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The moderating effect of physical health on the relationship between coping style and engagement in non-suicidal self-injury

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THE MODERATING EFFECT OF PHYSICAL HEALTH ON THE RELATIONSHIP BETWEEN COPING STYLE AND ENGAGEMENT IN NON-SUICIDAL SELF-INJURY

by

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Dedication

I would like to dedicate this project to my family and friends, as they have continued to support me in my academic endeavors throughout the years. Their unyielding encouragement helped provide the motivation to persist.

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Abstract

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Coping skills can be used in a myriad of situations, as these alleviate unwanted feelings. While negative coping skills might be effective in the short term, their long term effects are not beneficial. Non-suicidal self-injury (NSSI), a type of negative coping mechanism, has been shown to be reported by college students most when compared to adults and young adults. The independent relationships between coping strategy, physical health, and NSSI have been previously established. There is a paucity of literature assessing NSSI while considering the pre-existing relationship between physical and mental health. As such, this study examines the moderating function of physical health on the relationship between coping strategy and NSSI engagement. Undergraduate students (n=209) completed a self-report questionnaire. Three hierarchical logistic regressions yielded non-significant results. Physical health does not significantly moderate the relationship between coping strategy and NSSI engagement. The results can be helpful in identifying additional correlates and at risk individuals and/or populations.

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Chapter 1

Introduction

Background

There are a myriad of reasons an individual might begin to engage in a coping strategy. The literature has established current level of mental health to influence this behavior (Adams et al., 2018; Benson, 2010; Miquelon & Vallerand, 2008). While studies have shown level of physical health to be related to engagement in coping, more can be learned about this relationship (Ito & Matsushima, 2017; Lehavot, 2012; Parker & Kennedy, 2010). Coping is considered to be the process an individual takes to respond to a stressful event (Carver et al., 1989; Lazarus & Folkman, 1984; Sornberger et al., 2013). The use of coping skills has been shown to alleviate an individual's symptoms (Adams et al., 2018; Benson, 2010; Ito & Matsushima, 2016; Parker & Kennedy, 2010). There are various strategies that can be used to cope. Depending on the situation, different coping styles can be applied (Lazarus & Folkman, 1984; Wingo et al., 2015). Furthermore, the reason an individual chooses a particular coping style has been established previously (Lazarus & Folkman, 1984).

Lazarus and Folkman's transactional model of stress and coping is a widely accepted model for describing the decision making process used to choose a coping style. According to their theory, individuals select a specific coping style after they have fully assessed the current stressor (Lazarus & Folkman, 1984). Depending on their appraisal, the coping style will generally fall under one of two categories (Lazarus & Folkman, 1984). Emotion-focused coping involves attempts to reduce the feelings associated with a stressor, while problem-focused coping involves attempts to change a stressful situation

(Guerreiro et al., 2013; Hutchinson et al., 2006; Lazarus & Folkman, 1984). These two categories can be divided in order to further differentiate coping strategies.

Emotion-focused and problem-focused coping styles can be characterized as adaptive or maladaptive (Sornberger et al., 2013; Thomassin et al., 2017). Adaptive coping styles are described as being healthy for individuals and beneficial in the long term (Cawood & Huprich, 2011; Sornberger et al., 2013; Thomassin et al., 2017). Maladaptive coping styles are generally helpful in alleviating symptoms quickly, but are typically not physically or mentally healthy (Cawood & Huprich, 2011; Miquelon & Vallerand, 2008; Sornberger et al., 2013; Thomassin et al., 2017). Defining an emotion-focused and problem-focused coping style as adaptive or maladaptive primarily depends on the situation at hand. For example, one might consider positive reframing and self-blame to be examples of adaptive and maladaptive forms of emotion-focused coping, respectively (Guerreiro et al., 2013; Hutchinson et al., 2006). Similarly, depending on an individual's assessment of the situation, removing oneself from the stressful situation and taking control of the stressful situation can both be viewed as adaptive and maladaptive forms of problem-focused coping (Guerreiro et al., 2013; Hutchinson et al., 2006). An individual can also reach out and ask others for help.

Using a social network is another coping mechanism that can be applied (Clara et al., 2003; Heath et al., 2009). Social support is considered to be behaviors performed by an individual that directly affect someone else (Neuling & Winefield, 1988). There are two general categories of social support, emotional and instrumental (House et al., 1988). Individuals who employ emotional social support aim to affect another's feelings and self-worth, while the goal of instrumental social support is to provide tangible help

(House et al., 1988). In response to receiving this support, however, there is no guarantee that the recipient will react positively (Trujillo & Servaty-Seib, 2018; Turner et al., 2016). When considering maladaptive coping strategies that can be applied, there are various choices.

A maladaptive coping strategy that individuals may choose to use is non-suicidal self-injury (NSSI). NSSI is an intentional act of harming oneself without suicidal intent (Barnes et al., 2010; Favazza, 1998; Muehlenkamp, 2006; Pattison & Kahan, 1983). There are various forms of NSSI and studies have shown the type of self-injurious behavior chosen could depend on characteristics of the individual (Briere & Gil, 1998). In clinical samples, for example, cutting is the most common form of NSSI reported (Barnes, et al., 2010; Nock et al., 2006). In non-clinical samples, hitting and burning oneself are the predominantly used forms of NSSI (Lloyd-Richardson et al., 2007; Whitlock et al., 2008). Additional research has been performed to try and further identify characteristics of people who utilize NSSI.

Previous studies have attempted to determine whether NSSI differs between groups of people. Research regarding the influence of gender on frequency is mixed (Howe-Martin, Murrell, & Guarnaccia, 2012; Silverman et al., 2018; Thomassin et al., 2017; Victor et al., 2018). Although prevalence estimates have been known to vary, literature has been able to demonstrate that young adults (18-35 years old) are the age group that reports NSSI at the highest rate (Gratz et al., 2002; Silverman et al., 2018; Swannell et al., 2014). When compared to an adult population (36 and older), one study found NSSI among young adults to be 13.4%, 7.4% higher than the other group (Swannell et al., 2014). Engagement in this behavior has been shown to be even higher

among college students, a sub-set of young adults, with rates as high as 35% (Gratz & Gunderson, 2006; Laye-Gindhu & Schonert-Reichl, 2005; Whitlock et al., 2008). Theoretical frameworks can be helpful in explaining why individuals begin to partake in this behavior.

The Experiential Avoidance Model of Deliberate Self-Harm can be used to conceptualize NSSI engagement. Primarily developed for non-psychotic, cognitively normal populations, this model is based on the premise that NSSI is negatively reinforced as a result of reducing or terminating unwanted emotion arousals (Chapman et al., 2006; Jutengren et al., 2011). According to this theory, an unwanted event triggers an aversive emotional response. As these emotions are unpleasant, an urge to escape this state develops. Reduction and/or elimination of these emotions is ultimately achieved through NSSI engagement. As this cycle repeats, this behavior is negatively reinforced and could eventually become an automatic escape response (Chapman et al., 2006; Jutengren et al., 2011). Coping styles used by individuals who have reported NSSI specifically have also been examined.

Individuals who apply predominately adaptive coping strategies have been found to report the lowest rates of engagement in NSSI (Cawood & Huprich, 2011; Miquelon & Vallerand, 2008; Sornberger et al., 2013). Those who report using more maladaptive coping strategies, on the other hand, have been found to engage in NSSI at higher rates (Cawood & Huprich, 2011; Miquelon & Vallerand, 2008; Silverman et al., 2018). Lack of social support has also been found to be associated with increased NSSI (Hooper et al., 2013; Trujillo & Servaty-Seib, 2018; Turner et al., 2016). Interestingly, the probability of engaging in NSSI is not necessarily lower among individuals who reported utilizing

multiple types of coping strategies (Andrews et al., 2013; Czyz et al., 2019; Hasking et al., 2008; Nock et al., 2007; Trepal et al., 2015). While these studies are informative and produced significant results, they solely consider mental health correlates.

The current study employs a holistic approach to assess NSSI. This concept is similar to the Whole Health initiative presently being practiced at Veteran Affairs Medical Centers across the country. When working with Veterans, the Whole Health initiative allows physicians and patients to inclusively consider all aspects of a patient's life when evaluating health and wellness (Krejci et al., 2014). Studies have shown this initiative to be effective in identifying treatment areas and formulating treatment plans (Chinman et al., 2017; National Academies of Sciences, 2018). Examining self-injurious behaviors from this perspective allows experimenters to analyze the influence of physical and mental health.

Research concerning the relationship between physical health and coping style is limited and the populations studied are varied. For example, maladaptive coping styles have been previously shown to be predominantly used among those who report lower GI issues (Parker & Kennedy, 2010). Similar results were obtained among a sample of sexual minority women with an average age of 51 (Lehavot, 2012). Self-injurious behaviors were also found to be more common among individuals who report lower levels of physical health and psychopathology (Ito & Matsushima, 2016).

Literature concerning the relationship between physical health and NSSI specifically is scarce. Previous studies have found a negative correlation between these two variables, but the operationalization of physical health differs. In a study by Lossnitzer and colleagues (2009), a participant's physical health was determined based

on the presence or absence of congestive heart failure. NSSI was found to be more likely among those with congestive heart failure (Lossnitzer et al., 2009). Similarly, increased NSSI was found for individuals who reported less good health days (Zullig, 2016). Those who reported a chronic physical disease have also been found engage in NSSI (Barnes et al., 2010; Bergen et al., 2012). For the current study, physical health is defined as the physiological components of quality of life, including their self-reported levels of physical functioning, role-physical, bodily pain, and general health (Thoits, 2011; Ware, 2000). Although operationalized differently, the aforementioned studies all found a sub-par level of physical health to be indicative of using maladaptive coping strategies. However, a majority of them did not analyze NSSI specifically.

Significance of Study

Prior studies have looked at relationships between coping styles, physical health, and engagement in NSSI separately, but not together. As previously stated, the relationship between physical health and engagement in NSSI has been examined (Andover et al., 2005; Barnes et al., 2010; Briere & Gil., 1998; Bergen et al., 2012; Claes et al., 2010; Hamza & Willoughby, 2015; Klonsky, 2011; Lossnitzer et al., 2009; Zullig, 2016). Furthermore, the relationship between coping styles and engagement in NSSI has been researched as well (Silverman et al., 2018; Trepal et al., 2015; Trujillo & Servaty-Seib, 2018; Turner et al., 2016; Wester & Trepal, 2010). This study intends to bridge a gap between health psychology and psychopathology through investigating the moderating function of physical health on the relationship between coping strategy and engagement in NSSI. This study also attempts to fill another gap by examining these relationships in an undergraduate population. An investigation into the behaviors of this

population can provide additional insight as to how college students in particular deal with stressors, including how they acclimate into a new collegiate environment. This study can also potentially help in identifying risk factors, as well as differences between individuals who do and do not report NSSI.

Purpose. The present study examined the moderating function of physical health on the relationship between coping strategy (adaptive coping, maladaptive coping, and social support) and engagement in NSSI.

Research Questions and Hypotheses

Research question 1. To what extent does physical health moderate the relationship between adaptive coping and engagement in NSSI?

Hypothesis 1. Physical health moderates the association between adaptive coping on engagement in NSSI, such that the relationship between adaptive coping and engagement in NSSI weakens as physical health increases. In other words, those with better perceived physical health will report fewer engagements in NSSI.

Research question 2. To what extent does physical health moderate the relationship between maladaptive coping and engagement in NSSI?

Hypothesis 2. Physical health moderates the association between maladaptive coping on engagement in NSSI, such that the relationship between maladaptive coping and engagement in NSSI strengthens as physical health decreases. In other words, those with poorer perceived physical health will report a greater number of engagements in NSSI.

Research question 3. To what extent does physical health moderate the relationship between the use of social support and engagement in NSSI?

Hypothesis 3. Physical health moderates the association between social support and engagement in NSSI, such that the relationship between the use of social support and engagement in NSSI weakens as physical health increases. In other words, those with better perceived physical health will report fewer engagements in NSSI.

Chapter 2

Methodology

Recruitment and Procedure

Following IRB approval, participants were recruited through fliers that were placed throughout a southern New Jersey college campus. Students were also recruited by way of in-class presentations; this allowed various psychology classes to learn about the project and participate, if interested. The study was posted on the university's SONA website, which allows undergraduate students to partake in research projects for research credit. Participants received two SONA points if they completed the study through this website. If participants did not use SONA, extra credit points were provided by their professor.

Students who agreed to participate completed the survey online via Qualtrics. When initially accessing the survey, participants were given a web-based informed consent form and provided voluntary consent through an electronic signature. After successful completion of a screener to determine study eligibility (assuming the participant was eligible), the participant gained access to the full study. This took about 45 minutes to complete.

Participants. The initial sample consisted of 209 undergraduate students from the university's main campus. Individuals were not included in the final analysis if they did not finish at least 30% of the survey or did not completely answer questions from the measures that were being used in the analyses; this led to the listwise deletion of 51

participants. The final sample included 158 participants. The mean age was 22.2 years old (range 19 - 42, *SD* = 3.4) and the sample was predominantly comprised of females (71.5%, *n* = 113; see Table 1).

Measures

Demographics, screener, and future contact form questionnaires. The measure included questions pertaining to various aspects of their lives; this includes their age, gender, and if English was their first language. Once the screener was completed and the participant was deemed eligible, the full survey was opened. If the participant was under 18 and/or English was not their first language, they were deemed ineligible; therefore, access to the survey was denied and the participant was finished. The initial section of the survey asks participants to provide the following information: age, race, gender, employment status, marital status, whether or not they have health insurance, amount of physical activity, height and weight, risky behaviors, and if they are a transfer student. Participants also had the option of choosing whether or not they would like to be contacted for future studies.

Inventory of Statements about Self-Injury (ISAS). The ISAS is a 45-item self-report measure that assesses various aspects of NSSI. Two questions are open-ended; one asks the participant to estimate the frequency with which they have engaged in 13 different types of NSSI throughout their life, while the other asks for the first and most recent engagement in this behavior. Four questions use multiple choice to ask about the experience of engaging in NSSI, and 39 questions use a Likert scale ranging from (0) *not relevant*, (1) *somewhat relevant*, and (2) *very relevant* to better understand the functions of engaging in NSSI. The internal consistency for this measure ranges from 0.80 - 0.87

(Klonsky & Glenn, 2009). For the current sample, the internal consistency was 0.52. Since the ISAS does not ask about rate of self-injurious behavior, the current study operationalized this through dichotomizing and summing each type of NSSI asked. This allowed for the exclusion of potential outliers in the analysis. Scores range from 0-13; as this value increases, so does number of different self-injurious behaviors attempted. A score of 13, for example, indicates that an individual has used at least 13 different types of NSSI. Additionally, the current study used the question that asked about functions of self-harm.

Medical Outcomes Study Questionnaire Short Form 36 Health Survey (SF-36). The SF-36 is a 36-item self-report measure that assesses aspects of quality of life. Questions are asked using multiple Likert scales, with responses ranging from the following: (1) *Excellent* to (5) *Poor*; (1) *Much better now than one year ago* to (5) *Much worse now than one year ago*; (1) *Yes, limited a lot* to (3) *No, not limited at all*; (1) *Not at all* to (5) *Extremely*; (1) *None* to (6) *Very severe*; (1) *All of the time* to (6) *None of the time*; and (1) *Definitely true* to (5) *Definitely false*. Higher scores indicate a better health state. To ensure this, ten items are recoded; seven of these are reverse scored, while three are recalibrated based on values obtained by Gandek and Ware (1993). Raw scores are then computed through summing items within each scale. Lastly, the scores are transformed to a 0 to 100 scale. This measure has good internal consistency, with scores ranging from 0.80-0.90 (Morgan et al., 2017; Ware & Sherbourne, 1992).

The SF-36 is comprised of eight subscales: Physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. These subscales can be grouped into two summary measures, as demonstrated by Ware

(2000). The mental health summary measure is comprised of the following subscales: vitality, social functioning, role-emotional, and mental health. Higher values on this scale indicate less severe level of mental health issues. The physical health summary measure is comprised of the following subscales: physical functioning, role-physical, bodily pain, and general health. Greater values on this scale indicate higher levels of physical health. Aforementioned, each subscale scale is scored on a 0-100 scale. Accordingly, the summary measures have a maximum score of 400 (Ware, 2000). For purposes of this study, the physical health summary measure was used to represent level of physical health.

Coping Orientation to Problems Experienced Inventory (COPE). The COPE Inventory is a 60-item self-report measure that assesses how individuals respond to and feel throughout difficult situations. Questions are asked using a Likert scale, with responses including the following: (1) *I usually don't do this at all*, (2) *I usually do this a little bit*, (3) *I usually do this a medium amount*, and (4) *I usually do this a lot*. Higher scores indicate the increased use of a specific coping skill. This measure has good internal reliability, with scores ranging from 0.45 to 0.92 for each of the sub scales (Carver et al., 1989).

The COPE Inventory is comprised of fifteen subscales: Positive reinterpretation and growth, mental disengagement, focus on and venting of emotions, use of instrumental social support, active coping, denial, religious coping, humor, behavioral disengagement, restraint, use of emotional social support, substance use, acceptance, suppression of competing activities, and planning. In their seminal article, the experimenters performed a second-order factor analysis and found the subscales

theoretically clustered into two broad categories, which they categorized as “adaptive strategies” and “strategies that are of more questionable value” (Carver et al., 1989). Instead of using their categories, the experimenters recommended to create second-order factors using obtained data, as they asserted, “different samples exhibit different patterns of relations” (Carver et al., 1989). This study followed these recommendations.

Depression, Anxiety, and Stress Scale (DASS-42). The DASS-42 is a 42-item self-report measure that assesses depressive, anxiety, and stress symptoms. Questions use a Likert scale that range from (0) *did not apply to me at all* to (3) *applied to me very much or most of the time*. Total scores range from 0-42, with higher scores indicating greater levels of depressive, anxiety, and/or stress symptoms. The measure demonstrates good psychometric properties; internal consistency for the anxiety and depression subscales have been found to be 0.84 and 0.91, respectively (Lovibond & Lovibond, 1995).

Analytic Strategy

Preliminary analyses. An a priori power analysis was conducted through using the computer program G*Power (Erdfelder et al., 1996). A power of 0.80 was achieved with a sample size of 66, alpha of 0.05, a medium effect size, and three independent variables in the multiple regression analysis for moderation effects testing after the data set was cleaned. Descriptive statistics, including means, standard deviations, and frequencies were calculated to compare group differences. Demographic information, including gender, race, and age were compiled in order to learn about the sample (Table 1). SPSS 26 was used to analyze data (SPSS, 2019).

Main analyses. Three hierarchical multiple regressions were conducted; one to evaluate the moderating effect of physical health on the relationship between adaptive coping and engagement in NSSI, a second to evaluate the moderating effect of physical health on the relationship between maladaptive coping and engagement in NSSI, and a third to evaluate the moderating effect of physical health on the relationship between the use of social support and engagement in NSSI. The independent variables and the moderator were mean-centered prior to creating interaction terms. This was done to maximize interpretability of the results and minimize the potential of multicollinearity (Baron & Kenny, 1986; Dawson, 2014; Frazier et al., 2004). The interaction terms were then formed through multiplying each mean-centered independent variable with the mean-centered moderator (Aiken & West, 1991).

NSSI was input as the dependent variable. The other variables were then entered into the regression in two steps. For the first hypothesis, the mean-centered variants of adaptive coping and physical health were entered in step one and the interaction between these two variables was entered in step two. For the second hypothesis, the mean-centered variants of maladaptive coping and physical health were entered in step one and the interaction between these two variables was entered in step two. Similarly, the mean-centered variants of social support and physical health were entered into step one and the interaction between these two variables were entered into step two of the equation for the third hypothesis.

Chapter 3

Results

Demographic and Descriptive Statistics

Demographic and descriptive information of the sample can be found in Table 1 and additional descriptive statistics can be found in Table 2. Almost half of the participants 47.5% (*n*=75) reported engaging in NSSI; among these individuals, an average of 2.96 different types of NSSI was reported (*SD*=2.1). Banging or hitting one's self was the most common type of NSSI reported (*n*=32). A correlation matrix was produced to examine the relationships between the variables used in the main analyses; the results can be found in Table 3. Physical health was negatively associated with depression, anxiety, and maladaptive coping.

Table 1

Demographic & Descriptive Characteristics of the Sample

Characteristic		*f*	%
Age, years			
Mean	22.2		
Standard deviation	3.4		
Sex			
Female		113	72.0
Male		44	28.0
Race / Ethnicity			
Asian		5	3.2
Black		23	14.6
Hispanic		6	3.8
White		114	72.6
Other		9	5.7
Total N		157	

Table 1 (Continued)

Characteristic	*f*	%
NSSI Reason		
Release of Emotional Pressure	63	39.9
Reducing Anxiety, Anger	61	38.7
Calming Myself Down	57	36.1

Note. NSSI Reason = Function of self-harm question from the ISAS

Table 2

Descriptive Statistics of the Sample

Characteristic	Minimum	Maximum	Mean	Std. Deviation
Coping Style				
Adaptive Coping	24.0	96.0	62.0	13.8
Maladaptive Coping	26.0	64.0	31.4	10.3
Social Support Coping	12.0	48.0	30.9	8.4
Physical Health	95.2	400.0	305.4	73.4
Anxiety	0.0	39.0	8.7	9.2
Depression	0.0	42.0	9.9	11.0

Table 3

Correlations of Dependent and Independent Variables (N=157)

Measure	1	2	3	4	5	6	7	8
1.Depression	-	0.73**	-0.26**	0.05	0.28**	0.19*	0.15	0.38**
2. Anxiety	0.73**	-	-0.29**	0.06	0.30**	0.12	0.00	0.36**
3. Physical Health	-0.26**	-0.28**	-	0.19*	-0.21**	0.11	-0.28**	-0.07
4. Adaptive Coping	0.05	0.06	0.19*	-	0.40**	0.57**	0.01	0.10
5. Maladaptive Coping	0.03**	0.30**	-0.21	0.40**	-	0.50**	0.50**	0.16*
6. Social Support Coping	0.19*	0.12	0.11	0.57**	0.50**	-	-0.04	-0.01
7. Age	0.15*	0.00	-0.28	0.01	-0.01	-0.04	-	-0.03
8. NSSI	0.38**	0.36**	-0.07	0.10	0.16	-0.01	-0.03	-

Notes. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Principal Component Factor Analysis

Following the recommendation from the seminal article (Carver et al., 1989), a second-order principal components factor analysis with varimax rotation was performed using the fifteen COPE subscales. Results produced three components, each with an eigenvalue greater than one. If a subscale from the COPE loaded onto multiple factors, theory and previous literature were used to determine which would be the best fit (Walker et al., 2006). One component aligned with coping strategies that were considered adaptive (e.g., acceptance, positive reinterpretation and growth, humor, planning, active coping, and restraint). A second cluster aligned with coping strategies that were more

maladaptive (e.g., behavioral disengagement, mental disengagement, denial, and substance use). A third component aligned with coping strategies that involved the use of social support (e.g., the use of emotional social support, the use of instrumental social support, and focus on and venting of emotions). The internal consistency reliability of the adaptive coping cluster, the maladaptive coping cluster, and the social support cluster in the present sample was 0.87, 0.83, and 0.86, respectively. Suppression of competing activities was not used because it loaded poorly on all three factors. Religious coping was not used because it did not load onto any of the factors.

Table 4

Factor Loadings and Communalities based on a Principal Components Analysis with Varimax Rotation for the 15 COPE subscales (N=157)

	Adaptive Coping	**Maladaptive Coping**	**Social Support Coping**
Acceptance	0.85		
Positive Reinterpretation and Growth	0.74		0.36
Humor	0.70	0.45	
Planning	0.65		0.43
Active Coping	0.62		0.44
Restraint	0.54	0.39	0.32
Mental Disengagement	0.51	0.50	0.33

Table 4 (Continued)

	Adaptive Coping	Maladaptive Coping	Social Support Coping
Behavioral Disengagement		0.88	
Denial		0.86	
Substance Use		0.79	
Suppression of Competing Activities	0.43	0.45	0.43
Use of Instrumental Social Support			0.87
Focus on and Venting of Emotions		0.48	0.67
Religious Coping	0.00	0.00	0.00

Notes. Factor loadings < 0.3 are suppressed.

Adaptive Coping

A hierarchical multiple regression analysis was conducted to evaluate the moderating effect of physical health on the relationship between adaptive coping and engagement in NSSI. When considered individually, adaptive coping and physical health accounted for 2.0% of the total variance in engagement in NSSI, which was not a significant effect, $F(2, 155)=1.53$, $p=0.22$. In the second step, the inclusion of the interaction term (between adaptive coping and physical health) accounted for an additional 1.0% of the total variance in engagement in NSSI. This step was also not significant, $\Delta F(1, 154)=1.05$, $p=0.31$. These results show that there was no significant

moderating effect of physical health on the relationship between adaptive coping and engagement in NSSI (Table 5).

Table 5

Moderation of Physical Health on Adaptive Coping and NSSI Engagement (N=157)

Step	Predictor	R^2	ΔR^2	ß	*t*	*p*
1	Gender	0.01		0.11	1.38	0.17
2	Adaptive Coping		0.02	0.12	1.52	0.13
	Physical Health			-0.03	-0.42	0.68
3	Adaptive Coping * Physical Health		0.00	0.01	0.13	0.90

Maladaptive Coping

A hierarchical multiple regression analysis was conducted to evaluate the moderating effect of physical health on the relationship between maladaptive coping and engagement in NSSI. When considered individually, maladaptive coping and physical health accounted for 3.0% of the total variance in engagement in NSSI, which was not a significant effect, $F(2, 154)=2.17$, $p=0.12$. In the second step, the inclusion of the interaction term (between maladaptive coping and physical health) accounted for an additional < 0.01% of the total variance in engagement in NSSI. This step was also not significant, $\Delta F(1, 153)=0.04$, $p=0.84$. These results suggest that there was no significant

moderating effect of physical health on the relationship between maladaptive coping and engagement in NSSI (Table 6).

Table 6

Moderation of Physical Health on Maladaptive Coping and NSSI Engagement (N=157)

Step	Predictor	R^2	ΔR^2	ß	*t*	*p*
1	Gender	0.01		0.11	1.33	0.18
2	Maladaptive Coping		0.00	-0.00	-0.04	0.97
	Physical Health			-0.01	-0.13	0.89
3	Maladaptive Coping * Physical Health		0.00	0.01	0.13	0.89

Social Support Coping

A hierarchical multiple regression analysis was conducted to evaluate the moderating effect of physical health on the relationship between the use of social support and engagement in NSSI. When considered individually, social support coping and physical health accounted for 1.0% of the total variance in engagement in NSSI, which was not a significant effect, $F(2, 152)=0.54$, $p=0.59$. In the second step, the inclusion of the interaction term (between social support coping and physical health) accounted for an additional 0.3% of the total variance in engagement in NSSI. This step was also not significant, $\Delta F(1, 151)=0.40$, $p=0.53$. These results demonstrate that there was no

significant moderating effect of physical health on the relationship between social support coping and engagement in NSSI (Table 7).

Table 7

Moderation of Physical Health on Social Support Coping and Engagement in NSSI (N=157)

Step	**Predictor**	R^2	ΔR^2	ß	*t*	*p*
1	Gender	0.01		0.11	1.40	0.17
2	Social Support Coping		0.02	-0.14	-1.69	0.09
	Physical Health			0.00	0.02	0.98
3	Social Support Coping * Physical Health		0.00	0.02	0.19	0.85

Chapter 4

Discussion

Coping skills are typically used to alleviate unwanted thoughts and feelings. As coping strategies are copious, a decision must be made about which skill to use. Lazarus's transactional model of coping describes this process and asserts a coping skill is chosen after a stressful situation has been assessed and coping options have been considered (Lazarus & Folkman, 1984). Even though the coping skill might have been successful in alleviating unwanted symptoms, it is not necessarily healthy or sustainable (Barnes et al., 2010; Cawood & Huprich, 2011; Favazza, 1998; Miquelon & Vallerand, 2008; Muehlenkamp, 2006; Pattison & Kahan, 1983; Sornberger et al., 2013; Thomassin et al., 2017).

Prior research concerning NSSI has been useful in increasing our understanding about this behavior. The Experiential Avoidance Model of Deliberate Self-Harm suggests that NSSI is maintained through negative reinforcement (Chapman et al., 2006; Jutengren et al., 2011). Additionally, correlates like emotion regulation and affect have been found to significantly predict NSSI engagement (Adams et al., 2018; Benson, 2010; Miquelon & Vallerand, 2008). However, these studies neglect to consider the influence of the relationship between physical and mental health.

This study bridges a gap between health psychology and psychopathology through examining the moderating function of physical health on the relationship between coping strategy and engagement in NSSI. Physical health was hypothesized to moderate the association between adaptive coping and engagement in NSSI, such that the relationship between adaptive coping and engagement in NSSI weakens as physical

health increases. Physical health was also hypothesized to moderate the association between maladaptive coping and engagement in NSSI, such that the relationship between maladaptive coping and engagement in NSSI strengthens as physical health decreases. Finally, physical health was hypothesized to moderate the association between social support and engagement in NSSI, such that the relationship between the use of social support and engagement in NSSI weakens as physical health increases. Findings indicated that physical health did not significantly moderate any of the relationships tested.

Overview of Results

Moderation effect of physical health on adaptive coping and NSSI engagement. Results indicate that physical health did not significantly moderate the relationship between adaptive coping and engagement in NSSI. Physical health and adaptive coping were also found to not be independently related to NSSI engagement. While the non-significant associations are in-line with previous work, the strengths of their relationships obtained in the present study differ (Cawood & Huprich, 2011; Sornberger et al., 2013; Wester & Trepal, 2010). Comparisons should be made cautiously, since adaptive coping is defined differently in these studies. For example, The How I Deal with Stress Questionnaire (Ross & Heath, 2007) used by Sornberger and colleagues (2013), identifies the following coping strategies as adaptive: talking to someone, trying to solve the problem, listening to music, exercising, playing sports, reading, praying / engaging in other religious activities as adaptive coping strategies (Ross & Heath, 2007). The Coping Styles Questionnaire (Roger et al., 1993), another measure that assesses coping style, uses rational coping strategies (e.g. finding

information to help make a decision) and detachment coping strategies (e.g. not taking anything personally) to represent adaptive coping. Keeping this in mind, participants in the current sample might not have employed many (or any) of the adaptive coping strategies asked throughout the COPE; this could explain the differences in the strength of the relationships obtained between the present study and prior studies.

Moderation effect of physical health on maladaptive coping and NSSI engagement. Physical health did not significantly moderate the relationship between maladaptive coping and NSSI. Contrary to other findings, the relationships between NSSI engagement and each variable independently were also not significant (Andover et al., 2007; Lin et al., 2017; Silverman et al., 2018; Tanner et al., 2015). This could be indicative of the level of depression and anxiety in the sample, both of which were mild (Table 2). When this is the case, individuals are more likely to have a positive mindset and a heightened self-realization (Miquelon & Vallerand, 2008; Tanner et al., 2015). As a result, maladaptive coping skills are less likely to be employed (Boujut et al., 2012; Carver & Connor-Smith, 2010; Trepal et al., 2015; Saklofske et al., 2012). While the direction of the results were similar to prior studies, the percentage of reported NSSI in the current sample was higher.

Moderation effect of physical health on social support coping and engagement in NSSI. Physical health was found to not significantly moderate the association between social support coping and engagement in NSSI. The independent influences of social support and physical health on NSSI engagement were also not significant. Literature regarding the relationship between social support coping and NSSI is mixed (Buser et al., 2014; Byrne et al., 2008; Trujillo & Servaty-Seib, 2018; Turner et

al., 2016; Whisenhut et al., 2014; Yates et al., 2008). Studies that have found significant relationships suggest the social support received from an individual's family plays an important role in alleviating symptoms (Andrews et al., 2013; Brausch & Gutierrez, 2010; Wichstr⊘m, 2009). Keeping this in mind, participants in the current sample might not have been able to confide in their family as a result of moving out for college.

Summary. The mean scores obtained for each of the coping strategies is noteworthy. When compared to Walker's (2006) study where the same second-order clusters from The COPE were used, mean scores in the current sample were higher. This could be due to differences in the populations sampled; the average age of participants in Walker et al.'s study (2006) was 59, 37 years older than the average age of the current sample. In comparison to other age groups, young adults have reported needing to employ multiple coping skills to alleviate their symptoms the most (Chen et al., 2018; Hunt et al., 2003). Even though this might be the case, studies have shown the use numerous coping skills has varying levels of success in alleviating symptoms (Andrews et al., 2013; Czyz et al., 2019; Hasking et al., 2008; Nock et al., 2007; Trepal et al., 2015). If the coping strategies are predominately adaptive, however, NSSI probability is lower (Cawood & Huprich, 2011; Czyz et al., 2019; Miquelon & Vallerand, 2008; Sornberger et al., 2013; Trepal et al., 2015). These findings demonstrate how efficacious coping skills can affect NSSI frequency.

The number of participants who reported NSSI (47.5%, *n*=75) in the sample is elevated relative to figures from the Center for Collegiate Mental Health (2020). In their most recent report, 28.7% (*n*=59,643) of college students engaged in NSSI, a statistic that has increased each year for the past nine years (Center for Collegiate Mental Health,

2020). The various stressors and challenges that come with being an undergraduate student could explain the highened report of NSSI (Chickering & Reisser, 1993; Nock et al., 2009). Common stressors faced by this population can be in the realm of finances, academics, social pressures, personal issues, adjusting to a new place, and personal / professional development, among other areas (Midkiff et al., 2018; Nock et al., 2009). Instead of confronting these unfavorable situations and/or feelings, an individual might avoid them through engagement in NSSI. If NSSI is effective in alleviating their symptoms, this behavior is negatively reinforced and likely to occur again.

Conclusions. Physical health did not significantly moderate the relationship between coping strategy and NSSI engagement in all hypotheses tested. Analysis of the top reasons participants in the current sample chose for starting NSSI demonstrate that this behavior had an overall regulatory function. The reason reported with the highest frequency was that engagement in this behavior released built up emotional pressure (Table 1). This indicates NSSI served to reduce or avoid an unwanted emotional arousal (Chapman et al., 2006; Hulbert & Thomas, 2010; Söderberg et al., 2004). As such, the results are congruous with an experiential avoidance model. Given that no interventions have been shown to consistently decrease frequency of deliberate self-harm (Brausch & Girresch, 2012; Fox et al., 2015; Glenn et al., 2015; Gonzales & Bergstrom, 2013; Nock, 2010; Washburn et al., 2012), increasing our understanding about theories, risk factors, and protective factors of this behavior might help in prevention efforts.

Limitations and Future Directions

Limitations. The cross-sectional research design is one limitation of this study. Collecting data from only one point does not help when determining pathology and might not accurately represent the sample (Sedgwick, 2014). Since mental and physical health change over time (Cairney et al., 2009; Hankin & Abela, 2011; Ohrnberger et al., 2017; World Health Organization, 2005), adopting a longitudinal design for NSSI research could be helpful in identifying how different levels of physical and/or mental health influence NSSI engagement. Longitudinal work could also help illustrate patterns of engagement.

Potential effects of using solely self-report measures should be considered. This may have led to various methodological issues, including socially-desirable reporting styles (Huprich et al., 2011). Incorporating a questionnaire like the Marlow-Crowne Social Desirability Scale would have provided insight concerning social approval of the sample (Crowne & Marlowe, 1960; Vésteinsdóttir et al., 2015). Furthermore, because there is an increased likelihood of non-disclosure among undergraduate students, estimates provided in this study might be conservative (Midkiff et al., 2018). While the format of the measures allowed a participant to respond to a question as she saw fit, it also accepted any response that was entered (Revilla et al., 2017). This could have skewed the data and interpretation.

The way in which the variables were operationalized could have also impacted the results. NSSI frequency was measured using the ISAS. Although this questionnaire has sound psychometric properties (Klonsky & Glenn, 2009), it does not specifically ask about rate of engagement in NSSI. The same explanation can be used for The COPE,

which does not explicitly measure adaptive coping, maladaptive coping, and social support coping. If questionnaires that specifically measured variable frequency were used, such as The Deliberate Self-Harm Inventory (Gratz, 2001) for NSSI rate, the results may have been confirmed. Furthermore, adding these questionnaires could lend new relationships not previously considered. Additional aspects of the study could have limited the analysis.

The sample population of the current study is another limitation. The minimal variance within each of the variables indicates the current sample is relatively homogenous. There are studies that have obtained similar levels of homogeneity within their variables, but they are scarce (Gallagher, 1996; Goldstein, 2006). Moving forward, sampling a population whose physical health and/or coping styles are likely to vary could provide a more precise representation of their association with NSSI engagement. Evaluating these relationships among individuals who have chronic illness might be particularly informative, as the influence and perception of chronic illness has been known to fluctuate (Bonsaksen et al., 2015; Leventhal et al., 1980; Martin & Leventhal, 2004; McHugh et al., 2016).

The difference between the amount of men and women in the sample could represent another limitation. As the current sample was comprised of 69 more females than males, it could affect the results. In an attempt to limit the influence of gender, it was controlled for in the analyses. Moving forward, sampling a population that has a more even number of males and females might provide more generalizable results.

Future directions. Continuing to perform NSSI research is imperative because it can aid in continuing to identify at risk individuals and/or populations, as well as increase our knowledge about various aspects of this behavior. Prior literature has demonstrated that racial groups use different types of NSSI (Trepal et al., 2015; Van Gundy et al., 2015). For example, African Americans were found to apply more avoidance-oriented coping styles, while Caucasians used more problem-focused coping styles (Van Gundy et al., 2015). Future work might build on these results and aim to examine sub-sets of populations. This type of NSSI research could be particularly useful for identifying intragroup differences amongst similar groups of people. Transfer students, a sub-set of undergraduate students, have been found to be under additional stress when compared to classmates who did not transfer (Beiter et al., 2015; Jason et al., 1992; One & Cheong, 2009). As a result, this population might be interesting to assess. Examining type and frequency of NSSI is also recommended for future work, since these can be useful when conceptualizing this behavior (Cawood & Huprich, 2011; Gratz et al., 2002; Gratz & Roemer, 2004; MacLaren & Best, 2010).

References

Adams, D., Rose, J., Jackson, N., Karakatsani, E., & Oliver, C. (2018). Coping Strategies in Mothers of Children with Intellectual Disabilities Showing Multiple Forms of Challenging Behaviour: Associations with Maternal Mental Health. *Behavioural and cognitive psychotherapy*, *46*(3), 257-275.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.

Andover, M. S., Pepper, C. M., & Gibb, B. E. (2007). Self-mutilation and coping strategies in a college sample. *Suicide and Life-Threatening Behavior*, *37*(2), 238-243.

Andover, M. S., Pepper, C. M., Ryabchenko, K. A., Orrico, E. G., & Gibb, B. E. (2005). Self-Mutilation and Symptoms of Depression, Anxiety, and Borderline Personality Disorder. *Suicide and Life-Threatening Behavior*, 35(5), 581-591.

Andrews, T., Martin, G., & Hasking, P. (2012). Differential and common correlates of non-suicidal self-injury and alcohol use among community-based adolescents. *Advances in Mental Health*, *11*(1), 55-66.

Andrews, T., Martin, G., Hasking, P., & Page, A. (2013). Predictors of continuation and cessation of nonsuicidal self-injury. *Journal of Adolescent Health*, *53*(1), 40-46.

Armiento, J. S., Hamza, C. A., & Willoughby, T. (2014). An examination of disclosure of nonsuicidal self-injury among university students. *Journal of Community & Applied Social Psychology*, *24*(6), 518-533.

Barnes, A. J., Eisenberg, M. E., & Resnick, M. D. (2010). Suicide and self-injury among children and youth with chronic health conditions. *Pediatrics*. 125, 889-895.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of affective disorders*, *173*, 90-96.

Benson, P. R. (2010). Coping, distress, and well-being in mothers of children with autism. *Research in Autism Spectrum Disorders*, 4, 217–228. doi: 10.1016/ j.rasd.2009.09.008.

Bergen, H., Hawton, K., Waters, K., Ness, J., Cooper, J., Steeg, S., & Kapur, N. (2012). Premature death after self-harm: a multicentre cohort study. *The Lancet*, *380*(9853), 1568-1574.

Bonsaksen, T., Lerdal, A., & Fagermoen, M. S. (2015). Trajectories of illness perceptions in persons with chronic illness: An explorative longitudinal study. *Journal of Health Psychology*, *20*(7), 942-953.

Boujut, E., Bruchon-Schweitzer, M., & Dombrowski, S. U. (2012). Coping among students: Development and validation of an exploratory measure. *Psychology, 3*(8), 562-568.

Brausch, A. M., & Gutierrez, P. M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of youth and adolescence*, *39*(3), 233-242.

Brausch, A. M., & Girresch, S. K. (2012). A review of empirical treatment studies for adolescent nonsuicidal self-injury. *Journal of Cognitive Psychotherapy*, *26*(1), 3.

Briere, J., & Gil, E. (1998). Self-Mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry, 68* (4), 609-620.

Buser, T. J., Pitchko, A., & Buser, J. K. (2014). Naturalistic recovery from nonsuicidal self-injury: a phenomenological inquiry. *Journal of Counseling & Development*, *92*(4), 438-446.

Byrne, S., Morgan, S., Fitzpatrick, C., Boylan, C., Crowley, S., Gahan, H., Howley, J., Staunton, D., & Guerin, S. (2008). Deliberate self-harm in children and adolescents: a qualitative study exploring the needs of parents and carers. *Clinical child psychology and psychiatry*, *13*(4), 493-504.

Cairney, J., Faulkner, G., Veldhuizen, S., & Wade, T. J. (2009). Changes over time in physical activity and psychological distress among older adults. *The Canadian Journal of Psychiatry*, *54*(3), 160-169.

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual review of psychology*, *61*, 679-704.

Carver, C. S., Weintraub, J. K., & Scheier, M. F. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-283.

Cawood, C. D., & Huprich, S. K. (2011). Late adolescent nonsuicidal self-injury: The roles of coping style, self-esteem, and personality pathology. *Journal of personality disorders*, *25*(6), 765-781.

Center for Collegiate Mental Health. (2020, January). 2019 Annual Report (Publication No. STA 20-244).

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour research and therapy*, *44*(3), 371-394.

Chen, Y., Peng, Y., Xu, H., & O'Brien, W. H. (2018). Age differences in stress and coping: Problem-focused strategies mediate the relationship between age and positive affect. *The International Journal of Aging and Human Development*, *86*(4), 347-363.

Chickering, A. W., & Reisser, L. (1993). Education and Identity. The Jossey-Bass Higher and Adult Education Series. Jossey-Bass Inc., Publishers, 350 Sansome St., San Francisco, CA 94104.

Chinman, M., Daniels, K., Smith, J., McCarthy, S., Medoff, D., Peeples, A., & Goldberg, R. (2017). Provision of peer specialist services in VA patient aligned care teams: protocol for testing a cluster randomized implementation trial. *Implementation Science*, *12*(1), 57.

Claes, L., Klonsky, E. D., Muehlenkamp, J., Kuppens, P., & Vandereycken, W. (2010). The affect-regulation function of nonsuicidal self-injury in eating-disordered patients: which affect states are regulated?. *Comprehensive Psychiatry*, *51*(4), 386-392.

Clara, I., Cox, B., Enns, M., Murray, L., & Torgudc, C. (2003). Confirmatory factor analysis of the Multidimensional Scale of Perceived Social Support in clinically distressed and student samples. *Journal of Personality Assessment, 81*, 265–270.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of consulting psychology*, *24*(4), 349.

Czyz, E. K., Glenn, C. R., Busby, D., & King, C. A. (2019). Daily patterns in nonsuicidal self-injury and coping among recently hospitalized youth at risk for suicide. *Psychiatry research*, *281*, 112588.

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of business and psychology*, *29*(1), 1-19.

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers*, *28*, 1-11.

Evans, G. D., Bryant, N. E., Owens, J. S., & Koukos, K. (2004). Ethnic differences in burnout, coping, and intervention acceptability among childcare professionals. In *Child and Youth Care Forum* (Vol. 33, No. 5, pp. 349-371). Kluwer Academic Publishers-Plenum Publishers.

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing modertor and mediatior effects in counseling psychology. *Journal of counseling psychology*, 51, 115-134.

Gallagher, D. J. (1996). Personality, coping, and objective outcomes: Extraversion, neuroticism, coping styles, and academic performance. *Personality and individual differences*, *21*(3), 421-429.

Gandek, B., & Ware, J. E. (1993). SF-36 Health Survey manual and interpretation guide. *Boston: the Health institute, new england Medical center*.

Glenn, C. R., Franklin, J. C., & Nock, M. K. (2015). Evidence-based psychosocial treatments for self-injurious thoughts and behaviors in youth. *Journal of Clinical Child & Adolescent Psychology*, *44*(1), 1-29.

Glenn, C. R., & Klonsky, E. D. (2011). Prospective prediction of nonsuicidal self-injury: A 1-year longitudinal study in young adults. *Behavior therapy*, *42*(4), 751-762.

Goldstein, B. I. (2006). Why do women get depressed and men get drunk? An examination of attributional style and coping style in response to negative life events among Canadian young adults. *Sex Roles*, *54*(1-2), 27-37.

Gonzales, A. H., & Bergstrom, L. (2013). Adolescent non-suicidal self-injury (NSSI) interventions. *Journal of Child and Adolescent Psychiatric Nursing*, *26*(2), 124-130.

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of psychopathology and behavioral assessment*, *23*(4), 253-263.

Gratz, K., & Gunderson, J. (2006). Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behavior Therapy , 37* (1), 25-35.

Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American journal of Orthopsychiatry*, *72*(1), 128.

Gratz, K. L. & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41-54.

Guerreiro, D. F., Cruz, D., Frasquilho, D., Santos, J. C., Figueira, M. L., & Sampaio, D. (2013). Association between deliberate self-harm and coping in adolescents: a critical review of the last 10 years' literature. *Archives of Suicide Research*, *17*(2), 91-105.

Hamza, C. A., & Willoughby, T. (2015). Nonsuicidal Self-Injury and Affect Regulation: Recent Findings From Experimental and Ecological Momentary Assessment Studies and Future Directions. *Journal of clinical psychology*, *71*(6), 561-574.

Hankin, B. L., & Abela, J. R. (2011). Nonsuicidal self-injury in adolescence: Prospective rates and risk factors in a 2 ½ year longitudinal study. *Psychiatry research*, *186*(1), 65-70.

Hasking, P., Momeni, R., Swannell, S., & Chia, S. (2008). The nature and extent of non-suicidal self-injury in a non-clinical sample of young adults. *Archives of suicide research*, *12*(3), 208-218.

Heath, N., Toste, J., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling*, *30*(2), 137-156.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioral Science, 41*, 180–186.

Hooper, M. W., Baker, E. A., & McNutt, M. D. (2013). Associations between coping, affect, and social support among low-income African American smokers. *Addictive behaviors*, *38*(11), 2736-2740.

House, J. S., Umberson, D., & Landis, K. (1988) Structures and processes of social support. *Annual Review of Sociology, 14*, 293-318.

Howe-Martin, L. S., Murrell, A. R., & Guarnaccia, C. A. (2012). Repetitive nonsuicidal self-injury as experiential avoidance among a community sample of adolescents. *Journal of Clinical Psychology*, *68*(7), 809-829.

Hulbert, C., & Thomas, R. (2010). Predicting self-injury in BPD: an investigation of the experiential avoidance model. *Journal of personality disorders*, *24*(5), 651-663.

Hunt, S., Wisocki, P., & Yanko, J. (2003). Worry and use of coping strategies among older and younger adults. *Journal of anxiety disorders*, *17*(5), 547-560.

Huprich, S. K., Bornstein, R. F., & Schmitt, T. A. (2011). Self-report methodology is insufficient for improving the assessment and classification of Axis II personality disorders. *Journal of Personality Disorders*, *25*(5), 557-570.

Hutchinson, S. L., Baldwin, C. K., & Oh, S. S. (2006). Adolescent coping: Exploring adolescents' leisure-based responses to stress. *Leisure Sciences*, *28*(2), 115-131.

Ito, M., & Matsushima, E. (2016). Presentation of coping strategies associated with physical and mental health during health check-ups. *Community mental health journal*, *53*(3), 297-305.

Jaffe, A. D. (2018). Project PAN: Relationship between physical health, psychiatric correlates, and engagement in non-suicidal self-injury.

Jason, L. A., Weine, A. M., Johnson, J. H., Warren-Sohlberg, L., Filippelli, L. A., Turner, E. Y., & Lardon, C. (1992). *Helping Transfer Students: Strategies for Educational and Social Readjustment. A Joint Publication in the Jossey-Bass Social and Behavioral Science Series and the Jossey-Bass Education Series*. Jossey-Bass, Inc., Publishers, 350 Sansome Street, San Francisco, CA 94104.

Jutengren, G., Kerr, M., & Stattin, H. (2011). Adolescents' deliberate self-harm, interpersonal stress, and the moderating effects of self-regulation: A two-wave longitudinal analysis. *Journal of School Psychology*, *49*(2), 249-264.

Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography, and functions. *Psychological Medicine, 41* (9), 1981-1986.

Klonsky, E. D., & Glenn, C. R. (2009). Assessing the functions of non-suicidal self injury: Psychometric properties of the Inventory of Statements About Self-injury (ISAS). *Journal of Psychopathology and Behavioral Assessment*, 31(3), 215-219.

Krejci, L. P., Carter, K., & Gaudet, T. (2014). Whole health: the vision and implementation of personalized, proactive, patient-driven health care for veterans. *Medical care*, *52*, S5-S8.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.

Laye-Gindhu, A., & Schonert-Reichl, K. A. (2005). Nonsuicidal self-harm among community adolescents: Understanding the "whats" and "whys" of self-harm. *Journal of youth and Adolescence*, *34*(5), 447-457.

Lehavot, K. (2012). Coping strategies and health in a national sample of sexual minority women. *American Journal of Orthopsychiatry*, *82*(4), 494.

Leventhal, H., Meyer, D., & Nerenz, D. (1980). The common sense representation of illness danger. *Contributions to medical psychology*, *2*, 7-30.

Liddon, L., Kingerlee, R., & Barry, J. A. (2018). Gender differences in preferences for psychological treatment, coping strategies, and triggers to help-seeking. *British Journal of Clinical Psychology*, *57*(1), 42-58.

Lidón-Moyano, C., Wiebe, D., Gruenewald, P., Cerda, M., Brown, P., & Goldman-Mellor, S. (2019). Associations between self-harm and chronic disease among adolescents: Cohort study using statewide emergency department data. *Journal of adolescence*, *72*, 132-140.

Lin, M. P., You, J., Ren, Y., Wu, J. Y. W., Hu, W. H., Yen, C. F., & Zhang, X. (2017). Prevalence of nonsuicidal self-injury and its risk and protective factors among adolescents in Taiwan. *Psychiatry research*, *255*, 119-127.

Lloyd-Richardson, E. E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological medicine*, 37(08), 1183-1192.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, *33*(3), 335-343.

Lossnitzer, N., Müller-Tasch, T., Löwe, B., Zugck, C., Nelles, M., Remppis, A., & Wild, B. (2009). Exploring potential associations of suicidal ideation and ideas of self-harm in patients with congestive heart failure. *Depression and anxiety*, *26*(8), 764-768.

MacLaren, V. V., & Best, L. A. (2010). Nonsuicidal self-injury, potentially addictive behaviors, and the Five Factor Model in undergraduates. *Personality and Individual Differences*, *49*(5), 521-525.

Martin, R., & Leventhal, H. (2004). Symptom perception and health care-seeking behavior.

Mavroveli, S., Petrides, K. V., Rieffe, C., & Bakker, F. (2007). Trait emotional intelligence, psychological well-being and peer-rated social competence in adolescence. *British journal of developmental psychology*, *25*(2), 263-275.

McHugh, M., Harvey, J. B., Kang, R., Shi, Y., & Scanlon, D. P. (2016). Community-level quality improvement and the patient experience for chronic illness care. *Health services research*, *51*(1), 76-97.

Meerwijk, E. L., Parekh, A., Oquendo, M. A., Allen, I. E., Franck, L. S., & Lee, K. A. (2016). Direct versus indirect psychosocial and behavioural interventions to prevent suicide and suicide attempts: a systematic review and meta-analysis. *The Lancet Psychiatry*, *3*(6), 544-554.

Midkiff, M. F., Lindsey, C. R., & Meadows, E. A. (2018). The role of coping self-efficacy in emotion regulation and frequency of NSSI in young adult college students. *Cogent Psychology*, *5*(1), 1520437.

Mikolajczak, M., Petrides, K. V., & Hurry, J. (2009). Adolescents choosing self-harm as an emotion regulation strategy: The protective role of trait emotional intelligence. *British Journal of Clinical Psychology*, *48*(2), 181-193.

Miquelon, P., & Vallerand, R. J. (2008). Goal motives, well-being, and physical health: An integrative model. *Canadian Psychology/Psychologie canadienne*, *49*(3), 241.

Morgan, T. A., Dalrymple, K., Multach, M., & Zimmerman, M. (2017). Relations Between Mindfulness Processes, Psychiatric Symptoms, and Functioning in Psychiatric and Pre-bariatric Surgery Outpatients. *Mindfulness*, *8*(2), 417-432.

Muehlenkamp, J. (2006). Empirically supported treatments and general therapy guidelines for non-suicidal self-injury. *Journal of Mental Health Counseling , 28* (2), 166-185.

National Academies of Sciences, Engineering, and Medicine. (2018). Evaluation of the department of veterans affairs mental health services. National Academies Press.

Neuling, S. J. & Winefield, H. R. (1988). Social support and recovery after surgery for breast cancer: Frequency and correlates of supportive behaviours by family, friends, and surgeon. *Social Science and Medicine, 27*, 385–392.

Nock, M. K. (2010). Self-injury. Annual review of clinical psychology, 6, 339-363.

Nock, M. K., Holmberg, E. B., Photos, V. I., & Michel, B. D. (2007). Self-Injurious Thoughts and Behaviors Interview: development, reliability, and validity in an adolescent sample.

Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry research*, 144(1), 65-72.

Nock, M. K., Prinstein, M. J., & Sterba, S. K. (2009). Revealing the form and function of self-injurious thoughts and behaviors: A real-time ecological assessment study among adolescents and young adults. *Journal of abnormal psychology*, *118*(4), 816.

Ohrnberger, J., Fichera, E., & Sutton, M. (2017). The relationship between physical and mental health: A mediation analysis. *Social Science & Medicine*, *195*, 42-49.

Ong, B., & Cheong, K. C. (2009). Sources of stress among college students--The case of a credit transfer program. *College Student Journal*, *43*(4), 1279-1287.

Parker, J., & Kennedy, P. (2010). Factors predictive of distress in people awaiting a lower gastro-intestinal endoscopy. *Psychology, health & medicine*, *15*(1), 26-33.

Pattison, E., & Kahan, J. (1983). *The deliberate self-harm syndrome , 140* (7), 867-872.

Revilla, M., Ochoa, C., & Loewe, G. (2017). Using passive data from a meter to complement survey data in order to study online behavior. *Social Science Computer Review*, *35*(4), 521-536.

Roger, D., Jarvis, G., & Najarian, B. (1993). Detachment and coping: The construction and validation of a new scale for measuring coping strategies. *Personality and Individual differences*, *15*(6), 619-626.

Ross, S., & Heath, N. L. (2007). How I deal with stress questionnaire (HIDS). *Unpublished manuscript, McGill University, Montreal, Canada*.

Saklofske, D. H., Austin, E. J., Galloway, J., & Davidson, K. (2007). Individual difference correlates of health-related behaviours: Preliminary evidence for links between emotional intelligence and coping. *Personality and individual differences*, *42*(3), 491-502.

Saklofske, D. H., Austin, E. J., Mastoras, S. M., Beaton, L., & Osborne, S. E. (2012). Relationships of personality, affect, emotional intelligence and coping with student stress and academic success: Different patterns of association for stress and success. *Learning and Individual Differences*, *22*(2), 251-257.

Santos, J. C., Saraiva, C. B., & De Sousa, L. (2009). The role of expressed emotion, self-concept, coping, and depression in parasuicidal behavior: a follow-up study. *Archives of Suicide Research*, *13*(4), 358-367.

Sedgwick, P. (2014). Cross sectional studies: advantages and disadvantages. *Bmj*, *348*, g2276.

Segal, D. L., Hook, J. N., & Coolidge, F. L. (2001). Personality dysfunction, coping styles, and clinical symptoms in younger and older adults. *Journal of Clinical Geropsychology*, *7*(3), 201-212.

Silverman, J. R., Ross, E. H., & Kearney, C. A. (2018). Non-Suicidal Self-Injury Among Male Adjudicated Adolescents: Psychosocial Concerns, Coping Responses, Diagnoses, and Functions. *Journal of Child and Family Studies*, *27*(11), 3564-3571.

Söderberg, S., Kullgren, G., & Renberg, E. S. (2004). Life events, motives, and precipitating factors in parasuicide among borderline patients. *Archives of suicide research*, *8*(2), 153-162.

Sornberger, M. J., Smith, N. G., Toste, J. R., & Heath, N. L. (2013). Nonsuicidal self-injury, coping strategies, and sexual orientation. *Journal of clinical psychology*, *69*(6), 571-583.

SPSS, I. (2019). Statistical Package for Social Sciences Software, version 26, New York, USA. *SPSS, IBM*.

Stowell, J. R., Kiecolt-Glaser, J. K., & Glaser, R. (2001). Perceived stress and cellular immunity: When coping counts. *Journal of behavioral medicine*, *24*(4), 323-339.

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior*, *44*(3), 273-303.

Thomassin, K., Marion, C. G., Venasse, M., & Shaffer, A. (2017). Specific coping strategies moderate the link between emotion expression deficits and nonsuicidal self-injury in an inpatient sample of adolescents. *Child and adolescent psychiatry and mental health*, *11*(1), 21.

Trepal, H. C., Wester, K. L., & Merchant, E. (2015). A cross-sectional matched sample study of nonsuicidal self-injury among young adults: support for interpersonal and intrapersonal factors, with implications for coping strategies. *Child and adolescent psychiatry and mental health*, *9*(1), 36.

Trujillo, N. P. & Servaty-Seib, H. (2018). Parental Absence and Non-Suicidal Self-Injury: Social Support, Social Constraints and Sense-Making. *Journal of Child and Family Studies*, *27*(5), 1449-1459.

Turner, B. J., Cobb, R. J., Gratz, K. L., & Chapman, A. L. (2016). The role of interpersonal conflict and perceived social support in nonsuicidal self-injury in daily life. *Journal of abnormal psychology*, *125*(4), 588.

Van Gundy, K. T., Howerton-Orcutt, A., & Mills, M. L. (2015). Race, Coping Style, and Substance Use Disorder Among Non-Hispanic African American and White Young Adults in South Florida. *Substance use & misuse*, *50*(11), 1459-1469.

Vésteinsdóttir, V., Reips, U. D., Joinson, A., & Thorsdottir, F. (2015). Psychometric properties of measurements obtained with the Marlowe–Crowne Social Desirability Scale in an Icelandic probability based Internet sample. *Computers in Human Behavior*, *49*, 608-614.

Victor, S. E., Muehlenkamp, J. J., Hayes, N. A., Lengel, G. J., Styer, D. M., & Washburn, J. J. (2018). Characterizing gender differences in nonsuicidal self-injury: Evidence from a large clinical sample of adolescents and adults. *Comprehensive psychiatry*, *82*, 53-60.

Walker, M. S., Zona, D. M., & Fisher, E. B. (2006). Depressive symptoms after lung cancer surgery: Their relation to coping style and social support. *Psycho-Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer*, *15*(8), 684-693.

Ware Jr, J. E. (2000). SF-36 health survey update. *Spine*, *25*(24), 3130-3139.

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care*, 473-483.

Washburn, J. J., Richardt, S. L., Styer, D. M., Gebhardt, M., Juzwin, K. R., Yourek, A., & Aldridge, D. (2012). Psychotherapeutic approaches to non-suicidal self-injury in adolescents. *Child and adolescent psychiatry and mental health*, *6*(1), 14.

Wester, K. L., & Trepal, H. C. (2010). Coping behaviors, abuse history, and counseling: Differentiating college students who self-injure. *Journal of College Counseling*, *13*(2), 141-154.

Whisenhunt, J. L., Chang, C. Y., Flowers, L. R., Brack, G. L., O'Hara, C., & Raines, T. C. (2014). Working with clients who self-injure: A grounded theory approach. *Journal of Counseling & Development*, *92*(4), 387-397.

Whitlock, J., Muehlenkamp, J., & Eckenrode, J. (2008). Variation in nonsuicidal self-injury: Identification and features of latent classes in a college population of emeriging adults. *Journal of Clinical Child & Adolescent Psychology , 37* (4), 725-735.

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Abrams, G. B., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health*, *52*(4), 486-492.

Wichstr⊘m, L. (2009). Predictors of non-suicidal self-injury versus attempted suicide: similar or different?. *Archives of Suicide Research*, *13*(2), 105-122.

Williams, F. & Hasking, P. (2010). Emotion regulation, coping and alcohol use as moderators in the relationship between non-suicidal self-injury and psychological distress. *Prevention Science*, *11*(1), 33-41.

Wingo, A. P., Baldessarini, R. J., & Windle, M. (2015). Coping styles: Longitudinal development from ages 17 to 33 and associations with psychiatric disorders. *Psychiatry research*, *225*(3), 299-304.

World Health Organization. (2005). Promoting mental health: concepts, emerging evidence, practice: a report of the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation and the University of Melbourne. World Health Organization.

Yates, T. M., Tracy, A. J., & Luthar, S. S. (2008). Nonsuicidal self-injury among" privileged" youths: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical psychology*, *76*(1), 52.

Zelkowitz, R. L., Cole, D. A., Han, G. T., & Tomarken, A. J. (2016). The incremental utility of emotion regulation but not emotion reactivity in nonsuicidal self-injury. *Suicide and Life-Threatening Behavior*, 46(5), 545-562.

Zullig, K. J. (2016). The association between deliberate self-harm and college student subjective quality of life. *American journal of health behavior*, *40*(2), 231-239.