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# The Conditional Effects of Emotion Regulation on the Relationship Between Occupational Stress and Suicidal Behaviors in Veterinary Students

Sara Carroll Johnson

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THE CONDITIONAL EFFECTS OF EMOTION REGULATION ON THE RELATIONSHIP  
BETWEEN OCCUPATIONAL STRESS AND SUICIDAL BEHAVIORS IN VETERINARY  
STUDENTS

by

SARA CARROLL JOHNSON

(Under the Direction of Jeff Klibert)

ABSTRACT

Suicide is an area of increasing concern in the field of veterinary medicine. As veterinary students prepare to enter the profession and take on the unique stressors associated with this line of work, there is a need for models that identify protective factors for suicidal behaviors. Specifically, research is needed to identify factors that offset the relationship between occupational stress and suicidal behaviors. To better inform interventions designed to prevent suicidal behaviors in veterinary students, emotion upregulation and downregulation strategies were evaluated as potential moderators in the relationship between occupational stress and suicidal behaviors in a sample of veterinary students. Data were collected from 171 doctor of veterinary medicine students recruited from a large university. Participants were asked to complete a series of self-report surveys online via Qualtrics. Using the collected data, a series of mean differences, correlations, and moderated models were analyzed. Results indicated participants engaged in high rates of suicidal behaviors, which is consistent with previous literature. In addition, emotion upregulation strategies (savoring) were inversely associated with measures for occupational stress and suicidal behaviors. Alternatively, difficulties with downregulation strategies were positively associated with measures for occupational stress and suicidal behaviors. With regard to buffering effects, savoring strategies did not moderate the

relationship between occupational stress and suicidal behaviors. A different pattern was revealed for difficulties with emotion regulation strategies. Specifically, low levels of difficulties with non-acceptance of emotions, goal-directed behavior, impulse control, and limited emotion regulation strategies offset the relationship between occupational stress and suicidal behaviors. As a result, these emotion regulation domains are likely to serve as focal points for any suicide prevention program designed for veterinary students. Other clinical implications and future directions are discussed.

INDEX WORDS: Emotion regulation, Savoring, Upregulation, Downregulation, Suicidal behaviors, Occupational stress, Veterinary medicine, Veterinary students

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STUDENTS

by

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B.S., University of Georgia, 2017

M.S., Georgia Southern University, 2020

A Dissertation Submitted to the Graduate Faculty of Georgia Southern University in Partial

Fulfillment

of the Requirements for the Degree

DOCTOR OF PSYCHOLOGY

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SARA CARROLL JOHNSON

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## DEDICATION

This dissertation is dedicated to the veterinary students of Auburn University. May you be satisfied and fulfilled in your work; your labor is not in vain.

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## TABLE OF CONTENTS

ACKNOWLEDGMENTS.....	3
LIST OF TABLES.....	6
LIST OF FIGURES.....	7
CHAPTER 1: LITERATURE REVIEW.....	8
Purpose.....	9
Significance.....	10
Definition of Terms.....	11
Suicide in Professional Fields.....	12
Stress as Risk Factor.....	13
Conditional Relationship.....	14
Emotion Regulation as a Protective Factor.....	14
Upregulation of Positive Emotions.....	15
Downregulation of Negative Emotions.....	19
Current Study.....	22
Hypotheses.....	22
CHAPTER 2: METHODOLOGY.....	24
Participants.....	24
Measures.....	25
Demographics Form.....	25

Procedures.....	27
Planned Analysis.....	28
CHAPTER 3: RESULTS.....	30
Rates of Suicide.....	30
Factor Analysis.....	30
Mean Differences by Rural Groups.....	31
Primary Analyses.....	32
CHAPTER 4: DISCUSSION.....	53
Review of Purpose.....	53
Comparison of Suicide Rates.....	53
Rural Differences.....	54
Correlations.....	54
Moderated Effects for Savoring.....	57
Moderated Effects for Difficulties with Emotion Regulation.....	58
Clinical Implications.....	60
Limitations.....	62
General Conclusions.....	64
REFERENCES.....	65

## LIST OF TABLES

Table 1: Means and Standard Deviations by Rural Group.....	32
Table 2: Correlation Matrix for the Study's Main Variables.....	34
Table 3: Regression Statistics Occupational Stress and Total Savoring on Suicidal Behaviors...	35
Table 4: Regression Statistics Occupational Stress and Total Difficulties with Downregulation on Suicidal Behaviors.....	36
Table 5: Regression Statistics Occupational Stress and Non-Acceptance of Emotions on Suicidal Behaviors.....	40
Table 6: Regression Statistics Occupational Stress and Difficulties with Goal-Directed Behavior on Suicidal Behaviors.....	44
Table 7: Regression Statistics Occupational Stress and Difficulties with Impulse Control on Suicidal Behaviors.....	47
Table 8: Regression Statistics Occupational Stress and Limited Emotion Regulation Strategies on Suicidal Behaviors.....	50

## LIST OF FIGURES

Figure 1: Evaluation of Meaningful Factor Scores Using a Scree Plot.....	31
Figure 2: Simple Slopes Analysis for the Total Difficulties with Downregulation and Occupational Stress Interaction Effect on Suicidal Behaviors.....	38
Figure 3: Johnson-Neyman Graph Depicting Moderated Effect of Total Difficulties with Downregulation.....	39
Figure 4: Simple Slopes Analysis for the Non-Acceptance of Emotions and Occupational Stress Interaction Effect on Suicidal Behaviors.....	42
Figure 5: Johnson-Neyman Graph Depicting Moderated Effect of Non-Acceptance of Emotions.....	43
Figure 6: Simple Slopes Analysis for the Difficulties with Goal-Directed Behavior and Occupational Stress Interaction Effect on Suicidal Behaviors.....	45
Figure 7: Johnson-Neyman Graph Depicting Moderated Effect of Difficulties with Goal-Directed Behavior.....	46
Figure 8: Simple Slopes Analysis for the Difficulties with Impulse Control and Occupational Stress Interaction Effect on Suicidal Behaviors.....	48
Figure 9: Johnson-Neyman Graph Depicting Moderated Effect of Difficulties with Impulse Control.....	49
Figure 10: Simple Slopes Analysis for the Limited Emotion Regulation Strategies and Occupational Stress Interaction Effect on Suicidal Behaviors.....	51
Figure 11: Johnson-Neyman Graph Depicting Moderated Effect of Limited Emotion Regulation Strategies.....	52

## CHAPTER 1: LITERATURE REVIEW

Suicide is a significant public health concern in the United States (Hedegaard et al., 2018). Within the general population, there are certain groups who present as higher risk for suicide due to history of mental health concerns, challenging life circumstances, and particularly stressful occupations (Overholser et al., 2012). One such occupation is the field of veterinary medicine. Veterinarians are highly educated professionals who are charged with meeting the medical needs of their patients (i.e., animals) while balancing the needs of their clients (i.e., humans). Veterinarians are employed across a variety of settings, including small animal hospitals, agricultural facilities, and zoos. Approximately 1 in 6 U.S. veterinarians experience suicidal ideation in their lifetime (Nett et al., 2015). Notably, female veterinarians are 3.5 times more likely and male veterinarians are 2.1 times more likely to die by suicide compared to the general population (Tomasi et al., 2019). Similarly, doctor of veterinary medicine (DVM) students present as high risk for suicide (Dow et al., 2019) as they are integrating into a field under significant academic and emotional strain. Psychological strain often comes in the form of social isolation, tense workplace relationships, working long hours, learning about and practicing animal euthanasia, as well as co-occurring difficult life events (Bartram & Baldwin, 2010; Platt et al., 2012). Considering these trends, it is important research consider unique elements of veterinary training and practice in forming more professionally relevant prevention programs.

Despite elevated rates of risk, there is a lack of preventative models for suicide specific to veterinarians and DVM students (Platt et al., 2012). Instead, most research focuses on identifying risk factors and reducing suicidal behaviors once veterinarians present with suicidal symptoms. It is important that research identify protective factors for veterinarians and DVM students.

Protective factors are important in developing sensitive and effective models of prevention, and

there is a demonstrated need for further research in this area (Zalsman et al., 2016).

Methodologically, protective factors are defined as variables that demonstrate an inverse relationship with suicidal outcomes (Vagi et al., 2013) and mitigate the effects of known risk factors to thwart the development of suicide symptoms (Steca et al., 2014). In terms of DVM students, it is important to identify factors that are inversely related to suicide behaviors and mitigate the effects of occupational and academic stress on suicidal outcomes.

Emotion regulation is an under-developed yet potentially fruitful area of examination regarding suicide prevention for veterinary students and workers. Distinct from stress management, emotion regulation is defined as an individual's ability to control how his/her emotions, both positive and negative, are experienced (Gross, 2015). Emotion regulation strategies are multifaceted and include willful efforts to upregulate (i.e., prolong, extend) positive emotions and downregulate (i.e., reduce, halt completely) negative emotions (Gross, 2015; Quoidbach et al., 2010). Both processes of emotion regulation are important in understanding pathways to suicide (Vasudeva & Singh, 2017). Considering the intersecting emotional states DVM students and practicing veterinarians experience on a day-to-day basis, assessing for effective emotional control mechanisms seems like a prudent and theoretically rich course of action to halt suicide in this population. Moreover, emotion regulation is amenable to development through programmatic interventions, making it a promising area of exploration among a DVM student population.

## **Purpose**

In light of the scarcity of protective models for suicide in veterinary populations, the purpose of this study was to explore different emotion regulation tactics as protective factors for suicide in a DVM sample. Consistent with the empirical guidelines on identifying protective

factors, I investigated whether upregulation and downregulation strategies buffer the relationship between a professionally salient risk factor and suicidal behaviors. To this end, I aimed to answer the following questions: (a) are upregulation and downregulation strategies correlated with reports of occupational stress and suicidal behaviors among DVM students? and (b) do downregulating and upregulating strategies moderate the relationship between academic stress and suicidal behaviors among DVM students? At an exploratory level, I investigated differences in year of training in the DVM program, gender identity, and rurality of the town in which students were reared on reports of suicidal behaviors.

### **Significance**

Since so much attention is focused on responding to suicide behaviors once they occur, it is prudent to investigate protective factors, such as emotion regulation, to prevent early entry into the suicidal trajectory. Identifying emotion regulation strategies as protective factors is a great first step in building effective prevention methods for this population. Prevention strategies will contribute to well-being and longevity in the field by ensuring DVM and established veterinarians possess the needed mental health resources to face occupational challenges and stress with success. There is a need for evidence-based prevention programs around emotion regulation skills will help emerging professionals weaken the effects of negative emotions (e.g., fear, anxiety, sadness, guilt) and strengthen the effects of positive emotions (e.g., connectivity, joy, warmth) to promote higher levels of work and personal life satisfaction among emerging veterinarians. This project is one of the first to determine the importance of emotion regulation tactics in suicide prevention efforts for DVM students. Moreover, this study offers unique insights associated with how to develop professionally relevant prevention programs centered upon emotion regulation skill acquisition and usage.

## Definition of Terms

**Occupational Stress.** Occupational stress is defined within the context of this study as the subjective feeling of stress as a result of academic/occupational influences, both chronically (i.e., over an extended period of time without sufficient opportunity to recover) and acutely (i.e., in response to stressors of a more immediate nature; Winwood et al., 2006). Occupational stress serves as the focal predictor variable in this study.

**Emotion Regulation.** Emotion regulation is defined as attempts to control whether, when, and to what extent people experience emotions (Gross et al., 2006). This is a broad term as emotion regulation can be achieved through numerous avenues. However, this study focuses on the use of two particular emotion regulation tactics: emotion downregulation and emotion upregulation. Emotion downregulation involves the extent to which individuals are able to reduce or halt their experience of negative emotions (Gross, 2015). Emotion upregulation was assessed by examining the extent to which individuals savor their experience of positive emotions (Quoidbach et al., 2010). In the current study, emotional upregulation and downregulation strategies serve as the moderating variables.

**Suicidal Behaviors.** Suicidal behaviors involve both previous suicide attempts as well as current suicidal ideation (Osman et al., 2001). More specifically, this construct includes both passive and active consideration of engaging in suicide and previous unsuccessful attempts in completing suicide. In the current study, this scope of suicidal behaviors, which includes an individual's perceived likelihood of attempting suicide in the future, serves as the outcome variable.



## **Suicide in Professional Fields**

Suicide is a worldwide public health concern, but certain personal, environmental, and circumstantial factors elevate an individual's risk for ending his or her life (World Health Organization, 2014). In terms of environment, there is increasing discussion of how certain occupations, particularly those in medical fields, contribute to higher suicide risk (Agerbo et al., 2007). In fact, individuals in health-related occupations are at an elevated risk for suicide, even when controlling for demographic variables such as gender, race, age, and marital status (Stack, 2001). Relatively little is known about how specific risk factors contribute to elevated suicide risk in particular medical occupations. However, within the field of veterinary medicine, factors related to the stressful nature of the work (i.e., long hours, financial strain, practice of animal euthanasia, access to lethal drugs) are widely considered to contribute to mental health difficulties and, by extension, suicide outcomes (Bartram & Baldwin, 2008). Between 1979 and 2015 alone, 398 veterinarians died by suicide, a rate 3.5 times greater than that of the general United States population (Tomasi et al., 2019). While some discussions suggest particular personality traits (i.e., competitiveness) associated with entry into the field of medicine explain high risk to suicide (Dawson & Thompson, 2017), these discussions fail to adequately address the intensity and frequency by which veterinarians report suicidal behaviors, which is double the rate of what is observed in other healthcare fields (Halliwell & Hoskin, 2005).

As mentioned previously, there are unique factors contributing to the mental health needs of those in the veterinary field, including DVM students. For example, common stressors such as first-semester homesickness, academic difficulties, physical health concerns, and difficulty connecting with peers are contributing factors to depressive symptoms (Hafen et al., 2008). Additionally, financial strain, heavy workload, the accumulation of debt, and adjustment to life

as a junior professional colleague are other stressors thought to contribute to higher levels of behavioral health risk among DVM students (Collins & Foote, 2005). There is also some evidence that DVM students who have had more companion animals in their personal lives and students who identify as women are more likely to report experiencing stress in their programs (Strand et al., 2005). Like their fully qualified veterinarian counterparts, DVM students are repeatedly exposed to animal euthanasia which has the potential to increase the fearlessness associated with encountering deaths (Witte et al., 2013). In addition, DVM students are required to tackle significant emotional strain in preparation for working with their patients and their patients' caregivers (Yang et al., 2019). In combination, these elements can increase their desire for death and ability to enact severe suicidal behavior. Given the overlap of stressors experienced by DVM students with those of veterinarians and the high rates of suicide in the profession, there is a clear need for veterinary professional training programs to take steps to help trainees develop the skills needed to cope with the debilitating effects of career-related stress. However, more research is needed to clarify what these programs should entail.

### **Stress as Risk Factor**

Stress is a significant risk factor for suicidal behaviors in a multitude of populations (Fergusson et al., 2000; Wang et al., 2012). Occupational stress, especially in healthcare professionals, contributes to different psychopathological and suicidal outcomes (Bartram & Baldwin, 2010; Iliceto et al., 2013). Although many individual factors contribute to suicide risk, there is compelling evidence suggesting stress experienced in the veterinary workplace and training environments are uniquely predictive of different suicidal outcomes. For example, in addition to eroding the emotional and mental well-being of veterinarians, occupational stressors, which include heavy workload, financial strain, and emotional demands, are significantly

correlated with suicidal ideation (Andela, 2020; Hafen et al., 2008). The impact of these stressors are widely experienced to various degrees, but approximately 6.8% of men veterinarians and 10.9% of women veterinarians report currently experiencing severe psychological distress (Nett et al., 2015). Moreover, Bartram and Baldwin (2008) propose a model in which occupational stress, along with co-occurring personal life events and lack of healthy coping skills, contributes to psychological vulnerability to suicide. Particularly within the context of this framework, research clearly highlights occupational and training-related stressors as important in explaining suicide risk in different veterinary populations.

### **Conditional Relationship**

Despite the clearly defined evidence for stress as a risk factor, not all individuals who experience stress report difficulties with suicidal symptoms (Steinhardt & Dolbier, 2008). In fact, DVM students regularly graduate from their programs and go on to thrive in productive careers (Cake et al., 2015). For every veterinary student whose mental well-being suffers under stressors specific to the profession, there are many more who experience the same stressors but experience more positive psychological outcomes. Given these differences, it is important to identify factors that moderate the relationships between occupational stress and suicidal behaviors in samples of DVM students.

### **Emotion Regulation as a Protective Factor**

One factor that may explain the conditional nature in the relationship between occupational stress and suicidal behavior among DVM students is emotion regulation. Emotion regulation is a broad term encompassing the management of negative and positive emotions arising from various events/circumstances/stressors. Emotion regulation strategies are employed to attenuate the present emotional experience in a way that brings about better health outcomes.

Attenuating emotional experience can take different forms, all of which use a range of resources including implicit cognitive exercises (e.g., focusing attention on particular thoughts) and engagement in explicit behaviors (e.g., turning toward someone who is laughing; Gross, 2013). These strategies can be deployed in a variety of situations and be taught and practiced, which makes them well-suited for exploration as a protective factor for suicide outcomes.

There is evidence that well-developed emotion regulation skills promote resilience which can serve as a protective factor against future stressful events (Troy & Mauss, 2011). Moreover, there are numerous emotion regulation strategies established as effective methods of navigating stress, minimizing distress, and promoting well-being (Balzarotti et al., 2016). It is important to note that while significant deficits in emotion regulation contribute broadly to psychopathology (Sheppes et al., 2015), it is also true that appropriate use of healthy emotion regulation strategies contributes to social and emotional well-being, with the potential to help individuals offset the negative effects of stress (John & Gross, 2004). Currently, there are two large domains of emotion regulation strategies worth exploring in the context of suicide: upregulation of positive emotions and downregulation of negative emotions.

### **Upregulation of Positive Emotions**

Emotion upregulation involves the willful process of increasing and amplifying a particular emotional experience (Gross et al., 2006). Generally, people tend to use upregulation strategies to prolong their experience with positive emotions (Quoidbach et al., 2015).

Upregulation of positive emotions, when compared to downregulation of negative emotions, is under-acknowledged and under-researched within the literature, despite its association with physiological well-being (e.g., lower risk of cardiovascular disease and fewer sleep problems) and psychosocial well-being (e.g., feelings of connectedness and use of healthy coping

behaviors; Steptoe et al., 2009). In fact, the experience of positive emotional states is associated with greater resilience and life satisfaction, pointing to the importance of not only taking a generally positive view of one's life and circumstances, but of increasing the power by which an individual experiences positive emotions in the moment (Cohn et al., 2009). Given the benefits of prolonging positive affective states, strategies to upregulate an individual's experience of positive emotions appear key in promoting life satisfaction and reducing behavioral risk. For example, individuals may connect everyday events with positive meaning or intentionally engage in behaviors associated with positive emotions, such as smiling and laughter (Tugade & Fredrickson, 2007). The effects of such positive emotion regulation tactics are extremely beneficial in helping individuals build a dependable set of well-being resources (Colombo et al., 2021). One particular upregulation strategy worth exploring in the context of occupational stress and suicide is savoring.

Savoring involves the generation, sustainment, and enhancement of positive emotions (Bryant, 2003). Largely, savoring is an extension of mindfulness-based training, where individuals are asked to engage in strategies designed to sharpen their focus on the experience and expression of positive emotions (Bryant & Veroff, 2007). These strategies, which are associated with emotional well-being, include intentional reflection on positive life events (i.e., reminiscence on past events and anticipating events in the future), attending to positive emotional experiences in the moment, and sharing these experiences with peers (Quoidbach et al., 2010).

*Savoring and Stress.* Commonly, demanding academic programs and professional expectations often serve as barriers to savoring processes. However, savoring is a critical component of emotion regulation and associated skills can be developed even in the midst of

challenging circumstances through practice. Savoring the moment is positively associated with overall life satisfaction (Hurley & Kwon, 2013). It is also one of the primary avenues by which positive events elicit happiness in individuals (Jose et al., 2012). If two people have the same positive experience and one uses savoring strategies to prolong their positive feelings and the other does not, the one who utilizes those strategies would derive a greater benefit. However, the benefits of savoring extend beyond merely experiencing pleasant emotional states. The experience of positive emotions is linked with resilience in individuals undergoing stress, such that they can find meaning in their difficult circumstances and recover more quickly from distress (Tugade & Fredrickson, 2004). There is also evidence that increasing positive emotional states is linked with greater student engagement in the task of studying, which highlights the practical benefits of savoring (Ouweneel et al., 2011).

Currently, there is a strong movement to evaluate savoring in the context of stress and daily hassles. Paradoxically, research indicates individuals do experience a significant amount of positive emotions during stressful situations (Zautra et al., 2005). However, individuals are not likely to recognize and capitalize on these positive emotions because stress often generates more frequent and intense negative emotions. Despite this skewed ratio, theorists postulate that identification and regulation of existing positive emotions during a stressful event may bring about more resilient and well-being outcomes (Bryant & Smith, 2015).

*Inverse Relationship with Suicide.* There is limited research that establishes a definitive link between the practice of savoring and lower rates of suicide behaviors among veterinarians and DVM students. However, a handful of studies indicate savoring is inversely related with suicide risk factors and suicidal behaviors. For instance, individuals who engage in high levels of savoring strategies report fewer symptoms of depression (Ford et al., 2016), lower levels of

anxiety (Eisner et al., 2009) and greater adjustment to stressful events (Samios et al., 2020), all of which are risk factors for suicide. More directly, the frequency of positive emotions and increased use of savoring processes are connected to lower rates of engagement in suicidal behaviors (Klibert et al., 2018).

*Moderating Effects for Savoring.* There is a lack of research which establishes savoring as a protective factor for suicidal behaviors among professionals in the veterinary field. However, there is research to support the role of savoring as a buffer for different types of psychopathological outcomes. For instance, savoring functions as a moderator in the relationship between combat stress and mental health difficulties among veterans (Sytine et al., 2018). These findings suggest that the use of savoring techniques offset the negative effects of combat stress on poor mental health outcomes (e.g., depressive, post-traumatic stress, and substance use disorders). In addition, savoring moderates the link between physical health and life satisfaction in older adults, such that individuals with greater abilities to savor positive emotions are able to maintain high life satisfaction even in the face of reported health challenges. Likewise, savoring moderates the relationship between negative emotions and suicide outcomes in samples of gender or sexual minority (GSM) individuals (Klibert et al., 2018). Specifically, higher levels of savoring in the moment offset the relationship between negative emotions and different suicidal outcomes (e.g., ideation, attempts). Taken together, these findings suggest the degree to which individuals experience stress, which leads to increased engagement in suicidal behaviors, may be influenced in part by individual differences in savoring. Therefore, I expect savoring to be a significant factor in explaining variation in the relationship between occupational stress/fatigue and suicidal behaviors among DVM students.

## **Downregulation of Negative Emotions**

Downregulation of negative emotions is another component of emotion regulation to be examined in this study. Managing negative emotions is a set of applied skills that has the potential to help DVM students to minimize engagement in suicidal symptoms stemming from academic and occupational strain. Downregulation of negative emotions involves the extent to which individuals can attenuate (i.e., reduce or halt completely) their experience of negative emotions (Gross, 2015; Quoidbach et al., 2010). Individuals with this ability use strategies to accept negative emotions as they arise, engage in goal-directed behaviors (e.g., focusing on work or pleasurable activities) while experiencing distress, and refrain from responding to negative emotions with impulsivity (Bjureberg et al., 2016a). Individuals with high downregulation skills also have the ability to attend to their experience of negative emotions and understand those experiences, whereas people with difficulties in this area experience confusion and may even feel irritated by negative emotions (Bjureberg et al., 2016a). DVM students equipped with strategies to relate to negative emotions in this way would be able to respond flexibly to the emotional impact of challenges and setbacks that are inevitable in DVM training programs and not be derailed by them.

*Downregulating and Stress.* Difficulty with downregulating negative emotions is associated with stress, in that individuals who are limited in the application of emotion regulation strategies are disproportionately impacted by daily stressors. Exposure to stress consistently results in a variety of negative outcomes, including engagement in unhealthy coping behaviors. One of the benefits of effective downregulation of negative emotions, specifically the ability to describe one's emotional experience, is its association with less engagement in strategies of avoidance (e.g., substance use and distraction; Brown et al., 2021). As a result, downregulation is



emerging as an area of focus in stress management techniques, being linked with increase resilience and coping flexibility in response to life's inevitable stressors (Zimmer-Gembeck, 2021). There is also evidence that management of negative emotions under stressful conditions not only improves adjustment at the individual level, but in peers undergoing similar stressors, further highlighting the potential of downregulation strategies to promote longstanding effects on well-being (Oveis et al., 2020). From a theoretical perspective, downregulation strategies appear to be influential in how individuals manage and heal from stress.

Incidentally, research supports this position. For instance, stress is often associated with poorly developed emotion regulation skills in college student populations (Martin & Dahlen, 2005). Similarly, fewer difficulties with emotion regulation are associated with lower levels of perceived stress (Prakash et al., 2015). Research also highlights emotion regulation as one pathway by which clinicians reduce perceived and academic stress in college students (Cherry & Wilcox, 2020). Specifically, downregulation of negative emotions helps individuals recover from daily stressors and improve different emotional outcomes (Schraub et al., 2013).

*Inverse Relationship with Suicide.* It is important to note that vulnerability to suicide is shaped in part through difficulties with regulating negative emotions (Miranda et al., 2013). Particularly, difficulties finding emotional clarity and managing emotional impulsivity are clearly connected with suicide risk in populations of individuals with a previous attempt (Neacsiu et al., 2018). Dysregulation of negative emotions is also associated with greater desire for suicide as well as non-suicidal self-injury (NSSI; Heffer & Willoughby, 2018). Difficulties with downregulating negative emotions are significant predictors of suicidal ideation, especially among young adult populations (Rajappa, et al., 2012). Furthermore, emotion dysregulation, highlighted by difficulties in downregulation, is a significant predictor for suicidal ideation

independent of depression, which highlights it as an important area of further investigation to inform targeted prevention and intervention programs (Arria et al., 2009). Overall, due to the well-established link between emotion regulation and suicide, bolstering emotion downregulation skills is a priority for clinicians who seek to treat individuals who present as high-risk for suicide (DeCou et al., 2019).

*Moderating Effects for Downregulation.* Although very little literature exists regarding the effects of downregulation in DVM samples, this process of emotional downregulation is emerging as a major factor in suicide prevention. However, the manner in which emotion dysregulation influences suicide outcomes is complex. Emotional downregulation, particularly strategies that promote cognitive reappraisal, functions as a buffer between everyday stressors and negative mood, bolstering resilience to stress (Johnson et al., 2016). Another facet of downregulation, suppression of expression of negative emotions, also serves as a buffer between stress and suicide outcomes (Franz et al., 2021). In addition, emotion downregulation abilities moderate the relationship between perceived stress and overall well-being, as indicated by reports of fewer symptoms of depression, which is itself a risk factor for suicide (Extremera & Rey, 2015). Downregulation of negative emotions consistently serves as a buffer to suicide in other at-risk groups (Pisani et al., 2013). The protective features of effective downregulation are further demonstrated in the relationship between mental pain and suicide, such that individuals with less developed skills in this area experience suicidal ideation at greater rates (Shelef et al., 2015). Overall, evaluation of effective downregulation skills is useful in assessing later suicide risk (Brausch & Woods, 2019; Ward-Ciesielski et al., 2018); when there are deficits in this area, individuals are at greater risk of engaging in maladaptive self-regulatory behaviors, including non-suicidal self injury (NSSI) and suicide (Zelkowitz et al., 2016).

## **Current Study**

The purpose of this current study is to uncover the specific conditions by which the relationship between occupational stress/fatigue and suicide behaviors exists. For every DVM student that experiences suicidal ideation, there are many others who experience the same occupational stressors but do not have the same negative outcomes. I hope to clarify some of those differences in order to better inform interventions at a programmatic level. The moderating effect of savoring positive emotions and downregulating negative emotions is an underdeveloped line of research, so I hope through an examination of those factors in a DVM student population, valuable insights will be yielded to not only reduce suicide risk, but to improve overall well-being.

## **Hypotheses**

Based on previously conducted research, it was expected that occupational stress would be positively related to suicidal behaviors among a population of DVM students. It was also predicted that greater abilities to regulate emotions would be inversely related to suicidal behaviors. More specifically, it was expected that upregulation of positive emotions would be inversely correlated with suicidal behaviors. Alternatively, it was expected that difficulties with downregulation behaviors would be positively associated with suicidal behaviors. Finally, I hypothesized that upregulating strategies and difficulties with down-regulating strategies would moderate the relationship between occupational stress and suicidal behaviors among DVM students. Specifically, I expected that the relationship between occupational stress and suicidal behaviors would decrease as a function of upregulation strategies; the relationship would be offset at higher levels of upregulation strategies. I also expected the relationship between occupational stress and suicidal behaviors to decrease as a function of difficulties with

downregulation strategies; being offset at lower levels of difficulties with downregulation strategies.

## CHAPTER 2: METHODOLOGY

### Participants

Students pursuing a Doctor of Veterinary Medicine (DVM) degree were recruited from a large southeastern university to participate in my study. The expected age range of participants was between 22 and 35 years of age. In order to assure adequate power, the goal was to recruit 200 participants, all of whom were required to be 18 years of age or older and be enrolled as a current veterinary student. Also, it was important to detect and remove participant scores that offered questionable validity. To this end, I included some validity-based exclusionary criteria. First, participants who completed less than 90% of the entire survey were removed from the final sample. Second, individuals who answered any of the check questions incorrectly were also removed from the final sample. No other exclusionary criteria were applied. Each participant was compensated with a \$10 digital Amazon gift card for participation in the study.

Initially, there were 186 submitted responses to the Qualtrics survey. To preserve the validity of the sample, 15 responses were removed because they were not sufficiently completed. In fact, all of these individuals failed to report more than 20% of the items in the survey. The total sample size included in final analyses was 171. Each year of graduate training (i.e., years 1-4) was represented in the sample. Specifically, 40 (23.4%) participants were in their first year, 42 (24.6%) in their second year, 47 (27.5%) in their third year, and 42 (24.6%) in their fourth year. In terms of gender, 10.5% ( $n = 18$ ) of participants identified as cisgender men and 86% ( $n = 147$ ) self-identified as cisgender women. Most respondents ( $n = 160$ , 93.6%) identified as White/Caucasian with other participants identifying as Latinx ( $n = 4$ , 2.3%), Multiethnic ( $n = 3$ , 1.8%), Other ( $n = 2$ , 1.2%), African American/Black ( $n = 1$ , .6%), and Asian American ( $n = 1$ , .6%). Consistent with expectations, the average age of the students who participated in the

survey was 24.36 years of age, with a standard deviation of 1.92 years. Regarding rurality, 57.6% ( $n = 98$ ) of participants reported being from a rural hometown and 42.4% ( $n = 72$ ) indicated they were from a non-rural hometown. Lastly, 50.9% ( $n = 87$ ) self-identified a low financial resource status, 43.3% ( $n = 74$ ) as moderate financial resource status, and 5.8% ( $n = 10$ ) as high financial resource status.

## Measures

**Demographics Form.** Participants completed a demographics form designed to assess basic information such as age, gender, ethnicity, SES, and marital status. Geographic location, specifically rurality, was also assessed using two demographic questions: 1) “Of these terms, [urban, rural] which best describes the area that you currently live?” and 2) “Of these terms, [urban, rural] which best describes the area in which you grew up?” I also asked participants to estimate the population size of the city/town in which they were reared.

**Suicide Behaviors Questionnaire-Revised (SBQ-R).** The SBQ-R (SBQ-R; Osman et al., 2001) is a 4-item version of the original 34 item SBQ which assesses history of suicidal behaviors and current suicidal ideation (Osman et al., 2001). Total scores range from 3 to 18, with higher scores indicating greater suicide risk. The SBQ-R possesses adequate internal consistency among a non-clinical population of college students ( $\alpha = .76$ ; Osman et al., 2001). The construct validity of this scale is satisfactory as evidenced through significant correlations with other measures of suicide risk, anxiety, and depression (Farabaugh et al., 2015; Osman et al., 2001). In the current study, the SBQ-R demonstrated good internal consistency ( $\alpha = .87$ ).

**Inventory of College Students Recent Life Experiences (ICSRLE).** The ICSRLE (Kohn et al., 1990) is a 49-item scale which assesses the degree of everyday hassles experienced by college students, such as developmental challenges, time management, academic difficulties,

everyday annoyances, and social concerns (Kohn et al., 1990). The ICSRLE is designed to assess for frequency of important stressors, not the physical, cognitive, or emotional consequences of stressors. Each item is rated on a 4-point Likert scale ranging from 1 (*not at all part of my life*) to 4 (*very much part of my life*). Higher scores indicate greater frequency of stress in academic life. This scale demonstrates good internal consistency ( $\alpha = .88$ ) and high convergent validity with other well-validated stress scales (Kohn et al., 1990). In the current study, the ICSRLE demonstrated excellent internal consistency ( $\alpha = .94$ ).

**Occupational Fatigue Exhaustion Recovery Scale-15 (OFER15).** The OFER15 (Winwood et al., 2005) is a 15-item version of the original 20-item scale developed to measure chronic and acute fatigue related to academic demands. The measure is adapted and validated for workers representing a diverse range of occupations (Martin et al., 2012; Winwood et al., 2005). Each item is rated on a 6-point Likert-type response scale. Responses range from 0 (*Strongly Disagree*) to 6 (*Strongly Agree*), with higher scores representing greater levels of work-related fatigue. This scale demonstrates good internal consistency ( $\alpha = .75$  to  $.93$ ), as well as strong convergent validity with other measures of fatigue and burnout (Winwood et al., 2005). In the current study, the OFER15 demonstrated excellent internal consistency ( $\alpha = .94$ ).

**Savoring Beliefs Inventory (SBI).** The SBI (Bryant, 2003) is a 24-item self-report measure which assesses an individual's ability to engage with and reflect on positive experiences in such a way that intensifies enjoyment and promotes positive emotions associated with those experiences. The SBI is a measure of positive emotional upregulation. This scale assesses savoring across three dimensions: anticipating, savoring the moment, and reminiscing. However, the current study only examined the SBI total score. Items are rated on a 7-point scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores reflect greater abilities to generate,

maintain, and extend positive emotions through savoring. The SBI demonstrates good internal consistency ( $\alpha = .88 - .94$ ), convergent validity with related measures, and discriminant validity through negative associations with constructs unrelated to savoring (Bryant, 2003). In the current study, the SBI demonstrated excellent internal consistency ( $\alpha = .95$ ).

**Difficulties in Emotion Regulation Scale (DERS).** The DERS (Bjureberg et al., 2016b) is a 36-item measure, which assesses different facets of emotion dysregulation: lack of acceptance of negative emotions, inability to engage in goal-directed behaviors, impulse control difficulties, limited access to emotion regulation strategies, and lack of emotional clarity (Gratz & Roemer, 2004). The DERS is a measure of emotional downregulation. Items are rated on a 5-point Likert-type scale from 1 (*almost never*) to 5 (*almost always*). Total scores range from 36 to 180, with higher scores indicating greater difficulties with emotion regulation. This scale demonstrates good internal consistency ( $\alpha = .92$ ) and excellent concurrent validity with the original scale, as well as good convergent validity with other measures of emotion regulation (Bjureberg et al., 2016a). In the current study, the DERS total score demonstrated excellent internal consistency ( $\alpha = .95$ ).

## Procedures

Participants were recruited through a digital flyer distributed via email announcements. Through these means, participants received a link to a Qualtrics survey. Those individuals who were interested in participating clicked on the weblink or scanned the QR code to find the survey. Once at the survey page, participants were provided with an electronic informed consent. The informed consent outlined the potential risks of participating in the study, as well as possible benefits. Those who wished to continue with the survey indicated their consent to participate by clicking on the “I give my consent to participate” button. After providing their electronic



consent, participants were asked to complete a demographics questionnaire followed by a randomized list of the previously discussed self-report measures. Following completion of the survey, participants were debriefed about the nature and purpose of the study and provided with referrals for free or low-cost mental health services available in their community. Each participant was given the opportunity to submit their email address using a separate Google form to receive a digital \$10 Amazon gift card for their participation in the study.

**Data Storage.** All data was initially stored on Qualtrics. Following data collection, the data was transferred from its online platform to SPSS, at which time it was deleted from Qualtrics. Data transferred to SPSS was stored on a secure, password-protected hard drive.

### **Planned Analysis**

**Preliminary Analysis.** I first evaluated whether there should be one or two stress constructs based on the measures that were administered. During data collection, participants completed the ICSRLE and OFER15. To determine whether these constructs were fundamentally different from one another, I ran an exploratory factor analysis. This analysis revealed one common factor score, so I used a composite measure of occupational stress. In addition, I evaluated fluctuations in the study's main variables by important grouping variables. In order to evaluate rural, gender, and program specific differences on the study's main variables, I analyzed a series of MANOVAs. Specifically, I evaluated whether participants differed in self-reports of stress, emotion regulation tactics, and suicidal behaviors by gender, rurality, and year in the program.

**Primary Analysis.** Initially, I analyzed bivariate correlations to determine whether the study's main variables were related to one another in the expected direction and to the expected degree. Once this was established, I ran a series of moderated models using the PROCESS

MACRO, specifying the different functions of each variable within the models (Darlington & Hayes, 2016). Specifically, occupational stress served as the focal predictor, suicidal behaviors served as the outcome variable, and measures of emotion regulation (i.e., DERS and SBI) served as the moderators. Analyses revealed that emotion downregulation strategies significantly moderate the relationship between stress and suicidal behaviors. For exploratory purposes and to further delineate significant findings, I evaluated the subscales of the difficulties with emotion regulation scale, in addition to the total score. Then, I probed the significant effects further to clarify the point and degree of moderation. To do this, I first used a simple slopes analysis to determine how the relationship between occupational stress and suicidal behaviors varied at different levels of the moderating variables. Second, I used the Johnson-Neyman technique to determine any offsetting points, whereby the relationship between occupational stress and suicidal behaviors was offset or nullified.

## CHAPTER 3: RESULTS

### **Rates of Suicide**

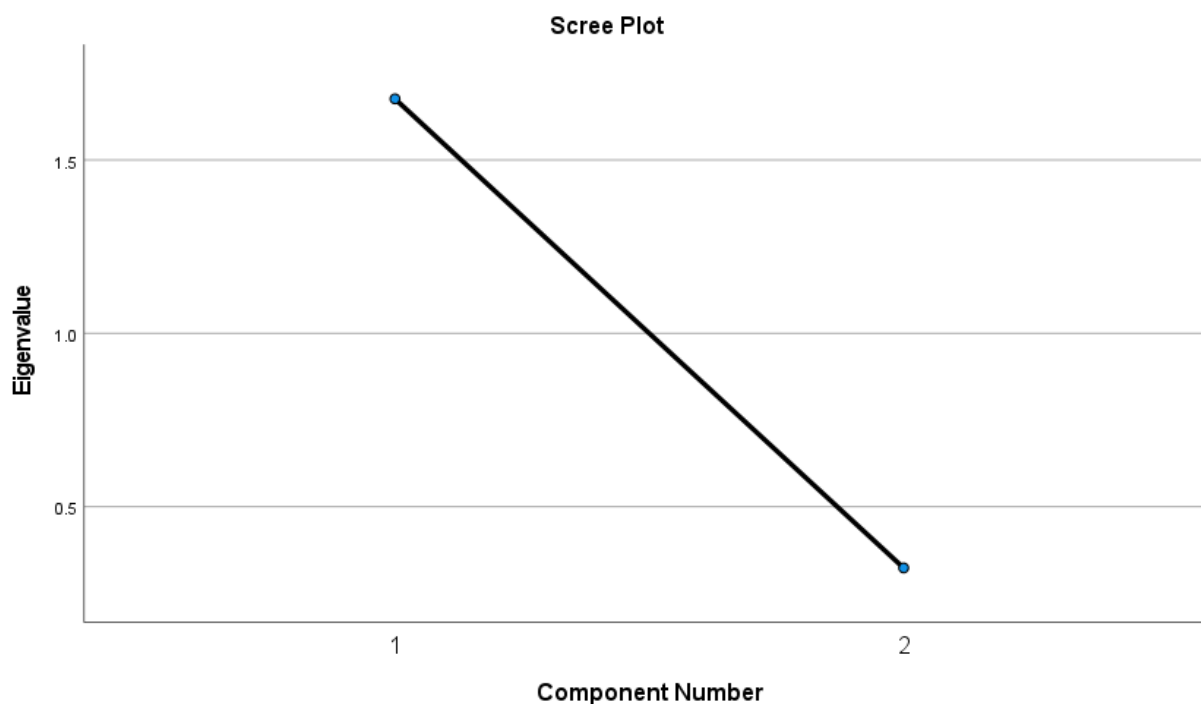
Because suicide is a growing public health concern among veterinary students and professionals, I decided to estimate the frequency by which my sample engaged in suicidal behaviors. Specifically, I evaluated participant responses to items measuring suicide ideation, suicide plans, lifetime attempts, and likelihood of future suicide attempts. DVM participants reported engaging in a wide range of suicidal behaviors. In terms of lifetime reports of suicidal ideation, 41.8% ( $n = 71$ ) thought about killing themselves at least once, with the majority of these individuals ( $n = 46$ ) engaging in passive forms of ideation only. Regarding ideation in the past year, 38.2% ( $n = 48$ ) thought about killing themselves at least once, with 28 (16.5%) of participants reporting suicidal ideation multiple times during the last year. Importantly, 25 (14.7%) participants reported making at least one plan to die by suicide during their lifetime and 31 (18.2%) reported telling another person they were going to die by suicide at some point in their life. Finally, 3% ( $n = 7$ ) of participants indicated they were likely to make a suicidal attempt someday.

### **Factor Analysis**

An exploratory principal component analysis was conducted to obtain a component score of DVM student occupational stress, using scores generated by the ICSRLE and OFER15. Consistent with Kaiser's (1960) recommendation, component scores with a minimum eigenvalue of 1.0 were retained. This yielded one factor of occupational stress that accounted for 83.82% of the total variance between both stress measures. This factor, termed occupational stress, represents the discrete features of recent stressful life experiences and the fatigue associated with a demanding academic program. Figure 1 depicts the scree plot.

**Figure 1**

*Evaluation of Meaningful Factor Scores Using a Scree Plot*



### Mean Differences by Rural Groups

A MANOVA was used to evaluate potential rural differences (rural vs. non-rural) in the study variables (i.e., occupational stress, downregulation, savoring, and suicide behaviors). The MANOVA revealed a non-significant overall effect for current rural status,  $F(1, 176) = .52, p > .05, \eta^2 = .02$ . Follow-up ANOVAs did not yield any significant findings. Table 1 depicts the means and standard deviations for each variable by rural group. Overall, these results suggest that individuals with rural hometowns have similar reported scores on measures related to savoring, emotion downregulation, and suicidal behaviors as compared to those with non-rural hometowns. I also considered evaluating differences based on participants retained in the sample

versus those who were removed. However, I could not run the analyses because all individuals removed from the final sample did not complete more than 20% of the survey.

**Table 1**

*Means and Standard Deviations Scores for Suicidal Behaviors, Occupational Stress, Savoring, and Difficulties with Emotional Downregulation by Rural Group*

	Rural Group ( <i>n</i> = 98)	Non-Rural Group ( <i>n</i> = 71)	<i>F</i>	<i>p</i>	<i>Partial</i> $\eta^2$
Suicidal Behaviors			.01	.93	.00
Mean	6.36	6.31			
Standard Deviation	3.64	3.35			
Occupational Stress			1.39	.24	.00
Mean	.08	-.10			
Standard Deviation	1.07	.90			
Savoring			2.13	.15	.01
Mean	123.76	129.14			
Standard Deviation	25.23	21.30			
Difficulties with Downregulation			1.65	.20	.01
Mean	91.86	86.89			
Standard Deviation	25.30	24.16			

### Primary Analyses

**Bivariate Correlations.** Zero-order correlations were examined to determine whether significant relationships existed among the study variables. Table 2 depicts the correlation coefficients among the study variables. As expected, the relationship between occupational stress and suicidal behaviors was significantly correlated in the positive direction ( $r = .44, p < .01$ ). Likewise, occupational stress was significantly positively correlated with difficulties with downregulation ( $r = .64, p < .01$ ) and inversely correlated with total savoring ( $r = -.51, p < .01$ ). Total savoring was significant in its inverse correlation with suicidal behaviors ( $r = -.47, p < .01$ ) and total difficulties with downregulation was significantly correlated with suicidal behaviors in the positive direction ( $r = .51, p < .01$ ). In addition, as an exploratory measure, I evaluated the

relationships among occupational stress, suicidal behaviors, and the unique domains of savoring and difficulties with emotion regulation (see Table 2). All correlations were in the expected direction and are consistent with study hypotheses.

**Table 2***Correlation Matrix for the Study's Main Variables*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Suicidal Behaviors	--												
2. Occupational Stress	.44*	--											
3. Total Savoring	-.47*	-.51*	--										
4. Anticipation Savoring	-.41*	-.39*	.93*	--									
5. Moment Savoring	-.50*	-.57*	.92*	.77*	--								
6. Reminiscence Savoring	-.39*	-.42*	.91*	.78*	.76*	--							
7. Total Difficulties with Downregulation	.51*	.64*	-.56*	-.43*	-.62*	-.49*	--						
8. Non-Acceptance of Emotions	.39*	.51*	-.43	-.37*	-.44*	-.36	.81*	--					
9. Difficulties with Goal-Directed Behavior	.36*	.50*	-.29*	-.19^	-.33*	-.27*	.67*	.46*	--				
10. Difficulties with Impulse Control	.49*	.52*	-.42*	-.29*	-.46*	-.41*	.76*	.48*	.51*	--			
11. Lack of Emotional Awareness	.13	.22*	-.33*	-.29*	-.37*	-.23*	.52*	.37*	.04	.15	--		
12. Limited Emotion Regulation Strategies	.55*	.63*	-.60*	-.44*	-.65*	-.54*	.87*	.64*	.60*	.74*	.22*	--	
13. Lack of Emotional Clarity	.25*	.38*	-.34*	-.22*	-.28*	-.28*	.72*	.49*	.30*	.43*	.62*	.47*	--

Note: ^ Correlations significant at the .05 level, \* Correlations significant at the .01 level

**Upregulation (Savoring) Moderation Models.** To gain a better understanding of the impact of savoring on the relationship between occupational stress and suicide behaviors in DVM students, I ran a moderated model using PROCESS (Model 1; Darlington & Hayes, 2016). In the regression model, occupational stress served as the focal predictor, total savoring as the moderator, and suicidal behaviors as the outcome variable. Regression statistics are presented in Table 3. In total, the main and interactive effects accounted for 28% of the variance in suicidal behaviors,  $F(3, 167) = 21.86, p < .01$ . Within the model, the main effect for occupational stress was non-significant ( $b = -.2.39, p = .06$ ), whereas the main effect for total savoring ( $b = -.05, p < .01$ ) was significant. At a multivariate level, the occupational stress x total savoring interaction ( $b = -.01, p = .23$ ) was non-significant. Given this pattern of findings, total savoring did not moderate the relationship between occupational stress and suicidal behaviors in my sample of DVM students. As an exploratory exercise, I also evaluated the impact of savoring subscale scores (Anticipation, Moment, Reminiscence) on the relationship between occupational stress and suicidal behaviors. Results were similar when compared to the total savoring model, in that none of the savoring subscale scores moderated this relationship.

**Table 3**

*Regression Statistics Occupational Stress and Total Savoring on Suicidal Behaviors*

Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	12.00	.51	7.90	.00	9.00	15.00
Occupational Stress	2.39	1.25	1.91	.06	-.07	4.85
Total Savoring	-.05	.01	-3.96	.00	-.07	-.02
Interaction Effect	-.01	.01	-1.20	.23	-.03	.01



**Downregulation Moderation Models.** To gain a better understanding of the impact of difficulties with emotion regulation, specifically downregulation, on the relationship between occupational stress and suicidal behaviors in DVM students, I ran a moderated model using PROCESS (Model 1). In the regression model, occupational stress served as the focal predictor, total difficulties with downregulation as the moderator, and suicidal behaviors as the outcome variable. Regression statistics are presented in Table 4. In total, the main and interactive effects accounted for 32% of the variance in suicidal behaviors,  $F(3, 166) = 25.41, p < .01$ . Within the model, the main effect for occupational stress was non-significant ( $b = -1.49, p = .07$ ), whereas the main effect for total difficulties with downregulation ( $b = .05, p < .01$ ) was significant. At a multivariate level, the occupational stress x total difficulties with downregulation interaction ( $b = .03, p < .01$ ) was significant. In total, these patterns of scores suggest that total difficulties with downregulation does moderate the relationship between occupational stress and suicidal behaviors in a sample of DVM students.

**Table 4**

*Regression Statistics Occupational Stress and Total Difficulties with Downregulation on Suicidal Behaviors*

Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	1.92	1.10	1.75	.08	-.25	4.09
Occupational Stress	-1.49	.81	-1.83	.07	-3.10	.12
Total Difficulties with Downregulation	.04	.01	3.60	.00	.02	.07
Interaction Effect	.03	.01	2.83	.01	.01	.04

To deconstruct the significant two-way interaction between occupational stress and total difficulties with downregulation, I examined the relationship between occupational stress and suicidal behaviors across different levels of total difficulties with downregulation. Specifically, I evaluated the deconstructed relationship through a simple slopes analysis and the Johnson-Neyman technique. These analyses were illustrated with the interactive utility tool (McCabe, Kim, & King, 2018) and the CAHOST Excel workbook for the Johnson-Neyman technique (Carden, Holtzman, & Strube, 2017). Conditional effects are depicted in Figures 2 and 3.

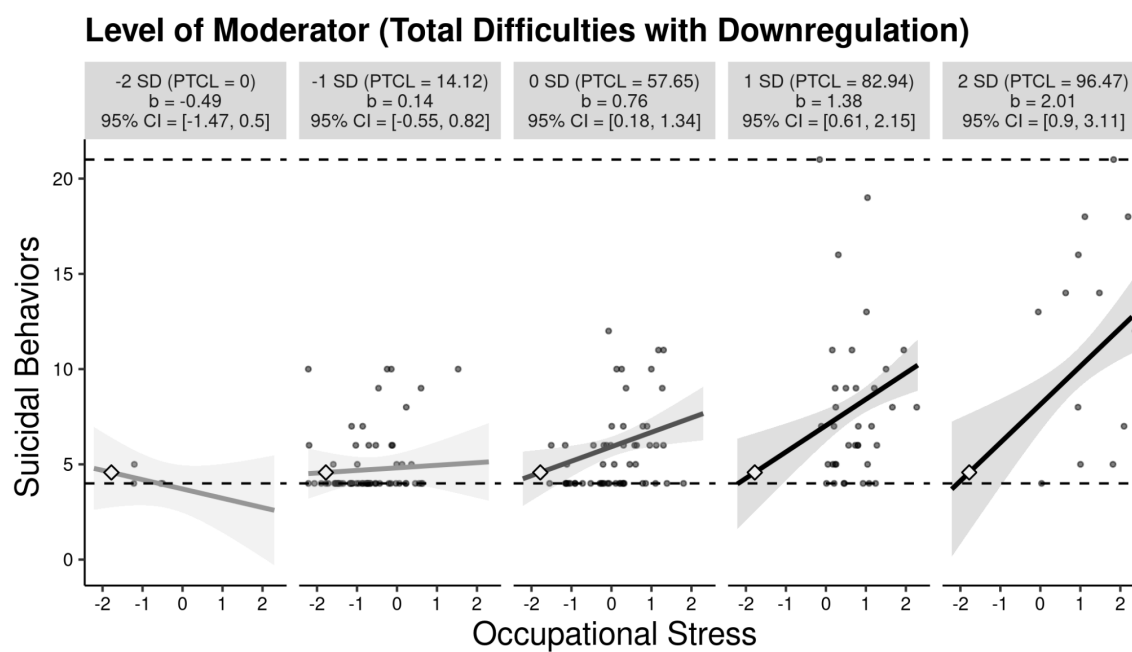
In Figure 2, the relationship between occupational stress and suicidal behaviors is depicted through simple slopes evaluation as a function of different levels of total difficulties with downregulation. Results indicate that at lower levels of total difficulties with downregulation, the relationship between occupational stress and suicidal behaviors weakens. Of note, the relationship between occupational stress and suicidal behaviors completely dissolves at low levels difficulties with downregulation (Panel 2 of Figure 2). Alternatively, at high levels of total difficulties with downregulation, this relationship strengthens. However, because simple slopes analyses use arbitrary values ( $-2 SD$  to  $2 SD$ ) to evaluate the effects of a moderator, I was unable to identify the precise point by which the values of a moderator completely offset the relationship between occupational stress and suicidal behaviors. In Figure 3, the moderated effect of total difficulties with downregulation is depicted through the Johnson-Neyman graph. Within the figure, the dark, thin vertical line marks the regional boundaries by which occupational stress was associated with suicidal behaviors. Results indicated a significant and positive relationship between occupational stress and suicidal behaviors for 54.71% of the sample. Consistent with this pattern, the Johnson-Neyman graph indicated that the relationship between occupational

stress and suicidal behaviors discontinues at an average total score of 81.97 on the total difficulties with downregulation measure.

**Figure 2**

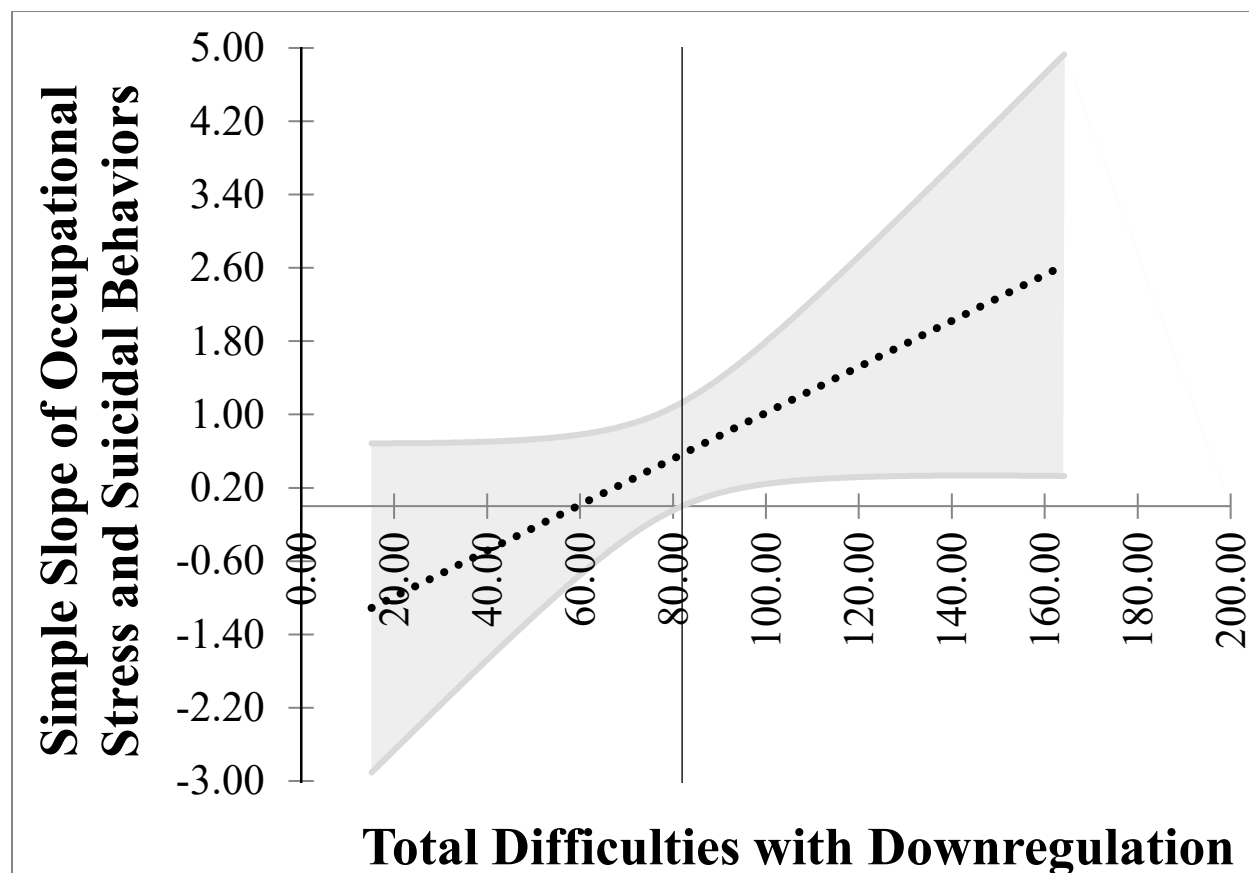
*Simple Slopes Analysis for the Total Difficulties with Downregulation and Occupational Stress*

*Interaction Effect on Suicidal Behaviors*



**Figure 3**

*Johnson-Neyman Graph Depicting Moderated Effect of Total Difficulties with Downregulation*



To further dissect this relationship, I evaluated the impact of difficulties with downregulation subscale scores on the relationship between occupational stress and suicidal behaviors. Results highlighted differential moderated effects by subscale. In total, four of the six difficulties with downregulation subscales significantly moderated the relationship between occupational stress and suicidal behaviors.

**Non-Acceptance of Emotions.** To understand the degree to which non-acceptance of difficult emotions moderates the relationship between occupational stress and suicidal behaviors, I ran a moderated model using PROCESS (Model 1). In the regression model, stress served as the focal predictor, non-acceptance of emotional responses as the moderator, and suicidal

behaviors as the outcome variable. Regression statistics are presented in Table 5. In total, the main and interactive effects accounted for 25% of the variance in suicidal behaviors,  $F(3, 167) = 18.4, p < .01$ . Within the model, the main effects for occupational stress was non-significant ( $b = -1.49, p = .07$ ), whereas the main effect for non-acceptance of emotional responses ( $b = .09, p < .05$ ) was significant. At a multivariate level, the occupational stress x non-acceptance of emotional responses interaction ( $b = .08, p < .05$ ) was significant. In total, these patterns of scores suggest that non-acceptance of emotional responses does moderate the relationship between occupational stress and suicidal behaviors in a sample of DVM students. To deconstruct the significant two-way interaction between occupational stress and non-acceptance of emotional responses, I examined the relationship between occupational stress and suicidal behaviors across different levels of non-acceptance of emotional responses. Specifically, I evaluated the deconstructed relationship through a simple slopes analysis and the Johnson-Neyman technique. Conditional effects are depicted in Figures 4 and 5.

**Table 5**

*Regression Statistics Occupational Stress and Non-Acceptance of Emotions on Suicidal Behaviors*

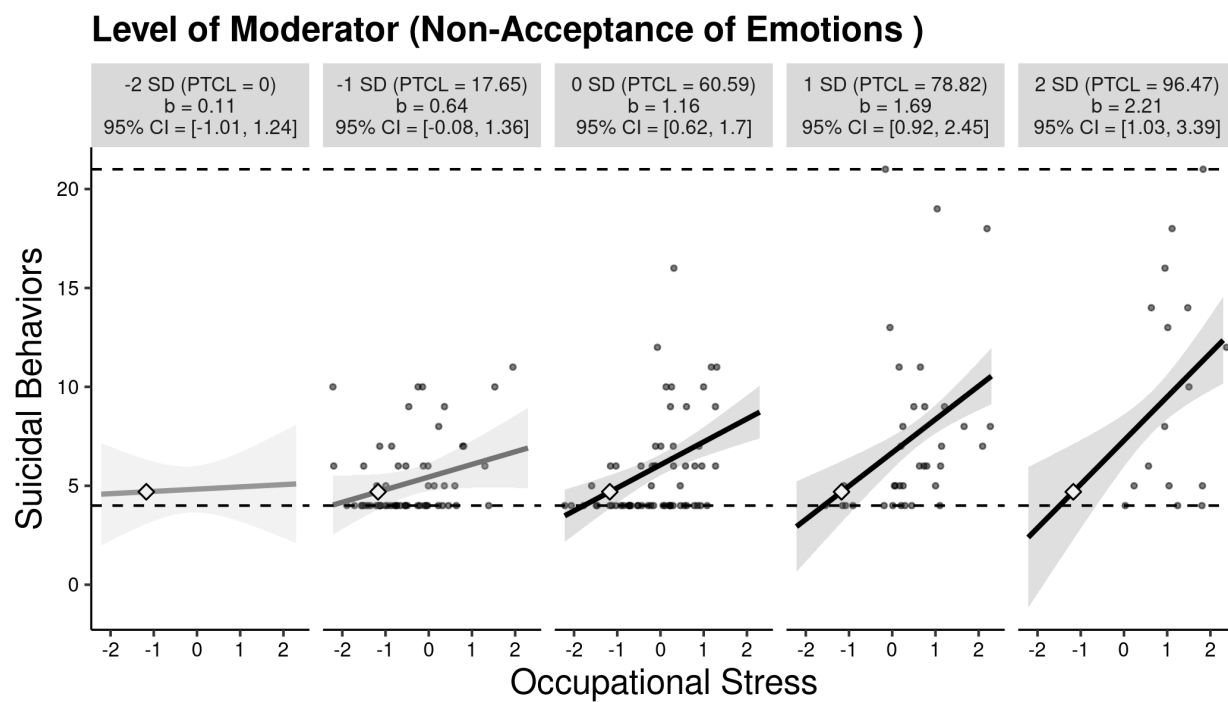
Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	4.68	.66	7.09	.00	3.38	5.98
Occupational Stress	-.02	.62	-.03	.98	-1.25	1.21
Non-Acceptance of Emotions	.09	.04	2.14	.03	.01	.18
Interaction Effect	.08	.04	2.04	.04	.00	.15

In Figure 4, the relationship between occupational stress and suicidal behaviors is depicted through simple slopes analysis as a function of different levels of non-acceptance of emotional responses. Results indicate that at lower levels of non-acceptance of emotional responses, the relationship between occupational stress and suicidal behaviors weakens. Importantly, the relationship completely dissolves at lower levels of non-acceptance of emotional responses (Panel 2 of Figure 4). Alternatively, at high levels of non-acceptance of emotional responses, this relationship strengthens. In Figure 4, the moderated effect of non-acceptance of emotional responses is depicted through the Johnson-Neyman graph. Results indicated a significant and positive relationship between occupational stress and suicidal behaviors for 82.46% of the sample. Consistent with this pattern, the Johnson-Neyman graph indicated that the relationship between occupational stress and suicidal behaviors discontinues at an average item score of 8.88 on non-acceptance of emotional responses measure.

**Figure 4**

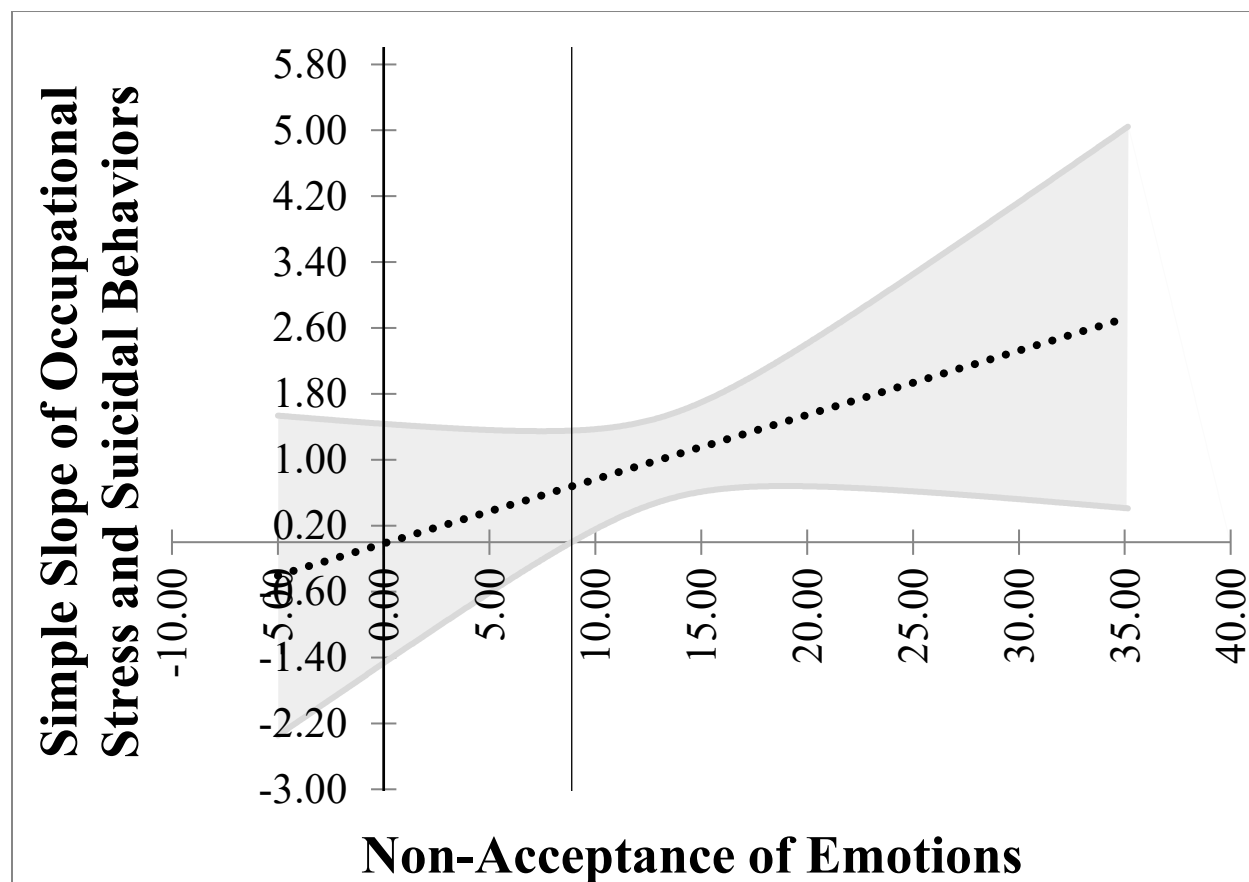
*Simple Slopes Analysis for the Non-Acceptance of Emotions and Occupational Stress Interaction*

*Effect on Suicidal Behaviors*



**Figure 5**

*Johnson-Neyman Graph Depicting Moderated Effect of Non-Acceptance of Emotions*



**Goal-Directed Behaviors.** The PROCESS moderated model was repeated with occupational stress serving as the focal predictor, difficulties engaging in goal-directed behaviors as the moderator, and suicidal behaviors as the outcome variable. Regression statistics are presented in Table 6. In total, the main and interactive effects accounted for 25% of the variance in suicidal behaviors,  $F(3, 167) = 19.02, p < .01$ . Within the model, the main effect for occupational stress was non-significant ( $b = -.95, p = .23$ ), whereas the main effect for difficulties engaging in goal-directed behaviors ( $b = .12, p < .05$ ) was significant. At a multivariate level, the occupational stress x difficulties engaging in goal-directed behaviors



interaction ( $b = .14, p < .01$ ) was significant. Taken together, these patterns of scores suggest that difficulty engaging in goal-directed behaviors does moderate the relationship between occupational stress and suicidal behaviors in a sample of DVM students. To deconstruct the significant two-way interaction between occupational stress and difficulties engaging in goal-directed behaviors, I examined the relationship between occupational stress and suicidal behaviors across different levels of difficulty engaging in goal-directed behaviors. Specifically, I evaluated the deconstructed relationship through a simple slopes analysis and the Johnson-Neyman technique. Conditional effects are depicted in Figures 6 and 7.

**Table 6**

*Regression Statistics Occupational Stress and Difficulties with Goal-Directed Behavior on Suicidal Behaviors*

Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	4.01	.92	4.37	.00	2.20	5.82
Occupational Stress	-.95	.79	-1.20	.23	-2.51	.61
Difficulties with Goal-Directed Behavior	.12	.05	2.23	.03	.01	.23
Interaction Effect	.14	.05	2.90	.00	.04	.23

In Figure 6, the relationship between occupational stress and suicidal behaviors is depicted through simple slopes analysis as a function of different levels of difficulties engaging in goal-directed behaviors. Results indicate that at lower levels of difficulties engaging in goal-directed behaviors, the relationship between occupational stress and suicidal behaviors weakens. The relationship is completely offset at low levels of difficulties engaging in goal-directed behaviors (Panel 2, Figure 6). Alternatively, at high levels of difficulties engaging in goal-

directed behaviors, this relationship strengthens. In Figure 7, the moderated effect of difficulties engaging in goal-directed behaviors is depicted through the Johnson-Neyman technique. Results indicated a significant and positive relationship between occupational stress and suicidal behaviors for 77.78% of the sample. Consistent with this pattern, the Johnson-Neyman graph indicated that the relationship between occupational stress and suicidal behaviors discontinues at an average item score of 11.31 on difficulties engaging in goal-directed behaviors measure.

**Figure 6**

*Simple Slopes Analysis for the Difficulties with Goal-Directed Behavior and Occupational Stress Interaction Effect on Suicidal Behaviors*

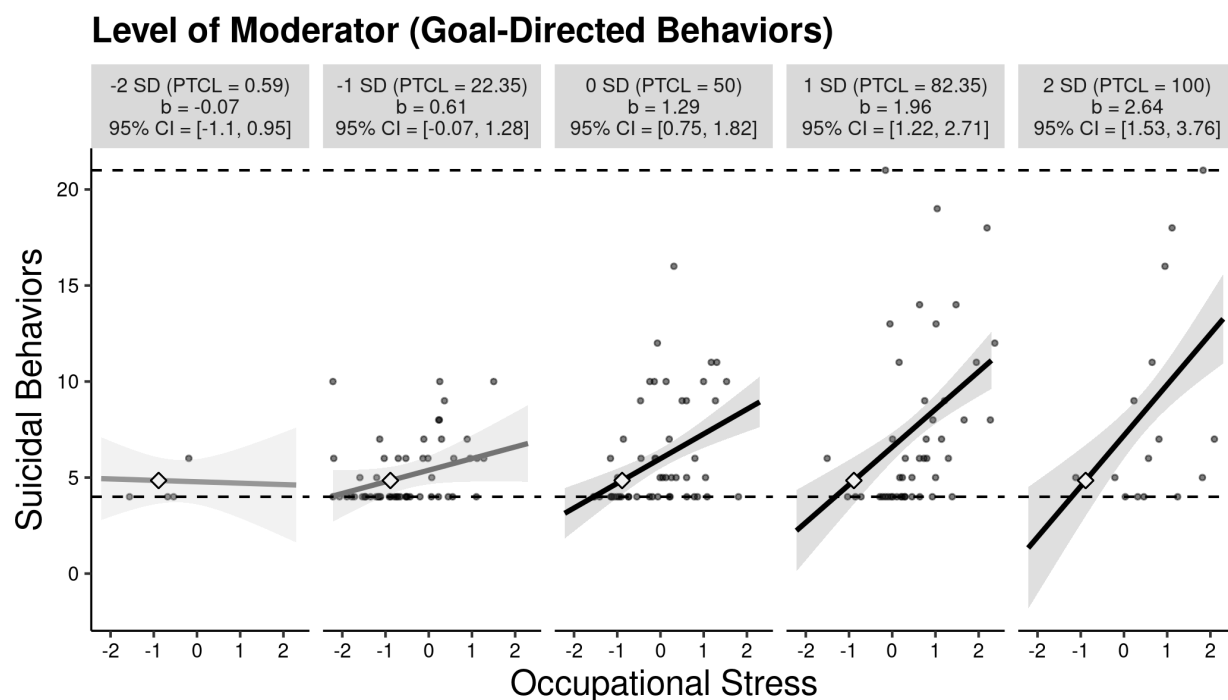
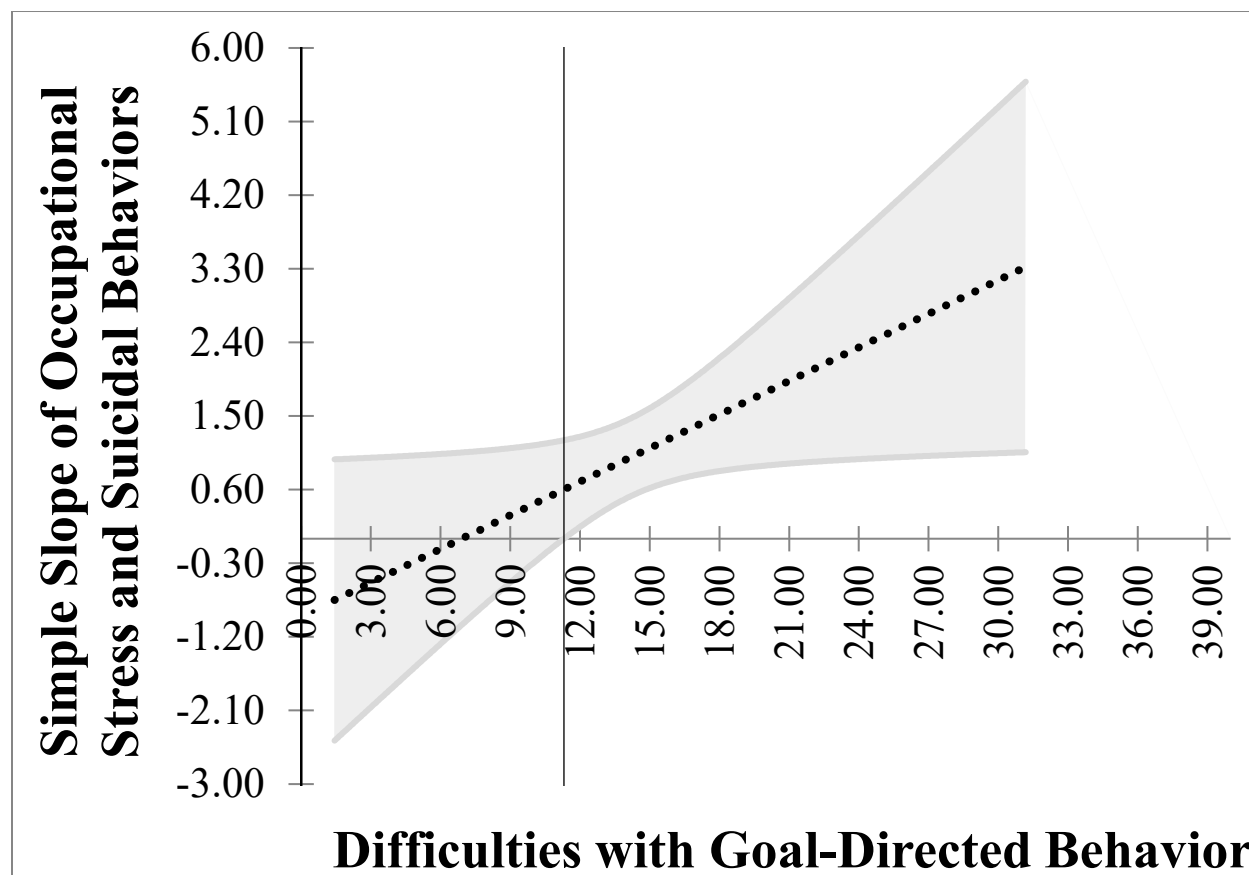


Figure 7

*Johnson-Neyman Graph Depicting Moderated Effect of Difficulties with Goal-Directed Behavior*



**Impulse Control Difficulties.** To gain a better understanding of the impact of impulse control difficulties on the relationship between occupational stress and suicide behaviors in DVM students, I ran a moderated model using PROCESS (Model 1). In the regression model, stress served as the focal predictor, impulse control difficulties as the moderator, and suicidal behaviors as the outcome variable. Regression statistics are presented in Table 7. In total, the main and interactive effects accounted for 31% of the variance in suicidal behaviors,  $F(3, 166) = 24.55, p < .01$ . Within the model, the main effect for occupational stress was non-significant ( $b = -.04, p = .94$ ), whereas the main effect for impulse control difficulties ( $b = .16, p < .01$ ) was significant. At a multivariate level, the occupational stress x impulse control difficulties

interaction ( $b = .09, p < .05$ ) was significant. In total, these patterns of scores suggest that impulse control difficulties do moderate the relationship between occupational stress and suicidal behaviors in a sample of DVM students. To deconstruct the significant two-way interaction between occupational stress and impulse control difficulties, I examined the relationship between occupational stress and suicidal behaviors across different levels of impulse control difficulties. Conditional effects are depicted in Figures 8 and 9.

**Table 7**

*Regression Statistics Occupational Stress and Difficulties with Impulse Control on Suicidal Behaviors*

Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	4.21	.69	6.13	.00	2.85	5.57
Occupational Stress	-.04	.50	-.08	.94	-1.03	.96
Difficulties with Impulse Control	.16	.06	2.63	.01	.04	.28
Interaction Effect	.09	.04	2.10	.04	.01	.17

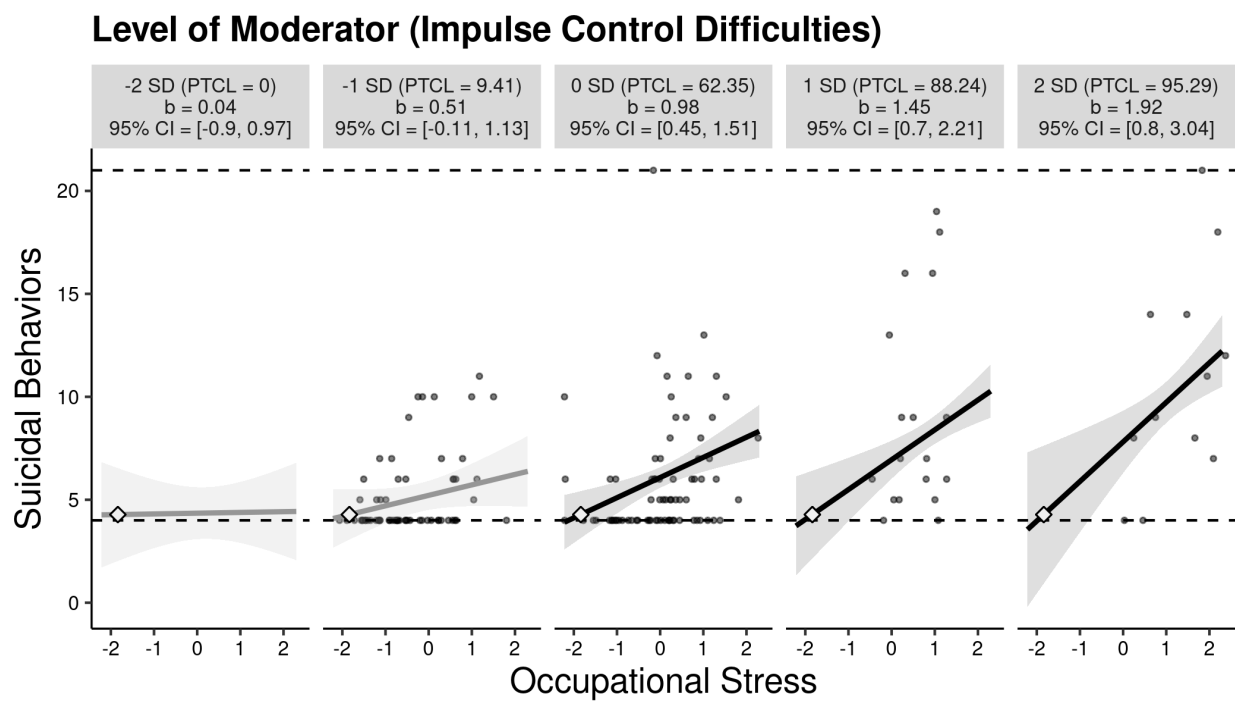
In Figure 8, the relationship between occupational stress and suicidal behaviors is depicted through simple slopes as a function of different levels of impulse control difficulties. Results indicate that at lower levels of impulse control difficulties, the relationship between occupational stress and suicidal behaviors weakens. The relationship is completely offset at low levels of impulse control difficulties (Panel 2 of Figure 8). Alternatively, at high levels of impulse control difficulties, this relationship strengthens. In Figure 9, the moderated effect of impulse control difficulties is depicted through the Johnson-Neyman technique. Results revealed a significant and positive relationship between occupational stress and suicidal behaviors for

80.59% of the sample. Consistent with this pattern, the Johnson-Neyman graph indicated that the relationship between occupational stress and suicidal behaviors discontinues at an average item score of 6.81 on the impulse control difficulties measures.

**Figure 8**

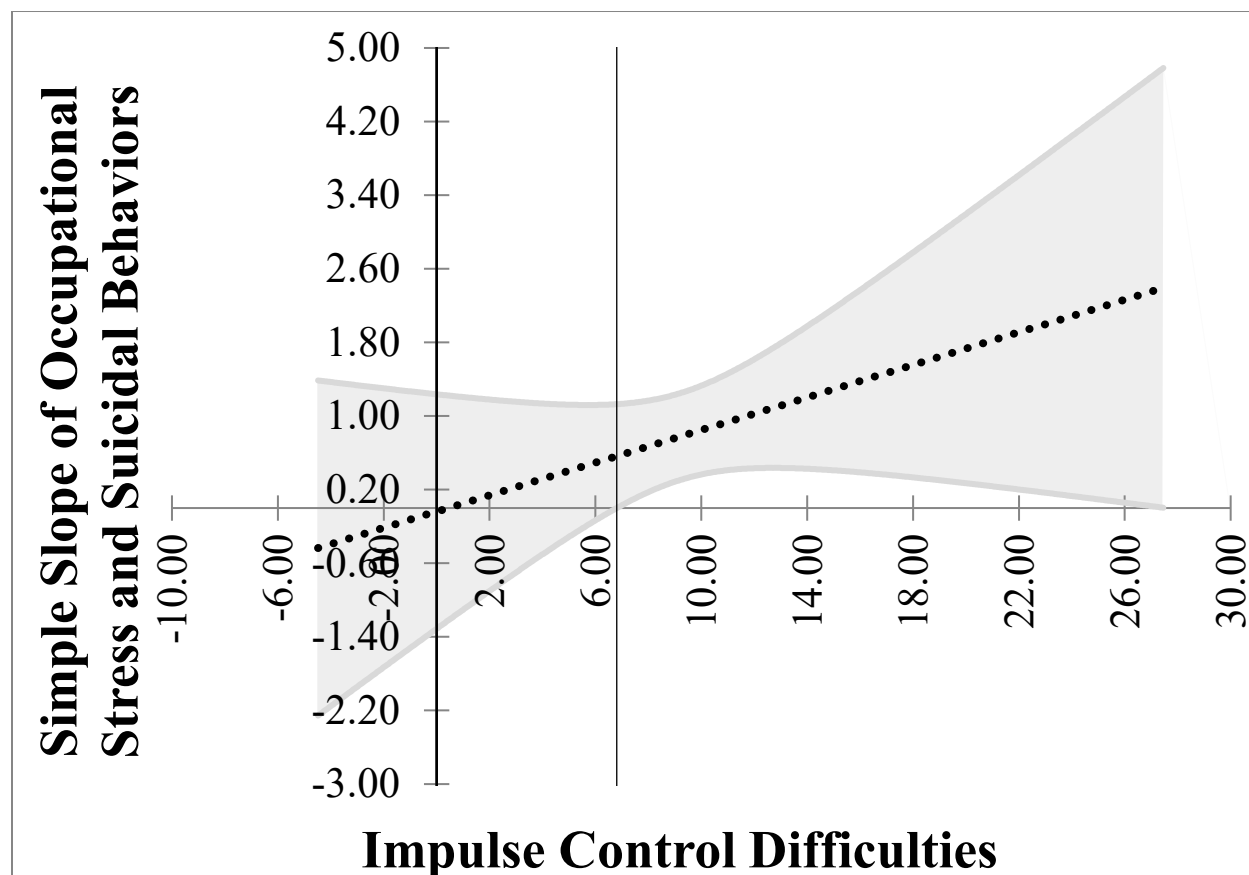
*Simple Slopes Analysis for the Difficulties with Impulse Control and Occupational Stress*

*Interaction Effect on Suicidal Behaviors*



**Figure 9**

*Johnson-Neyman Graph Depicting Moderated Effect of Difficulties with Impulse Control*



**Limited Emotion Regulation Strategies.** To understand the impact of limited access to emotion regulation strategies on the relationship between occupational stress and suicide behaviors in DVM students, I ran a moderated model using PROCESS (Model 1). In the regression model, stress served as the focal predictor, limited access to emotion regulation strategies as the moderator, and suicidal behaviors as the outcome variable. Regression statistics are presented in Table 8. In total, the main and interactive effects accounted for 34% of the variance in suicidal behaviors,  $F(3, 167) = 28.19, p < .01$ . Within the model, the main effect for occupational stress was non-significant ( $b = -.51, p = .36$ ), whereas the main effect for limited access to emotion regulation strategies ( $b = .18, p < .01$ ) was significant. At a multivariate level,

the occupational stress x limited access to emotion regulation strategies interaction ( $b = .06, p < .05$ ) was significant. In total, these patterns of scores suggest that limited access to emotion regulation strategies do moderate the relationship between occupational stress and suicidal behaviors in a sample of DVM students. To deconstruct the significant two-way interaction between occupational stress and limited access to emotion regulation strategies, I examined the relationship between occupational stress and suicidal behaviors across different levels of limited access to emotion regulation strategies. Conditional effects are depicted in Figures 10 and 11.

**Table 8**

*Regression Statistics Occupational Stress and Limited Emotion Regulation Strategies on Suicidal Behaviors*

Variable	b	Std. Error	t	p	LLCI	ULCI
Constant	2.78	.77	3.59	.00	1.25	4.31
Occupational Stress	-.51	.56	-.92	.36	-1.61	.59
Limited Emotion Regulation Strategies	.18	.04	4.09	.00	.09	.26
Interaction Effect	.06	.03	2.17	.03	.01	.12

In Figure 10, the relationship between occupational stress and suicidal behaviors is depicted through simple slopes as a function of different levels of limited access to emotion regulation strategies. Results indicate that at lower levels of limited access to emotion regulation strategies, the relationship between occupational stress and suicidal behaviors weakens. The relationship is completely offset at low levels of limited access to emotion regulation strategies (Panel 2, Figure 10). Alternatively, at high levels of limited access to emotion regulation strategies, this relationship strengthens. In Figure 11, the moderated effect of impulse control

difficulties is depicted through the Johnson-Neyman technique. Results indicated a significant and positive relationship between occupational stress and suicidal behaviors for 48.54% of the sample. Consistent with this pattern, the Johnson-Neyman graph indicated that the relationship between occupational stress and suicidal behaviors discontinues at an average item score of 16.53 on limited access to emotion regulation strategies. However, it is noted that at extremely low levels of limited access to emotion regulation strategies, stress may be inversely related to suicide.

**Figure 10**

*Simple Slopes Analysis for the Limited Emotion Regulation Strategies and Occupational Stress*

*Interaction Effect on Suicidal Behaviors*

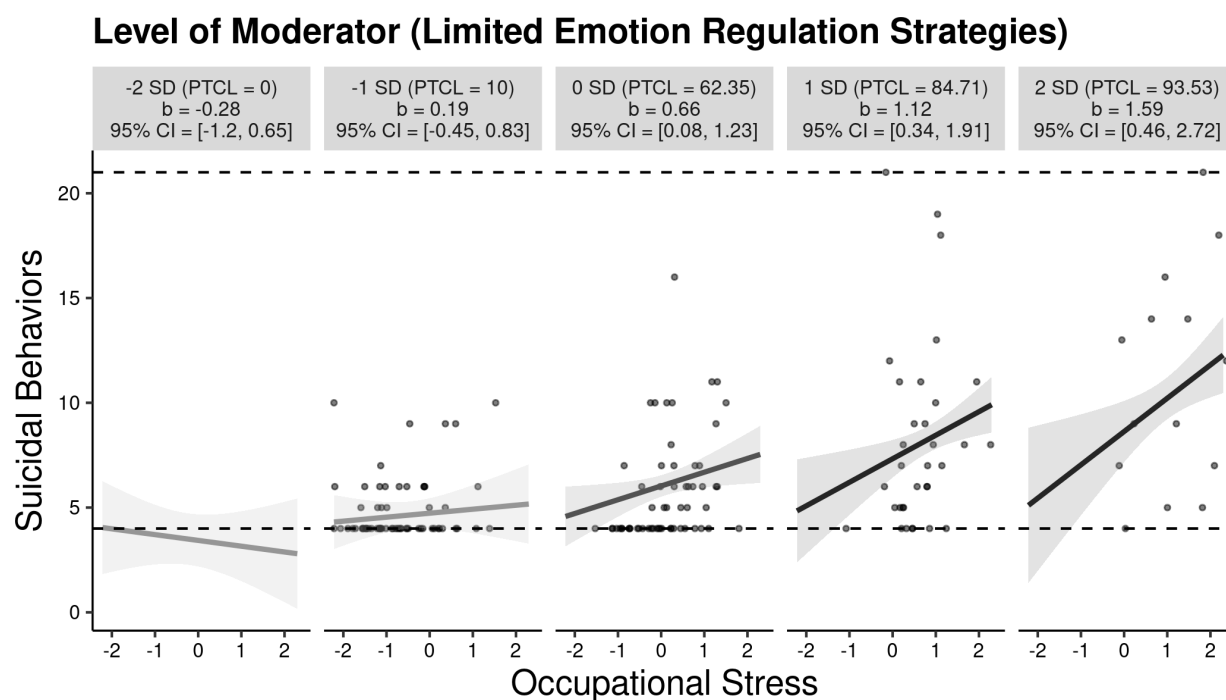
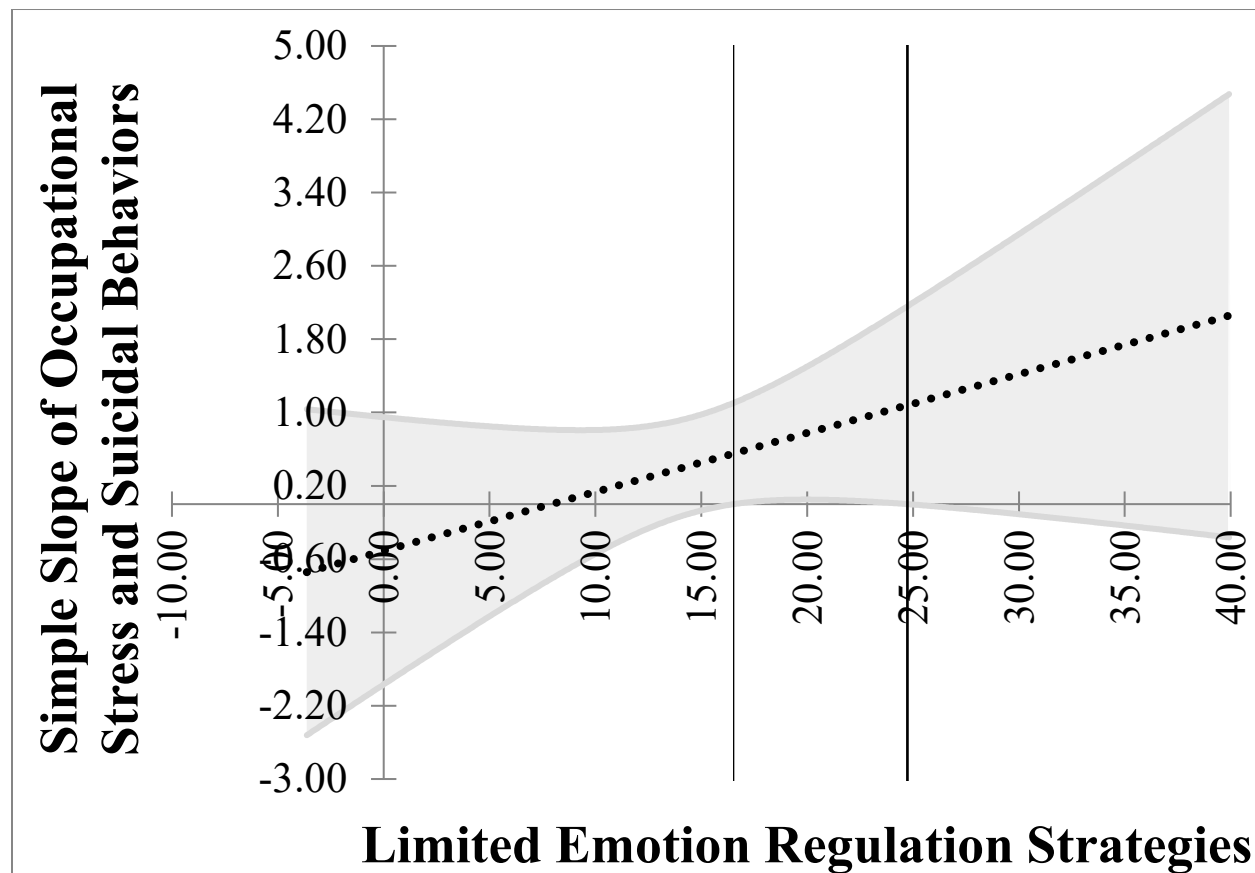




Figure 11

*Johnson-Neyman Graph Depicting Moderated Effect of Limited Emotion Regulation Strategies*



## CHAPTER 4: DISCUSSION

### **Review of Purpose**

The purpose of the current study was to investigate the role emotion regulation plays in the relationship between occupational stress and suicidal behaviors in a sample of veterinary students. To date, there have been no protective models identified for suicide prevention in this population. I specifically evaluated the extent to which upregulation of positive emotion (i.e., savoring) and downregulation of negative emotion strategies buffer the relationship between occupational stress and suicidal behaviors. This was done with the hope of identifying potential protective factors for suicide in a population that experiences unique stressors. It is my hope that this information can be useful for those who administer veterinary medicine programs and the mental health professionals who serve members of this population. The present study aimed to answer the following questions: (a) are upregulation and downregulation strategies correlated with reports of occupational stress and suicidal behaviors among DVM students? and (b) do downregulating and upregulating strategies moderate the relationship between academic stress and suicidal behaviors among DVM students?

### **Comparison of Suicide Rates**

In the present study, 38.2% ( $n = 48$ ) of respondents reported having thoughts of ending their life at least once in the past year and 14.7% ( $n = 25$ ) noted they had made a plan to die by suicide at least once in their lifetime. These high rates of suicidal ideation were not surprising given the prevalence of stressors experienced in the field of veterinary medicine (Collins & Foote, 2005). The present study highlights an urgent need for researchers and clinicians to collaboratively construct and implement models of prevention in DVM programs. These preventative models should take into account the unique features of DVM programs, including

financial burden, that contribute to greater psychological vulnerability to suicide. Furthermore, a strengths-based approach to prevention may also be advantageous. Such programs highlight and increase access to skills and characteristics that can be cultivated through positive psychoeducation to mitigate the impact of stressors on suicidal behaviors (Kelliher Rabon, et al., 2018).

### **Rural Differences**

Mean comparisons were analyzed to determine differences in the study's main variables between students who self-identified as being from a rural hometown and those who identified growing up in a non-rural hometown. The results revealed non-significant differences between rural and non-rural participants in terms of occupational stress, emotional downregulation, savoring, and suicidal behaviors. This is inconsistent with the literature, which shows individuals from rural areas are at greater risk for suicide, even when controlling for other variables such as socioeconomic status (Nestadt et al., 2017). Although it is unknown precisely why non-significant differences were observed, it is worth noting that most of the study's participants currently reside in a mid-size college town that is not considered rural. Consequently, all respondents had the same access to mental health resources, medical care, and opportunities for social connection, regardless of the rurality of their hometowns. Moving forward, I highly encourage future researchers to evaluate differences in our variables using more delineated samples of rural vs. non-rural DVM students.

### **Correlations**

**Occupational Stress and Suicidal Behaviors.** Laying the foundation for a moderation model, a significant, positive relationship was found between occupational stress and suicidal behaviors. This result was consistent with expectations and the

established literature. Notably, occupational stress is an established risk factor for suicide outcomes, particularly for professionals in healthcare and related fields (Bartram & Baldwin, 2010; Illiceto et al., 2013). My finding highlights the need for research to further investigate and deconstruct this relationship. Importantly, the design of my study was cross-sectional, which limits conclusions to be drawn about the stability and nature of this relationship. In the future, studies with longitudinal designs could examine how the influence of chronic occupational stress on suicidal behaviors changes over time, which could provide a better platform in determining whether occupational stress is a risk vs. vulnerability factor for suicidal behaviors in a sample of DVM students.

**Savoring and Suicidal Behaviors.** Consistent with study hypotheses, total savoring and suicidal behaviors were significantly and inversely correlated. This is consistent with the few studies represented in the literature that demonstrate an inverse relationship between savoring and suicidal behaviors, as well as suicide risk factors (e.g., depression, poor adjustment, etc.) (Ford et al., 2016; Klibert et al., 2018; Samios et al., 2020). While this finding plays a small role in closing a large gap in the literature concerning the relationship between savoring and suicidal behaviors, there is a great need for further research to be conducted in this area, both in terms of suicide prevention and suicide intervention. For instance, tracking the prevalence and use of this particular emotion regulation skill in students and veterinarians at different stages in their careers might be quite useful in determining how these individuals find purpose in life and happiness and how such processes may minimize suicide risk over time. I recommend future researchers evaluate longitudinal mediation models to determine the causal processes by which savoring may influence reduced levels of suicide risk.

**Difficulties with Emotion Regulation and Suicidal Behaviors.** Results indicated a significant and positive relationship between total difficulties with emotion regulation and suicidal behaviors. Likewise, five out of the six DERS subscales (i.e., non-acceptance of emotions, difficulties with goal-directed behavior, difficulties with impulse control, limited emotion regulation strategies, and lack of emotional clarity) were significantly and positively correlated with suicidal behaviors. One possible reason why the subscale measuring lack of emotional awareness was non-significant in its correlation with suicidal behaviors could be the abstract nature of those items in the DERS. For instance, because emotional awareness is a difficult concept to truly capture via a self-report measure, there are greater chances that participants misperceive the value or importance of being emotionally aware. In fact, sometimes it might be easier for participants to avoid becoming aware of their emotions because they can be so overwhelming. Because of this, there is a need to develop more comprehensive and concrete measures of emotional awareness from a strength-based perspective. However, these findings were overall consistent with expectations established in the literature (Rajappa et al., 2012). My finding highlights the need for further evaluation regarding the relationship between downregulation strategies and suicidal behaviors. Notably, it would be interesting to determine if and how these relationships fluctuated across time and setting. For instance, researchers could evaluate how specific downregulation strategies relate more strongly to suicidal outcomes when participants are highly stressed or experience substantial levels of grief in completing job requirements. These fine-grained analyses may provide a better understanding of how certain downregulation tactics are more beneficial in reducing suicidal outcomes in different work situations.

### **Moderated Effects for Savoring**

Consistent with the overall purpose of this project, I investigated whether the interaction between occupational stress and total savoring (moderated effect) accounted for variation in suicidal behaviors. Analyses revealed a non-significant interaction effect, meaning total savoring did not moderate the relationship between occupational stress and suicidal behaviors in this sample of veterinary students. Similar findings were noted when running savoring subscale scores in the model. These findings were inconsistent with expectations established through a review of the literature which highlighted savoring as a buffer against other poor mental health outcomes, such as psychopathology (Sytime et al., 2018).

One reason why total savoring did not function as a moderator is because the effects of stress may be heavily influential in the experience of suicidal behaviors among individuals in this population. Research indicates stress is a substantial risk factor to suicidal outcomes in veterinary professional and student samples (Andela, 2020). If this is the case, stress may overload one's emotional experience to a point where a veterinary student may be limited in his or her ability to generate, notice, or take advantage of positive emotions. Because savoring is dependent upon the presence of positive emotions, it may have limited effectiveness in offsetting the detrimental effects of individuals in this population. Moving forward, it may be important to evaluate how veterinary students generate, notice, and maintain levels of positive emotions to better evaluate fluctuations in suicidal behavior scores. It is quite possible that a lack of positive emotional experiences in veterinary school may contribute to greater engagement in suicidal behaviors and minimize the effectiveness of different upregulation strategies to build resilience and well-being in the face of suicide risk. Future researchers should evaluate the role of positive emotional

functioning more clearly in helping understand why veterinary students are at an increased risk for suicide and why savoring strategies might offer limited utility as a prevention strategy.

### **Moderated Effects for Difficulties with Emotion Regulation**

In the current sample of DVM students, results indicated the relationship between occupational stress and suicidal behaviors is not significant at low levels of total difficulties with emotion regulation, as measured by the DERS. This suggests difficulties with emotion regulation (specifically downregulation) moderate the relationship between occupational stress and suicidal behaviors in my sample of veterinary students. This pattern is also noted with other populations at-risk for suicide and, consequently, is useful in assessing later suicide risk (Brausch & Woods, 2019; Pisani et al., 2013; Ward-Ciesielski et al., 2018). My finding is consistent with this trend and helps to further solidify downregulation of negative emotions as a protective factor against suicidal behaviors. Importantly, results confirm (a) a positive relationship between difficulties with emotion regulations and suicide and (b) an offsetting effect whereby lower levels of difficulties with emotion regulation completely offset the relationship between occupational stress and suicidal behavior, both of which are key methodological criteria in identifying protective factors (Steca et al., 2014; Vagi et al., 2013). However, this finding does not demonstrate that all downregulation tactics are equal in terms of moderating the relationship between occupational stress and suicidal behaviors. As a result, I ran a series of moderated models to determine which downregulation tactics are most effective to serve as a buffer.

In evaluation of these models, results highlight some downregulation tactics as more effective in moderating the occupational stress-suicidal behaviors relationship. Specifically,

proficiency in accepting emotions, engaging in goal-directed behaviors, managing impulses, and using a diverse set of emotion regulation strategies all served as moderators. These results suggest these tactics are excellent candidates as protective factors against suicide in DVM student populations. Further examination of these specific skill sets among DVM students through longitudinal and experimental designs would likely be fruitful in designing adjunctive educational experiences in DVM programs to foster well-being and prevent adverse mental health outcomes, such as suicide. Longitudinal designs are crucial in determining stable protective factors because of their ability to establish temporal precedence. Similarly, the use of a quasi-experimental design to assess the efficacy of interventions designed to promote the above mentioned domains of emotion regulation would help to further clarify their utility in promoting veterinary students' mental health.

**Differentiated Effects by Emotion Regulation Dimensions.** Interestingly, it is unknown why the non-acceptance of emotions and lack of emotional clarity domains of emotion regulation did not moderate the relationship between occupational stress and suicidal behaviors. One possible reason for these findings is the difficulties participants faced in conceptualizing how being aware of emotions and finding clarity within emotional experiences relate to their lived experience. These skills are somewhat abstract, and it can be difficult to discern the meaning from the DERS items intended to represent these abstract ideas. In future research, clarification of these items in more concrete terms might yield greater insight into how emotional clarity and awareness influence the relationship between occupational stress and suicidal outcomes. Given the abstract nature of these constructs, researchers might design studies that frame these dimensions of emotion regulation in observable and behavioral terms. For example, emotional clarity could be evaluated through the coding of structured interviews designed to



assess the degree to which an individual is able to put words to their emotional experiences. Emotional awareness might also be assessed through behavioral observation of emotional responses in a laboratory setting and compared to research participants' subjective description of their emotional experiences in those scenarios. Overall, using a different method of measuring for these two domains of emotion regulations may clarify my findings.

### **Clinical Implications**

There are many practical benefits to be derived from these findings. Most prominently, the results of this study highlight the influence of total difficulties with emotion regulation and four out of six subscales on the relationship between occupational stress and suicidal behaviors. Although the DERS is framed in terms of difficulties, these results can be applied using a strengths-based approach to suicide prevention in DVM students. Given the high degree of stress experienced by DVM students and the link it has with suicidal behaviors, it is useful to know that interventions designed to bolster emotion regulation can undercut these effects. Interventions to cultivate emotion regulation ability can include psychoeducational materials distributed among the student body, mental health awareness programs with guest speakers, as well as psychotherapeutic interventions delivered in individual and/or group contexts. Ideally, these strategies would also be integrated into the classroom, particularly when students are receiving instruction concerning the more stressful aspects of veterinary practice, such as surgery and animal euthanasia. The goal is not to view deficits in emotion regulation as weakness, but rather to see well-developed emotion regulation ability as potential strength of DVM students.

Because of the Johnson-Neyman technique employed in data analyses, specific offsetting points for total difficulties with emotion regulation, non-acceptance of emotions, difficulties with goal-directed behavior, impulse control difficulties, and limited emotion regulation strategies

were identified. These thresholds, calculated for each significant moderator, can be practically applied in clinical settings in work with DVM students to determine if emotion downregulation skills, as measured by the DERS, are present to a great enough degree to buffer against suicidal behaviors. For instance, when using interventions designed to increase the acceptance dimension of emotion regulation ability, clinicians may want to track the degree to which clients are growing in these skills over the course of treatment. When clients obtain a DERS score in low acceptance of emotions under 9, clinicians should expect to see a corresponding decrease in suicidal behaviors. This is because 8.88 is the point at which the relationship between occupational stress and suicidal behaviors breaks down for this construct. This can be a useful benchmark in tracking individuals' progress over the course of treatment and can be used in determining when it is appropriate to consider termination of services. The same principle applies for total difficulties with downregulation, difficulty engaging in goal-directed behavior, impulse control difficulties, and limited access to emotion regulation strategies.

While my findings offer insight into some of the dynamics of the occupational stress and suicidal behaviors link in DVM students, they do not constitute a comprehensive model of suicidality in the population. As a result, downregulation of emotions should not be used as the sole, or even primary means, of approaching suicide prevention in DVM students. This requires a multi-level approach including access to mental health resources, psychoeducation interventions in DVM programs, and comprehensive safety-planning for students who indicated elevated suicide risk. However, my findings will be of practical use to those who administer DVM programs and the licensed clinicians who work with members of this population. Emotion downregulation skills can be practiced and cultivated, which is why I believe these results offer promise to at-risk DVM students and those who seek to support them.

## Limitations

**COVID-19 Pandemic Concerns.** This study was conducted during the COVID-19 pandemic when the educational experiences of all students, including those in colleges of veterinary medicine, were directly impacted. Pandemic stressors include financial strain, fewer opportunities for social support, adjustment to a remote or hybrid education model, personal illness, increased caregiving responsibilities, and even grief over the loss of loved ones. Because the nature of pandemic stressors is so varied, it is impossible to completely tease apart the stress reported by students by virtue of their occupation as DVM students and those brought on by the pandemic. In the future, it would be prudent to include questionnaires designed to assess stressors related to COVID-19 in order to better define how the occupational stress construct related to suicidal behaviors and different emotion regulation domains.

**Methodological Concerns.** The present study has several notable limitations. The first concerns the methods used to assess the study's major variables (i.e., occupational stress, suicidal behaviors, savoring, and difficulties with emotion regulation). All of these measures were delivered online and relied on self-report. Limitations of self-report measures include susceptibility to social desirability, biased responses, and demand characteristics (Mitchell & Jolley, 2007). These factors may have limited the accuracy of the study results. For example, participants may have underreported their stressors, difficulties with emotion regulation, and suicidal behaviors out of concern for privacy or to be seen as socially desirable. This may have negatively affected the accuracy of the data and the strength of the relationships noted among the study's main variables. In the future, it would be beneficial to use observable measures of occupational stress and emotion regulation to increase the accuracy and validity of the noted findings. In

addition, because the measures were administered via an online survey, there were some responses that were incomplete or failed validity-check questions. These participants' responses were excluded from the final data set and analyses. It is quite possible that these individuals were different from those who provided complete data sets. If this is the case, then it would be interesting to determine if my findings are generalizable to both sets of individuals.

Another study limitation is the lack of diversity in terms of gender and ethnicity in the sample. This sample was also derived from a non-clinical population. To generalize the study results more broadly, it is important to determine if findings hold with individuals from different gender, ethnic, sexual, and clinical identity statuses. Future research efforts should seek to replicate these findings with more diverse samples and with students recruited from DVM programs in other geographic areas.

Furthermore, the cross-sectional design of this study was a limitation. The design yielded correlational data that are unable to establish a causal relationship between study variables. Future research should investigate the relationship among occupational stress, savoring, difficulties with emotion regulation, and suicidal behaviors using either longitudinal or experimental methods. For example, researchers might deliver emotion regulation interventions to a group of DVM students and track occupational stress and suicidal behavior outcomes over time. This would introduce temporal precedence and the ability to compare a group receiving a specific intervention to those that did not on different prevention metrics.

## **General Conclusions**

The purpose of the current study was to identify mechanisms that buffer the relationship between occupational stress and suicidal behaviors in veterinary students. This study used a cross-sectional and correlational design to evaluate emotion upregulation (savoring) and emotion downregulation strategies as moderators in this relationship. All study variables were correlated in the expected direction and to the expected degree. From a path analytic perspective, findings revealed total difficulties with emotion regulation, non-acceptance of emotions, difficulties with goal-directed behavior, impulse control difficulties, and limited emotion regulation strategies to be significant moderators in the relationship between occupational stress and suicidal behaviors. To date, there have been few studies to examine preventative models of suicide in the field of veterinary medicine, let alone in DVM student populations. This study addresses that gap in the literature and helps to close it, while also highlighting the need for further research in this area. Rates of suicidal behaviors in the present sample were high. However, the results suggest the relationship between occupational stress and suicidal behaviors is conditional. This means clinical and programmatic interventions centered on downregulation tactics have great potential to buffer against the negative impact of occupational stress and reduce suicidal behaviors in samples of DVM students. In terms of future research, experimental research is needed to evaluate the most effective methods of bolstering emotion regulation skills in DVM students from a strengths-based perspective to minimize suicide risk.

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