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The Relationship Between Emotion Regulation and Health Status in Southeast Rural Firefighters

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THE RELATIONSHIP BETWEEN EMOTION REGULATION AND HEALTH STATUS IN
SOUTHEAST RURAL FIREFIGHTERS

by

CATHERINE GALLAGHER

(Under the Direction of Bridget Melton)

ABSTRACT

Firefighters are continuously interacting within high-stress and high physical demanding tasks. Minimal research investigates the influence of emotion regulation on health status among firefighters. **PURPOSE:** To determine the relationship between emotion regulation constructs and health status fitness metrics in a sample of career firefighters from southeast Georgia. **METHODS:** Forty-four career firefighters from southeast rural Georgia participated in a yearly fitness assessment. Body composition and fitness variables were collected. Emotion regulation was examined using the 36-item Difficulties in Emotion Regulation Survey. Inferential analysis including a Kruskal Wallis test was used to reveal differences between variables in health status (i.e., Perceived Health, Body Fat, Waist-Hip, and VO₂max). Bonferroni Post hoc pairwise comparisons were used on all significant findings. **RESULTS:** Significant mean differences were found in DERS total scores and Perceived Health ($X^2(2) = 6.51, p = .04$) No significant difference in DERS total score and body fat ($\chi^2(4) = 6.29, p = .18$) and DERS total score and waist:hip ($X^2(3) = .75, p = .87$). No significant difference in DERS total scores and Estimated VO₂max ($X^2(2) = 4.23, p = .12$). However, when broken down into DERS subgroups, Goals ($p = .02$) and Awareness ($p = .01$) showed a significant difference among the Estimated vO₂max groups **CONCLUSION:** Firefighters within from this region showed similar relationships between DERS total score, DERS subgroups and health status fitness metrics to individuals from previous studies. Given the preliminary nature of the study, this allows for new literature within a multitude of fields.

INDEX WORDS: Impact, Suppression, Reappraisal, Well-being

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CHAPTER 1

PURPOSE OF THE STUDY

This study aimed to determine the relationship between emotional regulation constructs and health status variables among firefighters. The purpose of this study was to investigate the influence of emotion regulation on health status among firefighters.

How This Study is Original

This study analyzed emotion regulation among firefighter's health status in southeast rural Georgia. Unlike current studies, this study focuses in on different health status variables while looking at the relationship of emotion regulation strategies within the tactical field. Additionally, the data collected from this study adds imperative research with rural firefighters and mental health Lastly, this data can support the need to utilize and require more effective mental health screening within departments.

CHAPTER 2

THE RELATIONSHIP BETWEEN EMOTION REGULATION AND HEALTH STATUS IN SOUTHEAST RURAL FIREFIGHTERS

INTRODUCTION

Firefighters (FFs) are consistently being exposed to painful and traumatic situations putting them at risk physically and mentally (International Association of Fire Chiefs, 2015). Mental health constitutes a major illness affecting millions of people yearly, yet only 50% of people with reported diagnoses receive treatment (SAMHSA, 2018). Additionally, FFs are faced with multiple barriers when seeking help, including the availability of resources, cost, and stigma (Stanley et al., 2017, & Carpenter et al., 2020). More than 80% of FFs believe asking for help would portray them as weak or unfit for duty (SPRC, 2018). This belief is especially problematic, as FFs are at an increased risk of mental health illness, including depression, post-traumatic stress, and suicidality (Kimbrel et al., 2016). Compared to the 6.8% to 7.8% lifetime prevalence rate of post-traumatic stress disorder in Americans, first responders range from 8% to 32%, along with a 13% to 16% risk of depression (Gulliver et al., 2018, Lanza et al., 2018, National Institute of Mental Health, 2017, & Haddock et al., 2018). Furthermore, alcohol consumption is commonly used as a stress reliever, where at least 56% of FFs partake in binge drinking once a month compared to the 17.1% estimated average in the U.S. adult (Haddock et al., 2012, & Kanny et al., 2012). These numbers help stress the importance of investigating mental health within the tactical field. As FFs are continuously faced with intensely emotional situations, recurring sleep interruptions, and hazards involving dangerous and disturbing scenes, they become more susceptible to various mental health concerns.

Health Status among Firefighters

Health status is an individual's relative level of wellness or illness, and it is often linked to their perceived health perceptions (ATS, 2020). Another indicator of health status is body composition. Obesity is a leading factor associated with increased cardiovascular risk. Research shows that FF body fat and waist-hip measurements are more similar to the public (Poston et al., 2018). More than 80% and 95% of career and volunteer firefighters who fell in the obese category did not meet the standard aerobic capacity tolerance (Poston et al., 2018s). This is concerning given the job's physical demand and the expectation that FFs should be of a certain fitness level. Lastly, an individual's ability to prolong strenuous physical activity for an extended amount of time is aerobic capacity (i.e., VO₂max). Failure to meet the recommended guidelines within the firefighter standards can result in lower performance within critical settings.

Decreased aerobic capacity impacts cardiovascular and respiratory systems functions, but looking further, stress and stress factors can affect oxygen utilization that impacts one's VO₂.

The standard set by the National Fire Prevention Association (NFPA 1583), which coincides with NFPA 1582, requires a yearly medical and fitness evaluation. This evaluation is comprised of multiple tests, including body composition and aerobic capacity.

Emotion Regulation

To positively impact health status, emotion regulation skills are critical. Emotion regulation (ER) is considered a central component in psychology to identifying and detecting multiple underlying mental health disorders (Mennin et al., 2007 & Mennin et al., 2009).

Additionally, ER is termed to describe an individual's ability to sufficiently manage and respond to emotion involving conscious and non-conscious strategies to increase, maintain, or decrease responses to emotional experiences (Guendelman et al., 2017; Rolston and Lloyd Richardson, n.d.). With FFs' health, it is essential to identify mechanisms that offset the effects of

occupational stress on notable behavioral health concerns, such as substance misuse, depression, post-traumatic stress, and suicide.

Emotion regulation is furthermore defined as the ability to influence the emotional quality, content, and intensity of emotional experiences and expressions. This allows for unique mechanisms that may modify how first responders react to crucial on-the-job occurrences and reduce vulnerability debilitating behavioral health outcomes. When specifying types of ER, little is known regarding the methods needed to serve as protective factors for FFs and whether these ER methods potentially yield the same effects for FFs working in different settings such as rural and non-rural locations. With-in the context of FF behavioral health, two ER methods are worth exploring. Down-regulation involves decreasing the experiential or behavioral response to negative emotions. Whereas up-regulation involves increasing the experiential or behavioral response to positive emotions (Gross et al., 2015). This dual process method of ER can aid in situationally managing stressful challenges in crucial situations (i.e., down-regulation), while developing resilience resources and sustaining occupational wellbeing (i.e., up-regulation) (Levy-Gigi et al., 2016; Quoidbach et al., 2015).

Emotion Regulation well-being and the six subgroups

Daily subjective well-being and perceived stress are related to different ER strategies and vary between individuals (Katana et al., 2019). Emotion can be portrayed by the intensity and fluxes in emotional states making the regulation of these dynamics a central component to ER. Improving ER skills has been shown to manifest both cognitive growth and social interactions, along with demonstrating the importance of adaptation, well-being, and attention. (Mestre et al., 2017; Steinberg, 2005; Saarni et al., 1998). Individuals who extensively use reappraisal express more positive emotions and have higher levels of personal well-being and fewer symptoms of

depression (Gross et al., 2003). Whereas individuals who more frequently suppress their emotions show decreased functioning in emotional, interpersonal, and well-being domains (Gross et al., 2007; 2003). The Difficulties in Emotion Regulation Scale (DERS) originated to assess emotion dysregulation. Within the DERS are six subgroups used to reflect the different scopes of difficulties within emotion regulation. In a study by Gratz and Roemer (2004), looking at the validity of emotion regulation, the importance of the six strategies is highlighted as: an individual's ability of being aware and clear about their emotions, the ability to control their impulsive acts and emotions as well as accepting them, ability to concentrate on desired goals, and lastly, attaining effective strategies to regulate emotion during a negative state. Research shows that effective regulation of emotions within situations was positively related to well-being (Cote et al., 2010). However, difficulties in regulating emotions in these areas are related to various psychological outcomes, such as the increased risk of self-harm (Gratz & Roemer, 2004).

This study aimed to determine the relationship between emotional regulation constructs and health status variables among FFs. The purpose of this study was to investigate the influence of emotion regulation on health status among FFs.

CHAPTER 3

METHODS

Participants and Procedure

A convenience sample of 44 career FFs from the Statesboro Fire Department in rural southeast Georgia volunteered to participate in the study. To be considered eligible for participation, individuals had to be a full-time active-duty FF in the department and older than the age of 18 years. Data for this study was part of their annual fitness assessment and a follow-up survey. Prior to participation, all FFs were informed of the study procedures, requirements, and risks involved in the study before providing written informed consent. After completing the fire department's required annual physical fitness assessment, FFs were asked to complete the hard copy survey in a private location. All methodologies used in the study were approved by the university's institutional review board, approval number H19098. G-Power highlighted that 36 participants were needed for significant differences to be revealed between emotion regulation and health status variables.

Measurements

Emotional Regulation

The Difficulties in Emotion Regulation Scale (DERS) was used to assess emotional dimensions associated with mental health. The DERS (Gratz & Roemer et al., 2004) is comprised of 36 questions rated on a 5-point scale where a higher score indicates a greater difficulty in regulating emotions (1=almost never to 5=almost always). It is based on a total sum and six strategies: Nonacceptance, Goals, Impulse, Awareness, Strategies, and Clarity. These domains have been validated as more interpretable when assessing trait-level perceived emotion regulation ability (Hallion et al., 2018). The six subscales are interpreted as such: (a) *nonacceptance* the unwillingness to accept certain emotional responses (“When I’m upset, I

become embarrassed at myself for feeling that way”); (b) *goals* individuals have difficulty in engaging in goal-directed cognition along with behavior when upset (“When I am upset, I have difficulty focusing on other things”); (c) *Impulses* where an individual has difficulty regulating their behavior when upset (“I experience my emotions as overwhelming and out of control”); (d) *awareness* a reverse score where one may lack emotional awareness (“When I am upset, I acknowledge my emotions”); (e) *Strategies* where an individual may lack access to strategies for feeling better when upset (“When I am upset, I believe that I will remain that way for a long time”); lastly (f) *Clarity* where one may lack emotional clarity (“I have difficulty making sense out of my feelings”).

Health Status

Health rating was defined base on four variables, perceived health status, body fat percentage, waist-hip ratio, and cardiovascular fitness. Perceived Health rating adapted from the Medical Outcomes Study (MOS) Short Form (SF36) including: “In general, would you say your health is: Excellent, Very Good, Good, Fair, Poor.”

Body fat percentage was measured during the FFs annual fitness assessment using the averages of three different testing procedures. First, a bioelectrical impedance analysis from foot-to-foot was measured using the Tanita (TBF300 WA, Tanita Corporation, Tokyo, Japan). Secondly, a 7-site skinfold was administered using the Lange skinfold calipers. The measurement sites consist of the chest, midaxillary, triceps, subscapular, abdominal, suprailiac, and thigh. The same experienced technician took all measurements following American College Sport Medicine (ACSM) guidelines. Lastly, a whole-body Dual-energy X-ray absorptiometry scan was assessed.

Waist-hip ratio was administered using a tape measure and an experienced technician. Ratio was calculated by dividing waist over hips. Following the ACSM's guidelines, individuals were appropriately categorized from very high, high, moderate, low. All three measures of body fat were averaged giving a total body fat percentage, where individuals were then categorized based off ACSMs chart from Obese to Underweight.

Estimated cardiovascular endurance measure by estimated volume of oxygen consumed (VO₂) were measured during the FFs annual fitness assessment. The National Fire Protection Association (NFPA) requires a minimum threshold of ≥ 42 ml/kg/min, the Queens College 3-minute Step-test was used to calculate this estimated VO₂ using a validated equation and heart rate recovery (NFPA & ACSM Manual). The NFPA scale four categorizes individuals from Ideal, Consultation, Exercise Plan, and Supervised Program.

Demographics

Basic demographic information, including age, gender, ethnicity, smoking status, years of service, and rank was obtained through self-report.

Statistical Analysis

Data were analyzed using SPSS version 27. Both descriptive and inferential data analysis were completed. Demographic characteristics will be described using frequencies and descriptive statistics. Inferential analysis including a Kruskal Wallis test was used to reveal differences between variables in health status (i.e., Perceived Health, Body Fat, Waist-Hip, and VO₂max). Post hoc pairwise comparisons were used on all significant findings. The breakdown of the research questions and statistical analysis can be seen in Table 1.

CHAPTER 4

RESULTS

Forty-four firefighters were included for data analysis. However, only 43 were used in VO₂max due to incompleteness of testing. Demographic characteristics are presented in Table 1.

Health status metrics represented are presented in Table 2. Lastly, the Mean \pm SD of the six subgroups within the DERS is provided in Table 3.

Table 1. Descriptive statistics of rural firefighters in southeast Georgia

Demographic Variables	Mean \pm SD	Min	Max	n(%)
Age (yr)	35.98 \pm 8.81	23	58	
Years of Service (yr)	12.61 \pm 8.61	1	40	
Gender				
Male				44 (100)
Female				
Ethnicity				
Caucasian				43 (98)
African American				1 (2)
Smoke Status				
Yes				26 (59)
No				18 (41)
Rank				
Admin				7 (16)
Battalion Chief				3 (7)
Captain				6 (14)
Lieutenant				6 (14)
Fire Apparatus Operator				13 (30)
Fire Fighter				9 (20)

Table 2. Health status metrics of rural firefighters in southeast Georgia

Health Status	n(%)
Perceived Health	
Excellent/Very Good	13 (30)
Good	22 (50)
Fair/Poor	9 (20)
Body Fat (%)	
Excellent	1 (2)
Good	2 (5)
Fair	4 (9)
Poor	4 (9)
Very Poor	33 (75)
W:H ratio	
Low	16 (36)
Moderate	16 (36)
High	10 (23)
Very High	2 (5)
Estimated VO2 NFPA	
Ideal	24 (56)
Consultation	15 (35)
Exercise Plan	4 (9)
Sup. Program	

Note: W:H ratio = waist-hip ratio; VO2 = estimated maximal oxygen consumption; NFPA = national fire prevention association

Table 3. Descriptive statistics of DERS subgroup categories

DERS Subgroup variables	Mean ± SD	Min	Max
Nonacceptance	9 ± 3.2	6	17
Goals	9 ± 3.4	5	23
Impulse	8 ± 2.8	6	18
Awareness	17 ± 4.6	8	30
Strategies	12 ± 4.9	8	31
Clarity	8 ± 2.2	5	14

Note: DERS = difficulties in emotion regulation

Initially a Spearman's correlation was run to assess the relationship between the DERS Health Behaviors and Health Status. There was no statistically significant correlation between the DERS and health behavior. There was a statistically significant, low strength negative correlation between DERS and VO₂, $r_s(43) = -.312, p = .05$. Along with a statistically significant, moderate negative correlation between DERS subgroups awareness and VO₂, $r_s(43) = -.479, p = .01$. Due to the nature and findings of the data, it was advised to focus more within the DERS total scores and the DERS six subgroups compared to health status variables.

Perceived Health

A Kruskal-Wallis H test was conducted to determine if there was a difference between the DERS total scores and perceived health. There was a statistically significant difference when looking at DERS total scores and Perceived Health ($X^2(2) = 6.51, p = .04$). Based on perceived health variables, "Excellent" (n = 1) and "Very Good" (n = 12) were categorized together, along with "Fair" (n = 9) "Poor" (n = 0) were also categorized together. Subsequently, pairwise comparisons were performed using a Bonferroni correction. Adjusted P-values showed no significant differences between comparison groups; Very Good/Excellent vs Fair/Poor ($p = 1.0$), Very Good/Excellent vs Good ($p = .08$), Fair/Poor vs Good ($p = .18$). Lastly, when broken down into DERS subgroups, no significant differences were found.

Body Fat

A Kruskal-Wallis test was conducted to determine if there was a difference between the DERS total scores and body fat. There was no significant difference ($\chi^2(4) = 6.29, p = .18$). Additionally, when broken down into DERS subgroups, no significant differences were found.

Waist & Hip

A Kruskal-Wallis test was conducted to determine if there was a difference between the DERS total scores and waist and hip ratio. There was no significant difference ($X^2(3) = .75, p = .87$). Additionally, when broken down into DERS subgroups, no significant differences were found.

Estimated VO2max

A Kruskal-Wallis H test was conducted and noted no significant difference ($X^2(2) = 4.23, p = .12$) between the DERS total scores and Estimated VO2max. However, when broken down into DERS subgroups, Goals ($p = .02$) and Awareness ($p = .01$) showed a significant difference among the Estimated vO2max groups. This post hoc analysis revealed statistically significant differences in Goals median scores between Exercise Plan vs Consultation, with higher scores shown in Consultation compared to the Exercise Plan ($p = .04$). The post hoc analysis also revealed a statistically significant differences on Awareness median scores between Consultation vs Ideal, with higher scores shown in Ideal compared to Consultation ($p = < .01$). Pairwise comparisons were performed using a pairwise Bonferroni correction. Adjusted p-values are presented. See Table 4 for values within each.

Table 4. DERS subgroups statistics within Estimated VO2max categories

DERS Subgroups	Ideal	Consultation	Exercise Plan
	≥ 43.9 mL/kg/min	36-42.9 mL/kg/min	29-35.9 mL/kg/min
Nonacceptance	9.5 ± 5.5	8 ± 6	6.5 ± 2
Goals	8.5 ± 3	$10 \pm 3^*$	6.5 ± 2
Impulse	8.0 ± 2.75	8 ± 7	7.0 ± 2
Awareness	$18.5 \pm 5.75^*$	13 ± 6	18 ± 2
Strategies	10.5 ± 5.5	11 ± 10	9 ± 4.5
Clarity	9.0 ± 4	8 ± 2	6 ± 2.25

Note: DERS = difficulties in emotion regulation; *Defines differences within subgroups compared to estimated VO2max categories

CHAPTER 5

DISCUSSION

This study analyzed the relationship between emotion regulation and health status among one rural fire department in southeast Georgia. Compared to multiple departments, these rural firefighters have access to resources (e.g., personal trainers, athletic trainer, human performance lab facility) to maintain basic health. However, like most fire departments, the requirements for health standards and mental health screenings are minimal. The data gathered from this study can aid in establishing and providing stronger mental health screenings and resources. This study is one of few research studies that explored the mental health components of rural firefighters. It was hypothesized that emotion regulation would impact health status and fitness metrics within rural firefighters.

Perceived Health

The results presented partially support the hypothesis of emotion regulation would impact influencing health status. Perceived health is a subjective measure of one's overall health status that allows individuals to self-assess the quality of their health. By doing so, this aspect has the ability to clinically capture potential physiological and psychological reserves. Within perceived health, individuals who viewed themselves as "good" had higher scores on the DERS, indicating more difficulty accessing emotion regulatory strategies. These findings can be a result of individuals suppressing their emotions. Gross et al., (2006) indicates individuals who suppress their emotions tend to be less satisfied with their well-being and satisfaction, though more intuitive with their awareness of reappraisal from others. Whereas individuals who view themselves as "excellent/very good", and "fair/poor" had lower scores on the DERS. Lower scores on the DERS indicated better emotion regulation strategy. These findings can be

associated with reappraisal. Individuals who are satisfied with their well-being experience more positive emotion compared to negative emotion (Gross et al., 2006).

Body Fat and Waist Hip Circumference

Although body fat and waist-hip ratio showed no significance when compared to the DERS, body fat showed a high presence of individuals in "very poor" ($n = 33$). Additionally, waist-hip ratio showed majority sitting at "moderate" ($n = 16$) and "high" ($n = 10$). These findings indicate a higher risk of cardiovascular disease and can also relate to stress exposure. A recent case-control study from Smith et al., (2018) found 30.8% of firefighter cardiac cases were overweight, and 59.2% were obese. Furthermore, Andrei et al., (2018), linked dysfunctional emotion regulation strategy in individuals overweight and obese. These individuals were more prone to suppress their emotions related to difficulty in assessing self-regulation strategies (Andrei et al., 2018). Future research, specifically withing the fire service can benefit of looking into different body composition measure in a bigger sample size and comparing different measure of emotion regulation along with fitness standards.

Estimated VO₂max

Although VO₂ showed no significance when compared to DERS, when broken down further into the six subcategories, goals and awareness revealed a significant difference. When looking at goals, individuals who ranked under "consultation" showed higher scores within the goal's subcategory. The goals subcategory is associated with reflecting difficulties such as concentrating and accomplishing task when being impacted by negative emotion, which may indicate an individual's problem in engaging in goal-directed behavior. Bernstein et al., (2018) found individuals who performed lower in aerobic exercise struggled with goal-directed strategies such as concentrating. Furthermore, the awareness subcategory showed individuals

who were categorized as "Ideal" had higher scores within the awareness subcategory. Awareness reflects on the tendencies to attend to and acknowledge emotions; however, due to the reverse score factor, this projects an individual's inability to show attention and their lack of awareness to emotional responses. Previous research has shown that exercise is a contributing factor within cognitive reappraisal (Berman et. Al., 2019). Reappraisal may lead to less negative emotions indicating a more satisfactory response with where one's aerobic capabilities lie. Additionally, Bernstein et al., found participants who aerobically exercise were more prone to compensating and directing focus more to certain emotion regulation subcategories such as strategies and goals. This could indicate individuals within the "Ideal" category deter from awareness regulatory strategies. This can also support why individuals who were categorized in "Consultation" had higher scores within goals strategies (Bernstein et al., 2018). It can be stated that these individuals had more difficulty in goal-directed cognition and behavior. Although there were no significant findings between VO₂ vs strategies and VO₂ vs goals, limitations such as sample size and the nature of the Queens step test relying on heart rate instead of a true VO₂ estimate could indicate these findings.

Limitations

As with any study, this investigation did have its limitations that should be noted. First, a small sample size was a key limiting factor of the study, as only 44 individuals participated. The DERS primarily focuses on the regulation of negative emotional states (i.e., majority items begin with the phrase "When I'm upset"). Future research could be imperative to incorporate a broader range of self-report measures such as assessing difficulties with the regulation of positive emotional states. Secondly, answers from the DERS survey may have been swayed due to reporter and environmental bias, taking the survey at the department and near individuals even

though they were informed to take the survey in isolation. Furthermore, nature of the Queens step test for VO₂ could impact the reliability of data due to it being based of heart rate and not a true VO₂ estimate. Lastly, due to the stigma within mental health and reporting, individuals may have felt the urge to not fully and honestly answer the questions within the DERS.

CHAPTER 6

CONCLUSION

Overall, given the preliminary nature of the study, this allows for new literature within a multitude of fields. While the DERS is a strong measure within psychological disorders, little research investigates the influence of emotion regulation on health status among firefighters exist. This study adds to the research with rural firefighters and mental health. Health status could be a predominant indicator for something more severe in the world of mental health and allow access and more comfort into normalizing mental health within firefighters. Moreover, these results can help in the need to utilize and require more effective mental health screening within departments.

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- 2005, and 2010 Needs Assessment Surveys. Quincy, MA: National Fire Protection Association, Fire Analysis and Research Division; 2016.
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APPENDICES

APPENDIX A - TABLES

Table 5.*Research Questions, Instruments, and Type of Data Analysis*

Research Question	Instruments	Independent Variables	Dependent Variables	Statistical Analysis
	-Medical Outcomes Study (MOS) Short Form (SF36)	Perceived Health		
Does emotion regulation influence health status among firefighters	-Tanita -7-site skinfold -DEXA -W:H ratio ACSM	Body Composition	Difficulties in Emotion Regulation -(DERS)	Kruskal Wallis
	-Queen's step-test NFPA	Estimated VO2		
	-Medical Outcomes Study (MOS) Short Form (SF36)	Perceived Health		
Do the Subgroups within DERS influence health status among firefighters	-Tanita -7-site skinfold -DEXA -W:H ratio ACSM	Body Composition	Nonacceptance Goals Impulse Awareness Strategies Clarity	Kruskal Wallis
	-Queen's step-test NFPA	Estimated VO2		

Note: DEXA = dual-energy x-ray absorptiometry; BF% = body fat percentage; VO2 = estimated maximal oxygen consumption; W:H = waist:hip ratio; ACSM = american college of sport medicine; NFPA = national fire prevention association

APPENDIX B – IRB APPROVAL



Institutional Review Board (IRB)
 Veazey Hall 3000
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 Phone: 912-478-5465
 Fax: 912-478-0719
IRB@GeorgiaSouthern.edu

To: Melton, Bridget; Ryan, Greg; Klibert, Jeff
From: Eleanor Haynes, Director, Research Integrity
Date: 4/9/2021
Current Expiration Date: 2/28/2022
Original Approval Date: 3/12/2019
Subject: Status of Modification (# 4) & Extension Request for Approval to Utilize Human Subjects in Research – Originally Approved by **Full Board Review**

After a review of your Extension & Modification Request for research project numbered **H19098**, and titled **“Physiological Profile of First Responders in Southeast Georgia,”** it appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable. You are authorized to enroll up to a maximum of 758 subjects.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that the Institutional Review Board has approved your extension and modification.

Modification description:

- **Addition of Jeff Klibert and Haresh Roshani as Co-Is. Addition of Thomas Nagel as a Research Assistant. Additionally, the updated COVID protocols and the expansion to regional recruitment has been approved.**

Please provide the IRB with any information concerning any significant adverse event, **whether or not it is believed to be related to the study**, within five working days of the event. In addition, if a change or modification of the approved methodology becomes necessary, you must notify the IRB Coordinator **prior** to initiating any such changes or modifications. At that time, an amended application for IRB approval may be submitted. Upon completion of your data collection, you are required to complete a *Research Study Termination* form to notify the IRB Coordinator, so your file may be closed.

APPENDIX C – SURVEY

Date: _____

Code I.D. _____

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1-----	2-----	3-----	4-----	5-----
almost never	sometimes	about half the time	most of the time	almost
always				
(0-10%)	(11-35%)	(36-65%)	(66-90%)	(91-100%)

- _____ 1) I am clear about my feelings.
- _____ 2) I pay attention to how I feel.
- _____ 3) I experience my emotions as overwhelming and out of control.
- _____ 4) I have no idea how I am feeling.
- _____ 5) I have difficulty making sense out of my feelings.
- _____ 6) I am attentive to my feelings.
- _____ 7) I know exactly how I am feeling.
- _____ 8) I care about what I am feeling.
- _____ 9) I am confused about how I feel.
- _____ 10) When I'm upset, I acknowledge my emotions.
- _____ 11) When I'm upset, I become angry with myself for feeling that way.
- _____ 12) When I'm upset, I become embarrassed for feeling that way.
- _____ 13) When I'm upset, I have difficulty getting work done.
- _____ 14) When I'm upset, I become out of control.
- _____ 15) When I'm upset, I believe that I will remain that way for a long time.
- _____ 16) When I'm upset, I believe that I will end up feeling very depressed.
- _____ 17) When I'm upset, I believe that my feelings are valid and important.
- _____ 18) When I'm upset, I have difficulty focusing on other things.

- _____ 19) When I'm upset, I feel out of control.
- _____ 20) When I'm upset, I can still get things done.
- _____ 21) When I'm upset, I feel ashamed at myself for feeling that way.
- _____ 22) When I'm upset, I know that I can find a way to eventually feel better.
- _____ 23) When I'm upset, I feel like I am weak.
- _____ 24) When I'm upset, I feel like I can remain in control of my behaviors.
- _____ 25) When I'm upset, I feel guilty for feeling that way.
- _____ 26) When I'm upset, I have difficulty concentrating.
- _____ 27) When I'm upset, I have difficulty controlling my behaviors.
- _____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.
- _____ 29) When I'm upset, I become irritated at myself for feeling that way.
- _____ 30) When I'm upset, I start to feel very bad about myself.
- _____ 31) When I'm upset, I believe that wallowing in it is all I can do.
- _____ 32) When I'm upset, I lose control over my behavior.
- _____ 33) When I'm upset, I have difficulty thinking about anything else.
- _____ 34) When I'm upset I take time to figure out what I'm really feeling.
- _____ 35) When I'm upset, it takes me a long time to feel better.
- _____ 36) When I'm upset, my emotions feel overwhelming.

APPENDIX D – ANNOTATED BIBLIOGRAPHY

Andrei, F., Nuccitelli, C., Mancini, G., Reggiani, G. M., & Trombini, E. (2018). Emotional intelligence, emotion regulation and affectivity in adults seeking treatment for obesity. *Psychiatry research*, 269, 191-198.

Andrei and colleagues explored emotion regulation and its affect in adults seeking treatment for obesity. 143 Participants seeking an obesity treatment completed multiple questionnaires to access emotion regulation strategies, anxiety, depression, happiness, and eating behaviors. The study found individuals who were in the obese category showed higher levels in depression and eating behaviors along with showing emotion suppression traits.

Bernstein, E. E., & McNally, R. J. (2018). Exercise as a buffer against difficulties with emotion regulation: A pathway to emotional wellbeing. *Behaviour Research and Therapy*, 109, 29-36.

In this article, the authors investigated exercise as a buffer against difficulties in emotion regulation, with hopes to aid a pathway to emotional well-being. 104 participants completed self-report questionnaires along with a randomly assigned 30 minutes of exercise or stretching. Results indicated minimal exercise predicted more depression, anxiety, and stress symptoms. Whereas, more exercise showed higher emotional resilience to prolonged effects of stress symptoms.

Carpenter, T. P., Pennington, M. L., Seebeck, J., Gomez, D. R., Denman, T. C., Kimbrel, N. A., ... & Gulliver, S. B. (2020). Dispositional self-forgiveness in firefighters predicts less help-seeking stigma and fewer mental health challenges. *Stigma and Health*, 5(1), 29.

The authors within this article investigate the role of stigma within mental health challenges and help-seeking in firefighters. A total of 72 firefighters completed measures of self-forgiveness,

stigma, PTSD symptoms, depression, and suicidality symptoms. It was concluded that self-forgiveness is an essential indicator within both stigma and mental health symptoms in firefighters.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological inquiry*, 26(1), 1-26.

This article looks at the current status of emotion regulation and its potential future prospects. Emotion regulation is deemed as one of the fastest growing areas within psychology. The first section defines emotion regulation and emotion by distinguishing both from related constructs. Furthermore, looking into the models and evidence within emotion regulation. Lastly, the article considers five potential key growth points within emotion regulation.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of personality and social psychology*, 85(2), 348.

This article looks at the individual differences in two types of emotion regulation processes. Additionally, how they may implicate affects, relationships, and well-being. The article evaluates 5 different studies that tested both emotion regulation strategies such as reappraisal and suppression. It was concluded that the 5 studies found reappraisal related to positively to well-being, whereas suppression of emotions is related negatively to well-being

Gross, J. J., Richards, J. M., & John, O. P. (2006). Emotion regulation in everyday life.

The authors of this article go in depth of utilizing emotion regulation within everyday life. Within the article two different strategies are discussed. The first being cognitive reappraisal, the second expressive suppression. Both strategies are defined and discuss how each play a role in everyday and how they can affect emotional response and regulation.

Guendelman, S., Medeiros, S., & Rampes, H. (2017). Mindfulness and emotion regulation: Insights from neurobiological, psychological, and clinical studies. *Frontiers in Psychology*, 8, 220.

Within this article, the authors looked at psychological mechanisms in comparison to emotion regulation and mindfulness. The article looked at a mixture of cross-sectional studies measuring mindfulness along with longitudinal studies looking at psychotherapy research and the mechanisms within. It is concluded that this article was able to show how mindfulness is related to emotion regulation and within that, the core mechanisms that effect mindfulness.

Haddock, C. K., Jahnke, S. A., Poston, W. S. C., Jitnarin, N., Kaipust, C. M., Tuley, B., & Hyder, M. L. (2012). Alcohol use among firefighters in the central United States. *Occupational Medicine*, 62, 661– 664.

In this article, the authors hit on the importance of alcohol use among career and volunteer firefighters. Data was collected between 2008 and 2010 with aims to survey alcohol use patterns. A total of 656 individuals participated from over 24 departments. It was revealed that 58% of career and 40% of volunteer firefighters averaged 3 or more drinks on days in which they consumed alcohol. In conclusion firefighters who consume alcohol but do not binge showed healthier outcomes compared to firefighters who binge drink.

Haddock CK, Poston WSC, Jahnke SA. Addressing the epidemic of obesity in the United States fire service: a report prepared for the national volunteer fire council. 2011.

<https://pdfs.semanticscholar.org/ab9f/fb57c9c3e451c438d6b330a72bd4fa3b6576.pdf>.

Accessed 10 Nov 2020.

The authors completed a report for the National Volunteer Fire Council addressing the epidemic of obesity within the US fire service. The report goes over obesity and its impact within the

general population along with the fire service. More so it goes into detail about why there is this obesity epidemic and recommendations for the fire services to help combat obesity and increase fitness hand in hand.

Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the Difficulties in Emotion Regulation Scale (DERS) and its short forms in adults with emotional disorders. *Frontiers in psychology, 9*, 539

In the article, the psychometric properties of the Difficulties in Emotion Regulation Scale are examined compared to three popular short forms of the DERS. 427 individuals who are treatment-seeking participated in taking each form. Results showed internal consistency within in the original DERS, except in the awareness category. Additionally, all three short forms showed good internal consistency as well as validity.

Health status, health perceptions. (2009, November 04). Retrieved October 4, 2021, from

<https://qol.thoracic.org/sections/key-concepts/health-status-health-perceptions.html>

The American Thoracic Society gives the definition of health status and health perceptions. Health status defined as an individual's relative level of wellness. Health perceptions is ones subjective rating affected by an individuals health status.

International Association of Fire Chiefs (2015). National safety culture change initiative: Study of behavioral motivation on reduction of risk-taking behaviors in the fire and emergency service. Retrieved from www.ffsafetyculture.org

Firefighter Safety Culture investigated behavioral motivation within reduction of risk-taking behaviors within the fire service. The document covers the culture within the fire and emergence services and the possible appropriate culture changing methods to be implemented. Additionally, it goes in depth on fire training, leadership, and operation. Overall, the documents generates

ideas that can potentially be implemented within the fire services to effectively change risk-behavior.

Katana, M., Röcke, C., Spain, S. M., & Allemand, M. (2019). Emotion regulation, subjective well-being, and perceived stress in daily life of geriatric nurses. *Frontiers in psychology, 10*, 1097.

This study examined emotion regulation, perceived stress, and well-being within geriatric nurses. There was a total of 89 participants who completed an Emotion regulation Questionnaire, subjective well-being survey, and perceived health single question. It was found that suppression was negatively associated with subjective well-being and positively associated with perceived stress. Additionally, off-days reported higher subjective well-being and lower perceived stress compared to working days.

Lanza, A., Roysircar, G., & Rodgers, S. (2018). First responder mental healthcare: Evidence-based prevention, postvention, and treatment. *Professional Psychology: Research and Practice, 49*(3), 193.

This article discusses the stressors applied on first responders from national tragedies such as hurricanes, wildfires, mass shooting etc. It is stated that first responders are susceptible to being key witnesses to a multitude of traumatic events most times within their own communities. The authors advocate to evidence-based practices such as provided mental healthcare, interventions increasing coping and social connection skills, and other specialized resources to enhance first responder preparedness for traumatic events.

Mennin, D. S., Holaway, R. M., Fresco, D. M., Moore, M. T., & Heimberg, R. G. (2007). Delineating components of emotion and its dysregulation in anxiety and mood psychopathology. *Behavior therapy, 38*(3), 284-302.

The authors for this article combine two studies to further explain the components of emotional regulation and dysregulation and their role within anxiety and mood disorders. It was concluded that heightened emotion intensity was closely related to dispositional emotion. Additionally, there are common relationships to symptoms of generalized anxiety and social disorder, and depression.

Mennin, D. S., McLaughlin, K. A., & Flanagan, T. J. (2009). Emotion regulation deficits in generalized anxiety disorder, social anxiety disorder, and their co-occurrence. *Journal of anxiety disorders*, 23(7), 866-871.

The authors in this article explored the role of emotion regulation in generalized anxiety and social anxiety disorders. Participants consisted of 113 college students voluntarily took the Difficulties in Emotion Regulation Scale and Affect Intensity Measure. Results indicated the biggest discrimination between emotional intensity and impaired regulation strategies within generalized anxiety disorders. It was concluded that poor emotional understanding is the most effective predictor for diagnosing social anxiety disorder.

Mental illness. (n.d.). Retrieved September 6, 2021, from

<https://www.nimh.nih.gov/health/statistics/mental-illness.shtml>

The National Institute of Mental health defines mental illness. Additionally, it presents a multitude of data points based off sex, age, race and ethnicity. The figures are broken up between diagnosed illnesses, mental health services acquired, and prevalence of mental illnesses and disorders.

Mestre, J. M., Núñez-Lozano, J. M., Gómez-Molinero, R., Zayas, A., & Guil, R. (2017).

Emotion regulation ability and resilience in a sample of adolescents from a suburban area. *Frontiers in psychology*, 8, 1980.

The authors in this article explore the ability and resilience of emotion regulation strategies in adolescents. 164 participants took the Cognitive Emotional Regulation Questionnaire survey to measure emotion regulation, where resilience was measured using the Educative Resilience Scale. It was concluded that emotion regulation is a significant predictor of resilience in adolescents.

National data Shows Firefighters' mental, emotional health not getting enough attention. (2021, January 22). Retrieved September 30, 2020, from <https://www.sprc.org/news/national-data-shows-firefighters%E2%80%99-mental-emotional-health-not-getting-enough-attention>

The Suicide Prevention Resource Center sent out a survey to 7,000 firefighters within California and New York. The survey covered mental health and challenges within their jobs. The survey revealed 19% of firefighter have experienced suicidal thoughts, 27% struggled with substance abuse, and 65% experience traumatic work memories. Additionally, 80% of firefighters said asking for help would perceive them as weak or unfit for their job. This survey was used to expose the gaps, and implement appropriate programming to ensure mental health resources and needs will be met.

National Fire Protection Association. Protection Association. Fourth Needs Assessment of the U.S. Fire Service. Conducted in 2015 and Including Comparisons to the 2001, 2005, and 2010 Needs Assessment Surveys. Quincy, MA: National Fire Protection Association, Fire Analysis and Research Division; 2016.

The National Fire Protection Association evaluated the fourth needs assessment of the U.S. fire service. The survey used previously was appropriately redesigned to better meet current roles,

responsibilities, and demands within the fire service. The document covers a multitude of areas such as personnel capabilities, protective equipment, and risk reduction.

Poston, W. S., Haddock, C. K., Jahnke, S. A., Jitnarin, N., Tuley, B. C., & Kales, S. N. (2011).

The prevalence of overweight, obesity, and substandard fitness in a population-based firefighter cohort. *Journal of occupational and environmental medicine*, 53(3), 266–273.

This article looks at the association between overweight, obesity, and fitness standards among firefighters. 478 career and 199 volunteer male firefighters were assessed in BMI, waist:hip, and body fat measurements along with a physical activity questionnaire. Results showed 79.5% of career and 33.5% of volunteer firefighters were categorized as obese and overweight.

Additionally, obese firefighters showed negative cardiovascular disease profiles.

Rolston, Abigail, & Elizabeth Lloyd-Richardson. “What Is Emotion Regulation and How Do We

Do It?” Cornell Research Program, Cornell University,

<http://www.selfinjury.bctr.cornell.edu/perch/resources/what-is-emotion-regulationsinfo-brief.pdf>

Rolston and colleagues go in depth on emotion regulation and how it is applied every day. This specific article is for individuals who may implement self-harm and go through recovery process.

The article further breaks down common emotion regulation strategies and what exactly emotion dysregulation is and how it can be used to break the cycle of self-injury.

Saarni, C., Mumme, D., & Campos, J. (1998). Emotional development: Action, communication, and understanding. In N. Eisenberg (Ed.), *Social, Emotional, and Personality*

Development: Handbook of Child Psychology (pp. 237-311). New York: John Wiley.

This chapter looks at emotion development by discussing action, communication, and understanding. It addresses theoretical platforms and flexible approaches to emotional behavior.

The last portion of the chapter examines 8 skills related to the development of emotional competence, along with social effectiveness and individual adaptiveness. It was concluded to look further into individual differences and emotional responsiveness to things such as cues, attention, and goals.

Smith, D. L., Haller, J. M., Korre, M., Fehling, P. C., Sampani, K., Grossi Porto, L. G., ... & Kales, S. N. (2018). Pathoanatomic findings associated with Duty-Related cardiac death in US firefighters: a Case–Control study. *Journal of the American Heart Association*, 7(18), e009446.

In this article, the authors looked to understand the pathoanatomic causes of duty-related cardiac deaths within US firefighters. Autopsies from 1999-2014 of firefighters age 18-65 who experienced duty-related fatalities were used. It was found that greater than 75% of fatalities had coronary artery stenosis resulting in the most underlying pathoanatomic cause was coronary heart disease.

Soteriades, E. S., Psalta, L., Leka, S., & Spanoudis, G. (2019). Occupational stress and musculoskeletal symptoms in firefighters. *International journal of occupational medicine and environmental health*, 32(3).

Soteriades and colleagues evaluated the association between occupational stress and musculoskeletal symptoms within firefighters. Data was collected via email to 430 firefighters. It was found and concluded that 50% of occupational stress is associated with higher prevalence of musculoskeletal symptoms.

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, 9(2), 69-74.

In this article the authors looked at the trends in cognitive behavior and brain development in adolescence. Specifically looking at regulation of behavior and emotion along with the perception and evaluation of risk and reward. In conclusion it was found adolescence can be seen as a critical development time frame for both normative and maladaptive patterns.

Quoidbach J, Mikolajczak M, Gross JJ. Positive interventions: An emotion regulation perspective. *Psychol Bull.* 2015;141(3), 655–693.

The authors of this article discuss positive interventions from an emotion regulation standpoint, specifically talking about positive traits and positive emotions to increase happiness. The article uses existing literature on positive interventions with aims to clarify mechanisms underlying their effectiveness within interventions. It was found that positive emotion in both long-term and short-term use 5 families of emotion regulation strategies such as situation selection, modification, attentional deployment, cognitive change, and response modulation. These strategies can be potentially used in nonclinical and clinical populations.

(2018, May). Retrieved September 12, 2020, from

<https://www.samhsa.gov/sites/default/files/dtac/supplementalresearchbulletin-firstresponders-may2018.pdf>

The Substance Abuse and Mental Health Services Administration issue of the Supplemental Research Bulletin talks about behavioral health concerns, emergency response, and trauma within first responders. The issue mainly focuses on mental health and substance use concerns in first responders. Within the issue multiple research articles are used to discuss the importance of behavioral health conditions such as stress, depression, substance use, and suicide. The issue also discusses interventions to reduce behavioral health risks for first responders.