades.
49. I push myself to see if I can do better than I have done before.

**Regulation of Performance-Avoidance Goals Self-Talk – 7 items**
50. I tell myself that I have to push myself more so I won’t be made fun of.
51. I imagine that my classmates make fun of my poor performance.
52. I think about how unpleasant it is to perform worse than others.
53. I think about doing better than other students in my class.
54. I tell myself that I should work at least as hard as other students.
55. I keep telling myself that I want to do better than others in my class.
56. I make myself work harder by comparing what I’m doing to what other students are doing.

**Emotion Regulation – 11 items**
57. When I have difficulty getting started on an academic task or become distracted, I count to 10 and then begin to studying again.
58. I call a friend from class and discuss the assignment or material with them.
59. *I listen to music (e.g., classical, soft, instrumental) to relax me when I need to study or if I become frustrated while studying.* **

60. When I have difficulty maintaining focus or beginning studying, I concentrate on my breathing, taking deep, slow steady breaths.

61. When frustrated about what I need to get done for my courses, I think about things that make me feel better.

62. When I get stressed about what I need to get done for my courses, I think about things that make me feel better.

63. I exercise for about a half hour before I begin studying to clear my head and help me get relaxed.

64. I usually meditate or use some form of relaxation technique so I am better able to concentrate on my studies.

65. I schedule regular studying hours with classmates so that I won’t get behind in my course work and feel stressed for putting studying off.

66. I schedule regular studying hours with classmates so that I won’t get behind in my course work and feel guilty for putting studying off.

67. In order to begin or resume studying, I take 5 to 10 minutes to clear my thoughts, and then begin studying.
Appendix C- Motivational Regulation Strategy Scales by Research

Measurement not administered within this study (listing of all previous measurements)

Wolters (1999)

**Interest Enhancement**
1. I make studying more enjoyable by turning it into a game.
2. I try to make a game out of learning the material or completing the assignment.
3. I think of a way to make the work seem interesting.
4. I try to get myself to see how doing the work can be fun.
5. I make doing schoolwork enjoyable by focusing on something about it that is fun.
6. I try to connect the material with something I like doing or find interesting.
7. I make an effort to connect what I’m learning to my own experiences.
8. I try to find ways that the material relates to my life.

**Performance Self-Talk**
1. I remind myself about how important it is to get good grades.
2. I try to make myself work harder by thinking about getting good grades.
3. I remind myself how important it is to do well on the tests and assignments in school.
4. I tell myself that I need to keep studying to do well in school.
5. I think about how my grade will be affected if I don’t do the assignment or reading.
6. I push myself to see if I can do better than I have done before.

**Self-Consequating**
1. I tell myself I can do something I like later if right now I do the work I have to get done. [SIC]
2. I make a deal with myself that if I get a certain amount of the work done I can do something fun afterwards.
3. I promise myself that I can do something I want later if I finish the assigned work now.
4. I promise myself some kind of reward if I get the assignment done.
5. I reward myself each time I get part of the work done until I’m finished.

**Mastery Self-Talk**
1. I persuade myself to work hard just for the sake of learning.
2. I persuade myself to keep at it just to see how much I can learn.
3. I challenge myself to complete the work and learn as much as possible.
4. I tell myself that I should keep working just to learn as much as I can.
5. I think about trying to become good at what we are learning or doing.
Environmental Control
1. I change my surroundings so that it is easy to concentrate on the work.
2. I try to study at a time when I can be more focused.
3. I try to get rid of any distractions that are around me.
4. I make sure I have as few distractions as possible.

Wolters and Benzon (2013)

Regulation of Value
1. I think up situations where it would be helpful for me to know the material of skills.
2. I try to make the material seem more useful by relating it to what I want to do in my life.
3. I make an effort to related what we’re learning to my personal interests.
4. I tell myself that it is important to learn the material because I will need it later in life.
5. I try to make myself see how knowing the material is personally relevant.

Regulation of Performance Goals
1. I remind myself about how important it is to get good grades.
2. I think about how my grade will be affected if I don’t do my reading or studying.
3. I remind myself how important it is to do well on the tests and assignments in this course.
4. I convince myself to keep working by thinking about getting good grades.
5. I tell myself that I need to keep studying to do well in this course.

Self-Consequating
1. I promise myself some kind of a reward if I get my reading or studying done.
2. I make a deal with myself that if I get a certain amount of the work done I can do something fun afterwards.
3. I tell myself I can do something I like later if right now I do the work I have do [sic] get done.
4. I set a goal for how much I need to study and promise myself a reward if I reach that goal.
5. I promise myself I can do something I want later if I finish the assigned work now.

Environmental Structuring
1. I try to get rid of any distractions that are around me.
2. I make sure I have as few distractions as possible.
3. I change my surroundings so that it is easy to concentrate on the work.
4. I try to study at a time when I can be more focused.

Regulation of Situational Interest
1. I making studying more enjoyable by turning it into a game.
2. I try to make a game out of learning the material or completing the assignment.
3. I make doing the work enjoyable by focusing on something about it that is fun.
4. I try to get myself to see how doing the work can be fun.
5. I think of a way to make the work seem enjoyable to complete.

Regulation of Mastery Goals
1. I persuade myself to keep at it just to see how much I can learn.
2. I tell myself that I should keep working just to learn as much as I can.
3. I challenge myself to complete the work and learn as much as possible.
4. I convince myself to work hard just for the sake of learning.
5. I tell myself that I should study just to learn as much as I can.
6. I eat or drink something to make myself more awake and prepared to work.

Schwinger et al. (2007)

Enhancement of Situational Interest
1. I make learning more pleasant for me by trying to arrange it playfully.
2. I try to invent a corresponding game if I have to learn or certain tasks.
3. I make myself look for ways to bring more fun to the tasks.
4. I carry out the tasks by highlighting the features that are fun.
5. I consider a way to make work more entertaining

Enhancement of Personal Significance
1. I look for connections between the tasks and my life as such.
2. I strive to relate the learning material to my own experiences.
3. I try to establish relations between work and my personal interests.

Mastery Self-Talk
1. I persuade myself to work intensely for the sake of learning.
2. I persuade myself to keep on learning in order to find out how much I can possibly learn.
3. I challenge myself to finish the task and thus learn a lot for me personally.
4. I tell myself that I should keep learning in order to learn as much as possible for me personally.

Performance-Approach Self-Talk
1. I call my attention to the fact of how important it is to obtain good grades.
2. I attempt to call myself to intense work by focusing on obtaining good grades.
3. I call my attention to the fact of how important it is to do well in tests and exams.
4. I tell myself that I should keep on learning if I wish to reach a good exam.
5. I think about how my grades will worsen if I refrain from learning.

Performance-Avoidance Self-Talk
1. I tell myself that I have to push me more if I do not want to make a fool of myself.
2. I imagine that my classmates make fun of my poor performance.
3. I think about that it would be very unpleasant for me to perform worse than the others.

Environmental Control
1. I consciously choose such learning times when I can concentrate especially well.
2. Prior to beginning with work, I strive to eliminate all possible distractions.
3. I make sure that distractions occur as seldom as possible.

Self-Consequating
1. I tell myself that after work I can do something nice, if I first keep on learning now.
2. I make a deal with myself saying that I will do something pleasant after I finish work.
3. I promise myself that, after work, I will do something that I like.
4. I put the prospect of any reward to myself in case I finish work.

Proximal Goal Setting
1. I break down the work load in small segments so I get the feeling that I can handle it more easily.
2. I approach work step-by-step in order to get the feeling that I proceed well.
3. I tell myself that I can master the tasks if I set myself sub goals.

Trang (2013)

**Regulation of Value**
1. I try to make the material seem more useful by relating it to what I want to do in my life.
2. I tell myself that it is important to learn the material because I will need it later in life.
3. I try to connect the material with something I like doing or find interesting.
4. I think up situations where it would be helpful for me to know the material or skills.
5. I try to make myself see how knowing the material is personally relevant.
6. I make an effort to relate what we’re learning to my personal interests.

**Regulation of Performance Goals**
1. I convince myself to keep working by thinking about getting good grades.
2. I tell myself that I need to keep studying to do well in this course.
3. I remind myself how important it is to do well on tests and assignments in this course.
4. I remind myself about how important it is to get good grades.
5. I remind myself I can do something I like later if right now I do the work I have to get done.

**Regulation of Performance-Avoidance Goals**
1. I tell myself that I have to push myself more so I won’t be made fun of.
2. I imagine that my classmates make fun of my poor performance.
3. I think about how unpleasant it is to perform worse than others.

**Regulation of Mastery Goals**
1. I tell myself that I should study just to learn as much as I can.
2. I tell myself that I should keep working just to learn as much as I can.
3. I persuade myself to keep at it just to see how much I can learn.
4. I convince myself to work hard just for the sake of learning.
5. I challenge myself to complete the work and learn as much as possible.

**Self-Consequating**
1. I make a deal with myself that if I get a certain amount of work done I can do something fun afterwards.
2. I promise myself some kind of reward if I get my reading or studying done.
3. I promise myself I can do something I want later if I finish the assigned work now.
4. I tell myself I can do something I like later if right now I do the work I have to get done.
5. I set a goal for how much I need to study and promise myself a reward if I reach that goal.

**Environmental Structuring**
1. I make sure I have as few distractions as possible.
2. I try to get rid of any distractions that are around me.
3. I change my surroundings so that it is easy to concentrate on the work.
4. I try to study at a time when I can be more focused.

**Regulation of Situational Interest**
1. I think of a way to make the work seem enjoyable to complete.
2. I try to get myself to see how doing the work can be fun.
3. I try to make a game out of the learning the material or completing the assignment.
4. I make studying more enjoyable by turning it into a game.
5. I make doing the work enjoyable by focusing on something about it that is fun.

**Regulation of Efficacy**
1. I tell myself, “Get to it and concentrate, this is an important exam/paper/assignment.”
2. To feel like I am capable of mastering the material, I set short-term goals.
3. I tell myself that I will be able to understand and remember this course material.
4. I tell myself, “You can do this!”
5. In order to feel like I proceeded well, I approach the study material one step at a time.
6. In order to feel capable of handling the learning material, I break it into small chunks.

**Wang (2013)**

**Mastery Self-Talk**
1. I tell myself that I should keep working just to learn as much as I can.
2. I persuade myself to keep at it just to see how much I can learn.
3. I challenge myself to complete the work and learn as much as possible.
4. I convince myself to work hard just for the sake of learning.
5. I tell myself that I should study just to learn as much as I can.
6. I think about trying to become good at what we are learning or doing.

**Performance/Extrinsic Self-Talk**
1. I remind myself about how important it is to get good grades.
2. I tell myself that I need to keep studying to do well in this course.
3. I convince myself to keep working by thinking about getting good grades.
4. I think about how my grade will be affected if I don’t do my reading or studying.
5. I remind myself how important it is to do well on the tests and assignments in this course.

**Performance/Relative Ability Self-Talk**
1. I think about doing better than other students in my class.
2. I tell myself that I should work at least as hard as other students.
3. I keep telling myself that I want to do better than others in my class.
4. I make myself work harder by comparing what I’m doing to what other students are doing.

**Interest Enhancement**
1. I make studying more enjoyable by turning it into a game.
2. I try to make a game out of learning the material or completing the assignment.
3. I try to get myself to see how doing the work can be fun.
4. I make doing the work enjoyable by focusing on something about it that is fun.
5. I think of a way to make the work seem enjoyable to complete.
**Relevance Enhancement**

1. I tell myself that it is important to learn the material because I will need it later in life.
2. I try to connect the material with something I like doing or find interesting.
3. I think up situations where it would be helpful for me to know the material or skills.
4. I try to make the material seem more useful by relating it to what I want to do in my life.
5. I try to make myself see how knowing the material is personally relevant.
6. I make an effort to relate what we’re learning to my personal interests

**Efficacy Enhancement**

1. I tell myself that I will be able to understand and remember this course material.
2. I tell myself, “I can do this!”
3. I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying.
4. I think about my strengths and the resources that I can draw upon to help me with difficult course material.
5. I tell myself I am a competent person.
References


Biography

Bryan Prewitt graduated from Manassas Park High School, Manassas Park, Virginia, in 2005. He received his Bachelor of Science from George Mason University in 2015. Bryan serviced in the United States Air Force, as an Aerospace Maintenance Craftsman on the C-130 airframe, from April 2006 to 2013; successfully completing five overseas deployment in support of both Operation Iraqi Freedom (OIF) and Operation Enduring Freedom.