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Resilience and Self-Control among Georgia Southern Students: A Comparative Study between ROTC Students and NonROTC Students

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in the *Psychology Department*.

By

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Under the mentorship of *Dr. Amy Hackney*

ABSTRACT

As American soldiers are coming home from fighting the War on Terror, we are seeing an increase in soldiers suffering from Post-Traumatic Stress Disorder (PTSD). Recently, there has been a shift from medical interventions to help those affected cope with the disorder, to prevention. The military has begun implementing resilience training programs for officers and leaders. These programs are designed to shed light on resilience and attempt to increase resilience. For instance, the Army's Master Resilience Training program is designed to teach officers about resilience and leadership in a way that they can teach this information to their unit. Cadets in the ROTC program at a college or university complete specific courses and training to prepare for their position as officers upon graduation. Many of these courses focus on leadership and military knowledge. The purpose of this study was to explore resilience and self-control among ROTC cadets and nonROTC students at Georgia Southern University.

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Resilience and Self-Control among Georgia Southern Students: A Comparative Study between ROTC Students and NonROTC Students

As soldiers of the United States military are gradually coming home from fighting the War on Terror in Iraq and Afghanistan, America is seeing an increase in Post-Traumatic Stress Disorder. Researchers are investigating ways to prevent this disorder, especially among military populations. Resilience has been identified as a key component of psychological wellbeing, which is related to a decrease in PTSD (Meredith et al., 2011). There are several definitions of resilience, but most definitions of resilience share commonalities. For the purpose of this study, we will adopt the definition given by Meredith, et al. (2011, p. 3): "Resilience is the capacity to adapt successfully in the presence of risk and adversity."

Military personnel have begun specific training programs and courses for their soldiers in hopes of promoting resilience. The difference between traditional medical interventions and resilience training programs is that the resilience training programs focus on prevention as opposed to intervention (Meredith et al., 2011). Ideally, with the emphasis on prevention, the need for intervention will decrease. These training courses are mostly designed for the officers in the military, as they are the leaders that others turn to for advice and direction.

Many military officers have worked their way through a college Reserve Officer's Training Corps (ROTC) program. This program is designed to prepare soldiers to be effective leaders in the military and combines class lecture and

hands-on field work. This program is designed to increase leadership skills, military skills and knowledge, and career skills (Today's Military, 2014).

Because cadets in a college ROTC program contract to become officers of the US military upon graduation, these individuals need to be resilient. These individuals are typically young and new to military life, and are expected to effectively lead a team of others. ROTC students are required to complete courses specific to military skills and training, but do they complete any courses that increase resilience? One of the purposes of this study was to identify if there were higher levels of resilience in Georgia Southern University's ROTC cadets compared to nonROTC students, and if there are any specific courses that are related to higher levels of resilience.

It was recognized however, that ROTC cadets may not have yet experienced the high levels of risk and adversity that are a necessary component for resilience. A psychological factor that is related to resilience but that does not require the experience of risk and adversity is self-control (Wills & Bantum, 2012). Therefore a second purpose of the current study was to identify if there are higher levels of self-control in ROTC cadets compared to nonROTC students, and if there are any specific courses that are related to higher levels of self-control.

A third purpose of this study was to experimentally test whether higher levels of resilience or self-control would serve to buffer the negative effects of a cognitively depleting task. The paper begins with a review of the literature on resilience and its importance to military members, followed by a review of ROTC

cadet training and the importance of self-control. We then describe the results of an experiment that tested the hypotheses that ROTC cadets would be buffered from the negative effects of a cognitively depleting task compared to nonROTC students because of higher levels of resilience and self-control.

Resilience

The concept of psychological resiliency was rooted primarily in developmental psychology and childhood psychopathy when research revealed that children were developing normally despite being reared in extreme poverty (Meredith et al., 2011). Although there is not a universal definition of psychological resilience, most definitions share core features. In general, there are two aspects of resilience. One aspect focuses on one's ability to return to a previous mental health state after a traumatic event, while the other emphasizes one's ability to achieve and maintain a better psychological mental state after adversity. The Latin roots of resilience, *salire* means "to jump" and *resilere* means "to spring back" offer a stricter definition to guide research (McBride, 2011). For the purpose of this study, we will adopt Meredith et al.'s definition of resilience, "Resilience is the capacity to adapt successfully in the presence of risk and adversity" (2011, p. 3).

There are four factors that have been identified that promote resilience. These factors include the individual, family, unit, and community. Within these four factors, there are twenty subcategories that promote resilience. The identified subcategories for individual factors include positive coping, positive affect, positive thinking, realism, behavior control, physical fitness, and altruism.

Factors at the family level that influence resilience are emotional ties, communication, support, closeness, nurturing, and adaptability. Factors at the unit level that influence resilience are positive command climate, teamwork, and cohesion, and factors at the community level that influence resilience are belongingness, cohesion, connectedness, and collective efficacy (Meredith et al., 2011).

The military community is currently undergoing a shift of thinking in regards to psychological health and the seeking of psychological assistance when problems arise. The U.S. Army, specifically, is trying to increase awareness that psychological fitness is just as important for soldiers as is physical fitness. Currently, there is a traditional view that seeking help is weak. Members of the Army are working to change this thinking by promoting psychological “strength” training.

Military Training and Resilience

Psychological resilience is of great importance to military members and their families. Not only do active military members need to be physically fit for duty, they need to be mentally fit as well. Military families also benefit from psychological resilience as their loved ones are away from home.

Several resilience programs have been made to promote resilience among military members. For example, the Army has begun implementing a program called the Comprehensive Soldier Fitness (CSF) program. The program is designed to develop resilience through five dimensions of physical, social,

emotional, spiritual, and family health (Casey, 2011). The program uses teaching techniques through the classroom and the internet. This program adapts to reflect lessons that fit each individual's resilience level.

The program consists of four components. The first component is an online self-assessment to identify personal resilience strengths, the Global Assessment Tool (GAT). The second component is a series of online self-help modules based upon the GAT scores to provide instruction in the areas that need improvement. The third component is the training of master resilience trainers, which is designed to be taught down to the unit level. The final component of this program is mandatory resilience training at every Army leader development school (Casey, 2011).

The Master Resilience Training program (MRT) is partially modeled after the Penn Resilience Program (PRP) from the University of Pennsylvania and the program APEX. The PRP was aimed for children aged from 9-13 years, while the APEX program has a preventative focus on depression and anxiety among college students. When creating the Master Resilience Program, researchers focused on the elements of the PRP and APEX program that focus on reducing depression and anxiety, among other negative traits (Reivich, Seligman, & McBride, 2011).

In 2009, the University of Pennsylvania and the U.S. Army collaborated to modify the PRP for a military population. The first program started in November of 2009 in Philadelphia. The MRT course is ten days in length; the first seven and

a half days focus on learning skills and concepts of resilience, and the last two and a half days focus on how to teach these skills to other soldiers.

There are four modules that are taught throughout the course. The first module explains resilience, the six 'core competencies' that have been targeted to build resilience, and how these competencies relate to the ability to be effective leaders. These "core competencies" include self-awareness, self-regulation, optimism, mental agility, character strength, and connection. The second module discusses skills to increase the competencies previously learned. This module teaches soldiers to distinguish between an event that caused certain thinking, their thoughts about the event, and the consequences of these thoughts and behaviors after the event. Soldiers also learn skills to identify thinking patterns that can either help them or hurt them, how to identify when their deeply held beliefs and core values are guiding emotion, how to handle their energy efficiently, how to effectively and accurately solve problems, how to manage and minimize catastrophic thinking, and to avoid focusing on negative thoughts, and how to acknowledge gratitude (Reivich, Marin, & McBride, 2011). The third module focuses on teaching soldiers how to find strengths in themselves and also among others. Having the ability to find strengths in others, merges into the fourth module which focuses on strengthening relationships between soldiers and family.

The ninth day of the Master Resilience Training is the sustainment portion of the course. It focuses on reinforcing the skills previously learned and how to apply them to the military setting. The last day teaches the enhancement

component which includes skills introduced by sports psychology such as mental skills foundations, building confidence, goal setting, attention control, energy management, and imagery (McBride, 2011).

ROTC Programs

The original intent of this thesis was to examine resilience in military members, but due to difficulties accessing this population, we conducted this study with Georgia Southern University's ROTC cadets.

College ROTC programs complete specific courses that teach management and leadership skills. These cadets also complete various training activities that are hands-on and in the field. The training activities are a chance for the cadets to apply the skills and knowledge they have learned in class. ROTC cadets sign a contract agreeing they will join the military as an officer upon graduation from the program. These cadets also need high levels of resilience and self-control as they will be leaders in the military once they have graduated. ROTC students have likely not faced the risk and adversity that is a necessary component of demonstrating resilience. A psychological factor that is related to resilience but that does not require the experience of risk and adversity is self-control (Wills & Bantum, 2012).

Self-control

Self-control has been identified as a component of resilience at the individual level (Meredith et al., 2011) Self-control, or self-regulation, is an aspect of behavioral control. The term self-control is often thought of as willpower and

the ability to control impulses; examples of self-control include changing emotions, continuing a task even when wanting to stop, and resisting impulses. Baumeister, Vohs, and Tice (2007) define self-control as “the capacity for altering one’s own responses, especially to bring them into line with standards such as ideals, values, morals, and social expectations, and to support the pursuit of long-term goals” (p. 351). Tangney, Baumeister, and Boone (2004) identified links between high self-control and positive characteristics. Task performance was found to be positively correlated with self-control in that participants that scored higher in a measure of self-control measure reported having a higher grade point average. Results also showed that participants scoring higher in self-control were less likely to have eating disorders or problems with drugs or alcohol compared to participants scoring low in self-control. Thus self-control is a positive psychological variable that is a component of resilience and is related to positive coping techniques when faced with stressors.

The energy model of self-control has been supported through research consistently since the 1990s (Baumeister, Vohs, & Tice, 2007). This model suggests that self-control can be depleted after strenuous tasks that require self-control. Researchers have likened self-control to a muscle in that self-control is believed to weaken in the short term from demanding tasks. However, repeated acts of self-control, over time, are thought to increase one’s ability to engage in self-control in the future, much as a muscle becomes stronger over time after repeated workouts. Both the energy model and strength model suggest that self-regulation is a finite resource that diminishes through tasks. This model also

suggests practice does increase an individual's ability to maintain or regulate one's self-control resources.

According to the energy model of self-control, resisting impulses or temptations during the first task will cause people to be less persistent on a challenging subsequent task. This is due to self-control being diminished during the first task, which would be needed to perform or continue during the second. There are several tasks that can deplete the pool of self-regulation such as controlling impulses, regulating emotions, resisting temptation, making decisions, controlling thoughts, and regulating performance. Researchers believe self-control occurs across seven different domains: controlling attention, controlling emotions, controlling impulses, controlling thought, cognitive processing, choice and volition, and social processing (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Researchers have used the dual-task paradigm to test the energy model of self-control. In this task, participants are randomly assigned to either perform a self-control task or to complete a similar neutral task that is not demanding of self-control. After completion of this task, participants complete a second, unrelated task. If self-control has been depleted by the first experimental task, then those participants will have worse performance on the second task. This decrease in self-control on subsequent tasks is referred to as ego-depletion (Baumeister, Bratslavsky, Muraven, & Tice, (1998). Experimental tests have supported that executive function is a limited resource (Schmeichel, 2007).

In Schmeichel's study (experiment two), participants were randomly assigned to either a control or experimental condition. The first task to be

completed was a writing task. Participants in the control condition did not have any restrictions on their writing, while participants in the experimental condition were instructed to not use the letters *a* or *n*. The experimenter asked all participants to stop writing after six minutes and a mood measure, the BMIS, was then administered. Participants then completed a memory test. Single digits were shown on a screen for three seconds; after a set of three, five, seven, or nine digits were shown, participants were asked to recall the digits. After half of the sets, participants were asked to recall the digits in the order they saw them. For the other half of the sets, participants were asked to recall the digits in reverse order. After this task, participants completed a follow-up questionnaire. This questionnaire assessed the difficulty of the writing task and memory task (Schmeichel, 2007).

Schmeichel's results support the strength model of self-control. Participants in the experimental writing condition, performed worse than their control group counterparts on the memory task. Forward-span was not as affected by the writing tasks; however, reverse-span was significantly affected by the writing tasks. Participants in the experimental condition that were required to inhibit using letters *a* or *n* consistently performed worse during reverse order recall. This study suggests that inhibiting tendencies impairs later attempts concerning working memory (Schmeichel, 2007).

Summary and Study Overview

As established, resilience is one's ability to bounce back after a traumatic event. The United States military has begun shifting focus from intervention to

prevention to reduce the negative effects of the military lifestyle. These prevention programs include Master Resilience Training. This training teaches skills that promote resilience and instructs members how to teach these skills to others members of their unit. Cadets in a college ROTC program are contracted to join a military branch as an officer once they graduate. These cadets also need to be trained in resilience skills so they can effectively lead and promote resilience within the group. Self-control has also been identified as a factor that promotes resilience at the individual level.

Cognitively depleting tasks result in problems with executive function. After experiencing cognitive depletion, individuals perform worse on subsequent, unrelated tasks. However, if an individual is high in resilience and self-control, the cognitively depleting task may affect them less than those not high in these characteristics. It is proposed that ROTC members may have higher levels of self-control and resilience and self-control may buffer the negative effects of a cognitively depleting task.

Hypotheses

The current study's hypotheses were as follows:

1. Participants with high cognitive depletion would perform worse than participants with low depletion on a difficult math test. Previous research has shown resisting the urge to use the letters *a* or *n* in story writing to be cognitively depleting (Schmeichel, 2007). Following the energy model of self-control, resisting the urge to use these everyday letters draws from the limited pool of self-control. Participants with high

depletion would therefore have less self-control and would perform worse on a subsequent difficult math test.

2. ROTC members would have higher scores on resilience and self-control than nonROTC members. ROTC specific courses and training programs are designed to increase leadership and management skills (Today's Military, 2014). A leader needs to have aspects of resilience and exhibit self-control; therefore the courses catering to these individuals should incorporate and promote resilience. Participants that have completed ROTC courses and training would have more knowledge of resilience and self-control, yielding higher scores in a measure of resilience and self-control.
3. ROTC members with high cognitive depletion would perform better on the math test by answering more questions correctly than the nonROTC participants with high depletion. The training and courses that ROTC participants complete promote leadership and management skills, such as management of self-control. Research has suggested that individuals are capable of reserving self-control (Baumeister, Vohs, & Tice, 2007). This research suggests self-control is conservable and participants are capable of reserving self-control when they are aware that more tasks will follow. In this study, participants were not aware of any specific tasks or measures they would be asked to complete, but knew the writing task was not the only task for the study. Having military ROTC training and courses which

promote leadership and management skills was expected to increase these participants' ability to conserve self-control and perform better on the subsequent math test.

4. The effect of a high cognitively depleting task would be mediated by resilience. It was predicted that ROTC members with high depletion would exhibit a higher performance than nonROTC members on the math test via their levels of resilience.
5. The effect of a high cognitively depleting task would be mediated by self-control. It was predicted that ROTC members with high depletion would exhibit a higher performance than nonROTC members on the math test via their levels of self-control.

METHOD

Design

This study was a 2 (cognitive depletion: high vs. low) x 2 (ROTC membership: ROTC member vs. nonROTC member) between-subjects experiment. Participants were randomly assigned to one of the two cognitive depletion conditions. The dependent variable was performance on a difficult math test.

Participants

Ninety-two undergraduate students participated in this study. NonROTC participants were recruited through the psychology department's online SONA

system. These participants were undergraduate psychology students who agreed to participate for class credit or extra credit. ROTC participants were recruited through a senior undergraduate ROTC member. ROTC members volunteered to participate in the study and did not receive any class credit or extra credit for completing the survey. Six participants were removed from the analyses because they did not follow the directions for the high cognitively depleting writing task. This resulted in usable data from 86 participants. Of these 86 participants, there were 27 women (31%) and 59 men (69%). The average age of the participants was 19.20 ($SD = 1.42$). The sample included 48 European Americans, 27 African Americans, 3 Latino(a)s, 1 Asian American, 1 Native American, and 4 participants who indicated other as race.

Stimuli and Measures

Writing Task. (See Appendix A) A writing task (Schmeichel, 2007) was used to manipulate cognitive depletion. Participants were instructed to write a story about a recent trip. Participants randomly assigned to the low cognitive depletion control group had no restraints for their story. Participants randomly assigned to the high cognitive depletion experimental group were instructed not to use the letters *a* or *n* in the writing of the story. According to Schmeichel (2007), participants in the experimental condition would use self-control to not use the letters throughout the task and would be forced to think of new ways to express their ideas.

Math Test. (See Appendix B) A difficult math test served as the dependent variable in this study. The math test consisted of 24 questions and

participants had ten minutes to complete the test. The questions from the math test were items used by Jamieson & Harkins (2011). The math questions were items from a Graduate Record Examination. Following Jamieson & Harkins, the math questions were scored using the number participants correctly answered. Participants were not penalized for leaving questions blank, but were encouraged to answer as many as they could.

Brief Self-Control Scale. (See Appendix C) Tangey, Baumeister, & Boone's (2004) brief self-control scale measures five domains of self-control with 13 items: task performance, impulse behaviors, psychological adjustment, interpersonal relationships, and moral emotions. The answers are on a measurement scale with 1 being "not at all" to 5 being "very much". Questions included items such as "*I am good at resisting temptation,*" "*I am lazy,*" and "*I am able to work effectively toward long term goals.*"

The validity and reliability of this brief measure has been established. The Brief Self-Control Scale was highly correlated with a long version self-control measure. Internal consistency across two studies was .83 and .85 (Tangney, Baumeister, & Boone, 2004). Test-retest reliability was also measured by conducting a third study three weeks later (.87). In the current sample, Cronbach's alpha was .76.

Connor-Davidson Resilience Scale. Connor and Davidson (2003) developed a scale to assess resiliency using the resilience model. This model suggests resiliency is an individual's attempt to maintain homeostasis, "one

adapts body, mind, and spirit to current life circumstances” (Connor & Davidson, 2003, p. 76).

The Connor-Davidson Resilience Scale, CD-RISC, is comprised of 25 items. The content was drawn from several sources including questions assessing hardiness, role of faith and beliefs, effects of stress, coping mechanisms, and self-esteem. Responses to these questions are along a 5-point scale: (0) not true at all, (1) rarely true, (2) sometimes true, (3) often true, (4) and true nearly all of the time. Participants are requested to respond how they felt over the past month. Scores can range from 0-100, with higher scores reflecting higher resilience (Connor and Davidson, 2003).

Connor and Davidson used the CD-RISC with several population samples including: a random-digit based general population sample (group 1), primary care patients (group 2), psychiatric outpatients in private practice (group 3), subjects in a study of generalized anxiety disorder (group 4), and subjects in two clinical trials of PTSD (groups 5 and 6) (Connor & Davidson, 2003). Using several population samples allowed researchers to gather information and generalize reference scores for the new scale. This study was also designed to test the reliability and validity of the scale. Researchers used other scales and measures to find a correlation with the CD-RISC scale. Other scales used include: measures of hardiness (Kobasa Hardiness Scale), perceived stress (Perceived Stress Scale), and stress vulnerability (Stress Vulnerability Scale) (Connor and Davidson, 2003). In this particular study, Cronbach’s α for the full scale was 0.89 for the general population sample. Test-retest reliability was also

assessed because this is a new scale. Researchers used 24 participants from clinical trials of the generalized anxiety disorder group (4) and with PTSD (5). Participants completed the scale twice, and mean scores showed a high level of agreement for both times. Connor and Davidson also found convergent validity among the CD-RISC scores and the Kobasa hardiness measure and the Sheehan Stress Vulnerability Scale which suggests the CD-RISC is measuring the desired aspects of resilience. In the current sample, Cronbach's alpha was .92.

Motivation and Manipulation Check. (See Appendix D) Participants completed a seven question motivation and manipulation check. Responses were on a six point scale ranging from: strongly disagree to strongly agree. Questions were designed to determine if participants felt engaged or motivated during the study. This check also asked if participants felt they followed instructions during the writing portion of the study. Questions regarding perceived difficulty level were also included in this questionnaire.

Demographics Questionnaire. (See Appendix E) The demographics questionnaire asked questions about the participant's sex, race or ethnicity, age, year in school, SAT verbal and mathematical scores, military membership, and ROTC membership. If participants responded that they were a military member, they were then asked what branch of the military they are a member of. If participants answered that they were in the ROTC program, they were then asked to list any classes or training they have specific to the ROTC program.

Procedure for nonROTC participants

First, participants were greeted and asked to sign in as they entered the laboratory room in which the study took place. They were given an informed consent form and asked to read over the form, sign, date, and return it if they wish to participate in the study. Once all informed consent forms were collected, participants were informed the study was analyzing characteristics among college students. They were informed they would be given a packet of materials to complete, but to wait until the experimenter instructed them to stop. Participants were informed that the experimenter would be asking them to stop at various times and to follow the directions the best that they could.

Participants were randomly assigned to the free writing condition (low cognitive depletion) or the controlled writing condition (high cognitive depletion). All participants were randomly given a packet with the tasks and measures used for the study. The first task participants completed was the writing task. Participants were given a blank sheet of paper and were asked to write about a recent trip that they had taken; the trip could be one that was taken out of town or a trip simply to the grocery store. Participants in the free writing condition did not have any restrictions on their writing. The experimental writing participants had restrictions on their writing; they were instructed to not use the letters *a* or *n* anywhere in their story. This method of exercising self-control has been used to demonstrate a decrease in cognitive effort (Schmeichel, 2007). All participants were allotted six minutes to write their story. Participants did not know the time limit. After the six minutes, participants were then instructed to stop writing and move to the next task. The next task was a worksheet of difficult GRE

mathematical problems. All participants were asked not to use a calculator and were given ten minutes to complete as many math problems as they could. Participants were also not aware that they only had ten minutes to complete this portion of the packet. Math tests have previously been used to assess how cognitively depleted participants are after an initial task (Vohs, Baumeister, Twenge, Schmeichel, Tice, & Crocker, 2005).

Participants were told that they should try to get as many math items correct as possible, so they should do their best. Participants were instructed to stop and move on to the remaining questionnaires in the packet once the ten minutes was over. They were informed that when they had finished all other measures in the packet, they could return the packet and leave the testing area.

The next measure participants completed was the Trait Self-Control Scale to measure trait self-control, followed by the Connor-Davidson Resilience Scale measuring resilience. Participants were then asked to complete the motivation check and manipulation check measure. The last task for participants was the demographics questionnaire. Participants returned their packets upon completion and were thanked for participating in this study.

Procedure for ROTC members

First, participants were asked to sit at the tables under the Recreation Pavilion. This session of the study took place outside, after all participants completed a lab exercise with their ROTC company course. Participants were divided by company and another experimenter who was an ROTC member

helped administer the study. ROTC participants were given the same instructions as the nonROTC students. ROTC participants were randomly given packets, which assigned them to either the control or experimental condition. The packets contained the same set of materials and participants were allowed the same amount of time on each task as the nonROTC participants. Upon completion, participants returned the packet to their experimenter, thanked, and exited the area.

Results

Preliminary Analyses

A correlational test was conducted to determine if resilience and self-control were correlated. As expected, there was a significant positive correlation between resilience and self-control, $r = .34$, $p = .002$. An independent samples t -test was conducted as a manipulation and motivation check on the writing task. Participants in the experimental, high depletion condition ($M = 4.62$, $SD = 1.59$) found the task harder than those in the control, low depletion condition ($M = 1.78$, $SD = .94$), $t(90) = -10.78$, $p < .001$.

Hypotheses Testing

Independent samples t -tests were conducted to analyze participants' scores on the CD-RISC and Trait Self-Control measure. Contrary to prediction, ROTC members ($M = 78.13$, $SD = 14.69$) did not significantly score higher in resilience on the CD-RISC scale than nonROTC members ($M = 73.91$, $SD = 13.02$), $t(83) = 1.40$, $p = .17$, $d = -0.29$. Also contrary to prediction, ROTC

members ($M = 2.72$, $SD = .65$) did not significantly score higher on self-control than nonROTC members ($M = 2.91$, $SD = .65$), $t(83) = -1.33$, $p = .19$, $d = 0.30$.

A series of 2(Cognitive depletion: low vs. high) x 2 (student type: ROTC vs. not ROTC) ANOVAs was conducted on number of items attempted on the math test and number of items correct. Results showed a main effect of ROTC membership on the number of math questions attempted. ROTC members ($M = 17.56$, $SD = 6.56$) attempted more math problems than did nonROTC members ($M = 13.09$, $SD = 4.17$), $F(1,82) = 8.76$, $p = .004$, $\eta_{\text{par}}^2 = .10$. There was not a significant main effect of cognitive depletion on the number of math items attempted on the math test, with participants with low depletion ($M = 15.79$, $SD = 6.03$) attempting a similar amount of problems as participants with high depletion ($M = 14.04$, $SD = 5.39$), $F(1,82) = 1.27$, $p = .26$, $\eta_{\text{par}}^2 = .01$. The test of the interaction between cognitive depletion and student membership was also nonsignificant, $F(1,82) = 1.53$, $p = .22$, $\eta_{\text{par}}^2 = .02$.

A second ANOVA was conducted to analyze the number of math question answered correctly. Results did not show a main effect of ROTC membership on the number of math questions answered correctly. ROTC members ($M = 4.41$, $SD = 2.36$) correctly answered math problems similarly to nonROTC members ($M = 3.67$, $SD = 2.06$), $F(1,82) = 1.96$, $p = .16$, $\eta_{\text{par}}^2 = .02$. Contrary to the hypotheses, there was also no significant main effect of cognitive depletion on the number of math items correctly answered on the math test, with participants with low depletion ($M = 4.12$, $SD = 2.33$) correctly answering a similar amount of problems as participants with high depletion ($M = 3.82$, $SD = 2.0$), $F(1,82) = .16$,

$p = .69$, $\eta_{\text{par}}^2 = .002$. Contrary to the hypotheses, the test of the interaction between cognitive depletion and student membership was also nonsignificant, $F(1,82) = .001$, $p = .98$, $\eta_{\text{par}}^2 = .001$.

A third ANOVA was conducted to investigate the number of items proportionally answered correctly. Results also did not show a significant main effect of ROTC membership on the proportion of math items answered correctly in comparison to the number of items attempted. ROTC members ($M = .27$, $SD = .15$) got a similar proportion of math items correct as nonROTC members ($M = .28$, $SD = .15$), $F(1, 82) = .01$, $p = .92$, $\eta_{\text{par}}^2 = .001$. There was also no significant main effect of cognitive depletion on proportion correct, with participants with low depletion ($M = .28$, $SD = .16$) getting a similar proportion correct as participants with high depletion ($M = .30$, $SD = .16$), $F(1,82) = .03$, $p = .87$, $\eta_{\text{par}}^2 = .000$. The test of the interaction between cognitive depletion and student membership was also nonsignificant, $F(1,82) = .67$, $p = .41$, $\eta_{\text{par}}^2 = .008$.

We could not test to see if resilience and self-control could serve as a mediator for a cognitively depleting task because there was no effect of the independent variable on the dependent variables. We therefore assessed whether levels of self-control or resilience might moderate the relationship between cognitive depletion and ROTC membership. A series of 2(Cognitive depletion: low vs. high) x 2 (student type: ROTC vs. not ROTC) ANCOVA analysis with self-control and resilience as covariates and interaction terms was conducted. Results showed a nonsignificant three-way interaction with self-

control, $F(3,77) = 2.09$, $p = .11$, and a nonsignificant three-way interaction with resilience, $F(3,77) = 1.00$, $p = .40$.

DISCUSSION

The primary purpose of this study was to identify if a sample of Georgia Southern University's ROTC cadets have higher levels of resilience and self-control than nonROTC students. The second purpose was to assess if resilience and self-control in ROTC cadets could buffer the negative effects of a cognitively depleting task. The hypotheses were not supported by the results found in this study, possibly due to several limitations in methodology and procedure.

The first hypothesis, which ROTC members would score higher in both resilience and self-control than nonROTC members, was not supported because both groups scored similarly. Although on average, ROTC members did score higher than nonROTC members, these differences were not significant. Thus, participants in the ROTC program did not display higher levels of resilience or self-control.

The next two hypotheses were also not supported. The second hypothesis tested whether or not participants with high cognitive depletion performed worse on the math test than participants with low cognitive depletion. The third hypothesis analyzed math scores among participants with high depletion in the ROTC program and those not in the program. Regardless of level of cognitive depletion or ROTC membership, all participants scored similarly on the mathematical test. ROTC members in both low and high cognitive depletion

conditions attempted more math questions than nonROTC participants in both conditions, but the difference was not significant. ROTC members also answered more questions correctly than nonROTC participants in both high and low depletion conditions, but the difference was also not significant.

It was hypothesized that ROTC members experiencing high cognitive depletion would perform better on the math test than nonROTC members with high depletion via their increased levels of resilience and self-control. Because there was no effect of either ROTC membership or cognitive depletion conditions on mathematical performance, we could not test if resilience and self-control served as mediating variables. Results also revealed a nonsignificant three-way interaction between resilience and self-control. These results do not support the hypotheses and suggest that neither resilience nor self-control moderated the effects of a highly cognitive depleting task among the current samples.

Limitations

There are several limitations to this current study. One limitation was the difficulty of the mathematical test. In the current study, the average score correct was 16% and scores ranged from 0% to 40% correct. In another study using these math questions with a sample of college students, the average score was 50% correct and scores ranged from 36%- 63% correct (Jamieson & Harkins, 2011). In general, this math test was too difficult for this sample. Thus, to analyze and understand the effect of the cognitively depleting task, a simpler mathematical test would be beneficial. Another limitation in this current study was low sample size. Although ROTC membership was divided relatively evenly, only

eleven participants were in the ROTC program and experienced high depletion. Since the number of ROTC members that experienced the high cognitive depletion condition was so low, this study suffered from low statistical power.

Another limitation in this study was a nonstandardized testing environment. NonROTC participants signed up for the study at their own convenience for a class credit or extra credit. They also completed this study in a controlled laboratory setting. ROTC members did not receive any class credit for completing this study and the study was conducted outside after a ROTC lab course. Prior to the study, these students completed physically demanding exercises specific to the ROTC. These participants completed the study under a pavilion at the end of their class. The weather conditions were not favorable, cold and wet, and there were more distractions for these participants. These distractions and conditions could have had an impact on overall perception and performance on the tasks. Having a standardized testing environment may yield results in line with the hypotheses.

The final limitation of the current study was that the majority of the ROTC participants were first or second year students with minimal ROTC courses and training experience. Because the majority of the participants in the ROTC sample had not completed many ROTC specific courses and training, this may be a reason why they were not higher in self-control or resilience than nonROTC students. Recruiting ROTC participants that are third or fourth year students may yield different results because these participants would have more classes and training specific to the ROTC program completed.

Future Directions and Conclusion

As mentioned previously, future research can use a simpler math test, increase the sample size, have a more standardized testing environment, and recruit ROTC members that are third or fourth years with more courses and training experience. Since the participants in this current study all performed similarly on the math test, regardless of ROTC membership or cognitive depletion condition, an easier math test might reveal if ROTC membership or if cognitive depletion conditions affect performance on a second task. Also increasing the sample size to include more ROTC participants that experience high cognitive depletion may produce different results. Having a standardized testing environment may also yield different conclusions. Finally, including ROTC participants with more experience in ROTC specific courses and training may also reveal more significant differences.

Although this study did not support the hypotheses, the limitations listed most likely affected the results. Future studies are needed to explore the possibility of ROTC training increasing resilience and self-control after a cognitively depleting task.

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Appendix A

Writing Task

Free-writing (control) condition instructions for writing task:

Write a story about a recent trip you have taken. It may be a trip to the store, to Florida, or to another country – wherever! Please write until the experimenter asks you to stop.

Controlled writing (experimental) condition instructions for writing task:

Write a story about a recent trip you have taken. It may be a trip to the store, to Florida, or to another country – wherever! Please write until the experimenter asks you to stop.

Very important! Please do not use the letters a or n anywhere in your story.

Appendix B

Math Test

Instructions: Please complete as many items as you can until the experimenter tells you to stop.

1. n is a positive integer and $(-1)^n = -1$

Column A

n

Column B

2

- The quantity in Column A is greater
- The quantity in Column B is greater
- The two quantities are equal
- The relationship cannot be determined from the information given

2. Column A

$$\sqrt{x^4 + 6x^2 + 9}$$

Column B

$$x^2 + 3$$

- The quantity in Column A is greater
- The quantity in Column B is greater
- The two quantities are equal
- The relationship cannot be determined from the information given

3. The greatest number of diagonals that can be drawn from one vertex of a regular 6-sided polygon is

- a. 2
- b. 3
- c. 4
- d. 5
- e. 6

4. If the total surface area of a cube is 24, what is the volume of the cube?

- a. 8
- b. 24
- c. 64
- d. $48\sqrt{6}$
- e. 216

5. Column A

The ratio of the circumference
to the diameter of a circle
that has radius 6

Column B

The ratio of the circumference
to the diameter of a circle
that has radius 6.5

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

6. A postal clerk sold 75 stamps for a total of \$10.85. Some of the stamps were 15-cent stamps and the remainder of the stamps were 13-cent stamps. How many of the stamps were 13-cent stamps?

- a. 15
- b. 20

- c. 25
- d. 30
- e. 55

7. Which of the following indicates all x such that $x^2 < x$?

- a. $-1 < x < 0$
- b. $-1 < x < 1$
- c. $0 < x < 1$
- d. $x < 0$
- e. $x > 1$

8.
$$yz + xz + xy = 16$$

xyz	17
-------	------

Column A

$$1 + 1 + 1$$

$$x + y + z$$

Column B

$$17$$

$$16$$

- a. The quantity in Column A is greater
 - b. The quantity in Column B is greater
 - c. The two quantities are equal
 - d. The relationship cannot be determined from the information given
9. What is the distance between two points on a number line if the coordinates of the points are $4 + \sqrt{5}$ and $2 - \sqrt{5}$?
- a. $2 - 2\sqrt{5}$
 - b. $2 + 2\sqrt{5}$
 - c. $6 + 2\sqrt{5}$
 - d. 2
 - e. 6

10. Which of the following CANNOT be expressed as the sum of the squares of two integers?

- a. 13
- b. 17
- c. 21
- d. 29
- e. 34

11. A discount of 40% of the original selling price of an item reduces the price to \$72.

Column A

Column B

The original selling price

\$120

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

12. A number is multiplied by 4 and then that product is divided by 100. This same result could be obtained by dividing the original number by ____

- a. 0.04
- b. 0.25
- c. 0.40
- d. 2.5
- e. 25

13. Item X costs twice as much as item Z, and item Y costs \$3 more than half the cost of item Z.

Column A

The cost of item X

Column B

The cost of item Y

- The quantity in Column A is greater
- The quantity in Column B is greater
- The two quantities are equal
- The relationship cannot be determined from the information given

14. N is an integer and $0 < N < 3$

Column A

$(\frac{1}{N+1})N$

Column B

$2 + \frac{1}{8}$

- The quantity in Column A is greater
- The quantity in Column B is greater
- The two quantities are equal
- The relationship cannot be determined from the information given

15. The lengths of two sides of isosceles triangle ABC are 9 and 15

Column A

The perimeter of ABC

Column B

33

- The quantity in Column A is greater
- The quantity in Column B is greater
- The two quantities are equal
- The relationship cannot be determined from the information given

16. City Y has installed 30 parking meters at 15-foot intervals along a straight street. What is the number of feet between the first meter and the last meter?

- a. 200
- b. 420
- c. 435
- d. 450
- e. 465

17. $(1 - x)(x - 1) = ?$

- a. $-(x - 1)^2$
- b. $(x - 1)^2$
- c. 0
- d. $x^2 - 1$
- e. $1 - x^2$

18. After 2 females leave a party, there are twice as many males as females. Then 9 males leave and there are twice as many females as males.

Column A

Column B

The total number of people
left at the party after the
9 males leave

8

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

19. $1020 = 10100 / 10n$

Column A

n

Column B

5

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

20.

If the circumference of circle P is 15.714 and the circumference of circle of circle Q is 6.28, then the diameter of circle P minus the diameter of circle Q is approximately equal to _____

- a. 1.5
- b. 3.0
- c. 5.5
- d. 9.0
- e. 9.4

21.

Column A

The average of three numbers,
the greatest of which is 78

Column B

The average of three numbers,
the greatest of which is 3

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

22. If \$4,500 was invested in a bond fund when the price per share was \$9 and \$3,000 was invested in the fund when the price per share was \$10, what was the average (arithmetic mean) price per share purchased?

- a. \$9.625
- b. \$9.50
- c. \$9.40
- d. \$9.375
- e. \$9.20

23. The rectangular floor of a warehouse is 300 feet wide and 350 feet long. If the width remains fixed, how many additional feet would have to be added to the length to increase the floor area by 20 percent?

- a. 42
- b. 50
- c. 65
- d. 70
- e. 84

24.

Column A

$$\sqrt{5/2}$$

Column B

$$(1/2)\sqrt{10}$$

- a. The quantity in Column A is greater
- b. The quantity in Column B is greater
- c. The two quantities are equal
- d. The relationship cannot be determined from the information given

Appendix C

Brief Self-Control Measure

Instructions: Using the scale provided, please indicate how much each of the following statements reflects how you typically are, by circling a number from 1 to 5. There are no right or wrong answers, so please answer as honestly as possible.

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

Appendix D

Motivation and Manipulation Check

Instructions: For each question below, please circle the answer choice that best fits how the statement applies to you. There are no right or wrong answers. Please be as honest as possible.

1. The math test kept my interest.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

2. I felt engaged while taking the math test.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

3. I felt motivated to do my best on the math test.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

4. I felt motivated to put a lot of effort into the math test.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

5. The math test was difficult.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

6. The writing task was difficult.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

7. I tried my hardest on the writing task to follow the task instructions.

Strongly	Disagree	Somewhat	Somewhat	Agree	Strongly
Disagree		Disagree	Agree		Agree

Appendix E

Demographic Information

Gender: _____ Female _____ Male

Age: _____

Race/Ethnicity:

_____ African American (Black) _____ European American (White)

_____ Latino(a) _____ Asian American

_____ Native American _____ Other (write-in)

Year in School (circle one): First year _____ Sophomore _____ Junior _____
Senior

SAT Scores: _____ Verbal _____ Mathematical

Member of the Military: _____ Yes _____ No

If yes, branch of military _____

Member of the Georgia Southern ROTC program: _____ Yes _____ No

If answered yes to the above question, please list all of the courses you have taken that is specific to the ROTC program.