

8-2014

Subjective Vs. Objective Physical Pain in Individuals Who Report a History of Nonsuicidal Self-Injury: A Closer Look at What it Means to Experience Pain

Cassandra A. Sturycz
cassandra.sturycz629@topper.wku.edu

Follow this and additional works at: <http://digitalcommons.wku.edu/theses>

 Part of the [Applied Behavior Analysis Commons](#), [Child Psychology Commons](#), and the [Pain Management Commons](#)

Recommended Citation

Sturycz, Cassandra A., "Subjective Vs. Objective Physical Pain in Individuals Who Report a History of Nonsuicidal Self-Injury: A Closer Look at What it Means to Experience Pain" (2014). *Masters Theses & Specialist Projects*. Paper 1404.
<http://digitalcommons.wku.edu/theses/1404>

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Masters Theses & Specialist Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.

SUBJECTIVE VS. OBJECTIVE PHYSICAL PAIN IN INDIVIDUALS WHO REPORT A
HISTORY OF NONSUICIDAL SELF-INJURY: A CLOSER LOOK AT WHAT IT MEANS TO
EXPERIENCE PAIN

A Thesis
Presented to
The Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts

By
Cassandra A. Sturycz

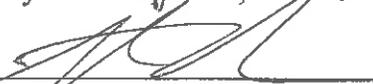
August 2014

SUBJECTIVE VS. OBJECTIVE PHYSICAL PAIN IN INDIVIDUALS WHO
REPORT A HISTORY OF NONSUICIDAL SELF-INJURY:
A CLOSER LOOK AT WHAT IT MEANS TO EXPERIENCE PAIN

Date Recommended July 17, 2014



Amy Brausch, Ph.D., Director of Thesis



Stephen O'Connor, Ph.D.



Aaron Wichman, Ph.D.

 8-8-14

Dean, Graduate Studies and Research Date

ACKNOWLEDGEMENTS

I would like to extend warm thanks to my research mentor and thesis chair, Dr. Amy Brausch, for all of her assistance throughout the writing process. I am also grateful for the advice and support of my committee members, Drs. Stephen O'Connor and Aaron Wichman. I have the deepest appreciation for all of the students who helped with data collection and those who volunteered to be a part of the research. Finally, I would like to express my gratitude for my family and friends for their constant encouragement and support.

TABLE OF CONTENTS

Abstract	vi
Introduction	1
Pain Research.....	1
Pain and Mental Health.....	2
Affect's Influence on Pain.....	4
Functions of NSSI.....	6
Conceptual and Operational Definitions of Variables.....	7
Method	10
Materials.....	10
Procedure.....	13
Results.....	14
Discussion.....	19
Study Limitations.....	21
Concluding Remarks.....	22
Appendix A: Informed Consent Document for College Student Participants.....	24
Appendix B: Demographics.....	27
Appendix C: Inventory of Statements about Self-Injury.....	28
Appendix D: Subjective Pain Scale.....	30
References.....	32

LIST OF TABLES

Table 1. Demographic and NSSI characteristics of sample.....	15
Table 2. Overall pain severity and pain frequency as predictors of pain threshold.....	17
Table 3. Functions of NSSI as predictors of overall pain frequency.....	18

SUBJECTIVE VS. OBJECTIVE PHYSICAL PAIN IN INDIVIDUALS WHO REPORT A HISTORY OF NONSUICIDAL SELF-INJURY: A CLOSER LOOK AT WHAT IT MEANS TO EXPERIENCE PAIN

Cassandra A. Sturycz

August 2014

36 pages

Directed by: Amy Brausch, Aaron Wichman, and Stephen O'Connor

Department of Psychology

Western Kentucky University

Non-Suicidal Self-Injury (NSSI) is the self-inflicted damage to one's bodily tissues without the intent to die. Previous research has sought to discover the motivation of an individual to perform such behavior and differences in the experience of pain among those who self-injure. The goals for the current study were to reveal any relationships between the function of NSSI, the subjective experience of pain, and an objective measurement of pressure pain threshold. Participants completed the Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009), which measures the functions that NSSI serves, and a measure assessing subjective pain experience, specifically frequency and severity of pain. Pain thresholds were also induced and recorded using a pressure algometer. The findings suggest that pain frequency significantly predicted pain threshold, whereas subjective pain severity did not. Furthermore, marking distress, the function of NSSI which serves as creating a tangible representation of emotional distress, was significantly associated with pain frequency, such that as marking distress increases in relevance, the less often one would be expected to experience pain. Therefore, the current study has implications relevant to both future research and the clinical setting.

Keywords: non-suicidal self-injury, pain threshold, affect

Non-Suicidal Self-Injury (NSSI) is the self-inflicted damage to one's bodily tissues without the intent to die (Nock, 2009). This behavior has recently received heightened attention, as its prevalence is being realized. Although NSSI was not identified in the Diagnostic and Statistical Manual-Fifth Edition (DSM-5; American Psychiatric Association, 2013) as an independent diagnosis, it was, instead, labeled as a suggested diagnosis for further research. One reason why NSSI is not well understood is that to most people, injury to one's body and subsequent physical pain are things that should be avoided. Why then do people engage in NSSI? Logically, experiencing and overcoming these painful stimuli has to serve a specific function. Past research has examined the functions that this maladaptive behavior serves (Klonsky, 2009; Turner, Chapman, & Layden, 2012; Whitlock et al., 2010). Overall, these researchers have found that the most commonly reported function of NSSI is affect regulation.

Pain Research

Researchers have examined the interplay of affective, social, and physical pain. To begin, it is useful to note that physical sensations of pain share many of the same pathways as emotional and social pain. This overlap has been exhibited in several ways. One of which has been through the manipulation of social rejection in a virtual ball-tossing task, during a functional resonance imaging (fMRI) scan (Eisenberger & Lieberman, 2004) In this case, participants were led to believe that they were a part of a game with other participants, while in actuality each they were participating in a preset program which was designed to lead participants to believe that they are being left out by the other imaginary participants. The resulting "social pain" activated areas of the brain

similar to affective pain, specifically the anterior cingulate cortex and prefrontal cortex in adults.

This phenomenon is not secluded to in-laboratory events. Borsook and MacDonald (2010) examined the effects of mildly negative social encounters on pain sensitivity, as induced by a pressure algometer, in 45 undergraduate participants. They found that participants reported an analgesic effect, specifically a lower report of pain intensity and unpleasantness, after this negative social interaction. The negative social interaction relied on a confederate to appear standoffish, make limited eye contact, and provide brief responses; however, the confederates were not rude or abrupt in order to perform in a mildly negative way. Interpersonal functions of NSSI, which are other commonly reported reasons to self-injure (Hilt, Cha, & Nolen-Hoeksema, 2008) may relate back to this overlap in neural activation.

Pain and Mental Health

However, conflicting differences in pain threshold have been observed within healthy controls. Carter et al. (2002) measured pain tolerance in a nonclinical sample of 80 undergraduate participants. Pain tolerance to induced pressure pain was measured before and after several mood inductions. Specifically, their results indicated that participants' pain threshold significantly decreased after mood inductions for anxiety and depression. This suggests that individuals have a higher sensitivity to pain as their reports of anxiety and depression increase. However, Rhudy and Meagher (2001) addressed a similar issue and differentiated between the emotions of fear, such as fear of electric shock, and anxiety, noting hypoalgesia as a result of fear and that anxiety leads to hyperalgesia. In addition, McKoy, Fremouw, and McNeil (2010) found that the

difference in pain threshold and tolerance between participants with a NSSI history and healthy controls no longer existed when controlling for depression. Their results indicated that participants who had engaged in NSSI behaviors scored higher on the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer, & Brown, 1996) as well as exhibiting higher threshold and tolerance for pressure pain as compared to healthy controls.

Klossika and colleagues (2006) observed that these results may inherently differ from research using clinical samples. Their review examined pain within the framework of mental disorder and compared emotional modulation of pain across individuals with different diagnoses, including: post-traumatic stress disorder (PTSD), Borderline Personality Disorder (BPD), depression, eating disorders, and schizophrenia. The review summarized the current research on pain sensitivity in clinical samples and indicated that these samples' results diverge from results acquired from nonclinical samples after the induction of affects intended to mirror those experienced in such disorders. For example, the induction of a depressed mood in healthy participants yields different effects on pain sensitivity than its affective counterpart in a participant with a depressive disorder.

Bohus et al. (2000) examined inpatient populations diagnosed with BPD who self-injured. The focus of this line of research was on pain perception. They compared BPD patients who had a history of self-injury with healthy controls in terms of pain thresholds. Pain threshold was measured via the Tourniquet Pain Test (TPT) to measure ischemic, deep, pain as well as the Cold Pressor Test (CPT) to measure superficial pain. The results indicated that pain thresholds in the inpatient population were significantly higher

than healthy controls. This difference was of a larger magnitude when the inpatients with BPD reported a state of distress.

Affect's Influence on Pain

Thinking about the pain-emotion interaction from the opposite direction, research has shown that there is a direct effect of physical pain on emotional experience.

Researchers have suggested that their findings evidence an increase in positive emotion and the decrease in negative emotion after pain induction in individuals with disordered eating (Muehlenkamp et al., 2009). While examining a sample of 177 college undergraduates, Bresin and colleagues (2010) found similar decreases in negative affect following painful stimuli, but reported a decrease of positive affect subsequent to the induction of pressure pain, as well. They noted that their results were moderated by gender, explaining that females showed a larger drop in negative affect, whereas males showed a larger drop in positive affect following painful stimulation. This study was followed-up by Bresin and Gordon (2013). Upon further examination, it was found that participants with a history of NSSI displayed a larger decrease in negative affect, as measured subjectively by the Positive and Negative Affective Schedule (PANAS; Watson, Clark, & Tellegen, 1988), following a painful stimulus, produced by a Medoc Thermal Sensory Analyzer, than participants without a history of NSSI. The results support the idea that individuals who engage in self-injurious behaviors may do so because of their increased ability to regulate negative emotions through pain.

Franklin and colleagues (2013) considered the pain offset relief as the mechanism for this apparent affect regulation. They also examined the effects of inducing and removing pain on the affective response of participants who self-injure and those who do

not. They found that there was an increase in positive affect and a decrease in negative affect, as measured objectively by startle eye blink and postauricular reactivity responses, in both groups after the cessation of pain induction via electrocutaneous stimulation (i.e. shocks). This is a plausible explanation for the utilization of self-injury as a form of self-induced painful stimulation in order to decrease negative affect and increase positive affect.

Furthermore, research has shown that as many as 50-67% of individuals who self-injure report an absence of pain during self-injurious behaviors (Bohus et al. 2000; Leibenluft, Garder, & Cowdry, 1987; Nock & Prinstein, 2005). Pain is identified as the “unpleasant sensory and emotional experience associated with actual or potential tissue damage” (Merskey & Bogduk, 1994). One mechanism that has been postulated to account for this analgesia during NSSI has been dissociation. Dissociation has been identified as being correlated with self-injurious behavior and functions as an escape from aversive stimuli. However, Hooley, Ho, Slater, and Lockshin (2010) did not find an association between pain experience in 67 participants, recruited from the community with a history of NSSI, and dissociation. In this case, pain experience was measured as pain threshold and pain endurance with induced pressure pain and dissociation was measured by the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). This absence of association has been replicated in other studies (McKoy, Fremouw, & McNeil, 2010) which included university undergraduate participants.

Previous attempts to acquire information regarding subjective pain experience within groups of individuals who self-injure have been limited. Klonsky and Glenn (2009) included an item measuring physical pain experience on the Inventory of

Statements About Self-Injury (ISAS); however, the options of *yes*, *sometimes*, or, *no* were not descriptive enough to interpret results without caution. Specifically, the endorsement of *sometimes* was shown to be lacking in specificity. (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006) also included a measurement of subjective pain severity in a study examining diagnostic correlates of NSSI. This created an opportunity for the current study to delve deeper in what it means to report an experience of pain.

Functions of NSSI

Affect regulation is the ability to monitor, evaluate, and modify one's own emotional state. There has been research to support the contention that difficulties with affect regulation are paramount in individuals with BPD (Linehan, 1993). Specifically, inpatient populations with a history of NSSI have evidenced difficulties with emotion dysregulation as it pertains to the availability of methods to regulate affect (Perez, Venta, Garnaat, & Sharp, 2012). In the past, NSSI had been synonymous with this population; however, more recently, NSSI has gradually begun to be regarded as its own separate entity. Nock and Mendes (2008), along with other researchers (Klonsky, Oltmanns, & Turkheimer, 2003), showed that NSSI is not uncommon in the community independent of diagnosed psychopathology.

According to the pain offset relief theory, affect regulation would only be effective via self-injury if there is a presence of pain. However, if an individual engages in NSSI and does not experience pain, is NSSI still used to regulate emotion and is it effective? Do individuals reap different types of benefits when there is an absence of pain during NSSI? The current study will seek to answer these questions.

Preliminary research suggests that individuals who subjectively denied experiencing physical pain during NSSI were significantly less likely to endorse affect regulation as a function of their NSSI than individuals who report an experience of pain (Sturycz, Brausch, Sobolewski, & Kittleman, 2013). Nevertheless, there was a percentage of individuals in the group who denied experiencing pain who endorsed this function. This, again, raises the question of effectiveness. No measure has yet to include an assessment of the effectiveness of self-injury at achieving voiced functions. The current study will, therefore, include an exploratory item to gauge any existing variability and open a door for further assessment.

Research has identified several common reported functions of NSSI (Klonsky & Glenn, 2009). These functions range from intra- to interpersonal. Overall, affect regulation has been supported as the most frequently endorsed reason for NSSI (Klonsky, 2011; Kock et al., 2009; Laye-Gindhu, & Schonert-Reichl, 2005). Intrapersonal function of NSSI is comprised of negative reinforcement (i.e., to decrease/distract from negative thoughts/feelings) and positive reinforcement (i.e., to generate feeling/sensation when experiencing numbness or anhedonia). Interpersonal function is comprised of social negative reinforcement, where individuals engage in NSSI to avoid negative emotions or to escape from an undesirable social situation. It is also comprised of social positive reinforcement, when individuals engage in NSSI to gain attention from or access to other people.

Conceptual and operational definition of variables

Non-Suicidal Self-Injury (NSSI) is the self-inflicted damage to one's bodily tissues without the intent to die (Nock, Prinstein, & Sterba, 2009). This will be

operationally defined by the participant on the basis of engagement in behaviors listed in Section 1 of the Inventory of Statements About Self-Injury (ISAS) (see Appendix C).

The information provided by the participant includes the frequency of self-injurious events based on the method by which he or she self-injures (i.e. cutting, burning, banging limbs, etc.).

The 13 functions of NSSI, as measured by Section 2 of the ISAS, (see Appendix D) fall into two superordinate factors: (1) intrapersonal functions (i.e., affect regulation, anti-dissociation, anti-suicide, marking distress, and self-punishment) and (2) interpersonal functions (i.e., autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, self-care, sensation seeking, and toughness) (Klonsky, 2009).

Pain is the unpleasant feeling caused by intense or damaging stimuli. Pain threshold is operationally defined as how many pounds of pressure (lbf), as measured by the pressure algometer, it takes for the participant to identify the pressure as painful as opposed to uncomfortable. The pressure will be applied to the distal (end) of the index and middle finger of the non-dominant hand. Past neural imaging research has suggested that pain sensation and pain unpleasantness are actually properties independent of each other (Price, 2000) and, as such, will be subjectively measured separately for the purposes of the current study.

The goal of the current study is to answer the following research questions: (1) Are some functions of NSSI more predictive than others of subjective pain experience? (2) How do the pain thresholds of individuals who engage in NSSI vary and how does this objective measure of pain compare to subjective experiences of pain? And, (3) Is there a relationship between pain threshold and the function of NSSI?

Hypothesis one. The first goal is to expand upon previous research that has identified functions of NSSI and different experiences of pain. It is expected that there will be a difference in the subjective experience of pain dependent upon relevant functions of NSSI. This is supported by the pain offset theory in that, pain is the mechanism responsible for affect regulation in individuals who self-injure. Therefore the endorsement of affect regulation, as a function of NSSI, is expected to be predictive of lower pain thresholds. Such differences are expected for other functions measured by the ISAS; however, these other functions will be regarded in an exploratory fashion, in terms of their predictive power of pain thresholds, as little is currently known about their relationship with pain, if one exists at all.

Hypothesis two. The goal is to expand on the research that looked at pain thresholds among BPD patients and that which examined emotion. It is predicted that self-reported frequency and severity of pain will be predictors of the objective measure of pain threshold; such that as subjective reports of severity and frequency of pain increase, the objective pain threshold will decrease.

Hypothesis three. The goal is to add to the literature on pain experience in NSSI in general. Currently, there is a lack of empirical evidence of a relationship between functions of NSSI and thresholds of pain. For the third hypothesis, it is expected that the reported function of NSSI, affect regulation in particular, will predict a given individual's objective pain threshold.

Method

Participants

The participants, which consisted of 19 current students at Western Kentucky University, were recruited from psychology courses. The current study used a non-probability sampling frame. The experimenters utilized purposive quota sampling, where the participants are selected based on their responses to questions about self-injury. Participants for the current study were recruited specifically from their participation in a previous study of College Student Mental Health and Risk Behaviors who reported a history of self-injury during completion of the Inventory of Statements About Self-Injury (ISAS) measure were recruited for the current study. This study involved the completion of several questionnaires regarding NSSI, suicidality, and other behaviors often associated with these constructs. Participants were contacted via email with an invitation to complete the current study, which was described as a follow-up to the previous study, and were given a monetary compensation of \$15 for their participation. All participants were treated in accordance to the APA Principals for the Ethical Treatment of Human Participants and the study underwent partial board review by the IRB at Western Kentucky University.

Materials

Function of Nonsuicidal Self-Injury. Experiences with NSSI were assessed through the re-administration of the Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2008) (see Appendix C). The ISAS assesses 13 functions of NSSI, as well as the frequency of 12 NSSI behaviors. The first section of the ISAS assesses the lifetime frequency of 12 different NSSI behaviors performed ‘‘intentionally (i.e., on

purpose) and without suicidal intent (i.e., banging/hitting self, biting, burning, carving, cutting, wound picking, needle-sticking, pinching, hair pulling, rubbing skin against rough surfaces, severe scratching, and swallowing chemicals).” Participants are given freedom to provide any frequency that they feel is accurate for each method of NSSI, from zero to infinity.

Section two of the ISAS includes 39 statement items to evaluate the 13 possible functions of NSSI. Participants were asked to endorse the relevancy of each item (0- *not relevant*, 1-*somewhat relevant*, 2- *very relevant*) to them in terms of their NSSI experience. The 13 functions of NSSI fall into two superordinate factors: (1) intrapersonal functions (i.e., affect regulation, anti-dissociation/ feeling-generation, anti-suicide, marking distress, and self-punishment) and (2) interpersonal functions (i.e., autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, self-care, sensation seeking, and toughness) (Klonsky, 2007). The intrapersonal scale is measured from a score of 0 to 36. The interpersonal score is measured from a score of 0 to 48. The 13 subscales in section two are scored from 0 to 6 based on three items each: affect regulation, anti-dissociation/ feeling-generation, anti-suicide, marking distress, self-punishment, autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, self-care, sensation seeking, and toughness.

The ISAS has been found to be a reliable and valid way to measure these descriptive aspects of NSSI (Klonsky & Glenn, 2008). The intrapersonal needs items in the ISAS range in validity from .69 to .84 and have a reliability coefficient of $\alpha=.80$. The interpersonal needs items range in validity from .41 to .98 and have a reliability coefficient of $\alpha=.87$.

Subjective Pain Experience. The ISAS includes an item which assesses the physical pain experience during NSSI. However, due to the lack of specificity in the responses to this item, additional items regarding physical pain experience were administered. Appendix D lists the additional items which were used to assess how often participants experience pain (pain frequency) and, when the participant experienced pain, how painful this experience was (pain severity). Participants rated pain frequency on a five-point Likert scale (1-*I do not recall ever experiencing physical pain during self-harm* 2- *Almost never*, 3- *Sometimes*, 4- *About half of the time*, 5- *Often*, 6- *Almost always*) and severity on a four-point Likert scale (1-*No pain*, 2-*Little pain*, 3-*Moderate pain*, 4-*Severe pain*).

Participants were asked to rate these variables of subjective pain experience in general as well as to rate these for their most recent episode of NSSI. Additionally, participants were asked to list the function(s) from Section II of the ISAS which most accurately describe the functional goal of the episode. Participants then rated how effective they perceived the NSSI episode to be at fulfilling this (these) functional goal(s).

Pain Threshold. Pain was induced using a JTech pressure algometer (Beecher, 1959), (JTech Medical Industries, Salt Lake City, UT). The algometer has a pressure point that is 1square centimeter in circumference. When placed on the finger (an area sparse in muscle and where neurohistological variations are minimal from one individual to another), the pressure point exerts a constant focal pressure and creates the sensation of a dull butter knife being pressed into the skin. Over time, this creates a constantly growing aching pain (Forgione & Barber, 1971). The use of the pressure algometer

results in no tissue damage. Throughout the trial, the participant was in full control of the procedure and could terminate it at any time.

Previous research has found this instrument to be a valid way to assess pain perception (Hooley & Delgado, 2001). The Average Pearson (r) correlations between the maximum force reading of the algometer and a force plate were extremely strong ($r = .999$).

Procedure

First, participants complete an informed consent form (see Appendix A) and then completed a demographic information form (see Appendix B), the ISAS, a self-report questionnaire, and were tested for pain threshold levels.

The testing sequence consisted of the administration of the ISAS followed by two pain trials, separated by the administration of the demographic form to allow for a recovery period: first using the index and then the middle finger of their non-dominant hand. The experimenter asked the participant to place their hand, palm facing up, on the desk and to say the word “now” when the pressure from the algometer changed from being perceived as uncomfortable to painful. Next, the algometer was placed on the distal (pad) of the index finger, perpendicular to the tissue surface and the experimenter will slowly and steadily assert pressure manually at a constant rate of 1 pound of force (lbf) per second. When the participant alerted the experimenter to the presence of pain, the experimenter recorded the quantity of pressure asserted and repeated the process with the middle finger of the participant, after reiterating the instructions. The measurements from the algometer were recorded in pounds of force (lbf). A higher number of lbf reflects a higher threshold for pressure pain. The two measurements were compared for

reliability purposes and then averaged to serve as their overall pressure pain threshold (OPPT).

To manage any distress following completion of the current study, participants were provided with contact information for several local and national crisis hotlines and the Counseling and Testing Center affiliated with Western Kentucky University. After they completed or voiced the desire to withdraw from the study, participants received \$15 to compensate for their time.

Results

Basic data

Demographic information as well as NSSI characteristics of the sample are presented in Table 1. Additionally, the participants' (N=19) average age was 22 ($SD=4.90$) and ranged from 19 to 40 years old. The overall frequency, a reported estimate of the number of times a participant has engaged in NSSI over their lifetime, ranged from 3 to 721 ($M=198.58$, $SD = 231.01$, Median= 112), with their most recent episode ranging in recency from eight years ago to within the week prior to participation. The participants endorsed a variety of methods, in descending order in terms of frequency, including: banging limbs/hitting self (N=13), wound excoriation (N=12), cutting (N=10), pinching (N=7), hair pulling (N=7), severe scratching (N=7), biting (N=6), burning (N=5), sticking self with needles (N=2), rubbing against rough surface (N= 2), and swallowing dangerous substances (N=2). Participants also reported a variety of functions for their most recent episode, most commonly: affect regulation, self-punishment, and evidencing toughness; furthermore, 52.6% of participants felt that their most recent episode was moderately

effective at accomplishing these goals and 89.5% experienced little to moderate pain.

Table 1.

Demographic and NSSI Characteristics of Sample (N=19)

Characteristic	Percentage of Sample	Frequency
Gender Identity		
Male	47.4	9
Female	52.6	10
Racial Identity		
White	73.7	14
Black	15.8	3
Hispanic	5.3	1
Other	5.3	1
Romantic Orientation		
Heterosexual	73.7	14
Homosexual	15.8	3
Bisexual	5.3	1
Not Sure	5.3	1
Frequency of Physical Pain During NSSI		
Almost Never	15.8	3
Sometimes	36.8	7
About Half of the Time	10.5	2
Often	26.3	5
Almost Always	10.5	2
Severity of Pain Experienced		
Never experienced pain	5.3	1
Little Pain	47.4	9
Moderate Pain	47.4	9
Severe Pain	0	0

Hypothesis one

The first hypothesis was tested using linear regression. The total scores for interpersonal and intrapersonal subscales of the ISAS were entered as predictors and pain threshold scores were entered as the outcome variable. The overall model was not significant; therefore, neither interpersonal ($F(1, 16) = .041; p = .957$) nor intrapersonal, $F(1, 16) = .041; p = .781$, reported functions of NSSI were adequate predictors of pain threshold levels.

Hypothesis two

The second hypothesis was also tested using linear regression. The scores for pain severity and pain frequency were entered as predictors and pain threshold scores were entered as the outcome variable. The overall model was significant, $F(1,16) = 3.628; p = 0.05$, and accounted for 31.2% of the variance. Overall pain severity was not found to be a significant predictor of pain threshold (see Table 2); however, a significant negative relationship between overall pain frequency, defined as the proportion of NSSI episodes during which physical pain is experienced, and pain threshold was found. The results indicated that the more often an individual experiences pain during NSSI, the lower this same individual's threshold for pain.

Table 2

Overall Pain Severity and Pain Frequency as Predictors of Pain Threshold.

Model	β	t	p	r^2
1. Pain Severity	.012	.052	.959	
2. Pain Frequency	-.563	-2.514	.022	.312

Note: Pain Severity and Pain Frequency scores were acquired from the subjective pain experience items listed in Appendix D.

Hypothesis three

Preliminary analyses. The third hypothesis posited that there is a relationship between the function of NSSI and subjective experience of pain. Similar analyses to that of hypothesis one were used to evaluate the amount of variance in the general linear model explained by the inter- and intra-personal superordinate scale functions of NSSI as measured by the ISAS and their predictive power of subjective overall pain frequency and severity. The overall model using the inter- and intrapersonal functions as the predictors of pain severity was not significant, $F(1, 16) = 0.272; p = .766$. Neither interpersonal nor intrapersonal functions of NSSI were significant predictors of overall pain severity during NSSI. The second regression using the inter- and intrapersonal functions as predictors of pain frequency had an overall significant model, ($F(1,16) = 5.242; p = 0.018$); the interpersonal functions subscale was not a significant predictor of overall pain frequency, $F(1, 16) = 5.242; p = .669$, while the intrapersonal scale was significant, $F(1, 16) = 5.242; p = .012$.

Primary Analysis. Subsequent to the significant results acquired in the preliminary analyses, one follow-up general linear regression was carried out, which included the five subordinate scale intrapersonal functions of NSSI (Affect Regulation, Anti-Dissociation, Anti-Suicide, Marking Distress, and Self-Punishment) as predictors of overall pain frequency. The overall model was significant, $F(1,16) = 6.007$; $p = 0.004$, and accounted for 69.8% of the variance. However, the only predictor that was significant was Marking Distress (see Table 3).

Table 3.

Functions of NSSI as Predictors of Overall Pain Frequency

Model	β	t	p
1. Affect Regulation	-.115	-0.549	.592
2. Anti-Dissociation	-.287	-1.784	.098
3. Anti-Suicide	.308	1.878	.083
4. Marking Distress	.617	2.427	.030
5. Self-Punishment	.284	1.357	.198

Note: Scores for each function of NSSI were acquired via the ISAS and the scores for overall pain frequency were acquired via the subjective pain experience items in Appendix D.

Discussion

The goals for the current study were to reveal any relationships between the function of nonsuicidal self-injury (NSSI), the subjective experience of pain, and an objective measurement of pain threshold. The hypotheses for the current study were partially supported. The first hypothesis, the contention that function of NSSI would have a significant association with pain threshold, was not supported. Therefore, the degree to which an individual who reports a history of NSSI endorses the relevancy of interpersonal and intrapersonal goals for their self-injurious behavior does not appear to have a significant relationship with their overall pain perception threshold. One would suppose that there would be some sort of relationship between pain threshold and affect regulation as a function of NSSI as a result of the pain offset theory (Franklin et al., 2013) which postulates that pain itself is the mechanism by which affect is regulated in NSSI, wherein a sensitivity to pain would in fact be adaptive and result in NSSI being more efficacious. However, the current study did not yield results to support such a supposition. Perhaps the pain experience necessary to result in the regulation of affect is so minimal that any sensitivity to pain (even in instances where an individual's pain threshold is very high, they still vocalize experiencing pain at the point of threshold) would be sufficient. Furthermore, the endorsement of any one function appeared to be somewhat weak in that average scores for any one of the 13 functions of NSSI were often less than 3 on a scale of 1 to 6. This could suggest a number of things. It could be that, in retrospect, an individual asked to explain why he/she performed an action may not be able to recall specific motivations or not clearly enough to cite a function as "very relevant" and chose the more ambiguous "somewhat relevant" option. It might also be the

case that the currently identified functions are not exhaustive and that an individual may, instead, have some other unlisted function for their NSSI. Future studies may include an open-ended question to rule out an unlisted function as being more relevant to participants as well as exploring minimum levels of pain experience necessary to produce regulatory effects in affect in conjunction with pain sensitivity measures.

The second hypothesis was partially supported. The second hypothesis posited that subjective reports of pain experience would have a significant association with objective pain threshold measures. The report of pain severity, the reported general magnitude of pain across all instances of NSSI, was not supported as a significant predictor of pain threshold. Thus, the magnitude of pain experience reported across all episodes of NSSI also does not seem to have a significant relationship with pain threshold. However, overall pain frequency, the proportion of episodes of NSSI wherein an individual experiences pain to any extent, had a significant relationship with pain threshold, such that the more often one experiences pain, the lower one's pain threshold is. This is in concordance with the predicted outcomes. In past research (Nock et al., 2006), pain severity has been used as a measure of the pain experience. The results of the current study would suggest that such a scale is not supported in its utility as a proxy for pain threshold; in future research, it may be desirable to use a subjective scale in situations where resources, such as pressure algometers, are unavailable or impractical. In such cases, a scale using pain frequency may be more appropriate as an indirect approximation of pain threshold.

The third and last hypothesis was also partially supported. The report of relevancy for interpersonal functions of NSSI, such as seeking attention or creating boundaries

between the self and others, had no significant relationship with pain threshold.

However, the relevancy of intrapersonal functions of NSSI, specifically the subordinate function of Marking Distress, was a significant predictor of pain threshold. Furthermore, the more relevant that Marking Distress is rated, the higher one's pain threshold. It may be the case that an individual who engages in NSSI for the purpose of creating a visual confirmation of overwhelming emotions seeks a wound or the sight of blood (Glenn & Klonsky, 2010) as the desired outcome in order to validate of his/her current emotional state, rather than an escape from such a state (as in affect regulation) and that the any pain associated with NSSI is a means to an end. Additionally, if the individual has a higher pain threshold, he/she may see the act of NSSI as having a low cost to benefit ratio and, therefore, be more apt to employ such a method, if self-validation is his/her motivation. This finding points to relevant implications for the clinician. It would be prudent to focus specifically on other forms of self-validation with individuals struggling with NSSI, especially if such an individual has a high pain tolerance and may view NSSI as fast and accessible way to have real, physical evidence of his/her suffering.

Study Limitations

The current study's most outstanding limitation is the small sample size. This may limit the significance of the results. The standard deviations of scores for the functions of NSSI were so large that more data may have been necessary to reveal patterns in responses. Furthermore, the wide variety in participant demographics may have further limited the results. Attaining a sample which represents closer to a random sample is desirable if the sample is large enough and one wishes to generalize findings therein. However, when a sample is small such variation could instead further minimize the

magnitude in the resulting data. Had the sample for the current study been more homogenous, the hypotheses may have told the experimenters more about the NSSI behaviors for that particular subset of the population.

Also, the study used an undergraduate sample, predominantly from some level of psychology course. Therefore, the issues one has with this sort of research: psychology undergraduates may be inherently different from other undergraduate students or even the general population, there may be a self-selection bias at play, research involving those involved in secondary education may be less generalizable to the population.

Concluding Remarks

It is notable that even with the aforementioned limitations, the current study found significant information about NSSI behavior. First, that overall pain severity, a method of gauging the experience of pain in past research, in the current study tells us little beyond explicit subjection about the pain threshold of an individual and that the pain experience may be too complex to evaluate in one question. Second, overall pain frequency is rather more telling about pain threshold levels, at least in the small sample collected for this study. Evaluating pain threshold or general pain experience in NSSI may be an important aspect of assessing risk of suicidality. Van Orden et al. (2011) point out that Acquired Capability, the ability to overcome the self-protective instinct, is necessary in order for someone to die by suicide. Little is known about the connection between pain threshold and Acquired Capability as it is involved in the Interpersonal Theory of Suicide. It is unclear whether habituation to pain or higher pain thresholds at baseline is more indicative of future risk for a suicide attempt. Likewise, it could be

possible that lower pain thresholds may even be a protective factor against suicide attempts.

Lastly the current study was able to support the contention that there is some relationship between function of NSSI and pain experience. Most specifically, scores reflecting the desire to create a tangible symbol of emotional distress were able to predict pain frequency ratings. It is interesting that this function stood out, as it is highly correlated with, yet distinctive from, affect regulation, the most commonly cited function for NSSI behavior.

Future studies should seek to explore the aspect of pain experience in NSSI further. Clearly, there is more to be learned about its relationship with NSSI as well as suicidal behavior. Pain experience may be a neglected piece of risk management evaluations done in clinical practice, which could help clinicians judge the risk of a suicide attempt more accurately while maintaining or building the therapeutic relationship by communicating understanding, insight, and empathy.

Appendix A

INFORMED CONSENT DOCUMENT FOR COLLEGE STUDENT PARTICIPANTS

Project Title: Community and Mental Health and Risk Behaviors

Investigators: Cassandra Sturycz, B.A. and Amy Brausch, Ph. D.

You are being asked to participate in a project conducted through Western Kentucky University. The university requires that you give your signed agreement to participate in the project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask him/her any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have.

If then you decide to participate in the project, please sign on the last page of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. Nature and purpose of the project: The project examines factors that put college students at risk for self-harm behavior. Additionally, the project seeks to identify factors that protect college students from self-harm.
2. Explanation of procedures: If you choose to participate in this study, you will complete the Inventory of Statements About Self-Injury (ISAS) which consists of questions about your thoughts, feelings and behaviors. After completing the ISAS, you will complete a pain threshold evaluation using a pressure algometer.

3. Discomfort and risks: The project involves a pressure algometer which applies pressure to a finger. The algometer exerts a constant pressure that creates a sensation that of a dull butter knife. Over time, this creates a constant growing pain in the finger. The use of a pressure algometer results in no tissue damage. Throughout the trial, the participant has complete control and can terminate at any time.

4. Benefits: For your participation, you will receive a check for 15 dollars. Your participation will also help others by providing important information that the primary investigator will utilize to develop and implement prevention programs for self-harm.

5. Confidentiality: The principle investigator will keep all information that you provide confidential to the fullest extent of the law. After you complete the survey, a researcher will conduct a brief risk assessment based on your responses to certain questions and provide any necessary referral information to you during an individual and completely confidential debriefing session. Your questionnaire will receive a number that corresponds with the number placed on this informed consent form. The principle investigator will keep both of these forms separate in two locked filing cabinets in their research lab. Results of the study may appear in a published scientific-journal. Such publication will not reveal your identity in name or description. Five years after the completion of the study, the principle investigator will remove all information related to the study from the file cabinet and shred it.

6. Refusal/withdrawal:

Refusal to participate in this study will have no effect on any future services you may be entitled to from the university. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks

Printed name of participant

Date

Signature

Date

Appendix B

Demographics

Please provide the following information:

Age: _____ years

Gender:

- 1) Male
- 2) Female
- 3) Transgender, Male-to-Female (MTF)
- 4) Transgender, Female-to-Male (FTM)
- 5) Transgender, do not identify as male or female
- 6) Not sure
- 7) Decline to state

Do you consider yourself to be:

- 1) Heterosexual/straight
- 2) Gay/Lesbian/Homosexual
- 3) Bisexual
- 4) Not sure
- 5) Decline to state

Year in School:

- 1) Freshman
- 2) Sophomore
- 3) Junior
- 4) Senior
- 5) Grad

Race/Ethnicity:

- 1) American Indian /Alaskan Native
- 2) Black /African American
- 3) Asian
- 4) White/ Caucasian
- 5) Hispanic/ Latino (a)
- 6) Multi-ethnic
- 7) Other: _____

Appendix C

INVENTORY OF STATEMENTS ABOUT SELF-INJURY (ISAS) – SECTION I. BEHAVIORS

This questionnaire asks about a variety of self-harm behaviors. Please only endorse a behavior if you have done it intentionally (i.e., on purpose) and without suicidal intent (i.e., not for suicidal reasons).

Please estimate the number of times in your life you have intentionally (i.e., on purpose) performed each type of non-suicidal self-harm (e.g., 0, 10, 100, 500):

Cutting _____	Severe Scratching _____

Biting _____	Banging or Hitting Self _____

Burning _____	Interfering w/ Wound Healing _____

Carving _____	(e.g., picking scabs) Rubbing Skin Against Rough Surface _____

Pinching _____	Sticking Self w/ Needles _____

Pulling Hair _____	Swallowing Dangerous Substances _____
Other _____, _____	

INVENTORY OF STATEMENTS ABOUT SELF-INJURY (ISAS) – SECTION II. FUNCTIONS

Name: _____

Date: _____

Instructions

This inventory was written to help us better understand the experience of non-suicidal self-harm. Below is a list of statements that may or may not be relevant to your experience of self-harm. Please identify the statements that are most relevant for you:

Circle **0** if the statement **not relevant** for you at all

Circle **1** if the statement is **somewhat relevant** for you

Circle **2** if the statement is **very relevant** for you

“When I self-harm, I am ...

Response

1. ... calming myself down	0 1 2
2. ... creating a boundary between myself and others	0 1 2
3. ... punishing myself	0 1 2
4. ... giving myself a way to care for myself (by attending to the wound)	0 1 2
5. ... causing pain so I will stop feeling numb	0 1 2
6. ... avoiding the impulse to attempt suicide	0 1 2
7. ... doing something to generate excitement or exhilaration	0 1 2
8. ... bonding with peers	0 1 2
9. ... letting others know the extent of my emotional pain	0 1 2

- | | |
|--|-------|
| 10. ... seeing if I can stand the pain | 0 1 2 |
| 11. ... creating a physical sign that I feel awful | 0 1 2 |
| 12. ... getting back at someone | 0 1 2 |
| 13. ... ensuring that I am self-sufficient | 0 1 2 |
| 14. ... releasing emotional pressure that has built up inside of me | 0 1 2 |
| 15. ... demonstrating that I am separate from other people | 0 1 2 |
| 16. ... expressing anger towards myself for being worthless or stupid | 0 1 2 |
| 17. ... creating a physical injury that is easier to care for than my emotional distress | 0 1 2 |
| 18. ... trying to feel something (as opposed to nothing) even if it is physical pain | 0 1 2 |
| 19. ... responding to suicidal thoughts without actually attempting suicide | 0 1 2 |
| 20. ... entertaining myself or others by doing something extreme | 0 1 2 |
| 21. ... fitting in with others | 0 1 2 |
| 22. ... seeking care or help from others | 0 1 2 |
| 23. ... demonstrating I am tough or strong | 0 1 2 |
| 24. ... proving to myself that my emotional pain is real | 0 1 2 |
| 25. ... getting revenge against others | 0 1 2 |
| 26. ... demonstrating that I do not need to rely on others for help | 0 1 2 |
| 27. ... reducing anxiety, frustration, anger, or other overwhelming emotions | 0 1 2 |
| 28. ... establishing a barrier between myself and others | 0 1 2 |
| 29. ... reacting to feeling unhappy with myself or disgusted with myself | 0 1 2 |
| 30. ... allowing myself to focus on treating the injury, which can be gratifying or satisfying | 0 1 2 |
| 31. ... making sure I am still alive when I don't feel real | 0 1 2 |
| 32. ... putting a stop to suicidal thoughts | 0 1 2 |
| 33. ... pushing my limits in a manner akin to skydiving or other extreme activities | 0 1 2 |
| 34. ... creating a sign of friendship or kinship with friends or loved ones | 0 1 2 |
| 35. ... keeping a loved one from leaving or abandoning me | 0 1 2 |
| 36. ... proving I can take the physical pain | 0 1 2 |
| 37. ... signifying the emotional distress I'm experiencing | 0 1 2 |
| 38. ... trying to hurt someone close to me | 0 1 2 |
| 39. ... establishing that I am autonomous/independent | 0 1 2 |

Response Key: 0 – not relevant, **1** – somewhat relevant, **2** – very relevant

Appendix D

SUBJECTIVE PAIN SCALE

OVERALL, how often do you experience pain during self-harm?

1. Almost never
2. Sometimes
3. About half of the time
4. Often
5. Almost always

OVERALL, if you do experience physical pain during self-harm, how severe is this pain?

1. I do not recall ever experiencing physical pain during self-harm.
2. No pain
3. Little pain
4. Moderate pain
5. Severe pain

When was your MOST RECENT episode of self-harm? _____

What method of self-harm did you use during this MOST RECENT event? _____

In regards to this MOST RECENT episode of self-harm, which item(s) from the previous list most accurately describes your goals?

How effective would you say that this MOST RECENT episode of self-harm was at achieving this (these) goal(s)?

1. Not effective at all
2. Mildly effective
3. Moderately effective
4. Mostly effective
5. Very effective

How much physical pain did you experience during this MOST RECENT episode of self-harm?

1. No pain
2. Little pain
3. Moderate pain
4. Severe

References

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM 5*. Books4US.
- Beck, A. T., Steer, R. A., & Brown G. K. (1996). *Manual for the Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.
- Beecher, H. K. (1959). Measurement of Subjective Response, Chapter 2. New York, Oxford University Press.
- Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *Journal of Nervous and Mental Disease*, 17 (12), 727-735.
- Bohus, M. U., Limberger, M., Ebner, U., Glocker, F. X., Schwarz, B., Wernz, M., & Lieb K. (2000). Pain perception during self-reported distress and calmness in patients with borderline personality disorder and self-mutilating behavior. *Psychiatry Research*, 95, 251-260.
- Bresin, K., & Gordon, K. H. (2013). Changes in negative affect following pain (vs.nonpainful) stimulation in individuals with and without a history of nonsuicidal self-injury. *Personality Disorders: Theory, Research, and Treatment*, 4(1), 62.
- Bresin, K., Gordon, K. H., Bender, T. W., Gordon, L. J., & Joiner, T. E. (2010). No pain, no change: Reductions in prior negative affect following physical pain. *Motivation and Emotion*, 34(3), 280-287.
- Borsook, T. K., & MacDonald, G. (2010). Mildly negative social encounters reduce physical pain sensitivity. *PAIN*, 151(2), 372-377.
- Carter, L. E., McNeil, D. W., Vowles, K. E., Sorrell, J. T., Turk, C. L., Ries, B. J., &

- Hopko, D. R. (2002). Effects of emotion on pain reports, tolerance and physiology. *Pain Research & Management, 7*(1), 21-30.
- Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts: a common neural alarm system for physical and social pain. *Trends in cognitive sciences, 8*(7), 294-300.
- Forgione, A. G., & Barber, T. X. (1971). A strain gauge simulator. *Psychophysiology, 8*, 102-106.
- Franklin, J. C., Puiza, M. E., Lee, K. M., Lee, G. E., Hanna, E. K., Spring, V. L., & Prinstein, M. J. (2013). *Clinical Psychological Science, 1*, 110-119.
- Glenn, C. R., & Klonsky, E. D. (2010). The role of seeing blood in non-suicidal self injury. *Journal of Clinical Psychology, 66*, 466-473.
- Hilt, L. M., Cha, C. B., & Nolen-Hoeksema, S. (2008). Nonsuicidal self-injury in young adolescent girls: Moderators of the distress–function relationship. *Journal of Consulting and Clinical Psychology, 76*, 63-71.
- Hooley, J. M., & Delgado, M. L. (2001). Pain insensitivity in the relatives of schizophrenia patients. *Schizophrenia Research, 47*, 265–273.
- Hooley, J. M., Ho, D. T., Slater, J., & Lockshin, A. (2010). Pain perception and nonsuicidal self-injury: A laboratory investigation. *Personality Disorders: Theory, Research, and Treatment, 1*, 170-179.
- Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: prevalence, sociodemographics, topography and functions. *Psychological Medicine,*

- Klonsky, E. D. (2009). The functions of self-injury in young adults who cut themselves: clarifying the evidence for affect regulation. *Psychiatry Research, 166*(2-3), 260-268.
- 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 Behavior Assessment, 31*, 215-219.
- Klonsky, E. D., Oltmanns, T. F., & Turkheimer, E. (2003). Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *American Journal of Psychiatry, 160*, 1501-1508.
- Klossika, I., Flor, H., Kamping, S., Bleichhardt, G., Trautmann, N., Treede, R. D., ... & Schmahl, C. (2006). Emotional modulation of pain: a clinical perspective. *Pain, 124*(3), 264-268.
- 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*, 447-457.
- Leibenluft, E., Gardner, D. L., & Cowdry, R. W. (1987). The inner experience of the borderline self-mutilator. *Journal of Personality Disorders, 1*, 317-324.
- Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford Press.
- McKoy, K., Fremouw, W., & McNeil, D. (2010). Thresholds and tolerance of physical pain among young adults who self-injure. *Pain Research Management, 15*, 371-377.
- Merskey, H., & Bogduk, N. (1994). Classification of chronic pain, IASP Task Force on

Taxonomy. *Seattle, WA: International Association for the Study of Pain Press.*(Also available online at www.iasp-pain.org).

- Muehlenkamp, J. J., Engel, S. G., Wadson, A., Crosby, R. D., Wonderlich, S. A., Simonich, H., & Mitchell, J. E. (2009). Emotional states preceding and following acts of non-suicidal self-injury in bulimia nervosa patients. *Behaviour Research and Therapy, 47*(1), 83-87.
- Nock, M.K., & Prinstein, M.J. (2005). Contextual features and behavioral functions of self-mutilation among adolescents. *Journal of Abnormal Psychology 114*, 140–146.
- Nock, M.K., Prinstein, M.J., & Sterba, S. (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*, 816–827.
- Nock, M.K., Joiner, T.E., Gordon, K.H., Lloyd-Richardson, E., & Prinstein, M.J. (2006). Nonsuicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144*, 65–72.
- Nock, M. K., & Mendes, W. B. (2008). Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology, 76*, 28–38.
- 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.
- Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The Difficulties in Emotion

- Regulation Scale: Factor structure and association with nonsuicidal self-injury in adolescent inpatients. *Journal of Psychopathology and Behavioral Assessment*, 34(3), 393-404.
- Price, D. D. (2000). Psychological and neural mechanisms of the affective dimension of pain. *Science*, 288(5472), 1769-1772.
- Rhudy, J. L., & Meagher, M. W. (2001). The role of emotion in pain modulation. *Current Opinion in Psychiatry*, 14(3), 241-245.
- Sturycz, C. A., Brausch, A., Sobolewski, S., & Kittleman, R. T. (2013). Differences in reported functions of non-suicidal self-injury in adults who indicate the presence of absence of pain. Poster presentation at the American Association of Suicidology Annual Conference in Austin, TX.
- Turner, B. J., Chapman, A. L., & Layden, B. K. (2012). Intrapersonal and interpersonal functions of non suicidal self-injury: Associations with emotional and social functioning. *Suicide and Life-Threatening Behavior*, 42(1), 36-55.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063.
- Whitlock, J., Muehlenkamp, J., Purington, A., Eckenrode, J., Barreira, P., Baral Abrams, G., ... & Knox, K. (2010). Non-suicidal self-injury in a college population: General trends and sex differences. *Journal of American College Health*, 59, 691-698.