EXPERIENCES, COGNITIONS, AND AFFECTS: INVESTIGATING NON-SUICIDAL SELF-INJURY THROUGH THE MODAL MODEL OF EMOTION

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Abstract

Non-suicidal self-injury (NSSI) is associated with psychiatric distress, physical harm, and suicide. NSSI is commonly used to regulate negative emotions, but it is still unclear how these negative emotions arise. Using the framework of the modal model of emotion, I considered how situations (hassles), attention (biases towards or away from emotional stimuli), appraisal (attributional style), and responses (emotional reactivity, problem solving, and emotion regulation) relate to NSSI. Specifically, I compared undergraduate (sample 1) and community adult (sample 2) participants with a recent and recurrent history of NSSI to participants with no NSSI history using self-report and behavioral data regarding NSSI, modal model components, and relevant potential covariates, such as depression and anxiety symptoms.

In both samples, daily hassles, negative event attributional style, emotional reactivity, (reduced) reappraisal, and rumination were significantly associated with NSSI. Positive event attributional style was only associated with NSSI in sample 2, but not in sample 1. Problem solving confidence and problem solving style were associated with NSSI in sample 1, but were not assessed in sample 2. Finally, NSSI was not associated with the use of expressive suppression in either sample. These results have important implications for understanding what contributes to NSSI among adults, namely, that a multitude of characteristics and processes seem to be associated with NSSI across different types of samples. Further, understanding which aspects of the modal model most clearly differentiate individuals with and without NSSI may highlight potential treatment targets that show promise for NSSI.
Preface

This dissertation is based on research conducted in the Personality, Emotion, and Behaviour Lab, at the University of British Columbia, Vancouver Campus, under the direction of Dr. E. David Klonsky. I (Sarah Victor) identified the research question that formed the basis of this dissertation; further, I designed the study described herein, collected and analyzed the data, and wrote this manuscript. Dr. E. David Klonsky provided guidance in the development of the project, the analyses of the data, and the drafting of the manuscript. Funding for data collection was provided, in part, by Dr. E. David Klonsky (sample 1) and, in part, by a dissertation award to Sarah Victor from the Military Suicide Research Consortium, a program of the United States Department of Defense (sample 2). The opinions expressed in this manuscript are entirely my own, and do not represent the opinions or official policy of the United States government generally or the Department of Defense specifically.

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# Table of Contents

Abstract ........................................................................................................................................... ii  
Preface ............................................................................................................................................... iii  
Table of Contents ............................................................................................................................... iv  
List of Tables ...................................................................................................................................... vii  
List of Figures ...................................................................................................................................... viii  
List of Abbreviations ........................................................................................................................... ix  
Acknowledgements ............................................................................................................................... x  
Dedication ........................................................................................................................................... xii  

Chapter 1: Introduction ......................................................................................................................... 1  
1.1 Overview ....................................................................................................................................... 1  
1.2 Non-Suicidal Self-Injury: Descriptive Characteristics and Correlates ............................................. 2  
  1.2.1 Definition .................................................................................................................................. 2  
  1.2.2 Prevalence .................................................................................................................................. 3  
  1.2.3 Descriptive characteristics ......................................................................................................... 4  
  1.2.4 Correlates: Psychiatric disorders and symptoms ......................................................................... 5  
  1.2.5 Correlates: Suicide ...................................................................................................................... 5  
  1.2.6 Summary: Why study NSSI? ........................................................................................................ 6  
1.3 Modal Model of Emotion: Description and Components of the Modal Model ................................. 6  
  1.3.1 Definition and overview of modal model components ............................................................... 6  
  1.3.2 Clinical utility ............................................................................................................................ 9  
  1.3.3 Modal model strengths and weaknesses ................................................................................... 9  
1.4 Why Use the Modal Model to Understand NSSI? ............................................................................ 12  
  1.4.1 Emotion dysregulation and NSSI ................................................................................................ 12  
  1.4.2 NSSI functions and emotion regulation ..................................................................................... 13  
  1.4.3 Negative emotional experiences in NSSI .................................................................................. 13  
  1.4.4 How the modal model contributes to understanding NSSI ....................................................... 14  
1.5 Modal Model Component 1: Situations and NSSI ........................................................................... 14  
  1.5.1 Interpersonal stressors ............................................................................................................... 14  
  1.5.2 Nonsocial and general stressors ................................................................................................. 16  
  1.5.3 Next Steps: Situations and NSSI ............................................................................................... 17  
1.6 Modal Model Component 2: Attention and NSSI ........................................................................... 18  
  1.6.1 Next Steps: Attention and NSSI ............................................................................................... 19  
1.7 Modal Model Component 3: Appraisal and NSSI .......................................................................... 20  
  1.7.1 External appraisals: stimulus valence and intensity ................................................................... 20  
  1.7.2 Attributional style, locus of control, and social explanatory models ...................................... 21  
  1.7.3 Next Steps: Appraisal and NSSI ............................................................................................... 22  
1.8 Modal Model Component 4: Responses and NSSI ...................................................................... 23  
  1.8.1 Subjective emotional experience ............................................................................................... 24  
  1.8.2 Response behaviors .................................................................................................................. 25  
  1.8.3 Cognitive response strategies .................................................................................................... 27  
  1.8.4 Next Steps: Responses and NSSI .............................................................................................. 29  
1.9 Purpose of Present Study .............................................................................................................. 30  
1.10 Research Questions and Hypotheses .......................................................................................... 31
Chapter 2: Methods ......................................................................................................................... 35
  2.1 Participant Recruitment and Characteristics ............................................................................. 35
    2.1.1 Inclusion and exclusion criteria ......................................................................................... 35
    2.1.2 Recruitment for sample 1 ................................................................................................. 36
    2.1.3 Recruitment for sample 2 .................................................................................................. 38
    2.1.4 Power analyses ................................................................................................................. 39
    2.1.5 Sample 1 participants ........................................................................................................ 39
    2.1.6 Sample 2 participants ........................................................................................................ 40
  2.2 Research Protocols and Procedures .......................................................................................... 41
    2.2.1 Procedures ....................................................................................................................... 41
    2.2.2 Technical and physical specifications ............................................................................... 43
    2.2.3 Institutional ethical approval ............................................................................................ 43
    2.2.4 Risk of participant distress .............................................................................................. 44
    2.2.5 Procedures to manage participant safety .......................................................................... 44
  2.3 Measures ................................................................................................................................ 45
    2.3.1 Non-suicidal self-injury history ......................................................................................... 45
    2.3.2 Modal model: Situations .................................................................................................. 46
    2.3.3 Modal model: Attention ................................................................................................... 48
    2.3.4 Modal model: Appraisal .................................................................................................. 52
    2.3.5 Modal model: Responses ................................................................................................ 55
    2.3.6 Covariates: State affect ..................................................................................................... 58
    2.3.7 Covariates: Demographics .............................................................................................. 58
    2.3.8 Covariates: Borderline personality disorder ................................................................. 58
    2.3.9 Covariates: Depression and anxiety ............................................................................... 59
    2.3.10 Covariates: Psychiatric diagnoses ............................................................................... 60
  2.4 Statistical Methods .................................................................................................................... 60

Chapter 3: Results ............................................................................................................................. 62
  3.1 Data Processing and Management ............................................................................................ 62
    3.1.1 Missing data management .............................................................................................. 62
    3.1.2 Dot probe data cleaning procedures .............................................................................. 62
  3.2 Descriptive Characteristics of NSSI ........................................................................................ 63
  3.3 Demographic Characteristics ................................................................................................... 64
  3.4 Descriptive Characteristics of Potential Covariates ................................................................ 65
  3.5 Modal Model Component 1: Situations .................................................................................... 67
    3.5.1 Descriptive and bivariate analyses for daily hassles ...................................................... 67
    3.5.2 Multivariate analyses for daily hassles .......................................................................... 68
  3.6 Modal Model Component 2: Attention ...................................................................................... 69
    3.6.1 Descriptive and bivariate analyses for attentional bias ................................................ 69
  3.7 Modal Model Component 3: Appraisal ...................................................................................... 70
List of Tables

Table 1. Descriptive characteristics of modal model components (dependent variables) ........ 108
Table 2. Descriptive characteristics of NSSI among self-injurers in samples 1 and 2 .......... 110
Table 3. Demographic characteristics in samples 1 and 2 ........................................ 111
Table 4. Group comparisons for demographic characteristics in samples 1 and 2 ............ 112
Table 5. Characteristics of covariates in samples 1 and 2 ........................................... 113
Table 6. Group comparisons for covariates in samples 1 and 2 .................................... 114
Table 7. Characteristics of clinical covariates in sample 2 ............................................ 115
Table 8. Group comparisons for clinical covariates in sample 2 .................................... 116
Table 9. Group comparisons for component 1 (Situation) in samples 1 and 2 ............... 117
Table 10. Group comparisons for component 2 (Attention) in samples 1 and 2 ............. 118
Table 11. Group comparisons for component 3 (Appraisal) in samples 1 and 2 ............. 119
Table 12. Group comparisons for component 4 (Response) in samples 1 and 2 ............ 120
Table 13. Multivariate analyses for all modal model components in samples 1 and 2 ....... 121
List of Figures

Figure 1. Modal model of emotion (Gross & Thompson, 2007, p. 6)................................. 7
List of Abbreviations

ASQ = Attributional Style Questionnaire
BPD = Borderline Personality Disorder
CBT = Cognitive Behavior Therapy
CQ = Coping Questionnaire
DASS-21 = Depression Anxiety Stress Scales, Short Form
DBT = Dialectical Behavior Therapy
DHS-R = Revised Daily Hassles Scale
EMA = Ecological momentary assessment
ERQ = Emotion Regulation Questionnaire
ERS = Emotional Reactivity Scale
HSP = Human Subjects Pool
ICC = Intraclass correlation coefficient
ICSRLE = Inventory of College Students Recent Live Events
IQR = Inter-quartile range
ISAS = Inventory of Statements About Self-Injury
M = Mean
MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder
NSSI = Non-suicidal self-injury
PSI = Problem Solving Inventory
RRS = Ruminative Responses Scale
SAM = Self-Assessment Manikin
SD = Standard deviation
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Dedication

This work is dedicated to my family, for their unwavering support of my education. This includes my mother, Beth (Randy) Goodman, my brother, Jacob Victor, and my sister, Lisa Small, as well as my parents-in-law, Dr. George and Eileen Murphy, and my husband, Dr. Michael Murphy. In particular, I wish to dedicate this work to my father, Richard Victor, and my grandmother, Polly Daeger, who passed away while this dissertation was being drafted.
Chapter 1: Introduction

1.1 Overview

Non-suicidal self-injury (NSSI) is a prevalent and complex set of behaviors that is associated with significant negative physical and psychiatric sequelae. Research in demographically and clinically diverse groups has consistently shown that NSSI is an emotion regulation behavior: something that individuals use to deal with aversive negative emotions, thoughts, and situations. A great deal of research has characterized NSSI with respect to its functions (Chapman, Gratz, & Brown, 2006; Klonsky, 2007), the types of emotional experiences associated with NSSI, such as self-directed negative emotions (St Germain & Hooley, 2012; Victor & Klonsky, 2014), and how NSSI is related to changes in emotional experience (Armey, Crowther, & Miller, 2011), but far less research has investigated the factors that contribute to those emotional experiences in the first place.

In this introductory section, I address four key areas. First, I describe the state of knowledge about NSSI in general, including its prevalence, major correlates, and phenomenology, in order to fully characterize the behaviors I am trying to understand. Second, I thoroughly describe the particular lens through which I am investigating NSSI, the modal model of emotion (Gross & Thompson, 2007). This model separates an emotional experience into four parts: Situation, Attention, Appraisal, and Response, allowing me to consider how these processes individually and jointly contribute to the negative affective experiences that are related to NSSI. I also provide justification for the relevance of this model and its potential utility to researchers and clinicians hoping to better understand NSSI. Third, I review previous research that describes how certain aspects of these components have been related to NSSI; for example, research characterizing the relationship between exposure to traumatic experiences (within the
Situation modal model component) and NSSI. After reviewing research on NSSI and each component separately, I describe some of the research questions left unanswered with respect to each component and its relationship to NSSI. Finally, I describe how the present study addresses the emotional experiences associated with NSSI through the modal model, and enumerate specific hypotheses regarding all four modal model components and their relationships to NSSI.

1.2 Non-Suicidal Self-Injury: Descriptive Characteristics and Correlates

1.2.1 Definition

NSSI is the intentional and direct destruction of one’s own body tissue without suicidal intent (International Society for the Study of Self-Injury, 2007). NSSI is most commonly typified by cutting oneself, but can also include behaviors that result in tissue damage that is not immediately obvious, such as hitting oneself. This definition typically excludes indirect methods of self-injury, such as disordered eating behavior, risky sexual behavior, and reckless driving, as well as behaviors that are socially sanctioned, such as piercing and tattooing (Nock, 2009).

NSSI occurs in multiple contexts and within a variety of populations (Favazza & Rosenthal, 1993). While individuals with developmental disabilities may engage in behaviors that result in physical injury, such as head banging or self-biting, these behaviors are typically characterized as “self-injurious behavior” rather than NSSI, due to the difficulty in characterizing the intentions of the behavior (Jensen & Heidorn, 1993). Self-injury that occurs in response to hallucinations, delusions, or other types of severe psychopathology, sometimes called “major” self-injury (Favazza & Rosenthal, 1993) is usually studied separately, and as such, will not be discussed here. Finally, suicidal behaviors, meaning actions taken to harm oneself with at least some intent to die, are not considered NSSI.
1.2.2 Prevalence

Early research on NSSI focused on characterizing the behavior among adults receiving treatment for Borderline Personality Disorder (BPD), the only psychiatric diagnosis for which NSSI was listed as a symptom in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000). NSSI is highly prevalent among BPD patients, with prevalence estimates of over 60% in clinical samples (Niedtfeld et al., 2010; McKay, Gavigan, & Kulchycky, 2004). Recent research suggests that NSSI is also common in adults without BPD, with rates in general adult psychiatric inpatient samples of approximately 40 to 45% (Andover & Gibb, 2010; Claes, Klonsky, Muehlenkamp, Kuppens, & Vandereycken, 2010); these findings suggest that NSSI is not uniquely diagnostic of BPD and is worthy of independent study.

As the field of NSSI research expanded, significant work was conducted to determine the prevalence of NSSI among nonclinical and community populations. Studies of community adolescents have found prevalence rates between 12 and 17% (Andrews, Martin, Hasking, & Page, 2013; Nixon, Cloutier, & Jansson, 2008), while studies of young adults indicate higher prevalence rates, up to 24% (Favaro, Ferrara, & Santonastaso, 2007). Community adult samples typically show lower prevalence rates, with estimates ranging from 2 and 4% (Akyuz, Sar, Kugu, & Doğan, 2005; Klonsky, 2011). Research indicates that NSSI often begins in the early to mid-teens (Andover, Primack, Gibb, & Pepper, 2010; Taylor, Peterson, & Fischer, 2012) and ends in the mid-twenties (Klonsky, 2011), although there is also evidence for NSSI in younger (Barrocas, Hankin, Young, & Abela, 2012) and older (Martin, Swannell, Hazell, Harrison, & Taylor, 2010) populations.
Extensive research now demonstrates that NSSI is common, particularly in adolescents and young adults, and its prevalence may actually be increasing over time (Wilkinson, 2013). Given the robust evidence that NSSI often occurs outside of the context of BPD, the importance of research specifically investigating correlates and consequences of NSSI has become clear.

1.2.3 Descriptive characteristics

Individuals engaging in NSSI comprise a highly heterogeneous group, whose self-injury varies by methods, functions, and descriptive characteristics (Bjärehed, Wångby-Lundh, & Lundh, 2012; Bracken-Minor, McDevitt-Murphy, & Parra, 2012; Klonsky & Olino, 2008).

In many studies of clinical and nonclinical populations, participants report cutting as the most common NSSI method (e.g., Cawood & Huprich, 2011; Dougherty et al., 2009; Nixon, Cloutier, & Aggarwal, 2002); however, the use of multiple NSSI methods is also common (Taylor et al., 2012; Tresno, Ito, & Mearns, 2012), and other common methods include severe scratching, head banging, burning, and self-hitting (Cawood & Huprich, 2011; Claes, Houben, Vandereycken, Bjittebier, & Muehlenkamp, 2010; Dougherty et al., 2009). The frequency with which individuals engage in NSSI also varies, both between individuals and across NSSI methods (Andover et al., 2010; Whitlock, Eckenrode, & Silverman, 2006).

Other characteristics of NSSI include location of the injury, medical severity, and the amount of pain experienced with the injury. NSSI most commonly occurs on the lower arms, wrists, and hands (Nixon et al., 2002; Williams & Hasking, 2010), although NSSI has been reported across other areas of the body, such as legs, chest, stomach, face, and genitals (Sornberger, Heath, Toste, & McLouth, 2012). While NSSI is generally of low medical severity, injuries can require medical attention, either due to the nature of the injury method or accidentally injuring oneself more severely than anticipated (Nixon et al., 2002; Whitlock et al.,
Some self-injurers report pain analgesia during NSSI, but others experience varying amounts of pain (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006); research on pain processing among self-injurers has suggests that NSSI is associated with decreased pain perception in response to laboratory pain inductions (Franklin, Aaron, Arthur, Shorkey, & Prinstein, 2012; Hooley, Ho, Slater, & Lockshin, 2010).

### 1.2.4 Correlates: Psychiatric disorders and symptoms

NSSI occurs in the context of a variety of psychiatric conditions. In studies of patients receiving psychiatric treatment, NSSI is common, and diagnostic heterogeneity and comorbidity is typical (Nock et al., 2006). Research suggests that NSSI is associated with diagnoses of mood and anxiety disorders (Esposito-Smythers et al., 2010; Wolff et al., 2014), as well as eating disorders (Claes, Soenens, Vansteenkiste, & Vandereycken, 2012). Even in less severe populations, psychiatric comorbidity is common, with studies reporting that NSSI is significantly associated with mood disorders, anxiety disorders, and personality disorders (Martin et al., 2010; McCloskey, Look, Chen, Pajoumand, & Berman, 2012).

In addition to diagnostic correlates, NSSI is also robustly associated with dimensional measures of psychopathology. For example, NSSI has been correlated with symptoms of depression, anxiety, and hopelessness in a variety of groups when considered cross-sectionally (Anderson & Crowther, 2012; Andover & Gibb, 2010; Brausch & Gutierrez, 2010; Nixon et al., 2008). Longitudinal research suggests that depression, anxiety, and hopelessness are associated with later NSSI development (Cox et al., 2012; Marshall, Tilton-Weaver, & Stattin, 2013).

### 1.2.5 Correlates: Suicide

Extensive research has clarified the relationship between suicidal and non-suicidal self-harm (Victor & Klonsky, 2015). While these behaviors are conceptually distinct (Muehlenkamp...
they frequently co-occur (Hamza, Stewart, & Willoughby, 2012). In fact, when compared to other known risk factors for suicidality, NSSI exhibits a particularly important relationship, with studies in a variety of samples showing that NSSI is more strongly associated with suicidal behavior than depression, anxiety, impulsivity, and BPD (Klonsky, May, & Glenn, 2013), and even suicidal ideation itself (Andover & Gibb, 2010; Asarnow et al., 2011; Guan, Fox, & Prinstein, 2012). These findings are consistent with the interpersonal-psychological theory of suicide, as NSSI is strongly associated with psychological distress and negative affect (suicidal desire) as well as a source of exposure to painful experiences that enhance capability to enact suicidal behavior (Joiner, 2007).

1.2.6 Summary: Why study NSSI?

NSSI is prevalent, harmful, and associated with a range of negative correlates and consequences, including distress, impairment, and suicidal thoughts and behaviors. NSSI has often been considered a problem predominantly among adolescents and patients with BPD, but recent work suggests that NSSI also occurs frequently in non-clinical samples of adults and in clinical populations without BPD. Given the range of types of psychopathology associated with NSSI, it will be important for researchers to look beyond correlates of related psychiatric disorders and to focus specifically on understanding the characteristics and processes associated with NSSI in a variety of populations.

1.3 Modal Model of Emotion: Description and Components of theModal Model

1.3.1 Definition and overview of modal model components

According to Gross and Thompson’s (2007) modal model, an emotion is “a person-situation transaction that compels attention, has particular meaning to an individual, and gives rise to a coordinated yet flexible multisystem response to the ongoing person-situation
transaction” (p. 5). From the perspective of this model, emotional experience can be distilled into four component parts: Situation, Attention, Appraisal, and Response (see Figure 1).

Figure 1. Modal model of emotion (Gross & Thompson, 2007, p. 6)

In this model, a Situation is a stimulus that contributes to the emotional response. An external stimulus, for example, might include getting stuck in rush hour traffic, seeing a missed call from a friend, or opening a birthday present. An internal stimulus might be a worried thought, one’s heart skipping a beat, or remembering a pleasant conversation with a friend. These distinct Situations contribute to subjective emotional experiences that differ in valence and intensity for a particular individual; they may also differ systematically across individuals (e.g., some individuals experience more frequent stressful Situations than others).

Attention is the extent to which an individual notices the prompting Situation. This could refer to whether an individual is even aware of what occurred; for example, a person’s car door may be “dinged” in a parking lot, but if the individual never sees the scratch, he or she will not have an accompanying emotional response. It could also refer to missing a particular aspect of a
Situation in which the person is engaged; for example, a student giving a speech may be aware of a single audience member giggling, but not of other audience members looking on with interest.

Appraisal refers to cognitive processes that permit an individual to make meaning out of the information they have received. Appraisal can vary on a variety of dimensions, for example, those related to the concept of locus of control (Levenson, 1981). Appraisals can also vary on dimensions such as personal importance and valence. Take, for example, the Situation of receiving a grade of 75 on an exam; Appraisals could include thoughts such as “this mark is due to my (lack of) studying,” “this is a good grade,” “I had no control over my grade,” “this means that I will fail out of university,” or “this grade is unimportant to me.”

Finally, a Response includes not only the perceived, subjective emotional experience (feelings of sadness, for example), but also related behavioral and physiological changes. Among self-injurers, Responses might include a subjective urge to self-injure or the behavior of engaging in NSSI. Responses will, through a feedback loop, influence subsequent Situations (both external and internal) that contribute to additional emotional experiences.

For a complete example, one might consider calling a friend and leaving a message to meet for coffee. After two days, the friend may have left a voicemail message to schedule coffee (Situation 1), or the friend may not returned the call (Situation 2). In the latter case, a person might notice that they have not heard back from their friend (Attention 1), or they may forget about calling the friend in the first place (Attention 2). If the person does recall that their friend has not returned the message, he or she might consider that the friend is busy and will call back later (Appraisal 1) or that the friend no longer wants to socialize anymore (Appraisal 2). Finally, in response to the belief that one’s friend is not interested in socializing, a person may experience feelings of sadness and isolate him/herself (Response 1) or experience feelings of anger and
leave the friend a nasty voicemail (Response 2). These responses then have implications for subsequent interactions with the friend, leading to new emotion-relevant situations. Of course, individual differences in life events, thoughts, beliefs, and emotional reactivity will influence the overall trajectory of emotional experience.

1.3.2 Clinical utility

The modal model of emotion has contributed to the development of the process model of emotion regulation (Gross & Jazaieri, 2014; Gross & Thompson, 2007). In this model, each step of the emotional process (Situation, Attention, Appraisal, and Response) provides an opportunity for emotion regulation strategies to be used. While an extensive discussion of the process model is beyond the scope of this work, this framework provides a theoretical foundation for the use of a variety of empirically supported psychological treatments to address difficulties with emotion regulation. For example, regulation strategies focused on the Situation component of the modal model, such as situation selection and modification, can be addressed through interpersonal skills training, a component of Dialectical Behavior Therapy (DBT; Linehan 1993), whereas Attention Bias Modification has been used with some success to address attentional biases in anxiety disorders (Hakamata et al., 2010). Cognitive therapies could address disturbances in the way individuals experience Appraisal (Ghahramanlou-Holloway, Bhar, Brown, Olsen, & Beck, 2012), while mindfulness- and acceptance-based therapies could target emotion regulation within the Response component of emotional experience (Gratz & Gunderson, 2006).

1.3.3 Modal model strengths and weaknesses

The modal model of emotion provides a straightforward and easy to interpret way of thinking about processes that contribute to emotional experiences. By considering NSSI through the lens of the modal model, I can evaluate a variety of relevant domains within the model
components, and to think critically about how these domains might contribute differentially to downstream engagement in NSSI.

The easiest way to think about the modal model is by considering a specific, linear example of how the four components might contribute to a single emotional experience (see p. 9). Yet, it is also important to understand that modal model components not only vary on a moment-to-moment basis, but also differ more generally between individuals over extended periods of time. For example, some individuals experience more events in their daily lives that could objectively be considered “negative” or “stressful,” on average, than other individuals (Hazel & Hankin, 2014). Similarly, evidence from adolescent research suggests that attributional style is often stable over time within individuals (Hankin & Abramson, 2002). Given that treatments targeting modal model components (see 1.3.2) are going to be most valuable when they are used to address impairments that impact an individual across time, there is utility in understanding how modal model components differ between self-injurers and non-injurers generally. As a result, my literature review and study design are focused on general group differences between self-injurers and non-injurers on the modal model components, rather than focusing on the specific correlates associated with emotions immediately preceding and following NSSI. This also allows me to more appropriately compare individuals with and without NSSI; evaluating only emotions immediately associated with NSSI precludes appropriate comparisons with non-injuring populations (Victor & Klonsky, 2014).

There are also some important caveats to consider when evaluating existing research on the modal model, as well as the results described in later chapters. While the modal model is easiest to understand when considered in a linear fashion, these processes are almost assuredly not linear; for example, research suggests that self-critical perfectionism (Response component)
contributes to the generation of stressful life events (Situation component) among adults (Luyten et al., 2011). It is, therefore, important to understand that, while I will discuss these components as though they are unique, individual contributors to NSSI, it is more accurate to consider these components as parts of interactive processes that impact and are impacted by each other.

Further, each of the modal model components can incorporate a large range of potential variables of interest. For example, researchers interested in traumatic stress and post-traumatic growth might conceptualize exposure to trauma as the most relevant variable of interest within the Situations component (Bonn-Miller, Vujanovic, Boden, & Gross, 2011), while others might be more interested in interpersonal conflict (Kim et al., 2015). Within the Attention component, some researchers have investigated engagement, sustained attention, and disengagement with emotionally valenced stimuli (Nelson, Purdon, Quigley, Carriere, & Smilek, 2015), while others have been more concerned with more general attentional processes in the face of conflicting stimuli (Dixon-Gordon, Gratz, McDermott, & Tull, 2014). For Appraisal, measures of interest have included the tendency to catastrophize about an ambiguous situation (Tuna & Bozo, 2014), as well as depressogenic cognitive style that involves viewing ambiguous negative events as being caused by internal (self-relevant), stable (consistent over time), and global (applicable to many situations) causes, sometimes referred to as a “depressogenic” cognitive style (Barrocas, Giletta, Hankin, Prinstein, & Abela, 2015). Finally, for the Response component, variables of interest have included physiological responses to stress (Crowell et al., 2013), subjective emotional experiences (Victor & Klonsky, 2014), behavioral consequences, such as aggression (Cox et al., 2012), or cognitive responses to emotions, such as reappraisal (Andrews et al., 2013). Therefore, it is important to consider that previous research and the present study highlight how
certain aspects of each component are associated with NSSI, but no single study can address the full breadth of any single modal model component, let alone all of its components jointly.

1.4 Why Use the Modal Model to Understand NSSI?

The modal model of emotion provides a valuable way to understand the factors that contribute to emotional experiences in a variety of populations. This model has particular utility for understanding NSSI for several reasons, namely, that NSSI is associated with problems regulating emotional experiences, that NSSI is most commonly used as a (maladaptive) way to manage one’s emotional experiences, and that the subjective emotional experiences reported by individuals engaging in NSSI differ from people who do not engage in NSSI.

1.4.1 Emotion dysregulation and NSSI

Emotion dysregulation has been characterized as the absence of any or all of the following abilities: awareness/understanding of emotions, acceptance of emotions, ability to control behaviors when experiencing negative emotions, and ability to flexibly use appropriate strategies to change emotional experiences (Gratz & Roemer, 2004). Deficits in these areas have been repeatedly found among self-injurers, ranging from relatively high-functioning undergraduates (Gratz & Chapman, 2007; Gratz & Roemer, 2008) to lower-functioning adult psychiatric patients (Gratz & Tull, 2010). This relationship has also been found longitudinally, suggesting that lack of effective emotion regulation strategies may contribute to engagement in NSSI (Wilcox et al., 2012). Even within self-injurers, research suggests that greater exposure to NSSI is associated with greater emotion dysregulation, such that higher frequency of NSSI (Anestis, Knorr, Tull, Lavender, & Gratz, 2013; Jenkins & Schmitz, 2012; Muehlenkamp, Bagge, Tull, & Gratz, 2013; Tresno et al., 2012) and more NSSI methods (Adrian, Zeman, Erdley, Lisa, & Sim, 2011) have been associated with greater emotion regulation deficits.
1.4.2 NSSI functions and emotion regulation

Myriad theories have attempted to characterize the functions of NSSI, meaning the reasons an individual chooses to engage in NSSI or the purposes that NSSI serves. Modern research has conceptualized NSSI as occurring for either intrapersonal (automatic) or interpersonal (social) functions (Nock & Prinstein, 2004, 2005). The relative contributions of these functions have been evaluated thoroughly, and the majority of research indicates that NSSI primarily serves intrapersonal or automatic purposes (Chapman et al., 2006; Klonsky, 2007). In particular, almost all self-injurers report using NSSI to reduce or avoid intense negative affect, and a majority also report using NSSI to punish themselves (Klonsky 2007). This model of NSSI functions is supported by studies on the self-reported reasons for engaging in NSSI (e.g., Martin et al., 2010), as well as ecological momentary assessment (EMA) and retrospective research regarding the affective states that precede and follow NSSI (Armey et al., 2011; Claes et al., 2010; Klonsky, 2009; Nock, Prinstein, & Sterba, 2009).

1.4.3 Negative emotional experiences in NSSI

Given that NSSI is associated with many types of psychopathology, including mood, anxiety, eating, and substance use disorders (see 1.2.4), it is perhaps unsurprising that NSSI is associated with high levels of negative affect. This relationship has been demonstrated in adolescents (Cohen et al., 2015), undergraduates (Bresin, 2014; Victor & Klonsky, 2014), adults (Drabble, Bowles, & Barker, 2014), and military recruits (Klonsky, Oltmanns, & Turkheimer, 2003). Further, EMA studies have suggested that NSSI urges and acts are often preceded by increased negative emotions (Bresin, Carter, & Gordon, 2013; Muehlenkamp et al., 2009). These results suggest that emotional experiences, particularly negative emotional experiences, are
important not only in the general experience of self-injurers but also in the specific emotions preceding and following NSSI behaviors.

**1.4.4 How the modal model contributes to understanding NSSI**

All individuals experience a variety of types and intensities of emotions throughout their daily lives, including self-injurers (Victor & Klonsky, 2014); to better understand engagement in NSSI, it will be important to know not only that self-injurers report more frequent, intense, or long-lasting negative emotions, but also how and why these emotional experiences come about. Simply knowing that NSSI is associated with negative emotions and attempts to alleviate those emotions is not enough to appropriately understand or treat NSSI; it is important to understand where in the process from Situation to Response do things go awry for self-injurers to appropriately intervene. Most treatments in the field of clinical psychology aim to improve their clients’ emotional functioning in some way; by knowing which aspects of this process are more or less strongly associated with NSSI, researchers can further focus the aims of future studies and clinicians can improve the potential utility of their treatments to address NSSI. In the following sections, I will describe the state of the literature on each modal model component and its relationship to NSSI in a variety of populations.

**1.5 Modal Model Component 1: Situations and NSSI**

**1.5.1 Interpersonal stressors**

Social relationships are complex and multifaceted, and contribute to emotional experiences in a variety of ways. While social support is not identical to the concept of the Situation in the modal model, the quality, quantity, and types of social interactions an individual has are likely to influence emotion-prompting Situations that the individual experiences. As a result, I will briefly summarize existing research regarding social and interpersonal support and
conflicts and NSSI here. Most frequently, these studies investigate how family and peer relationships are associated with engagement in NSSI in youth.

Research on parental and family relationships in adolescents engaging in NSSI has been mixed due to the multiple types of relationship characteristics being evaluated and variability in study designs and populations. For example, while cross-sectional research in community (Brausch & Gutierrez, 2010; Tanner, Hasking, & Martin, 2015) and clinical (Tsai, Chen, Chen, Hsiao, & Chien, 2011; Wolff et al., 2014) samples of adolescents suggests that NSSI is associated with lack of family and parental support, some longitudinal research suggests that NSSI may be associated with low quality parental relationships among adolescent self-injurers at baseline, but that these relationships, particularly with fathers, may actually improve more over time than relationships between non-injuring adolescents and parents (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008). With respect to criticism and hostility, parental criticism (Wedig & Nock, 2007), parental antipathy (Kaess et al., 2013), and observer-rated parental aversiveness during mother/daughter interactions (Crowell et al., 2013) have all been associated with NSSI in cross-sectional research; longitudinal studies have also shown relationships between family invalidation (You & Leung, 2012) and lack of interaction with family (Hurtig, Taanila, Moilanen, Nordström, & Ebeling, 2012) and later NSSI. In contrast, other longitudinal research suggests that neither harsh parenting (Jutengren, Kerr, & Stattin, 2011) nor family adaptability and cohesion (Cox et al., 2012) are predictive of subsequent NSSI.

With respect to peer relationships among adolescents, findings are also somewhat equivocal. Some studies have found lower perceived social support among self-injurers in community (Brausch & Gutierrez, 2010; Tanner et al., 2015) and clinical samples (Wolff et al., 2014), as well as cross-sectional and longitudinal evidence for an association between peer
relationship problems and NSSI in Chinese adolescents (You, Leung, & Fu, 2012; You, Leung, Fu, & Lai, 2011). In contrast, research from the US found that, after controlling for depressive symptoms, self-injurers actually had higher preference-based and reputation-based popularity than non-injurers (Heilbron & Prinstein, 2010). Other research from the US and Europe has failed to find relationships between social support, loneliness, and peer preference and NSSI (Giletta, Scholte, Engels, Ciairano, & Prinstein, 2012; Swahn et al., 2012). Importantly, the objective level of social support experienced (either family support or peer support) is not necessarily identical to level of perceived support, which may be influenced by factors such as selective attention and biased appraisal, which are discussed further below.

Some cross-sectional research suggests that peer victimization may be more closely associated with NSSI than peer social support, at least in adolescents (Giletta et al., 2012; Watanabe et al., 2012). Longitudinal research has been equivocal, with one study showing that peer victimization was associated with subsequent NSSI (Jutengren et al., 2011), but another finding no relationship (Heilbron & Prinstein, 2010). Finally, one study found that NSSI was associated with later peer sexual harassment, suggesting NSSI-victimization relationship may be bidirectional (Marshall, Faaborg-Andersen, Tilton-Weaver, & Stattin, 2013).

1.5.2 Nonsocial and general stressors

Some research has looked more broadly at stressful experiences and how these may be associated with NSSI. For example, among adults presenting to the emergency room, those presenting with NSSI were much more likely to report having experienced an acute stressor than participants presenting with other injuries, although there were no differences with respect to other domains of potential stressors (Chartrand, Katz, & Bolton, 2015). Research in adolescents has demonstrated a relationship between major stressful life events and NSSI both cross-
sectionally (Keenan, Hipwell, Stepp, & Wroblewski, 2014) and longitudinally (Liu et al., 2014). One longitudinal study of adolescents also suggests that daily hassles, or minor stressors, may be associated with later NSSI development (Larsson & Sund, 2008).

1.5.3 Next Steps: Situations and NSSI

Much of the existing research on life experiences in NSSI has focused on childhood trauma (e.g., Muehlenkamp, Kerr, Bradley, & Adams Larsen, 2010) and general measures of social support (e.g., Wolff et al., 2014). While important, the modal model of emotion is more interested in the immediate Situational aspects of emotional experience than in the distal effects of trauma or broad effects of interpersonal interactions. As a result, I believe that an important next step to understanding NSSI is to investigate how daily hassles (sometimes described as daily stressors or minor stressors; Bolger, DeLongis, Kessler, & Schilling, 1989) may be associated with NSSI. Some examples of hassles include having too much to do, problems with an employee or a boss, concerns about crime, physical illness, not having enough money for recreation, and trouble making decisions (Holm & Holroyd, 1992). Previous research has demonstrated that daily hassles and uplifts are associated with mental and physical well being generally (Bolger et al., 1989; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Kanner, Coyne, Schaefer, & Lazarus, 1981), as well as with anxiety and depression specifically (Chan, Chan, & Kwok, 2015), both known correlates of NSSI. Understanding how daily hassles are related to NSSI may provide useful information to better understand how recent, minor stressors contribute to the emotional experiences that underlie NSSI. As such, I chose to investigate the concept of Situations through assessment of past month daily hassles in people with a recent or no NSSI. The measures used to assess daily hassles provide opportunities not only to see whether
NSSI is associated with more frequent or severe stressful events, but also to see whether NSSI is differentially associated with certain hassles, for example, interpersonal hassles.

1.6 Modal Model Component 2: Attention and NSSI

To date, very little research has investigated how attentional processes are associated with NSSI, and in almost all cases, researchers were focused on understanding whether NSSI was associated with difficulties with sustained attention. For example, longitudinal research now suggests that Attention-Deficit/Hyperactivity Disorder is associated with elevated risk of NSSI among girls, particularly those with the combined subtype of the disorder (Hinshaw et al., 2012; Hurtig et al., 2012; Swanson, Owens, & Hinshaw, 2014).

In studies using treatment-seeking populations, however, the relationship between NSSI and attentional impairment is not as clear. Some research in adolescent, young adult, and forensic populations suggests that there is no relationship between attentional capacity and NSSI (Andover, Schatten, Crossman, & Donovick, 2011; Tsafrir et al., 2014), while other research suggests that attention deficits may be unique to NSSI in the context of BPD (Burgess, 1991).

To date, only a handful of studies have investigated attention in community samples of adults with NSSI. In response to neutral stimuli, two studies found deficits in the ability to focus or shift attention in the context of distracting information among self-injurers (Dixon-Gordon et al., 2014; Drabble et al., 2014). In a study using emotionally evocative stimuli, researchers investigated whether adults with recent NSSI showed an attentional bias towards or away from words related to positive emotions, physical pain, or psychological pain, as compared to a “psychological pain” control group (Photos, 2010). Self-injurers demonstrated a bias towards words related to psychological pain and away from positive emotion words, and greater
frequency of NSSI was associated with greater evidence of these biases; no relationship between NSSI and attentional bias was found for physical pain words.

1.6.1 Next Steps: Attention and NSSI

While understanding general attentional processes in NSSI is important (for example, to understanding decision-making in NSSI, or to understand mechanisms of school or work impairment associated with NSSI), the Attention component of the modal model is most particularly interested in emotion-relevant attention, including attention towards or away from negatively or positively valenced stimuli. One of the most common ways of assessing this type of attention is through laboratory tasks that assess participants’ reactions to different types of emotionally evocative material. For example, studies using eye-tracking methodologies have demonstrated unique patterns of orientation and maintenance of attention towards emotional stimuli in both anxiety and depression (Armstrong & Olatunji, 2012). There is also robust evidence from a variety of studies showing relationships between an attentional bias towards threatening information and anxiety (Van Bockstaele et al., 2014), and biased attention for negative information in depression (Peckham, McHugh, & Otto, 2010).

Because of my interest in understanding selective attention, or preferential focus on a particular type of information, rather than the ability to sustain attention across contexts, this project used a computer task designed to evaluate whether individuals show a bias towards particular types of emotional facial expressions. Facial expressions are a constant and critical source of information about social environments, and understanding how an individual notices and focuses on this information can elucidate the way that Attention influences the emotional process. The dot-probe computer task (MacLeod, Mathews, & Tata, 1986) is a commonly used measure of these processes. In this way, I evaluated whether participants with NSSI showed a
bias towards or away from facial expressions that show sadness, anger, fear, and disgust, four commonly experienced negative emotions.

1.7 Modal Model Component 3: Appraisal and NSSI

Appraisals or interpretations for an event are influenced by external factors (e.g., what occurred, when it happened, how common it is) and internal factors (e.g., beliefs about oneself, others, and the world). These form the two primary categories of research on appraisals and NSSI, namely, how individuals describe and evaluate external stimuli and how they make personally relevant meaning out of these stimuli. Research addressing these two categories in the context of NSSI is described below.

1.7.1 External appraisals: stimulus valence and intensity

When presented with a particular image, sound, smell, event, or other type of stimuli, Appraisals will influence the perceived valence of the stimulus. For example, the sound of an infant giggling provokes, in many people, an appraisal of “good” or “cute,” while the sight of an infected wound prompts an appraisal of “bad” or “disgusting.” Yet, individuals may vary in the extent to which they make these judgments of stimuli (take, for example, a person who hates babies, or who finds medical procedures interesting). This question has only been investigated in a few studies looking at valence of Appraisal and NSSI.

Only a few studies have looked explicitly at external Appraisals in NSSI. These studies have shown that non-clinical participants with and without NSSI do not rate neutral or negative images differently (Franklin, Lee, Puzia, & Prinstein, 2014; Glenn, Blumenthal, Klonsky, & Hajcak, 2011). Interestingly, one study found that NSSI participants rated positive images as less pleasant than non-injurers (Franklin et al., 2014), while the other found no group differences in ratings for positive emotions (Glenn et al., 2011).
1.7.2 Attributional style, locus of control, and social explanatory models

Understanding how individuals make sense of themselves, others, and the world has been crucial to the development of cognitive models of psychopathology, with depression as the primary example (Beck, 2008). Within the modal model of emotion, trait-like explanatory models for events in the social world are an organismic variable that would influence the Appraisal and Response components of the model. Some researchers have recently begun to explore these components within the context of NSSI.

Social interactions require an understanding of how we and others behave, which may be different or impaired among self-injurers. For example, two studies of psychiatric patients found that individuals with NSSI reported greater difficulties in social relationships, including a poorer understanding of social causality and a greater expectation of poor treatment from others (Whipple & Fowler, 2011) and greater sensitivity in interpersonal situations (Claes, Jiménez-Murcia et al., 2012). In nonclinical populations, research suggests that NSSI is associated with greater feelings of inadequacy, alienation, and social insecurity (Ross, Heath, & Toste, 2009), as well as a more external locus of control, suggesting a perceived lack of ability to control their own circumstances (Hooley et al., 2010).

Most work regarding attributions in NSSI has been conducted with measures based on the cognitive triad in depression, namely, beliefs that negative events are due to one’s own actions (internal), unlikely to change (stable), and applicable to other situations (global; Beck 2008). Typically, participants respond to vignettes describing ambiguous situations, for which they are then asked to rate or respond on these various dimensions. Participants who report more internal, stable, and global explanations for these negative situations are considered to show a pessimistic or depressogenic attributional style.
Among nonclinical populations, this negative cognitive style has been associated with NSSI both cross-sectionally and longitudinally (Buser, 2009; Hankin & Abela, 2011). A similar longitudinal study in Chinese adolescents found that negative attributional style differentiated between participants with chronic NSSI and participants with moderate or low NSSI, suggesting that negative attributional style might be a particular risk factor for chronic or more severe NSSI (Barrocas et al., 2015).

Attributional or explanatory style has also been investigated among adolescent psychiatric populations, with consistent results indicating that negative cognitive style is associated with NSSI even after controlling for relevant covariates, such as gender, psychopathology, and history of trauma (Weismore & Esposito-Smythers, 2010; Wolff et al., 2014). Longitudinal research using latent growth curve modeling in a sample of adolescent psychiatric patients suggests that the interaction between negative attributional style and interpersonal life events is more strongly predictive of long-term NSSI maintenance than depressive symptoms (Guerry & Prinstein, 2010).

1.7.3 Next Steps: Appraisal and NSSI

Research indicates that internal, stable, and global attributions for negative events are associated with depression (Hessling, Anderson, & Russell, 2003), and that attributional style can serve as buffer against risk factors for suicidality (Johnson, Wood, Gooding, Taylor, & Tarrier, 2011), suggesting that understanding this concept may be helpful in understanding other types of self-directed violence, such as NSSI. Further, limited research investigating attributional style in adolescents suggests that this construct might be useful in understanding NSSI onset or transition from low severity to more chronic NSSI. Given the conflicting findings in the
literature regarding this relationship, the present study considered how attributional style relates to NSSI in several novel ways.

First, I considered how individuals with and without NSSI evaluate the likely causes of negative and positive hypothetical events; this method allowed me to determine whether NSSI is associated with more internal, stable, and global attributions for negative events (e.g., “I was fired because I am a bad employee, and I will likely be fired from any job I take”), less internal, stable, and global attributions for positive events (e.g., “My friend called to ask me to get coffee because she is lonely, and her interest in seeing me will not last”), or both. Second, I evaluated whether negative or positive attributional styles are related specifically to NSSI history, or whether these relationships are due to other characteristics that might influence appraisal. For example, I considered whether participants in either group perceived negative or positive hypothetical events as being more or less important, and whether that impacts attributions. Additionally, I directly evaluated whether the events assessed had happened to participants before and, if so, if the causes of those past events were the same or different from those identified for hypothetical events; in this way, I determined whether differences in attributional style were due to differences in past experiences (Situations component) rather than cognitive processes (Appraisal component).

1.8 Modal Model Component 4: Responses and NSSI

Responses within the modal model of emotion include the subjective and behavioral experiences that comprise an emotion. While NSSI is one set of behaviors in response to emotion, it is valuable to further understand a) the subjective emotional experiences that self-injurers describe preceding and following their NSSI and b) the other types of overt behaviors and covert cognitive strategies chosen to deal with these subjective emotional experiences.
1.8.1 Subjective emotional experience

NSSI is primarily used as a way to reduce or avoid aversive emotional experiences (Chapman et al., 2006; Klonsky, 2007). It therefore makes sense that NSSI most frequently occurs in the context of negative affect, and that engagement in NSSI leads to reductions in those negative affective experiences. Empirical research using retrospective self-report as well as EMA supports this hypothesis in a variety of populations.

In clinical and forensic samples, research suggests that NSSI is typically preceded by high arousal negative emotions, which decrease following NSSI; positive, low arousal emotions typically increase following NSSI (Claes, et al., 2010). Specific emotions that precede NSSI include anger, anxiety, tension, and pressure, while emotions following NSSI include relief, relaxation, and shame (Chapman & Dixon-Gordon, 2007; Kleindienst et al., 2008). This pattern of results suggests that NSSI may replace high arousal negative affect with low arousal, self-directed negative affect and low arousal positive emotions that are associated with the removal of an unpleasant experience (e.g., relief).

While clinical and nonclinical samples of self-injurers may differ in some ways (for example, severity of NSSI), research suggests that the subjective feelings that co-occur with NSSI are similar. For example, research in undergraduates using daily diary methodologies shows that negative emotional experiences are associated with NSSI urges (Bresin et al., 2013), and retrospective self-report suggests that these emotions decrease following NSSI acts and are replaced by increased feelings of positive, low arousal emotions (Klonsky, 2009).

Two researchers have further investigated these phenomena in nonclinical samples using EMA technology, with similar results. In one sample of undergraduates, NSSI was typically preceded by feelings of guilt, hostility, anger, and loathing, all of which decreased following
NSSI; in contrast, time points without NSSI showed lower levels of each of these feelings that decreased over time (Armey et al., 2011). In a study of adolescents and young adults from the community, participants who engaged in NSSI were most likely to report feelings of self-directed anger, feeling overwhelmed, and self-hatred (Nock et al., 2009).

While researchers know a good deal about the emotions that precede and follow NSSI, significantly fewer studies have evaluated the subjective feeling states experienced by self-injurers in response to stressors, negative events, or other potentially relevant stimuli that are not directly tied to NSSI. What research has been conducted suggests that NSSI is not associated with greater changes in emotional experience in response to laboratory-based stressors, which provides some evidence against the argument that self-injurers are especially emotionally reactive compared to non-injurers (Davis et al., 2014; Kaess et al., 2012). There is, however, that self-injurers are significantly worse than non-injurers at intentionally trying to reduce or regulate their negative affect in response to these stimuli (Davis et al., 2014).

In contrast, studies have demonstrated that self-reported emotional reactivity is associated with NSSI. Research in undergraduate students has shown that participants with NSSI report greater emotional reactivity than participants without NSSI (Glenn et al., 2011; Knorr, Jenkins, & Conner, 2013), while a study of adults in the community showed a relationship between NSSI frequency and emotional intensity, one component of emotional reactivity (Anestis, Coffey, Schumacher, & Tull, 2011).

1.8.2 Response behaviors

By definition, self-injurers do, at times, use NSSI as a behavioral Response to an emotional prompt; however, even among the most severe self-injurers, it is much more common for individuals who engage in NSSI to engage in some other type of behavior than to engage in
NSSI. As such, it is useful to describe what is known about problem solving and other Responses to Situations as can be applied in the modal model with respect to NSSI.

Several studies have investigated this question in community samples. In two studies of undergraduate students, NSSI was associated with higher levels of avoidance coping (Andover, Pepper, & Gibb, 2007; Cawood & Huprich, 2011). In one study, NSSI was also associated with more emotional coping, less detached coping, and less rational coping (Cawood & Huprich, 2011); in the other study, NSSI was associated with less problem solving and social support coping, but only for women, suggesting that NSSI may serve somewhat different problem-solving functions based on gender (Andover et al., 2007). A longitudinal study in Australian adolescents further suggested that new onset NSSI and continued NSSI were both associated with reduced problem solving coping, although this relationship was only significant for new onset NSSI after adjusting for relevant covariates (Andrew et al., 2013; Andrews, Martin, Hasking, & Page, 2014).

While self-reported coping strategies are useful to help understand how self-injurers generally respond to stress, these measures are influenced by recall and other biases that may impact results. Two research teams have gone beyond self-report to investigate behavioral Responses in a standardized laboratory context. In one case, adolescents and young adults drawn from the community were asked to generate solutions to problems provided in vignettes (Nock & Mendes, 2008). There were no differences between NSSI and no NSSI groups on number and quality of solutions; however, the NSSI group chose significantly worse solutions than the group without NSSI. This tendency to choose worse solutions was made worse after a distress-inducing task, suggesting that self-injurers may have particular difficulty implementing a set of behaviors that would optimally address their situation when under stress. The NSSI group also tolerated the
distress-inducing task for a shorter period of time than individuals without NSSI, such that perhaps the threshold for being “under stress” is different and lower among self-injurers. This lack of ability to problem solve in response to stress was replicated in a subsequent study in which female self-injurers tolerated a frustrating task for a substantially shorter period of time after considering a distressing situation (Gratz et al., 2011). In contrast, among men, self-injurers persisted in the frustrating task for longer following the distressing situation memory. These results may highlight gender differences in emotional reactivity, attributions (for the situation being recalled) and the meaning an individual ascribes to continuing a frustrating task.

1.8.3 Cognitive response strategies

Cognitive style has a substantial impact on the Appraisal component of the modal model of emotion (see section 1.7 for review). In addition to the implicit, trait-like biases individuals hold that influence how they interpret their experiences, however, people also use cognitive strategies in response to beliefs, feelings, and situations, which seem to fit more appropriately under the concept of Response within the modal model. In this section, I will review some of the cognitive strategies, both maladaptive and adaptive, that self-injurers use in emotional contexts, primarily focusing on rumination, reappraisal, and suppression.

Rumination is the tendency to repetitively think about an emotion, its antecedents, and its consequences (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). While rumination has been robustly associated with depression and other types of psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010), it has only recently been considered in the context of NSSI, with somewhat inconsistent findings. For example, studies in nonclinical samples have found that rumination is associated with NSSI (Hoff & Muehlenkamp, 2009; Tanner, Hasking, & Martin, 2014), that certain types of rumination are associated with NSSI only in the context of
low positive affect (Cohen et al., 2015), and that there is no relationship between rumination and later NSSI development (Hankin & Abela, 2011). Similarly, some research suggests that NSSI frequency may be associated with rumination (Cerutti, Presaghi, Manca, & Gratz, 2012), while other studies find no such relationship (Tuna & Bozo, 2014).

To my knowledge, only one study has investigated how rumination is associated with NSSI in a clinical population. In a daily diary study of adults with BPD, NSSI acts and urges were predicted by an interaction of rumination (in this case, brooding) and emotional differentiation (Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013). Specifically, at low levels of differentiation between negative emotions, rumination was a risk factor for NSSI acts and urges. At high levels of negative emotion differentiation, however, the inverse was true, where rumination was negatively associated with NSSI. These results suggest that brooding may be protective at high levels of negative emotion differentiation, or, inversely, negative emotion differentiation may be protective at high levels of rumination.

Two additional types of strategies used to manage affective experiences are cognitive reappraisal and suppression. Reappraisal is a cognitive process where an emotionally evocative situation is reconsidered in a way that changes the resulting emotional experience, whereas suppression is the inhibition of outward expressions of emotion (Gross & John, 2003). For example, being pulled over while driving a car can prompt fear, guilt, and anger; reappraisal might involve telling oneself “this is a good learning experience for me to remember to follow the speed limit,” while suppression might involve trying not to cry or yell at the police officer.

Low levels of reappraisal have been associated with NSSI (Tanner et al., 2015), although in some cases this relationship has been wiped out after controlling for relevant covariates (Williams & Hasking, 2010) or not found at all (Cerutti et al., 2012). In a longitudinal study of
adolescents, reappraisal at baseline was associated with less frequent and severe NSSI at baseline, but paradoxically, associated with increases in NSSI over time (Voon, Hasking, & Martin, 2014). These conflicting findings suggest that reappraisal may not be a robust correlate of NSSI.

Similarly conflicting results have been found for suppression, with some studies showing a relationship (Tanner et al., 2015) and others finding no relationship after controlling for relevant covariates (Voon et al., 2014; Williams & Hasking, 2010). Further research in adolescents found that suppression may be related to NSSI only for individuals with particular personality traits, specifically people low in conscientiousness or high in neuroticism (Hasking et al., 2010). In a laboratory-based study, women with BPD with and without NSSI received instructions to suppress or accept their emotions following a negative mood induction; suppression was associated with no change in NSSI urges, while acceptance was associated with increased NSSI urges, suggesting that suppression may act as a self-protective mechanism for some self-injurers when under emotional strain (Svaldi, Dorn, Matthies, & Philipsen, 2012).

1.8.4 Next Steps: Responses and NSSI

Out of all the modal model components, NSSI research historically has been most focused on constructs within the Response component. For example, a great deal of research has characterized the subjective emotional experiences that immediately precede and follow NSSI, while less, but still extensive, research has shown that emotional reactivity may be associated with NSSI. Research on NSSI and coping suggests that self-injurers exhibit some deficits in their ability to respond behaviorally in response to stress or negative emotions, although the specific types of difficulties in this domain are less clear. Research on cognitive responses to emotions,
such as rumination, reappraisal, and suppression, has yielded conflicting results, and has focused primarily on understanding NSSI in adolescents, rather than across a variety of ages.

In this study, I have tried to clarify the relationship between NSSI and these constructs in several ways. First, I evaluated whether participants with and without NSSI differed with respect to not only emotional reactivity generally, but also to specific types of emotional reactivity, including emotional sensitivity, emotional intensity, and emotional persistence. Second, I considered whether different types of problem solving characteristics (such as confidence in problem solving abilities and approach or avoidant problem solving styles) were associated with NSSI. Third, I considered whether emotional reappraisal, suppression, and rumination differed between participants with and without NSSI. Finally, I considered these Response characteristics jointly, to understand if these constructs relate to NSSI after considering other constructs such as daily hassles, attention, and attributional style.

1.9 Purpose of Present Study

A great deal of previous work has shown that negative emotionality and emotion dysregulation are strongly associated with NSSI, and that NSSI is commonly used as a method of emotion regulation. This study extends this research by clarifying why and how emotional processes go awry in the context of NSSI. Specifically, this study uses a basic model of emotion and emotion regulation to frame and evaluate constructs that may contribute to high levels of negative emotionality in self-injuring populations, including stressful situations, biased attention, depressogenic attributional style, and problematic behavioral and cognitive responses to emotional prompts. The aim of this study is to identify the primary factors that contribute to emotional difficulties among self-injurers, in order to improve scientists’ understanding of NSSI and to provide clinically relevant information to practitioners assessing and treating NSSI.
1.10 Research Questions and Hypotheses

In order to better understand and treat NSSI, this study aims to answer several distinct questions about the experience of self-injurers within the modal model of emotion.

1.10.1 Hypothesis 1: Situations

To address the first component of the modal model, I compared participants with and without NSSI with respect to the number (samples 1 and 2) and the severity (sample 2) of recent daily hassles.

**Hypothesis 1**: Participants with recent NSSI will report greater frequency (samples 1 and 2) and severity (sample 2) of daily hassles than participants without NSSI.

**Rationale for Hypothesis 1**: Research from adolescent samples suggests that recent stressful life events are associated with NSSI (Keenan et al., 2014; Liu et al., 2014). This study will expand on these results to determine if this pattern holds true in young adult and adult samples, as well as evaluating whether previous research is specific to major stressors (e.g., death of loved ones, major illness) or is also applicable to minor, daily stressors.

1.10.2 Hypothesis 2: Attention

**Hypothesis 2**: Participants with NSSI will show a tendency to look away from stimuli with a negative emotional valence (e.g., faces with negative emotional expressions) in a behavioral task assessing attentional bias.

**Rationale for Hypothesis 2**: Limited research has evaluated attention processes among self-injurers for emotionally salient stimuli, such as facial expressions. There is, however, some limited research indicating that self-injurers exhibit more avoidance coping than non-injurers (Andover et al., 2007; Cawood & Huprich, 2011), which might be demonstrated behaviorally through a tendency to avoid looking at evocative images.
1.10.3 Hypothesis 3: Appraisal

**Hypothesis 3:** Participants with NSSI will exhibit a more depressogenic attributional style for negative and positive events than participants without NSSI; specifically, participants with NSSI will view causes of negative events as being more internal, stable, and global, and causes of positive events as being less internal, stable, and global, than participants without NSSI.

**Rationale for Hypothesis 3:** Research in adolescents suggests that NSSI is associated with a more depressogenic attributional style when focusing on negative events (Buser, 2009; Weissmoore & Esposito-Smythers, 2010), although less research has focused on positive events. There is, however, some evidence that individuals with NSSI rate positive stimuli as being less positive than individuals without NSSI (Franklin et al., 2014), and that they exhibit a bias away from positive emotion words in behavioral tasks (Photos, 2010). These results support the hypothesis that NSSI will be associated with problematic attributional style in both negative and positive contexts.

1.10.4 Hypothesis 4: Response

**Hypothesis 4a:** Participants with NSSI will exhibit greater emotional reactivity (sensitivity, arousal/intensity, and persistence) than participants with no NSSI, with the greatest differences in emotional persistence (duration).

**Rationale for Hypothesis 4a:** Research has demonstrated that self-injurers report greater overall levels of emotional reactivity than non-injurers (Glenn et al., 2011; Knorr et al., 2013). Research also suggests that the duration of emotional experiences may be the most pronounced difference between people with and without NSSI (Victor & Klonsky, 2012). I anticipate that these findings will be replicated in this study.
**Hypothesis 4b:** Participants with NSSI will exhibit reduced problem solving confidence and perceived control over problem solving, and a greater tendency to use avoidance coping when problem solving, than participants without NSSI.

**Rationale for Hypothesis 4b:** Research on problem solving in NSSI has been muddled, with some researchers finding higher levels of avoidance coping in self-injurers (Andover et al., 2007) and some not (Andrews et al., 2013). Given that existing research in undergraduate students has demonstrated this relationship, however, I hypothesize that in sample 1 (undergraduates), I will find greater avoidance coping among self-injurers. Additionally, there is some limited research suggesting that self-injurers report lower self-perceived competence in social domains (Baetens, Claes, Muehlenkamp, Grietens, & Onghena, 2012; McKay et al., 2004), as well as evidence from lab-based problem solving tasks that self-injurers feel less able to respond in their desired way in the “real world” in response to problems than non-injurers (Nock & Mendes, 2008). While these studies were conducted in different populations (clinical and adolescent samples), they provide some justification for hypothesizing that problem solving will be impaired among self-injurers.

**Hypothesis 4c:** Participants with NSSI will exhibit similar levels of rumination, reappraisal, and suppression as participants without NSSI.

**Rationale for Hypothesis 4c:** Research in adolescents suggests that there may be a relationship between rumination and NSSI (Bjärehed & Lundh, 2008; Tanner et al., 2014), although findings are mixed (see, for example, Hankin & Abela, 2011). Given the strong relationship between rumination and depression (Aldao et al., 2010), and the relationship between NSSI and depression (Martin et al., 2010; Wolff et al., 2014), it is surprising that a more robust relationship between rumination and NSSI has not been found. The existence of several
studies demonstrating a relationship between rumination and NSSI only in very specific circumstances (e.g., low emotional differentiation; Zaki et al., 2013) suggests that there is not a robust difference between individuals with and without NSSI with respect to rumination.

Similarly, research in undergraduates has failed to demonstrate a relationship between reappraisal, suppression, and NSSI (Cerutti et al., 2012; Williams & Hasking, 2010). In a laboratory study that considered suppression in response to a negative mood induction, participants with NSSI reported no change in NSSI urges when using suppression, suggesting that this method may not be particularly attractive or useful to self-injurers (Svaldi et al., 2012). Based on these findings, I anticipate replicating previous research that has found no relationship between NSSI and these particular emotion regulation strategies.

**1.10.5 Hypothesis 5: Multivariate analyses across modal model components**

**Hypothesis 5:** When all modal model components are considered jointly, daily hassles (Component 1, Situation), attributional style (Component 3, Appraisal) and emotional reactivity (Component 4, Response) will show the greatest predictive value in differentiating between participants with and without NSSI.

**Rationale for Hypothesis 5:** The bulk of existing research evaluating modal model components has shown that NSSI is associated with more significant major stressors, biases in thinking (particularly around negative events), and extremely aversive emotional experiences that both precede NSSI episodes and characterize the lives of self-injurers more generally. Relatively less evidence indicates that there may be some group differences with respect to attention (particularly for self-relevant negative emotions, such as disgust), behavioral responses to emotions, and cognitive emotion regulation strategies, suggesting that these factors may play less of a role in understanding NSSI.
Chapter 2: Methods

2.1 Participant Recruitment and Characteristics

2.1.1 Inclusion and exclusion criteria

Two samples were recruited for this study, which were drawn from undergraduate students at the University of British Columbia (sample 1) and adults in Vancouver, British Columbia, Canada (sample 2). Participants in sample 1 had to be currently enrolled in a psychology course in order to be eligible for the study; participants in sample 2 did not have to meet any unique exclusion or inclusion criteria.

All participants had to be at least 19 years of age or older, based on the laws regarding age of majority in British Columbia. Participants were also required to demonstrate the ability to read, understand, and speak English with enough fluency to complete the study procedures. Participants were recruited for two distinct groups: individuals with no lifetime history of NSSI (No NSSI group) and individuals with a recent and repeated history of NSSI (NSSI group). For both groups, participants were asked to complete the Inventory of Statements About Self-Injury (ISAS; see below), which asks about the lifetime frequency of twelve methods of self-harm without suicidal intent; there is also an “other” category. Participants were also asked for the age of onset of NSSI as well as the date of most recent NSSI, if applicable.

Participants were eligible for inclusion in the No NSSI group if their reported frequency of all of the NSSI methods on the ISAS was zero, e.g., they had never engaged in NSSI.

Participants were eligible for inclusion in the NSSI group if their reported lifetime frequency of all NSSI methods on the ISAS was greater than or equal to five, which is the proposed frequency criterion for Non-Suicidal Self-Injury Disorder in fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). Further, to be eligible for
inclusion in the NSSI group, the participant must have reported the date of last NSSI as within the six months preceding the laboratory assessment.

The exclusion criteria for this study were any mental or physical condition that precluded provision of informed consent or accurate completion of the measures administered. This included, for example, individuals with a recent head injury, neurological disorders that impact comprehension or visual processing, learning disabilities that substantially impact one’s ability to complete questionnaires, or a visual impairment that precluded completion of the computer task. Some psychiatric conditions that impair participant functioning and render someone ineligible included current psychotic or manic symptoms that interfere with processing of information, or current substance intoxication or active withdrawal from a substance. Because of the high comorbidity between NSSI and psychiatric disorders, a history of any of these conditions alone was not grounds for exclusion from the study.

2.1.2 Recruitment for sample 1

Participants were recruited from the student population at the University of British Columbia. NSSI is prevalent among undergraduate students across a variety of cultures (Kuentzel, Arble, Boutros, Chugani, & Barnett, 2012; Tresno, Ito, & Mearns, 2013; Whitlock et al., 2011). Recent research from a large, multi-university study further demonstrates that almost one quarter of undergraduates engaging in NSSI did not begin self-injuring until ages 18 to 22, suggesting that research focusing exclusively on adolescents may fail to capture the full range of NSSI behaviors (Whitlock et al., 2011). Additionally, NSSI among undergraduates is associated with significant impairment, including suicidality (Andover et al., 2010; Klonsky & Olino, 2008; Tresno et al., 2012). While some individuals may both start and stop NSSI before reaching adulthood, continuing NSSI into adulthood is associated with greater clinical severity
(Groschwitz, Plener, Kaess, Schumacher, Stoehr, & Boege, 2015), suggesting that it may be especially important to understand what contributes to NSSI among adults. Given the prevalence and clinical relevance of NSSI in this population, university students served as an appropriate population in which to study NSSI-related phenomena. Additionally, recruitment of students improved feasibility of the study by allowing a larger number of participants to be enrolled.

Advertisements (see Appendix A) were placed in multiple public spaces on campus, including boards in the Student Union Building and in buildings on campus that house psychology courses. Potential participants interested in the study could reach the research team by phone or email; no clinically relevant information was requested as part of this initial contact. Following first contact by a potential participant, a member of the research team provided them with a brief description of study eligibility requirements and procedures. If the individual was still interested in participating in the study, the laboratory session was scheduled at a time that was convenient for the individual through the Human Subjects Pool (HSP) system.

The study was also advertised to undergraduate psychology students directly through the HSP system. Students enrolled in psychology courses had the option to enroll in the HSP online system, through which they browse available studies and determine which studies they would like to participate in. Students may complete a “prescreening” assessment for HSP, which permits restriction of study advertisements so that they are only displayed to students who may be eligible for the study. Students who learned about the study through this system enrolled in the study and scheduled appointment times directly in the HSP system.

The study listing in HSP (see Appendix A) described the nature of the study, the time required, and the eligibility requirements. The study listing was only visible to students who reported either a) no lifetime history of NSSI or b) a lifetime history of five or more episodes of
NSSI on the prescreening assessment. The study was listed for recruitment during the winter term (January through April) and summer term (May through August) of 2015.

As an additional recruitment strategy, students who provided affirmative consent to be contacted about studies for which they might be eligible on the prescreening assessment, and whose prescreening responses indicated that they were eligible for the study, were sent an email regarding the study procedure and eligibility. Individuals’ responses (e.g., whether or not they reported NSSI on the prescreening assessment) were not included in the email (see Appendix A).

2.1.3 Recruitment for sample 2

Participants were recruited from the adult population residing in Vancouver, British Columbia, Canada. Advertisements (see Appendix B) were posted online on general websites, such as Craigslist, as well as websites that attracted a disproportionate number of individuals engaging in NSSI, such as those for the Mood Disorders Association of British Columbia and for S.A.F.E. Alternatives, a website about treatments for NSSI. Advertisements were also posted online with the University of British Columbia Paid Studies List, which includes a website database of paid research studies as well as a listserv to receive emails about ongoing studies.

Advertisements (see Appendix B) were also posted at a variety of physical locations in Vancouver. These included places of general interest, such as coffee shops, libraries, and community centers, as well as places that serve individuals struggling with mental illness, including Mental Health Team locations and the Suicide Attempt Follow-Up, Education and Research program through Vancouver Coastal Health.

Following first contact by a potential participant, a member of the research team provided them with a brief description of the study eligibility requirements and procedures (see Appendix
B). If the individual was still interested in participating, the research session was scheduled at a convenient time. Participants were enrolled in sample 2 between January and April of 2015.

The goal of recruiting this adult community sample in addition to sample 1 was three-fold. First, this sample included recruitment from mental health treatment centers and did not require current university enrollment to participate; as a result, I anticipated that this sample would exhibit more clinical impairment than sample 1. Second, the vast majority of existing NSSI research has focused on adolescents, undergraduate students, and clinically referred samples of adolescents and adults; this study provides a unique opportunity to evaluate how NSSI may be related to constructs of interest in an as-yet-understudied group (adults in the community). Third, the evaluation of similar constructs in two unique samples permitted a comparison of results between samples, providing me either with unique information about how these constructs relate to NSSI differently in distinct groups, or with information about how certain patterns might apply to understanding NSSI across age ranges.

2.1.4 Power analyses

In order to determine the number of participants needed in both samples, I conducted power analyses using G*Power software (version 3.1.9.2, Faul, Erdfelder, Lang, & Buchner, 2007). Specifically, I used the parameters for two-tailed comparisons between two independent groups, with a medium effect size (Cohen’s $d = .5$), and a desired power of .8. Based on this analysis, the desired sample size for each sample was 128 ($n = 64$ per group).

2.1.5 Sample 1 participants

A total of 199 individuals enrolled in sample 1. Of these, data were excluded for one participant who informed the researcher that he was not a student, and was therefore ineligible
for this study, resulting in usable data from 198 individuals. All participants were recruited through the HSP system, and all participated for research credit.

Of those 198 individuals, 89 reported no history of NSSI in their lifetime on the ISAS comprising the No NSSI group. The remaining 109 individuals reported at least some history of NSSI; however, 9 reported less than five episodes of lifetime NSSI, and a further 35 did not report NSSI in the 6 months preceding the study session, rendering them ineligible. Therefore, a total of 65 participants were included in the NSSI group, for a total usable sample size of 154. This recruitment was consistent with the desired sample size determined through power analysis (see 2.1.4). Post-hoc power analyses based on this sample size, an estimated effect size of .5, and an alpha level of .05 yielded an estimated power of .86 for two-tailed statistical tests.

2.1.6 Sample 2 participants

A total of 102 individuals completed the protocol for sample 2. Of these, data were excluded for two participants. In one case, the individual had difficulty in understanding the English-language questionnaires; in the second case, the participant expressed great difficulty completing the questionnaires and smelled strongly of cannabis, leading the researcher to conclude that he was likely under the influence of cannabis at the time and therefore unable to complete the study protocol. In total, therefore, data were available from 100 individual participants. These participants were primarily recruited through online advertisements (n = 82, 82%), followed by the paid studies list (n = 7, 7%), flyers (n = 5, 5%), mental health treatment centers (n = 3, 3%), and friend or family referral (n = 3, 3%).

Of those 100 participants, 40 reported no lifetime history of NSSI, and comprised the No NSSI group. Of the 60 participants reporting some history of NSSI, 3 reported less than 5 lifetime episodes of NSSI, and a further 15 did not report NSSI in the preceding 6 months,
rendering them ineligible. Therefore, a total of 42 participants were included in the NSSI group, for a total usable sample size of 82 participants. This sample size was below what had been desired based on power analyses (see 2.1.4), due to financial limitations on the number of participants who could be enrolled in the study. Post-hoc power analyses based on this sample size, an estimated effect size of .5, and an alpha level of .05 yielded an estimated power of .61 for two-tailed statistical tests.

2.2 Research Protocols and Procedures

2.2.1 Procedures

Participants were sent a reminder email with directions to the laboratory prior to the study session (see Appendices C and D). Participants who did not have access to email or who did not wish to provide one were given directions by phone, mail, or fax.

The study procedure took approximately one hour. First, the participant was provided with the study consent form, which described the procedure, eligibility requirements, risks, and benefits of the study (see Appendices C and D). The consent forms varied slightly between samples due to the differences in remuneration for the study. Participants were provided with unlimited time to read through the consent form and ask questions. If the participant agreed to participate, he or she signed one consent form for laboratory records, and was given the other form for his or her records. No participants refused participation during the consent process.

Participants then completed a series of questionnaires and computer tasks designed to measure components of the modal model of emotion. The methodological details (e.g., structure, reliability, validity) of these measures are provided below. First, participants completed a measure of positive coping strategies (the Coping Questionnaire, or CQ). Second, the researcher provided verbal instructions on how to complete the Self-Assessment Manikin (SAM), which the
participant then completed. Third, the researcher gave verbal instructions on how to complete the dot-probe computer task, while written instructions were provided on a computer screen. Participants also completed practice trials for the computer task while the researcher was present, to ensure that the participant understood the instructions. Fourth, the researcher left the room while the participant completed the dot-probe computer task. Fifth, after the participant completed the task, the researcher provided a second set of instructions regarding the SAM, and the participant completed the measure again. Sixth, the participant completed a set of questionnaires; participants were instructed to contact the researcher with any questions or concerns regarding any of the measures. The specific questionnaires varied slightly between samples 1 and 2; details can be found below. Participants were told they could skip questions or end the study if they felt uncomfortable. No participants asked to end the study protocol early.

After the participant completed the questionnaires, the researcher conducted a debriefing procedure. This involved providing verbal and written information (Debriefing Form; see Appendices C and D) to the participant about the study’s goals, measures, and hypotheses. Participants in sample 1 were further asked to enter this information into an online form to ensure understanding of the material provided, which is a requirement to use the HSP system (see Appendix C). Participants were provided with the opportunity to ask questions regarding all aspects of the study. No participants refused to complete the debriefing procedure.

Following debriefing, the researcher reviewed the list of positive coping strategies (the CQ) as a positive mood induction and to provide the participant with ideas for novel coping strategies to use when stressed or upset. The researcher also provided the participant with a copy of their completed CQ. Additionally, all participants were provided with a list of resources and referrals to mental health and crisis counseling services in the greater Vancouver area (see
Appendices C and D). Participants in sample 1 received 1 research credit for their participation, which was administered using the online HSP system; participants in sample 2 were paid $20 for participation, in addition to reimbursement for bus fare or parking, when applicable.

2.2.2 Technical and physical specifications

All study sessions took place in a sound-attenuated room at the University of British Columbia, Vancouver, British Columbia, Canada. All participants completed paper versions of the consent forms, CQ, and SAM, while the remaining questionnaires were completed on a computer using the Qualtrics survey system. All paper questionnaires were entered twice into the Qualtrics system by trained researchers, and the data were checked for accuracy and discrepancies were corrected by the primary researcher (S.V.).

The computer used was manufactured by Lenovo (ThinkPad) and used the Windows 10 operating system. The computer was attached to a standard keyboard, mouse, and an external monitor with a screen size of 22 inches (1920 pixels by 1080 pixels).

2.2.3 Institutional ethical approval

Study procedures were conducted in accordance with the requirements for ethical conduct of research set out by the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*, the Behavioural Research Ethics Board at the University of British Columbia, and the Vancouver Coastal Health Research Institute’s review procedures for studies involving human subjects. All study procedures and materials were approved prior to data collection by the University of British Columbia (#H14-03242) and the Vancouver Coastal Health Research Institute (#V14-03242). Vancouver Coastal Health approval was required in order to permit posting of study advertisements in their facilities (e.g., Mental Health Team locations) for recruitment for sample 2.
2.2.4 Risk of participant distress

Participant safety is of utmost importance in all research with human subjects, but particularly when working with individuals experiencing psychological distress, such as individuals engaging in NSSI. Fortunately, decades of research show that asking individuals, even those at high risk of distress, about psychiatric symptoms, NSSI, or suicide does not increase the likelihood of harmful outcomes for participants. For example, research found that high school students exposed to questions about suicide were no more distressed or suicidal after the study than students who were not asked about suicide, even for those identified as “high risk” (Gould et al., 2005). Similar results have also been found for depressed adults asked about suicide and followed over longer periods of time (Smith, Poindexter, & Cukrowicz, 2010) and, more recently, for undergraduate students asked about NSSI and suicide (Whitlock, Pietrusza, & Purington, 2013). This research extends what researchers know about the risks and benefits of suicidality research to the field of NSSI, and supports researchers’ understanding of these studies as generally low risk for participants.

2.2.5 Procedures to manage participant safety

Because participant safety is critical in any study, and individuals may differ in their response to questionnaires regarding NSSI, safety procedures were implemented to ensure that participants’ welfare was protected. In addition to the provision of the CQ and a list of resources and referrals (see 2.2.1), all researchers interacting with participants for this project were trained on a crisis response protocol (see Appendix E). Because the participants in sample 2 were, in part, recruited from mental health treatment facilities, all sessions for that sample were conducted by the primary researcher (S.V.), in order to reduce the likelihood of a crisis situation arising during a session conducted by an undergraduate research assistant.
A single participant in sample 2 reported transient suicidal thoughts; upon further evaluation, the participant denied any suicidal intent or plan and did not report feeling in any danger to leave the study session. The primary researcher (S.V.) consulted with the Principal Investigator of the study (Dr. Klonsky), and both agreed that the participant was not at imminent risk of harming themselves or someone else. No crisis intervention measures were administered.

2.3 Measures

2.3.1 Non-suicidal self-injury history

NSSI history was assessed using the Inventory of Statements About Self-Injury (ISAS; Klonsky & Olino, 2008). This measure asks about the lifetime frequency of twelve methods of NSSI, with an additional space to record other NSSI methods. The twelve methods were cutting, biting, burning, carving, pinching, pulling hair, severe scratching, banging or hitting, interfering with wound healing, rubbing skin against a rough surface, sticking self with needles, and swallowing dangerous substances. This measure also asks about age of onset and date of most recent NSSI. Research suggests that this measure is reliable over a period of one year (Glenn & Klonsky, 2011). Additionally, this measure is internally consistent (Cronbach’s α = .84; Klonsky & Olino, 2008) and unidimensional (Latimer, Meade, & Tennant, 2013). Internal consistency was good in both samples (sample 1: Cronbach’s α = .82; sample 2: Cronbach’s α = .88).

Participants provided a number to indicate their frequency of each NSSI method (e.g., 0, 1, 3, 72, 500). These frequencies were then converted into binary variables indicating whether or not an individual had ever engaged in a specific method of NSSI that, when summed, yielded the number of NSSI methods an individual used in his/her lifetime.
2.3.2 Modal model: Situations

Sample 1. Participants completed the Inventory of College Students Recent Life Events (ICSRLE), a measure of daily hassles specific to university students (Kohn, Lafreniere, & Gurevich, 1990). The ICSRLE is a 49-item self-report measure of negative, frustrating, or difficult experiences over the past month. The instructions for the measure ask the respondent to indicate “how much it [each experience] has been a part of your life over the past month,” from not at all (0), only slightly (1), distinctly (2), to very much (3). This framing, rather than focusing on the perceived impact of the hassles, aims to separate the experience of hassles with the experience of subjective stress or distress following from the hassles, which would be better evaluated in other domains of the modal model. Additionally, items were developed and validated specifically with undergraduates, with the goal of tapping into hassles specific to university life, for example, “conflict with professor(s),” in addition to more general hassles, such as “social rejection.” An overall score was calculated by summing the 49 individual items, yielding a total score that ranged from 0 to 147.

The ICSRLE demonstrates excellent internal consistency (Cronbach’s $\alpha = .89$), and good external validity in its correlation with a measure of perceived stress ($r = .67$; Kohn et al., 1990). In sample 1, internal consistency of the overall measure was excellent (Cronbach’s $\alpha = .94$).

The ICSRLE has seven factor-analytically-derived dimensions: developmental challenges, time pressures, academic alienation, romantic problems, general social mistreatment, assorted annoyances, and friendship problems. Subscale scores are calculated by summing the items that comprise each subscale. These dimensions exhibited generally moderate to good internal consistency in this sample, with the lowest reliability for assorted annoyances (Cronbach’s $\alpha = .58$) and the highest for developmental challenges (Cronbach’s $\alpha = .86$).
Sample 2. Participants in sample 2 completed the Revised Daily Hassles Scale (DHS-R; Holm & Holroyd, 1992), a 64-item, shortened version of the Daily Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981), a well-known measure of daily hassles in the lives of adults. This scale was designed to ameliorate two potential problems in previously designed measures of daily hassles. First, the DHS-R removed items from the original DHS which were most confounded with symptoms of psychiatric conditions, in order to avoid artificially increasing the relationship between hassles and psychological problems. Second, the DHS-R permits participants to report on hassles that occurred, but that did not cause them distress or difficulty, thereby removing concerns about original DHS scores being more appropriately attributed to generalized distress. The scale has been shown to exhibit high internal consistency and appropriate validity in adults (Holm & Holroyd, 1992; Scott & Melin, 1998).

Each item on the measure asks the participant to indicate whether a particular hassle occurred in the preceding month and, if so, its severity, with scores ranging from 1 (not severe at all) to 5 (occurred, extremely severe). A hassles count score is calculated by summing the total number of hassles that occurred for an individual; a hassles severity score is calculated by taking the sum of all severity ratings and dividing by the number of hassles endorsed, resulting in a score from 1 to 5. In this sample, internal consistency for hassles count was excellent (Cronbach’s $\alpha = .93$).

The DHS-R has seven factor-analytically-derived dimensions. Subscale scores are calculated in the same manner as the total hassles scores. In this sample, the environmental hassles (Cronbach’s $\alpha = .63$) and family hassles (Cronbach’s $\alpha = .66$) subscales exhibited questionable reliability, while health hassles (Cronbach’s $\alpha = .71$) exhibited moderate reliability,
and the financial concerns (Cronbach’s $\alpha = .85$), inner concerns (Cronbach’s $\alpha = .89$), time pressures (Cronbach’s $\alpha = .80$), and work hassles (Cronbach’s $\alpha = .81$) exhibited good reliability.

### 2.3.3 Modal model: Attention

**Dot-probe task overview.** The dot-probe computer task (“dot-probe;” MacLeod, Mathews, & Tata, 1986) is a commonly used measure of selective attention towards and away from emotional and non-emotional stimuli. The dot-probe began with instructions to the participant to focus on a fixation cross (“+” sign) in the middle of the screen. Participants were told that they would be shown two faces on the left and right sides of the screen, which would then disappear and be replaced with a grey dot in the previous location of one of the two faces. Participants were instructed to respond as quickly as possible upon seeing the dot by pressing a computer key marked with “L” (F key) or “R” (J key) on the left and right sides of the computer keyboard, respectively, depending on whether the dot appeared on the left or right. Following a key press, the next trial began. Participants completed 8 practice trials while the researcher remained in the testing room, in order to ensure that the participant understood the task instructions. A visual representation of the task can be found in Appendix F.

**Dot-probe task stimuli.** The two faces displayed on the screen were images of the same individual displaying a neutral facial expression in one image and an emotional facial expression (angry, sad, scared, disgusted) in the other image. The images were drawn from the NimStim database of emotional faces, which has been validated for recognition of the target facial expression (Tottenham et al., 2009). Because of the predominance of East Asian and Caucasian student participants at the University of British Columbia, only images of East Asian and Caucasian models were used in this study. Faces were evenly divided between male and female models. Unfortunately, due to the paucity of East Asian male models in the NimStim dataset,
only Caucasian male images were used. In total, 20 models were selected (5 East Asian female, 5 Caucasian female, 10 Caucasian male).

**Detailed procedures.** The task was conducted on a Windows-based desktop computer, and the facial images were displayed at a size of approximately 12.5 x 16 cm. The pictures appeared approximately 7 cm apart on a white background. Participants were seated directly in front of the computer screen in a well-lit, sound-attenuated room at a distance of approximately 60 cm from the computer screen. The task was administered using the SuperLab computer software, which randomized stimuli presentations and tracked the response time across trials.

The program was designed such that each face pair (neutral-sad, neutral-scared, neutral-angry, neutral-disgusted) for each individual model (n=20) was displayed once per trial block, for a total of 80 trials per block. Face pairs were randomized across trials within each block, as was the location of the dot-probe on each trial (left or right side). Participants completed a total of four blocks, with an opportunity to take a break between each of the four blocks. Because of a data coding issue, one face pair (neutral-disgusted) was displayed correctly during block 1, but was not displayed during the subsequent 3 blocks, resulting in a total of 317 trials per participant (80 trials in block 1, 79 in block 2, 79 in block 3, 79 in block 4).

With respect to timing, participants were shown a black fixation cross in the center of the screen for 500 milliseconds. Then, participants were shown two images of the same individual at the same time, for 250 milliseconds. This exposure time was chosen because of meta-analytic research suggesting that the attentional bias towards threatening information in anxiety, and away from threatening information in control participants, in the dot-probe task is greatest when images are exposed for less than 500 milliseconds (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007).
Once the images left the screen, a grey dot approximately 1 cm in diameter appeared in the location of one of the previously displayed images. This dot remained on the screen until the participant responded indicating where it was located (left or right), or for 1000 milliseconds, whichever was first. Following the participant’s response, or 1000 milliseconds, the dot was removed from the screen and replaced by a fixation cross, which began the subsequent trial.

*Data cleaning and management.* Trials were divided into one of four categories:

- EIPI: emotional face on the left, dot-probe on the left
- EIPr: emotional face on the left, dot-probe on the right
- ErPI: emotional face on the right, dot-probe on the left
- ErPr: emotional face on the right, dot-probe on the right

On trials where the emotional face and the dot-probe appear on the same side (congruent trials: EIPI and ErPr), individuals whose attention is focused on the emotional face will exhibit a faster response to the probe that appears following the face because the probe appears in the location where the participant’s attention is already focused; on trials where the emotional face and the dot-probe appear on different sides (incongruent trials: EIPr and ErPI), individuals whose attention is focused on the emotional face will exhibit a slower response to the probe that appears following the face, because the probe appears on the opposite side of the screen.

For each individual, trials were removed if the participant indicated the incorrect location for the probe or if the participant did not respond by 1000 milliseconds. Practice trials were also excluded. Outliers were addressed using a Windsorizing procedure in an attempt to improve overall reliability of the task, as described by Price et al. (2015). Specifically, the interquartile range was calculated for all trials, and then values outside of 1.5 interquartile ranges were rescaled to the smallest or largest value within the valid range.
Following these data cleaning procedures, a total of 16 scores were calculated for each individual participant; these scores were the average reaction time (in milliseconds) across trials for each type of trial (ElPl, ElPr, ErPl, ErPr) and for each type of emotional expression (sad, angry, scared, disgusted). These scores then facilitate the calculation of an overall measure of attentional bias for each type of emotional face (sad, angry, scared, disgusted). The traditional method for calculating attention bias uses the following equation (Joormann & Gotlib, 2007):

\[
\text{Attentional bias} = \frac{1}{2}[(\text{ElPr} - \text{ErPr}) + (\text{ErPl} - \text{ElPl})]
\]

By subtracting the average response time for congruent trials from the average response time for incongruent trials, an overall attentional bias score is calculated in which positive values indicate attention toward the emotional face (and/or away from the neutral face) and negative values indicate attention away from the emotional face (and/or toward the neutral face).

There is some evidence (Price et al., 2015) that using only trials on a single side of the screen, while decreasing the number of trials included in the calculation, may improve reliability for the task as a whole. As a result, I calculated the measures of attentional bias for each emotion using only the trials on the left or right side of the screen using the following formulas:

\[
\text{Attention bias left} = (\text{ElPr} - \text{ElPl})
\]

\[
\text{Attention bias right} = (\text{ErPl} - \text{ErPr})
\]

Following these calculations, I compared the reliability of each type of attention bias measure in order to use the measure that demonstrated the highest reliability. Specifically, I calculated the intraclass correlation coefficient (ICC) of attention bias for each emotion across the four blocks of the task using a two-way random effects model, as per the recommendations of Price et al. (2015). In each case, the ICC was tested as to whether or not it was significantly different from 0 using an F test, which provides a resulting p value. ICCs can be roughly
interpreted as a correlation coefficient ranging from 0 to 1; negative ICCs are considered equivalent to a reliability of 0 (no reliability).

Dot-probe internal consistency. In sample 1, attention bias for the four emotions (angry, sad, scared, disgusted) showed low consistency, with ICCs ranging from -.16 \((p = .85)\) to .13 \((p = .15)\). The ICCs for the left-only trials only ranged from -.53 \((p = 1)\) to .14 \((p = .12)\). Similarly, ICCs for the right-only trials ranged from -.01 \((p = .52)\) to .12 \((p = .16)\). In sample 2, the ICCs also demonstrated poor consistency. For the overall attention bias measures, ICCs ranged from -.42 \((p = .96)\) to .2 \((p = .11)\). Similarly, the measure of attention bias using left-only trials had ICCs that ranged from -.27 \((p = .89)\) to -.007 \((p = .5)\), and using right-only trials had ICCs ranging from -.32 \((p = .92)\) to .1 \((p = .28)\). These results suggest that this administration of the dot-probe task did not yield a reliable measure of attentional bias across the trial blocks, and that no method of estimating attention bias yielded significantly more reliable results than any other.

2.3.4 Modal model: Appraisal

In order to evaluate the influence of cognitive style on interpretation of emotion-eliciting events, participants completed the Attributional Style Questionnaire (ASQ; Peterson et al., 1982), a well-known and commonly used measure of attributional style. The questionnaire asked participants to generate one most likely cause for each of 6 positive and 6 negative events. Participants responded to questions about their perceived cause with respect to internality (the degree to which the event occurred because of something internal to them or external to others or the environment), stability (the degree to which the cause is specific to this time or likely to occur again), and globality (the degree to which the cause is unique to this situation or relevant to many situations). Each of these dimensions was assessed on a Likert scale ranging from 1 to 7, with higher scores indicating greater internality, stability, and globality.
In order to understand how appraisal may interact with previous experiences and values, three questions were added for each event described (see Appendix G). First, participants were asked to rate how important the situation would be if it happened to them, on a 1-7 Likert scale, with higher scores indicating greater importance. Second, participants were asked whether the ambiguous situation has ever happened to them before. Third, participants were asked whether, had the event occurred previously, the cause was the same cause as he or she wrote down above.

Scores for negative attributional style were calculated by summing the internality, stability, and globality ratings for the 6 negative events and then dividing the summed scores by 6, resulting in a score that ranges from 3 to 21, with higher scores indicating more internal, stable, and global attributions, which are generally considered to be maladaptive. Scores for positive attributional style were calculated the same way, but for positive events; while higher scores continue to indicate more internal, stable, and global attributions, these are generally considered to be adaptive. Scores on each individual dimension (e.g., negative stability, positive globality) and for perceived importance were calculated by summing the answers for the dimension across the relevant (positive or negative) events, and then dividing by 6, resulting in dimension scores that range from 1 to 7.

For assessing whether the events presented on the ASQ had happened to participants in the past, answers indicating that an event had happened (whether in the recent, relatively recent, or distant past) were summed for positive and negative events separately, and then divided by 6, resulting in a value between 0 and 1 indicating the proportion of the negative and positive events that had actually happened to the participant in the past. For assessing whether the causes of these past events were the same as what was identified on the questionnaire, answers that indicated that the cause was the same were summed for positive and negative events separately,
and then divided by the total number of events that the person indicated had happened in the past, resulting in a value between 0 and 1 indicating the proportion of negative and positive events that, having occurred in the past, had the same cause as the participant indicated.

While the ASQ has previously demonstrated poor internal consistency for its subscales (negative and positive internality, stability, and globality), the composite negative and positive attributional style scores have shown acceptable reliability (Cronbach’s α = .72 and .75 for negative and positive, respectively; Peterson et al., 1982). In this previous research, the scale showed adequate test-retest reliability (r = .64 to .70 for negative and positive, respectively).

In this sample, reliability for the composite scales was somewhat higher than previously reported (sample 1: Cronbach’s α = .84 for negative, .79 for positive; sample 2: Cronbach’s α = .85 for negative, .76 for positive). In sample 1, the subscales exhibited reliability that ranged from .53 (positive internality) to .76 (negative stability); in sample 2, the range was similar, from .57 (negative internality) to .79 (negative stability).

For the added subscales regarding the perceived importance of the positive and negative events, reliability was acceptable (sample 1: Cronbach’s α = .73 for positive, .71 for negative; sample 2: Cronbach’s α = .77 for positive, .81 for negative). After coding the items that assessed whether the events had occurred before into binary (yes/no) variables, regardless of when the event happened in the past, reliability was unacceptably low (sample 1: Cronbach’s α = .36 for positive, .49 for negative; sample 2: Cronbach’s α = .39 for positive, .48 for negative). For the subset of events that had happened to the participant, the items assessing whether the cause was the same or different were recoded into binary variables, where a “yes” answer was coded as 1 and any other answer (“no, different cause,” “I’m not sure,” and “Happened multiple times, sometimes same cause sometimes different cause”) was coded as 0. These scales demonstrated
adequate reliability (sample 1: Cronbach’s $\alpha = .63$ for negative, .76 for positive; sample 2: Cronbach’s $\alpha = .70$ for negative, .69 for positive).

### 2.3.5 Modal model: Responses

Because the Response component of the modal model of emotion incorporates subjective experience of emotions, behavioral changes, and cognitive strategy implementation, understanding how this is experienced in NSSI required assessment of several constructs.

*Subjective emotional experience.* Participants completed the Emotion Reactivity Scale (ERS; Nock et al., 2008), a 21-item self-report measure of emotional sensitivity, arousal/intensity, and persistence. Each item was scored on a Likert scale from 0 (not at all like me) to 4 (completely like me). The overall score and subscale scores for sensitivity, arousal/intensity, and persistence were calculated by summing the relevant items. This measure was validated in a sample of adolescents and young adults with a high prevalence of NSSI, and demonstrated excellent internal consistency for the total score, as well as the three more specific emotion factors (Cronbach’s $\alpha$s = .94, .88, .86, and .81 for overall, sensitivity, arousal/intensity, and persistence, respectively; Nock et al., 2008). The measure shows appropriate convergent and divergent validity with other scales relevant to emotional experience, and appropriately differentiates individuals with NSSI, suicidality, mood disorders, anxiety disorders, and eating disorders. In this study, reliability for the overall scale and subscales ranged from good to excellent (sample 1: Cronbach’s $\alpha$s = .96, .93, .90, and .87; sample 2: Cronbach’s $\alpha$s = .97, .94, .93, and .85, for overall, sensitivity, arousal/intensity, and persistence, respectively;).

*Problem solving.* Problem solving style and perceived self-efficacy to solve problems were assessed with the Problem Solving Inventory (PSI; Heppner & Petersen, 1982). This measure was only administered in sample 1 due to time constraints in sample 2. This is a self-
report measure with 35 items (3 of which are filler items) that tap confidence in problem-solving ability (e.g., “I make decisions and am happy with them later”), approach avoidance style (e.g., “I generally go with the first good idea that comes to my mind”), and lack of personal control over problem solving (e.g., “I make snap judgments and later regret them”). Items are scored on a Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree); some items are reverse-coded. Because of the use of a Likert scale where agreement results in lower scores, lower scores on each of these subscales are considered more adaptive: lower confidence subscale scores reflect greater problem solving confidence, lower control subscale scores reflect greater perceived control over problem solving, and lower approach avoidance style scores indicate greater tendency to approach problems actively, rather than through avoidance.

The overall and subscale scores were calculated by summing items following reverse coding. This measure has been validated in undergraduate samples, and each subscale, as well as the total score, had good to excellent internal consistency (Cronbach’s α = .72 to .90). This measure also exhibited good convergent and divergent validity, as well as good test-retest reliability (Heppner & Petersen, 1982). In sample 1, the overall score exhibited excellent reliability (Cronbach’s α = .90), while the subscales exhibited moderate to good reliability (confidence Cronbach’s α = .84, approach style Cronbach’s α = .84, control Cronbach’s α = .78).

Cognitive strategies. In order to understand types of cognitive responses to emotional experiences, participants completed the Ruminative Responses Scale (RRS; Nolen-Hoeksema & Morrow, 1991) as well as the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The RRS is a 22-item self-report measure of rumination, specifically, thoughts about the self, symptoms, causes of mood, and consequences of mood in response to depression. Participants rated how often they engage in rumination in response to feeling down or sad on a Likert scale
ranging from 1 (almost never) to 4 (always). The total score is calculated by summing all items. In the original validation study of undergraduates, the scale showed good internal consistency (Cronbach’s $\alpha = .89$) and demonstrated a prospective relationship between tendency to ruminate and depression following the 1989 Loma Prieta earthquake (Nolen-Hoeksema & Morrow, 1991). A subsequent study using a random sample of community adults assessed found high internal consistency (Cronbach’s $\alpha = .9$) and adequate test-retest reliability over 1 year ($r = .67$; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Internal consistency was excellent in sample 1 (Cronbach’s $\alpha = .96$) and in sample 2 (Cronbach’s $\alpha = .94$).

The ERQ is a 10-item self-report measure of the tendency to use cognitive reappraisal and expressive suppression in response to emotional experiences (Gross & John, 2003). Items were scored on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Factor analysis has supported the use of this scale to measure two independent factors that are internally consistent (Cronbach’s $\alpha = .79$ and .73 for reappraisal and suppression, respectively), and test-retest reliability has been adequate ($r = .69$; Gross & John, 2003). Reappraisal and suppression were correlated with other emotion regulation strategies in expected ways; for example, cognitive reappraisal was positively associated with reinterpretation coping, while expressive suppression was positively correlated with inauthenticity and negatively correlated with reinterpretation coping. Finally, the measure appropriately discriminated from other unrelated constructs, such as cognitive ability and social desirability (Gross & John, 2003). Reappraisal and suppression subscales were computed by taking the average of the relevant items, yielding a score for each subscale between 1 and 7. In these samples, internal consistency was excellent for reappraisal (sample 1: Cronbach’s $\alpha = .90$; sample 2: Cronbach’s $\alpha = .86$) and was adequate for suppression (sample 1: Cronbach’s $\alpha = .67$; sample 2: Cronbach’s $\alpha = .73$).
2.3.6 Covariates: State affect

State affect, both valence and arousal, can substantially impact attentional processes being measured as part of this study (Harmon-Jones, Gable, & Price, 2011; Nelson et al., 2015); as such, it is important to have an assessment of affect preceding the attentional bias (dot-probe) task. In order to do this, participants completed the Self-Assessment Manikin (SAM; Lang 1980). I also considered that state affect might impact responses to self-report questionnaires; as such, participants completed the SAM twice, both before the dot-probe computer task (pre-task) and after the dot-probe task, but before completing questionnaires (post-task). The SAM is a set of three rating scales for emotional valence, arousal, and dominance that use images of a human-like robot to show a 9-point continuum that spans 5 unique images for each scale. Participants were asked to rate how they currently felt for valence, arousal, and dominance. Scores on each scale range from 1 to 9. Because of my primary interest in emotional valence and arousal, only the first two SAM scores were used as potential covariates.

2.3.7 Covariates: Demographics

Several demographic characteristics could be associated with NSSI, emotional experiences, and attentional processes, particularly for human faces. As such, a demographics form (see Appendix G) was given to participants to self-report their age, gender, ethnicity, and sexual orientation. Participants also reported on their marital status, current employment, educational attainment, extent of time living in Canada, and use of English as a first language.

2.3.8 Covariates: Borderline personality disorder

Participants completed the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003), a 10-item self-report measure of BPD symptoms keyed to the Diagnostic and Statistical Manual, 4th Edition, Text Revision diagnostic criteria.
Each item required a binary (yes/no) response, and total score was calculated by summing all items. Given that NSSI history is also a symptom of BPD, a total score without the NSSI item on the MSI-BPD was calculated, to avoid artificially increasing the relationship between NSSI group and BPD symptoms (Victor & Klonsky, 2014). The MSI-BPD has shown convergent validity with interview-based measures of BPD in nonclinical populations, with particularly strong sensitivity and specificity for subjects under age 30 (Zanarini et al., 2003). The MSI-BPD exhibited good test-retest reliability and good internal consistency (Cronbach’s α = .74, Zanarini et al., 2003). In this study, the total score with no NSSI item was reliable (sample 1: Cronbach’s α = .79; sample 2: Cronbach’s α = .85).

2.3.9 Covariates: Depression and anxiety

Similar to the concerns regarding overlap between my constructs of interest and BPD, psychological distress related to anxiety and depression can also be strongly associated with NSSI, attention, appraisal, and life stress. Therefore, participants completed the Depression, Anxiety, and Stress Scales Short Form (DASS-21; Lovibond & Lovibond, 1995), a 21-item self-report measure of anxiety, depression, and stress. The DASS-21 exhibits greater separation between these factors than other scales, permitting more detailed analysis of potential covariates in this study. This three-factor structure has been replicated in other clinical and non-clinical samples beyond the original validation study (Antony, Bieling, Cox, Enns, & Swinson, 1998). Additionally, the DASS-21 has demonstrated excellent internal consistency (Cronbach’s α = .94, .87, and .91 for depression, anxiety, and stress, respectively; Antony et al., 1998). Scores were calculated for each subscale by summing the items for that subscale and multiplying by 2. Because I was specifically interested in evaluating anxiety and depression, and the stress subscale may tap other constructs measured here (e.g., hassles), only anxiety and depression
subscales were considered for analysis here. Reliability in these samples for each subscale ranged from good to excellent (sample 1: depression Cronbach’s $\alpha = .92$, anxiety Cronbach’s $\alpha = .83$; sample 2: depression Cronbach’s $\alpha = .94$, anxiety Cronbach’s $\alpha = .88$).

2.3.10 Covariates: Psychiatric diagnoses

Participants in sample 2 were asked to provide information about their psychiatric and mental health history using the Mental Health History Form (see Appendix G). This form was added for sample 2 in order to capture the potentially higher clinical severity in this sample, given that some participants were recruited from mental health treatment centers in Vancouver. This measure asks about past and present psychological treatment (e.g., therapy) and psychiatric care (anti-depressants, anti-anxiety medications), as well as lifetime history of psychiatric hospitalization. Participants were further asked to indicate if they had ever been given a mental health or psychiatric diagnosis and, if so, the type of diagnosis (mood, anxiety, substance, psychotic, eating, personality, or other disorders). Participants were also asked whether they had a primary current diagnosis or diagnoses and, if so, the type of primary current diagnosis.

2.4 Statistical Methods

The primary research questions for this study involved comparing two groups (NSSI and No NSSI) with respect to a variety of characteristics. These analyses were conducted in several ways, which varied depending on the variable of interest. For all analyses, tests that resulted in a $p$ value less than .05 were considered statistically significant.

For comparing binary variables (e.g., gender) between the groups, 2-by-2 $X^2$ (chi-square) analyses were used. For comparing interval variables (e.g., age) between the groups, independent-samples $t$-tests were used. For some analyses, I was interested in evaluating the relationship between two variables while controlling for a third variable; for example, evaluating
whether NSSI group is related to being born outside of Canada after controlling for East Asian ethnicity. In this case, a partial phi (correlation) coefficient \((r)\) was calculated.

In each of these types of analyses, I was interested not only in whether the statistical test was significant, but also in the magnitude of the relationship between two variables (or the magnitude of difference between groups). To evaluate this construct in a way that was consistent across statistical tests, the Cohen’s \(d\) measure of effect size was used (Cohen, 1988). While no strict cutoff for measures of Cohen’s \(d\) exists, commonly used guidelines suggest considering effects between .3 and .5 to be small, .5 to .8 to be medium, and .8 or higher to be large.

For multivariate analyses, binary logistic regression was used to evaluate the relative contribution of each of a set of variables to explaining participants’ group membership (NSSI or No NSSI). The measure of effect size for these analyses is the odds ratio, which is bounded by a 95% confidence interval and reported as \(OR = X [Y, Z]\), where \(X\) is the odds ratio, \(Y\) is the lower bound of the confidence interval, and \(Z\) is the upper bound of the confidence interval.
Chapter 3: Results

3.1 Data Processing and Management

3.1.1 Missing data management

Due to the use of computerized questionnaires, missing data within a particular questionnaire was relatively uncommon; in some cases, participants ran out of time to complete the full battery, resulting in full questionnaires being left incomplete. There were no missing data on the measure of the independent variable (NSSI history). In one case, a participant’s data were excluded for the dot-probe task because the participant (sample 2) stated that she did not follow task instructions. For questionnaires assessing the remaining modal model components, the proportion of missing data in sample 1 ranged from a low of 1.30% (ASQ) to a high of 10.39% (ERQ, ERS). In sample 2, missing data ranged from a low of 1.22% (ASQ) to 3.66% (DHS-R, EHS). Because the missing data were not missing at random, using multiple imputation methodologies would have been inappropriate for these data. As such, cases with missing data were excluded in a pairwise fashion. The exact amount of missing data for each variable of interest can be found, along with descriptive characteristics for each variable, in Table 1.

3.1.2 Dot probe data cleaning procedures

Each of the participants completed 317 non-practice trials of the dot-probe task, resulting in a total of 48,818 trials in sample 1 and 25,677 trials in sample 2. Of these, 101 trials (0.21%) in sample 1 and 10 trials (0.04%) in sample 2 did not include a press of the two appropriate buttons (“L” or “R”), and were removed. A further 1,282 trials (2.63%) from sample 1 and 305 trials (1.19%) from sample 2 were removed because the participant pressed the button for the incorrect side (e.g., hitting the “L” button when the cue appeared on the right side of the screen),
resulting in 47,435 total trials across 154 participants in sample 1 and 25,362 trials across 81 participants in sample 2. The number of usable trials per participant ranged from 263 to 317.

To address reaction time outliers, a Windsorizing approach was used. Specifically, I calculated the bounds of acceptable reaction times by multiplying the interquartile range (IQR) by 1.5, and then adding this value to the value of the 75\textsuperscript{th} percentile to establish an upper bound, and subtracting this value from the value of the 25\textsuperscript{th} percentile to establish a lower bound. For sample 1, the 25\textsuperscript{th} percentile was 365 milliseconds, the 75\textsuperscript{th} percentile was 451 milliseconds, and the IQR was 86 milliseconds. These values resulted in an upper bound of 580 milliseconds and a lower bound of 236 milliseconds. A total of 2,280 trials (4.81\%) involved reaction times above or below these cutoffs, and were recoded to 580 milliseconds and 236 milliseconds, respectively. In sample 2, the 25\textsuperscript{th} percentile was 392 milliseconds, the 75\textsuperscript{th} percentile was 505 milliseconds, and the IQR was 113 milliseconds. These values resulted in an upper bound of 675 milliseconds and a lower bound of 222 milliseconds. A total of 1,182 trials (4.66\%) involved reaction times outside these cutoffs and were recoded to 675 milliseconds and 222 milliseconds, respectively.

3.2 Descriptive Characteristics of NSSI

Among the 65 participants reporting recent NSSI in sample 1, the most common NSSI methods were interference with wound healing, banging or hitting, and cutting. Participants typically reported multiple NSSI methods, with a median of 3 and a mode of 2. Among the 42 participants with NSSI in sample 2, the most common methods of NSSI were banging or hitting, severe scratching, and cutting. These participants reported a median of 6 NSSI methods and a mode of 5 methods. Further details regarding NSSI characteristics can be found in Table 2.
Given the high prevalence of what many consider to be a low-severity method of NSSI (interference with wound healing) in sample 1, I evaluated the extent to which self-injuring participants reported NSSI methods that are strongly associated with tissue damage, specifically, cutting, burning, biting, carving, and sticking oneself with needles. A total of 49 participants (75.38% of the NSSI group) reported at least one of these methods of NSSI. Participants who reported interfering with wound healing did not differ from participants who did not use this method in total number of other NSSI methods endorsed (independent-samples \( t(63) = .16, d = .04, p = .87 \)). Only a small number of participants endorsed only interference with wound healing \( (n = 5, 7.69\%) \); these participants reported an average of 262 episodes of this method \( (SD = 414.39; \text{median} = 100; \text{mode} = 100) \). Given the relatively high lifetime number of interference with wound healing episodes in this subgroup, and the likelihood that their inclusion would only make the statistical comparisons between participants with and without NSSI more conservative (by potentially reducing the clinical severity of the NSSI group), I elected to retain these participants for subsequent analyses. No participants reported interference with wound healing as their sole method of NSSI in sample 2.

### 3.3 Demographic Characteristics

Participants in sample 1 ranged from 19 to 44 years old, with a mean age of 21.24 \( (SD = 2.97) \). Participants in sample 2 ranged from 19 to 65 years old, with a mean age of 34.46 \( (SD = 12.81) \). Both samples were predominantly female and Caucasian or East Asian descent.

Complete details regarding demographic characteristics in both samples can be found in Table 3.

In sample 1, participants who were sexual minorities, born in Canada, not East Asian, and native English speakers were more likely to be in the NSSI group than participants who were heterosexual, born outside of Canada, East Asian, or non-native English speakers. There was no
relationship between NSSI group and age, gender, marital status (single versus not single), educational history (some college or university versus other education level), or employment status (employed versus not employed). Details on these analyses, as well as the analyses in sample 2, can be found in Table 4. Based on these results, multivariate analyses of modal model components will control for ethnicity, place of birth, and native English status as relevant covariates (sexual minority status cannot be included as a covariate because all sexual minority participants were in the NSSI group).

In sample 2, NSSI group participants were significantly more likely to be sexual minorities and to have been born in Canada than No NSSI group members. There was no relationship between ethnicity (Caucasian versus not Caucasian) or being a native English speaker and NSSI group in this sample, nor were there associations between NSSI and gender or marital status. In this sample, NSSI group participants were significantly younger than No NSSI participants, and were significantly less likely to have a college or university degree. The NSSI group was also more likely to be unemployed than the No NSSI group. Given that these final two results seem more appropriately considered to be consequences of psychological difficulties (such as NSSI) than as causes, I will control for age, sexual orientation, and birth location in subsequent multivariate analyses.

3.4 Descriptive Characteristics of Potential Covariates

Participants reported on their symptoms of BPD, anxiety, and depression, as well as their state affect at the time of the session, all of which were evaluated for inclusion as potential covariates. Descriptive characteristics for these covariates can be found in Table 5, and comparisons of these covariates between groups can be found in Table 6. After removing the NSSI item from the total score, the NSSI group exhibited significantly more BPD symptoms.
than the No NSSI group in both samples. Consistent with existing research, NSSI participants also reported higher levels of anxiety and depression than No NSSI participants in both samples.

Participants also completed a measure of state emotional valence and arousal before the dot-probe computer task and before the completion of self-report questionnaires. Participants in the NSSI group reported significantly lower emotional valence (e.g., less positive and more negative emotion) on the pre-task SAM than No NSSI participants in both samples, suggesting that this measure of emotional valence should be considered a relevant covariate for analyses involving the dot-probe computer task. There were no significant between-group differences in emotional valence following the dot-probe task but before completing the questionnaires, and there were also no group differences on emotional arousal at either time point. Therefore, the SAM scores will not be included as potential covariates for any of the self-report measures.

In sample 2, participants also completed a self-report measure regarding their history of psychiatric and psychological care, as well as whether or not they had received any psychiatric diagnoses. Descriptive characteristics on these variables can be found in Table 7, and details regarding the comparisons on these variables between groups can be found in Table 8. Participants in the NSSI group were more likely to have received any psychiatric diagnosis than participants in the No NSSI group and had, on average, a significantly greater number of lifetime and current diagnoses than No NSSI participants. Group comparisons for specific psychiatric diagnoses were only possible for mood and anxiety disorders due to small cell sizes (< 5 cases per cell) for the remaining diagnostic categories. NSSI group participants were more likely to have a lifetime and current mood disorder diagnosis, and were also more likely to have a lifetime and current anxiety disorder diagnosis. Because of the greater relevance of current psychiatric diagnoses...
difficulties to the modal model constructs of interest, I chose to use number of current psychiatric diagnoses as a covariate in multivariate analyses for this sample.

A large majority of participants had received psychological therapy services, and slightly over half had at some point taken a psychiatric medication. Slightly less than one quarter of participants had ever received inpatient psychiatric care. Participants in the NSSI group were more likely to have received all kinds of psychiatric and psychological services than participants in the No NSSI group.

3.5 Modal Model Component 1: Situations

3.5.1 Descriptive and bivariate analyses for daily hassles

For sample 1, participants in the NSSI group had higher scores on all of the ICSRLE subscales, as well as for the ICSRLE total score, than the No NSSI group. These differences were statistically significant and of medium to large effect size for the social mistreatment, academic alienation, developmental challenges, and time pressures subscales, as well as for the total score. The NSSI group reported slightly greater romantic problems, assorted annoyances, and friendship problems scores, although these differences were small (ds = .3 to .32) and not statistically significant (ps = .06 to .09).

For sample 2, participants in the NSSI group reported significantly more health hassles, inner concerns, financial concerns, and time pressures than participants in the No NSSI group, as well as a higher number of overall hassles. There were no statistically significant group differences with respect to environmental hassles, work hassles, or family hassles. NSSI group participants also reported significantly greater severity for inner concerns, time pressures, financial concerns, and health hassles, as well as overall hassle severity; there were no statistically significant differences for severity of family hassles, work hassles, or environmental
hassles. In summary, NSSI participants in both samples reported a greater number of recent daily hassles, although differences varied by the particular types of hassles being evaluated. Further details regarding these statistical comparisons can be found in Table 9.

3.5.2 Multivariate analyses for daily hassles

To evaluate the relative importance of the various domains of daily hassles to NSSI, binary logistic regression was used. For sample 1, I included all seven daily hassles subscales in the binary logistic regression. The only type of daily hassle that was significantly associated with NSSI history was social mistreatment ($OR = 1.25$ [1.09, 1.42], $p = .001$); all other daily hassles were unrelated to NSSI history ($ps = .28$ to .97). When social mistreatment hassles and the total hassles score were entered into a binary logistic regression simultaneously, social mistreatment hassles remained a significant predictor of NSSI ($OR = 1.23$ [1.07, 1.41], $p = .004$), while overall hassles score was not ($OR = 1.00$ [.98, 1.03], $p = .84$). Given these results, I chose to focus multivariate analyses for sample 1 on social mistreatment hassles specifically.

In a binary logistic regression that included demographic covariates (East Asian ethnicity, native English speaker status, birth in Canada) and social mistreatment hassles, social mistreatment remained a significant predictor of NSSI group ($OR = 1.33$ [1.19, 1.50], $p < .001$). This relationship remained after controlling for anxiety ($OR = 1.14$ [1.02, 1.27], $p = .02$) and BPD ($OR = 1.14$ [1.02, 1.28], $p = .02$), but not after controlling for depression ($OR = 1.05$ [.93, 1.19], $p = .44$).

For sample 2, I evaluated whether the four hassles count subscales that were significantly associated with NSSI in bivariate analyses would show a unique relationship to NSSI in a binary logistic regression. In this analysis, no subscale was significantly associated with NSSI; as a result, I elected to use the total hassles count (an omnibus measure of hassles frequency) for
further multivariate analyses. I chose not to consider daily hassles severity for potential multivariate analyses because participants only completed a measure of hassles severity if they endorsed at least one hassle from a particular subscale, resulting in widely varying numbers of participants providing data on each of the severity subscales (ns = 34 to 73).

In a binary logistic regression with total hassles count and the relevant demographic covariates (age, sexual orientation, birth in Canada), hassles count remained a significant, albeit weak, predictor of NSSI ($OR = 1.08 \ [1.02, 1.14], p = .007$). The relationship between daily hassles count and NSSI remained significant after controlling for current psychiatric diagnoses ($OR = 1.06 \ [1.01, 1.11], p = .02$), but there was no significant relationship between NSSI and daily hassles after controlling for BPD ($OR = 1.03 \ [.96, 1.10], p = .44$), depression ($OR = 1.04 \ [.98, 1.11], p = .19$), or anxiety ($OR = 1.05 \ [.99, 1.12], p = .09$). This pattern of results suggests that, consistent with hypothesis 1, reporting greater social mistreatment hassles (sample 1) and total hassles (sample 2) is associated with a higher likelihood of being in the NSSI group, and that this relationship cannot be explained by demographic characteristics associated with NSSI. With respect to clinical covariates, however, inclusion of most of the relevant covariates reduced or eliminated the relationship between NSSI and self-reported daily hassles.

3.6 Modal Model Component 2: Attention

3.6.1 Descriptive and bivariate analyses for attentional bias

Due to the lack of reliability for the dot-probe computer task in both samples, results for these analyses should be interpreted with caution. In study 1, participants in the NSSI group exhibited slightly lower attention bias values, meaning that these participants exhibited slightly less of a tendency to look at or attend to the negative emotional faces compared to the No NSSI group participants. These differences, however, were not statistically significant or large for any
of the emotions considered. In study 2, participants in the NSSI group exhibited a slightly greater attentional bias towards three of the four emotional faces (with the exception of disgust). There were no statistically significant or large between group differences in the measure of attention bias between NSSI and No NSSI participants. Complete details on these statistical tests can be found in Table 10. Given that none of the bivariate analyses suggested notable group differences with respect to attentional bias, and the low internal consistency reliability of the dot-probe task measure itself, I did not conduct any further analyses for these variables.

3.7 Modal Model Component 3: Appraisal

3.7.1 Descriptive and bivariate analyses for attributional style

In sample 1, participants in the NSSI group exhibited a significantly more internal, stable, and global (depressogenic) attributional style for negative events, and this difference was of medium effect size. The three components of this attributional style were all significantly higher among NSSI group participants, with relatively similar (medium) effect sizes for internality, stability, and globality. Additionally, NSSI group participants rated the importance of these negative events more highly than No NSSI group participants. There were no group differences in the proportion of negative events that occurred or in whether those events had the same cause as what the participant indicated for the hypothetical events. These and other group comparisons regarding attributional style for both samples can be found in Table 11.

There was no statistically significant difference between NSSI and No NSSI group participants in depressogenic attributional style for positive events. Specifically, there were no significant differences in stability or globality of positive events, although participants in the NSSI group rated positive events as significantly more externally caused than No NSSI participants. There were no group differences in perceived importance of the hypothetical
positive events, whether these events had ever occurred for the participant, and whether the identified causes of past events were the same as those reported for hypothetical events.

In sample 2, NSSI group participants also exhibited a significantly more depressogenic (internal, stable, and global) attributional style for negative events than No NSSI group participants, and this difference was large. There were also significant group differences for each dimension (internality, stability, and globality) considered separately. There were no group differences with respect to the perceived importance of these negative events. NSSI group participants reported a higher proportion of the negative events had actually occurred in their lives, and that those events that did occur were less likely to have the same cause as the one identified for the hypothetical negative events, than No NSSI group participants.

In contrast to findings in sample 1, NSSI group participants in sample 2 exhibited a more depressogenic (external, unstable, and specific) attributional style for positive events than No NSSI participants, and this difference was of medium effect size. Specifically, there were significant group differences for internality and stability of positive events, but not for globality of positive events; there were also no significant group differences with respect to the perceived importance of these events or whether the events had actually occurred. NSSI group participants were less likely to report that positive events that had occurred had the same cause as the one identified for the hypothetical event than No NSSI participants.

### 3.7.2 Multivariate analyses for attributional style

First, I considered whether differences in attributional style could be due to differences in perceived importance of the hypothetical events, whether the events had previously occurred, and whether the events that occurred previously had the same cause as what the participant identified for the hypothetical event. Using binary logistic regression, the relative contribution of
these four variables to NSSI was evaluated. Negative attributional style remained a significant predictor of NSSI group after considering the remaining three variables in sample 1 \((OR = 1.22 \ [1.03, 1.44], p = .02)\) and in sample 2 \((OR = 1.41 \ [1.09, 1.83], p = .009)\). Attributional style for positive events was also significantly associated with NSSI when considering the same three variables in sample 1 \((OR = .80 \ [.65, .99], p = .04)\) and sample 2 \((OR = .70 \ [.52, .95], p = .02)\).

Second, I evaluated whether attributional style was higher among participants in the NSSI group after controlling for demographic characteristics in both samples. After including these characteristics in a binary logistic regression, negative attributional style remained a significant predictor of NSSI group for sample 1 \((OR = 1.37 \ [1.17, 1.60], p < .001)\) and sample 2 \((OR = 1.35 \ [1.06, 1.72], p = .02)\). Positive attributional style remained significantly associated with NSSI when controlling for demographic characteristics in sample 2 \((OR = .74 \ [.55, .98], p = .04)\), but not sample 1 \((OR = .89 \ [.75, 1.06], p = .20)\).

Finally, I considered whether clinically relevant covariates would reduce or eliminate the relationship between attributional style and NSSI. In sample 1, negative attributional style remained a significant predictor of NSSI group when controlling for anxiety \((OR = 1.19 \ [1.02, 1.40], p = .03)\) and BPD \((OR = 1.26 \ [1.07, 1.49], p = .006)\), but not for depression \((OR = 1.14 \ [.96, 1.35], p = .13)\). In sample 2, negative attributional style remained associated with NSSI after controlling for depression \((OR = 1.28 \ [1.01, 1.64], p = .04)\) and current psychiatric diagnoses \((OR = 1.41 \ [1.12, 1.78], p = .004)\), but not after controlling for anxiety \((OR = 1.27 \ [.98, 1.63], p = .07)\) or BPD \((OR = 1.09 \ [.84, 1.42], p = .53)\). In sample 1, positive attributional style was not significantly associated with NSSI when controlling for depression \((OR = 1 \ [.83, 1.21], p = 1)\), anxiety \((OR = .93 \ [.78, 1.12], p = .45)\), or BPD \((OR = .92 \ [.77, 1.10], p = .38)\). In sample 2, positive attributional style was not associated with NSSI group when controlling for anxiety \((OR \)
= .77 [.55, 1.08], \( p = .13 \), depression (\( OR = .78 \) [.57, 1.07], \( p = .13 \)), BPD (\( OR = .79 \) [.55, 1.12], \( p = .18 \)), or number of current psychiatric diagnoses (\( OR = .81 \) [.62, 1.06], \( p = .12 \)).

In summary, negative attributional style was associated with NSSI above and beyond attributional characteristics (e.g., perceived importance of the events), demographic characteristics, and some clinical covariates, while positive attributional style’s relationship to NSSI was typically eliminated after considering relevant covariates. Interestingly, the covariates that fully mediated the relationship between negative attributional style and NSSI differed between samples, suggesting that attributional style may play a different role in understanding NSSI for undergraduates as compared to community adults. These findings suggest partial support for hypothesis 3.

3.8 Modal Model Component 4: Responses

The Response component of the modal model was assessed in three distinct domains: emotional reactivity (subjective emotional experience), problem solving (behavioral responses to emotion), and emotion regulation strategies (including suppression, reappraisal, and rumination). Full statistical test information for these group comparisons can be found in Table 12.

3.8.1 Descriptive and bivariate analyses for emotional reactivity

Participants in the NSSI group reported greater reactivity in each domain and for overall emotion reactivity than participants in the No NSSI group in both samples. The magnitude of these group differences was of medium effect size for sample 1 (\( ds = .57 \) to .71) and of large effect size for sample 2 (\( ds = 1.43 \) to 1.67). There were no marked differences in the relationship between any of the subscales (sensitivity, arousal/intensity, and persistence) and NSSI, insofar as the effect sizes for each of the subscales were very similar within each sample.
3.8.2 Multivariate analyses for emotional reactivity

In order to evaluate the relative importance of the three domains of emotional reactivity (sensitivity, arousal/intensity, and persistence) to understanding NSSI, I conducted a binary logistic regression predicting NSSI group from these three variables. In sample 1, arousal/intensity was weakly associated with NSSI ($OR = 1.12 [ .99, 1.27 ], p = .07$), while persistence and sensitivity were not ($ps = .87$ and $.91$, respectively); in sample 2, none of the subscales were uniquely associated with NSSI when considered jointly (all $ps > .2$). Given that no single domain showed markedly better predictive value for NSSI history, the total scale score for the ERS was used for subsequent multivariate analyses, as a more robust indicator of emotional reactivity.

After controlling for demographic variables that were associated with NSSI group, overall emotional reactivity remained a statistically significant, albeit weak, predictor of NSSI group in sample 1 ($OR = 1.04 [1.02, 1.07], p < .001$) and sample 2 ($OR = 1.09 [1.04, 1.13], p < .001$). In sample 1, emotional reactivity was not significantly associated with NSSI in logistic regressions that included depression ($OR = 1.00 [.98, 1.03], p = .90$), anxiety ($OR = 1.01 [.99, 1.03], p = .41$), or BPD ($OR = 1.02 [1.00, 1.04], p = .13$). In sample 2, emotional reactivity remained associated with NSSI when controlling for depression ($OR = 1.06 [1.02, 1.10], p = .003$), anxiety ($OR = 1.05 [1.01, 1.09], p = .03$), and current psychiatric diagnoses ($OR = 1.08 [1.04, 1.12], p < .001$), but not after controlling for BPD ($OR = 1.03 [.99, 1.08, p = .15$).

These results indicate that emotional reactivity is significantly elevated in participants engaging in NSSI, consistent with hypothesis 4a. This result was robust to the inclusion of demographic covariates, as well as some, but not all, clinical covariates. In both samples, the inclusion of BPD symptoms eliminated the relationship between NSSI and emotional reactivity,
suggesting that features of BPD may contribute to the relationship between emotional experiences (particularly reactivity) and NSSI.

3.8.3 Descriptive and bivariate analyses for problem solving

Participants in sample 1 reported on their problem-solving abilities in three domains on the PSI: confidence in their ability to solve problems (confidence subscale), tendency to actively approach problem solving rather than avoid thoroughly considering problems (approach avoidance style subscale), and ability to purposefully and intentionally make problem solving choices (personal control subscale). In each case, lower scores indicated stronger problem solving abilities.

Participants in the NSSI group exhibited higher scores on the confidence subscale, indicating lower perceived ability to solve problems, and higher scores on the personal control subscale, indicating lower control of problem solving, than No NSSI group participants. In both cases, this result was small in magnitude, and the difference was only statistically significant for problem solving confidence (problem solving control $p = .06$). Interestingly, the NSSI group participants had lower scores on the approach avoidance subscale, indicating a slightly more adaptive tendency to approach problem solving rather than avoid, although this difference was also not statistically significant ($p = .07$). The overall score for general problem solving abilities did not differ significantly between groups.

3.8.4 Multivariate analyses for problem solving

In a binary logistic regression predicting NSSI group status from the three components of problem solving, all components were significantly associated with NSSI group, including confidence ($OR = 1.13 [1.06, 1.20], p < .001$), approach avoidance style ($OR = .89 [.85, .94], p < .001$), and control ($OR = 1.14 [1.03, 1.125], p = .009$). Given that the direction of the effects of
these components differed, I elected to consider the three components separately, rather than using the overall problem solving score. Each of these subscales remained statistically significantly associated with NSSI group when controlling for relevant demographic covariates, including the confidence ($OR = 1.15 \ [1.07, 1.24], \ p < .001$), approach avoidance style ($OR = .88 \ [.83, .94], \ p < .001$), and control ($OR = 1.17 \ [1.05, 1.130], \ p = .005$) subscales.

With respect to clinical covariates, findings differed depending on the problem solving subscale being evaluated. Problem solving control was not significantly associated with NSSI when controlling for depression ($OR = 1.05 \ [.94, 1.17], \ p = .44$), anxiety ($OR = 1.07 \ [.96, 1.19], \ p = .20$), or BPD ($OR = 1.05 \ [.94, 1.17], \ p = .43$). Problem solving confidence, however, remained associated with NSSI when controlling for depression ($OR = 1.08 \ [1.002, 1.16], \ p = .04$), anxiety ($OR = 1.09 \ [1.02, 1.17], \ p = .02$), and BPD ($OR = 1.12 \ [1.04, 1.20], \ p = .002$). Similarly, approach avoidance style remained associated with NSSI after controlling for depression ($OR = .92 \ [.87, .97], \ p = .004$), anxiety ($OR = .91 \ [.86, .97], \ p = .002$), and BPD ($OR = .90 \ [.85, .95], \ p < .001$).

These analyses yielded several notable findings. First, while problem solving control and confidence showed similar results in bivariate analyses, only reduced problem solving confidence was robustly associated with NSSI in multivariate analyses. Second, problem solving style was also associated with NSSI when controlling for relevant covariates, but in the opposite direction anticipated; NSSI group participants reported more approach-oriented (adaptive) problem solving strategies than No NSSI participants. These findings provide only partial support to hypothesis 4b, which stated that NSSI would be associated with reduced problem solving confidence, reduced problem solving control, and a more avoidant problem solving style.
3.8.5 Descriptive and bivariate analyses for emotion regulation strategies

Participants completed the ERQ, a measure of the tendency to try to change one’s emotions by changing how a person thinks about their experience (reappraisal) as well as the tendency to try to control emotions by not expressing them (suppression). Participants also reported on their tendency to ruminate when feeling depressed on the RRS. Participants in the NSSI group reported significantly lower scores for reappraisal than participants in the No NSSI group in sample 1 and sample 2; these differences were of small to medium effect. NSSI participants also exhibited significantly higher rumination scores that the No NSSI participants, and these differences were of large effect in both samples. There was no large or statistically significant difference between groups with respect to the use of suppression in either sample.

3.8.6 Multivariate analyses for emotion regulation strategies

Using binary logistic regression, I determined that emotional reappraisal was significantly associated with NSSI group after controlling for relevant demographic covariates in sample 1 (OR = .67 [.49, .91], p = .01) and sample 2 (OR = .51 [.30, .87], p = .01). The relationship between NSSI and emotional reappraisal was eliminated when controlling for clinical covariates, such as depression (sample 1: OR = .94 [.66, 1.32], p = .71; sample 2: OR = .76 [.44, 1.31], p = .33), anxiety (sample 1: OR = .85 [.62, 1.17], p = .33; sample 2: OR = .79 [.45, 1.37], p = .39), BPD (sample 1: OR = .89 [.65, 1.21], p = .45; sample 2: OR = .93 [.48, 1.80], p = .82), or current psychiatric diagnoses (sample 2: OR = .64 [.39, 1.05], p = .08).

I followed a similar pattern of analyses to evaluate the relationship between rumination and NSSI group, while considering relevant covariates. Rumination remained a significant predictor of NSSI when controlling for demographic characteristics in sample 1 (OR = 1.07 [1.04, 1.10], p < .001) and sample 2 (OR = 1.17 [1.08, 1.26], p < .001). Rumination also retained
a significant association with NSSI when controlling for anxiety (sample 1: OR = 1.04 [1.01, 1.08], p = .01; sample 2: OR = 1.12 [1.04, 1.20], p = .002), BPD (sample 1: OR = 1.04 [1.01, 1.07], p = .006; sample 2: OR = 1.09 [1.01, 1.18] p = .03), and current psychiatric diagnoses (sample 2: OR = 1.16 [1.08, 1.24], p < .001). Rumination was significantly associated with NSSI when controlling for depression in sample 2 (OR = 1.14 [1.06, 1.22], p < .001), but not in sample 1 (OR = 1.03 [.99, 1.06], p = .14).

These results provide three important findings to consider. First, NSSI was associated with less use of emotional reappraisal (inconsistent with hypothesis 4c), and this relationship was fully explained by relevant clinical covariates (e.g., depression, anxiety, BPD). Second, NSSI was not associated with significant differences in the use of expressive suppression, which was consistent with hypothesis 4c. Finally, participants with NSSI exhibited markedly greater levels of rumination than participants without NSSI, and this difference could not be fully explained by most relevant clinical or demographic covariates, again inconsistent with hypothesis 4c.

3.9 Multivariate analyses involving all dependent variables and covariates

In sample 1, there were significant relationships between NSSI and the following variables: social mistreatment hassles (Situation), negative attributional style (Appraisal), emotional reactivity (Response), problem solving confidence, approach avoidance style, and control (Response), reappraisal (Response), and rumination (Response). In order to evaluate how these distinct components might uniquely contribute to understanding NSSI, a binary logistic regression was conducted with all of these variables as predictors of NSSI group. The overall model was significant ($\chi^2(8) = 45.79, p < .001$, Cox & Snell $R^2 = .28$) and accurately identified 74.5% of participants into the correct group. Social mistreatment hassles, emotional reactivity, emotional reappraisal, problem solving confidence, and problem solving control were not
uniquely associated with NSSI (all $p$s $> .20$). Negative attributional style and rumination were slightly associated with greater likelihood of being in the NSSI group, although these effects did not meet the threshold for statistical significance ($p$s $= .06$). The only variable that retained a statistically significant relationship with NSSI group was problem solving approach avoidance style, where lower scores (more approach-oriented problem solving) were associated with NSSI. The complete results from these analyses for both samples can be found in Table 13.

In sample 2, there were significant bivariate relationships between NSSI and total daily hassles (Situations), negative attributional style (Appraisal), positive attributional style (Appraisal), emotional reactivity (Response), emotional reappraisal (Response), and rumination (Response). I conducted a binary logistic regression with those six variables as predictors of participant group (NSSI or No NSSI). The overall model was significant ($\chi^2(6) = 54.50, p < .001$, Cox & Snell $R^2 = .50$) and accurately identified 84.6% of participants into the correct group. There was no unique relationship between NSSI group and daily hassles, negative attributional style, positive attributional style, or emotional reactivity (all $p$s $> .20$). Greater emotional reactivity was associated with slightly increased likelihood of being in the NSSI group, but this relationship was not statistically significant ($p = .09$). The only unique significant predictor of NSSI group was rumination, whereby higher levels of rumination were associated with greater odds of being in the NSSI group.

These findings suggest that variables in the Response component of the modal model, particularly problem solving style (sample 1) and rumination (sample 2), may be uniquely important to understanding NSSI. These results were in contrast with hypothesis 5, which stated that daily hassles, negative attributional style, and emotional reactivity would show the greatest unique relationships to NSSI group.
Chapter 4: Discussion

This study was designed to clarify how components of the modal model of emotion (Gross & Thompson, 2007) might contribute to the negative emotionality and emotion dysregulation commonly associated with NSSI. To address this question, I compared undergraduates (sample 1) and community adults (sample 2) with and without a history of NSSI on constructs relevant to the four model components. For each component that was measured reliably (Situation, Appraisal, Response), I found marked differences between participants with and without a history of NSSI. In particular, NSSI was associated with having more frequent and severe daily hassles, more depressogenic attributional style, greater emotional reactivity, reduced problem solving confidence, less emotional reappraisal, and a greater tendency to engage in rumination. While the details for each of these results (e.g., magnitude of effect, extend to which findings were robust to covariates) varied somewhat by construct and by sample, these results generally suggest that NSSI is associated with global impairments in emotional processing across a variety of domains and contexts. Below, I discuss each specific hypothesis as it relates to the modal model, describe the relevant findings and their implications, as well as characterize the study’s limitations and potential future directions for researchers and clinical practitioners.

4.1 Modal Model Component 1: Situations

4.1.1 Hypothesis 1

Hypothesis 1 stated that NSSI would be associated with greater frequency of daily hassles in both samples, and with higher severity of daily hassles in sample 2. This hypothesis was fully supported. The overall number of hassles was significantly higher in the NSSI group for sample 1 (d = .67) and sample 2 (d = .91), and the severity of hassles was significantly higher for self-injurers in sample 2 (d = 1.31). These results were maintained after including relevant
demographic characteristics, such as age. While this pattern of results suggests that the severity of daily hassles may play a particularly important role in understanding NSSI, it is important to note that severity was self-rated, and that severity ratings may therefore be subject to biases that might be more appropriately considered within other modal model components (e.g., Appraisal). These results are consistent with longitudinal research in adolescents connecting daily hassles to NSSI (Larsson & Sund, 2008); to my knowledge, these findings are the first evidence of a relationship between daily hassles and NSSI in undergraduates or in adults, and only the second study to evaluate daily hassles in relationship to NSSI in any population.

Because of the relationship between daily hassles and symptoms of anxiety and depression (Chan et al., 2015), I considered whether this relationship would remain robust after considering the clinical covariates assessed. In both samples, the inclusion of clinical covariates either reduced or eliminated the relationship between NSSI and daily hassles, suggesting that comorbid psychiatric symptoms may be more closely associated with hassles than with NSSI specifically, or that psychiatric symptoms are a potential mediator of the NSSI/hassles relationship.

With respect to particular types of hassles, in sample 1, the type of hassles with the greatest difference between NSSI and No NSSI participants was social mistreatment hassles ($d = .86$); this scale included items such as, “being taken for granted,” “social rejection,” “loneliness,” and “being ignored.” However, two other scales that tap into interpersonal hassles had some of the smallest differences between groups; these include the romantic problems subscale ($d = .30$) and the friendship problems subscale ($d = .30$). Romantic problems included items such as “decisions about intimate relationship(s)” and “conflicts with boyfriend/girlfriend/spouse”, while friendship problems included items like “having your trust betrayed by a friend” or “conflicts
with friends.” Based on these items, it appears that NSSI is most uniquely associated with interpersonal stressors related to isolation and rejection, rather than interpersonal conflict or victimization, at least among undergraduates. These results will be valuable for future researchers investigating social phenomena and NSSI, insofar as the existing literature’s mixed findings may be due to differences in the way researchers conceptualize interpersonal stress (see, for example, Giletta et al., 2012, and Heilbron & Prinstein, 2010).

These findings are also interesting given that NSSI may be associated with interpersonal stress generation, something more commonly studied in the context of depression (Luyten et al., 2012). For example, previous longitudinal work in adolescents suggests that NSSI is associated with later peer sexual harassment (Marshall et al., 2013), suggesting that, while NSSI may be prompted by interpersonal stressors, engaging in NSSI might also be associated with negative responses from others and therefore associated with social mistreatment hassles. It is also possible that a third variable, such as depression, contributes to NSSI engagement as well as negative interpersonal interactions and loneliness.

4.1.2 Limitations and future directions

There are several important limitations relevant to this assessment of daily hassles and their relationship to NSSI, which provide a foundation upon which future research can be developed. First, daily hassles are only one type of construct that falls within the Situation component of the modal model. Not only are there other types of negative events that might cause distress (e.g., traumatic life events, interpersonal conflicts), but also there are emotional prompts that are generally viewed as positive (e.g., daily uplifts) that were not assessed as a part of this study. It is possible that, in addition to group differences on daily hassles, self-injurers might also report deficits in Situations that prompt positive emotions, which would be valuable
information for clinicians trying to address NSSI. For example, one component of DBT, which has demonstrated efficacy in reducing NSSI and suicide, is developing a “life worth living,” including through engagement in positive and pleasurable activities; the potential utility of this specific aspect of DBT might be better addressed by evaluating how experiencing positive events relates to NSSI. It is also possible that NSSI is uniquely related to negative, but not positive, daily events, in which case clinical attention would be better focused on reducing exposure to these kinds of stressors, potentially through what the process model of emotion regulation refers to as situation selection and situation modification (Gross & Jazaieri, 2014). Future studies interested in understanding how this component relates to NSSI would benefit by using more comprehensive assessments of daily hassles and uplifts, as well as other kinds of stressors.

Second, our findings are somewhat limited by the fact that different measures of daily hassles were used in each sample. I elected to use these distinct measures based on existing literature suggesting that university students’ hassles may be unique from those experienced by other age groups (Kohn et al., 1990), but this limits my ability to compare results across samples.

Third, as with any cross-sectional study, it is impossible to evaluate causation from these correlational analyses. The relationship between daily hassles and NSSI could occur through several pathways. The first, and perhaps easiest, explanation is that people who experience greater frequency and severity of daily hassles turn to NSSI to a greater degree to cope with the emotions that follow these hassles (e.g., that the daily hassles fall within the Situation component of the modal model explaining emotions in NSSI). It is also possible that both NSSI and daily hassles are associated with other Situation components, such as exposure to trauma and major life stressors (e.g., homelessness), or that they are both associated with aspects of a different modal model component (e.g., depressogenic attributional style contributing to both NSSI and
daily hassles). There is also a reverse causality explanation, whereby individuals engaging in NSSI subsequently experience greater hassles, potentially through a stress generation pathway. Given that the relationship between NSSI and daily hassles was not significant after controlling for depressive symptoms, it is also possible that this relationship is due to a third variable separate from the modal model itself, such as psychiatric symptoms. Of course, this relationship could also provide support for a mediational model, whereby daily hassles are associated with NSSI through increases in depressive symptoms.

4.2 Modal Model Component 2: Attention

4.2.1 Hypothesis 2

I hypothesized that participants with NSSI would show a tendency to look away from stimuli with a negative emotional valence (e.g., faces with negative emotional expressions) in the dot-probe computer task. This hypothesis was based on previous work showing a bias away from threatening information in anxiety disorders (Van Bockstaele et al., 2014) combined with literature supporting the use of NSSI as an avoidant coping strategy to deal with negative emotions (Chapman et al., 2006; Klonsky, 2007). This hypothesis was not supported; there were no significant between group differences for any of the four emotions evaluated (angry, sad, scared, disgusted) in either sample.

This result is most likely due to the fact that dot-probe task was not a reliable indicator of attentional bias in these samples. I determined this by using ICCs, which were below .2 in both samples and therefore unacceptable for measuring a theoretically stable characteristic (tendency to look towards or away from emotional stimuli). I evaluated whether the reliability would improve when using only trials from a single side of the screen (left or right) in order to reduce noise, as suggested by Price and colleagues (2015), but this did not improve the ICCs above .2.
4.2.2 Limitations and future directions

There were several significant limitations with respect to measuring attention among self-injurers, all of which may help guide future researchers investigating these processes. The first was the lack of reliability in the dot-probe task itself, which introduced excessive noise into my analyses and may have obscured “real” group differences with respect to attention bias that were not captured here. The dot-probe computer task, while widely used, has long suffered from questions about its reliability (Waechter, Nelson, Wright, Hyatt, & Oakman, 2014). Recent work (Price et al., 2015) has suggested some strategies to help improve reliability, such as particular methods of dealing with outliers. While some of these strategies were employed here (e.g., Windsorizing approach), others (repeated administrations of the dot-probe task) were not feasible given the study design; additionally, these suggested guidelines were not published until after data collection for this study was underway. Because of problems with reliability for this measure, analyses that might have clarified the relationship between NSSI and attentional bias were not possible. For example, in the context of a reliable measure, potential covariates, such as match or mismatch between participant ethnicity and the ethnicity of the displayed faces, might have interacted with NSSI group to contribute to differences in attentional bias.

Price and colleagues (2015) found that a moderately acceptable ICC for the dot-probe task was only possible when responses were averaged across multiple dot-probe administrations. It will therefore be important for future researchers interested in understanding attentional bias to develop study methodologies that include the opportunity to assess attentional bias multiple times, in order to yield reliable results.

Were the dot-probe computer task to exhibit appropriate reliability, there would still be other issues to consider in interpreting our findings. To date, no published research has evaluated
whether NSSI is associated with biases towards or away from emotional faces, even though some limited and unpublished work has addressed this question using words as stimuli (Photos, 2010). It is possible that different types of stimuli might yield different results; for example, given the relationship between self-criticism and NSSI, an interesting next step would be the development of an attentional bias task using faces of loved ones or even the participant themselves to increase ecological validity. It would also be valuable to consider including additional facial expressions, such as contempt, which might elicit self-criticism among self-injurers and therefore prompt behavioral responses worthy of study. It might also be valuable to look for tasks that are more ecologically valid from the start, for example, tasks that ask participants to pick out a face among a crowd of faces, rather than displaying two single faces without context for response. There are also a variety of other types of tasks meant to measure attentional bias, including both behavioral (e.g., Stroop tasks; Peckham et al., 2010) and physiological (e.g., eye tracking; Harrison & Gibb, 2015) methods, that could be used in subsequent studies in an effort to assess the Attention modal model component in a reliable and valid way. Finally, I chose to compare negative emotional expressions to neutral expressions, but there are also dot-probe designs that compare negative expressions with positive emotional expressions (e.g., happy faces; Joormann & Gotlib, 2007), which could produce further interesting and worthwhile results for evaluation.

4.3 Modal Model Component 3: Appraisal

4.3.1 Hypothesis 3

I hypothesized that participants with NSSI would exhibit a more depressogenic cognitive style for negative and positive events than participants without NSSI. This hypothesis was consistent with research in adolescents evaluating cognitive style for negative events (Buser,
2009; Weissmoore & Esposito-Smythers, 2010), as well as research showing that self-injurers rate positive stimuli as less positive than non-injurers (Franklin et al., 2014). This hypothesis was partially supported. NSSI group participants exhibited significantly more depressogenic cognitive style for negative events in both samples, but group differences for positive events were only statistically significant for sample 2. The finding for negative cognitive style was robust to demographic covariates in both samples, as well as some clinical characteristics, although the specific pattern of findings varied between samples. In sample 2, depressogenic attributional style for positive events was no longer associated with NSSI when controlling for any of the clinical covariates.

This pattern of results yields several important insights. First, attributional style for negative events appears to be more strongly related to NSSI than attribution style for positive events in both samples. Existing research on attributional style has focused primarily on negative events (e.g., Hankin & Abela, 2011); to my knowledge, this is the first work to directly compare the role of attributional style in negative and positive events in understanding NSSI in the same sample. This pattern of findings could have emerged for several reasons. First, it is possible that more ambiguously negative events actually occur for self-injurers, providing greater opportunity for negative attributional style to play a role in emotional responding for this group; this potential explanatory model is consistent with my results suggesting that NSSI is associated with daily hassles. Second, it is possible that attributional style for negative events is more impactful for self-injurers than for positive events, given research showing that NSSI is associated with high rates of negative affect, but less robustly with deficits in positive affect (Bresin, 2014; Victor & Klonsky, 2014).
A second aspect of these results worth mentioning is the fact that potential mediators of the relationship between depressogenic attributional style and NSSI, such as whether the events assessed had happened to the participants before and whether those events had the same cause, as well as the perceived importance of the assessed events, did not explain the relationship between NSSI and depressogenic style. This may be due to specifics of the assessment instrument; while the events assessed on the ASQ are meant to capture a broad range of experiences, some events are simply unlikely to have happened to most participants regardless of their NSSI history (“you become very rich”), while other events are likely to have happened to most adults (“you meet a friend who compliments you on your appearance”). It is also possible that depressogenic attributional style is a stable trait, and therefore unlikely to be impacted by previous experiences.

Finally, the relationship between negative attributional style and NSSI was robust to most covariates, with the exception of depression. This is perhaps unsurprising, given that most literature on attributional style has focused on its strong associations to depression (Hessling et al., 2003). These results suggest several potential explanatory pathways, including the possibility that underlying depression contributes to changes in attributional style and engagement in NSSI, or that attributional style contributes to depression and then subsequently, through depression, NSSI (mediation effect). It is also possible that NSSI, through its use as a method of experiential avoidance (Chapman et al., 2006) contributes to increases in distress and depressive symptoms, which then contribute to more depressogenic attributional styles.

4.3.2 Limitations and future directions

Future researchers can expand upon this work in a variety of important ways. First, there are multiple aspects of the Appraisal component that could be investigated, using different methodologies, beyond attributional style. For example, some researchers have used the
Thematic Apperception Test to assess appraisals for social and interpersonal relationships (Whipple & Fowler, 2011), or behavioral tasks that ask participants to unscramble words into either a positive or negative, grammatically correct sentence (Wells, Vanderlind, Selby, & Beevers, 2014). These different methods also highlight how specifics of a particular research strategy might impact results; for example, if the relationship between attributional style and NSSI is most evident in self-relevant situations, measures that assess personally relevant interpretations (such as the Interpretation Bias Questionnaire; Wisco & Nolen-Hoeskema, 2010) will be more useful than measures that are broader and assess other types of situations.

It will also be important for future research to look more explicitly at how attributional style interacts with other variables of interest, including other modal model components. For example, it is possible that a depressogenic attributional style is particularly strongly associated with NSSI in the context of greater negative interpersonal events (e.g., Situations), or that positive attributional style would show a stronger relationship to NSSI among participants with greater trait optimism, for whom the impact of positive event attributions might be greater.

4.4 Modal Model Component 4: Response

4.4.1 Hypothesis 4a

I hypothesized that participants with NSSI would exhibit greater emotional reactivity than participants without NSSI, and that the most pronounced differences would be in emotional persistence (duration). This hypothesis was based off of previous work in similar populations regarding emotional reactivity generally (Glenn et al., 2011) and emotional duration specifically (Victor & Klonsky, 2012). This hypothesis was partially supported. Specifically, emotional reactivity was, in fact, greater among NSSI participants than No NSSI participants in both samples, but persistence of emotional experience did not show a stronger relationship to NSSI
than other emotion reactivity components (e.g., arousal/intensity and sensitivity). In each sample, the effect sizes for each component of emotional reactivity were similar, and persistence showed the smallest effect when comparing the NSSI and No NSSI groups. In both samples, the relationship between NSSI and emotional reactivity remained after controlling for demographic characteristics; however, the relationship was no longer significant after controlling for BPD in either sample.

The relationship between overall emotion reactivity and NSSI found here functions as a replication of existing literature in undergraduate samples (Glenn et al., 2011; Knorr et al., 2013), and provides further evidence that this relationship is also present in more general samples of community adults. In fact, the relationship between NSSI and emotion reactivity was markedly larger in sample 2; this may be due to greater levels of overall clinical severity in the NSSI group in sample 2, compared with the No NSSI group. Additionally, the fact that this relationship was greater in sample 2 may help explain why that finding was robust to some clinical covariates, such as depression, while the relationship in sample 1 did not remain significant after controlling for the same clinical covariates.

In both samples, controlling for BPD symptoms reduced the association between NSSI and emotion reactivity below the threshold for statistical significance. This is likely related to the fact that emotion reactivity is associated with BPD (Dixon-Gordon et al., 2015; Kleiman, Ammerman, Look, Berman, & McCloskey, 2014), and so removing BPD symptoms removes crucial variance from emotion reactivity scores. These results might suggest several mechanisms by which these variables are related. It is possible, for example, that experiencing symptoms of BPD might contribute both to emotional reactivity and NSSI, or that emotional reactivity
contributes to the experience of BPD, which then subsequently contributes to NSSI. It is also possible that BPD is related to NSSI through the mechanism of emotional reactivity.

While I anticipated that NSSI would be most strongly related to emotional persistence (e.g., duration of emotions) given previous work in this area (Victor & Klonsky, 2012), there was actually no unique relationship between any emotion reactivity component and NSSI. This might be because there truly is no single emotion reactivity component that plays a special role in understanding NSSI, or it is possible that different individuals who engage in NSSI experience different types of problematic aspects of emotion reactivity, clouding the results. For example, it might be the case that depressed NSSI group participants report more marked reactivity in the domain of emotional persistence, given the pervasive experience of sadness and anhedonia that occurs in depression (American Psychiatric Association, 2013), while NSSI participants with high levels of anxiety might report greater reactivity in the context of emotional arousal (Lang, Bradley, & Cuthbert, 1998).

4.4.2 Hypothesis 4b

I anticipated that NSSI would be associated with lower problem solving confidence, lower perceived control over problem solving, and more avoidant coping with problem solving. This hypothesis was based on research in varied samples that suggested that self-reported competence was lower among self-injurers (Baetens et al., 2012; Nock & Mendes, 2008), as well as research suggesting that avoidance coping is common among self-injuring undergraduate students (Andover et al., 2007; Cawood & Huprich, 2011). Due to time constraints, and the addition of a measure of psychiatric history in sample 2, this hypothesis was only assessed in sample 1. The hypothesis was partially supported. Specifically, NSSI participants did report lower confidence about and control over problem solving; however, the NSSI group reported a
more approach-oriented (rather than avoidance-oriented) problem solving style when compared to the No NSSI group. These results were robust to inclusion of demographic covariates. Interestingly, only problem solving confidence and problem solving style were associated with NSSI after controlling for clinical covariates, while problem solving control was not. To my knowledge, this is the first study to evaluate these general problem solving constructs as they relate to NSSI in an undergraduate or adult sample.

This pattern of results provides several interesting points for discussion. First, lower problem solving confidence was a robust predictor of NSSI across multiple analyses, suggesting that confidence to solve problems may be a unique protective factor against NSSI. Given that NSSI occurs as a response to negative emotional experiences, this finding makes intuitive sense; self-injurers resort to NSSI because they lack the self-perceived ability to solve emotional problems in another way. It is also possible, of course, that this relationship follows in the other direction, whereby individuals engage in NSSI and, by doing so, change their perception of themselves to be less confident in their problem solving abilities (e.g., “if I use self-injury to manage my emotions, I must not be a good problem solver”). A third variable, self-criticism, might also explain this relationship, given that NSSI has been robustly associated with self-criticism (St Germain & Hooley, 2012) and that more highly self-critical individuals may view themselves as less competent or capable to solve problems than less critical individuals.

Second, perceived control of problem solving was associated with NSSI when controlling for demographic characteristics, but not when controlling for relevant clinical characteristics. Previous research suggests that NSSI is associated with an external locus of control (Hooley et al., 2010), which could relate to less perceived control to solve one’s own problems. An external locus of control has been associated with depression (Presson & Benassi, 1996), anxiety
(Watson, 1967), and BPD (Watson, 1998); it is possible that this common third variable explains why the relationship between perceived problem solving control and NSSI did not remain significant after controlling for those clinical covariates.

Third, the finding regarding self-injurers reporting a less avoidant problem solving style is particularly noteworthy, and contrary to expectations. While there have been some conflicting findings regarding avoidance coping and NSSI in the literature (see, for example, Andrews et al., 2013), no research to date has suggested that NSSI is associated with significantly less avoidance compared to No NSSI. Part of the explanation for this result is that the measure used here, the PSI, is a broad measure that assesses problem solving across a variety of domains, not specifically emotion-focused problem solving. For example, some items for which a higher score indicates a less avoidant coping style on the PSI are “I try to predict the result of a particular course of action,” “I use a systematic method to compare alternatives and make decisions,” and “When confronted with a problem, I usually first survey the situation to determine the relevant information.” These statements are more consistent with problem solving for externally focused, rather than internally focused, problems. In contrast, existing research on avoidance has focused on measures that assess coping in response to stressful events (e.g., Andover et al., 2007). It is possible that, if asked about responses to stressful events specifically, NSSI group participants would report more avoidance than was found using this particular measure.

It is also possible that self-injuring participants in this study did not view their NSSI as a method of avoidance, but rather as a specific coping strategy. Participants in the sample 1 NSSI group, in spite of their recent and repeated engagement in NSSI, were all enrolled students at the University of British Columbia participating for course credit, and as such, may have exhibited a generally higher level of functioning than many other self-injurers. These individuals might be
more likely to see their NSSI as a part of an overall problem solving strategy that, at least temporarily, works for them.

4.4.3 Hypothesis 4c

I hypothesized that participants in the NSSI group would not differ significantly from participants in the No NSSI group with respect to rumination, reappraisal, and suppression. This was based on the mixed findings in the literature regarding these constructs (e.g., Bjärehed & Lundh, 2008; Cerutti et al., 2012; Tanner et al., 2014). This hypothesis was partially supported.

In support of the hypothesis, I found that there was no relationship between NSSI and expressive suppression in either sample. However, there were significant relationships between NSSI and reduced emotional reappraisal and increased rumination in both studies.

The lack of a relationship between NSSI and suppression is consistent with findings from experimental research that suggests that suppression in response to a negative mood induction does not positively or negatively impact NSSI urges (Svaldi et al., 2012). When NSSI has been associated with suppression in other research, it has typically been in specific contexts, for example, high neuroticism or low conscientiousness (Hasking et al., 2010). It is therefore unsurprising that this construct was not related to NSSI in our samples; this finding should be conceptualized as an extension and replication of existing literature on this topic. Suppression has been associated with other types of psychological disorders, such as depression (Beblo et al., 2012), that are common in NSSI, as well as more generally associated with negative emotionality, interpersonal problems, and poor well-being (Gross & John, 2003). This begs the question: if NSSI is associated with a host of psychological difficulties, as is suppression, why isn’t there at least some small relationship between NSSI and suppression?
One potential explanation is that self-injurers turn to NSSI when suppression does not work to alleviate emotional pain. If this is accurate, then the high levels of depression, anxiety, and BPD among the NSSI groups studied here would normally be associated with higher levels of suppression, but the use of NSSI is in response to failed attempts to use suppression. Another potential explanation is that NSSI makes suppression unnecessary; participants may engage in NSSI in response to emotions before they try to use suppression. Finally, it is also possible that these two constructs are simply unrelated to each other.

In contrast to the findings regarding suppression, I found that reappraisal was negatively associated with NSSI, even after controlling for demographic characteristics; however, this relationship was not robust to inclusion of clinical covariates. It is possible that psychiatric disorders associated with NSSI (depression, anxiety, BPD) contribute to NSSI engagement through reduced tendency to reappraise negative experiences, or that reduced reappraisal is causally related to experiencing psychiatric symptoms, that then contribute to NSSI. These results contribute to the existing, mixed literature regarding the use of reappraisal and NSSI.

Among the different types of Response strategies assessed here, rumination was the most robust predictor of NSSI when considering clinical covariates. Rumination was associated with NSSI in both samples, above and beyond demographic and most clinical characteristics (with the exception of depression symptoms in sample 1). This pattern of results suggests that rumination may play a unique and important role in understanding NSSI, and expands upon some existing literature that has yielded conflicting results when evaluating the NSSI/rumination relationship. One explanation for this finding is the relationship between rumination and self-criticism.

While rumination has been defined as the tendency to repetitively think about an emotion, its antecedents, and its consequences (Nolen-Hoeksema et al., 2008), it is also possible
to ruminate about something other than an emotion; for example, some example items from the RRS include “think ‘Why do I have problems other people don’t have?’” and “think about all your shortcomings, failings, faults, mistakes” (Nolen-Hoeksema & Morrow, 1991). These types of thoughts may prime an individual for self-criticism, something that has been repeatedly demonstrated to have a strong relationship to NSSI (Claes et al., 2012; St Germain & Hooley, 2010). Research has demonstrated that rumination and self-criticism are related in depression (Spasojević & Alloy, 2001); while this specific question has not been evaluated with respect to NSSI, it seems plausible that rumination may be associated with NSSI through increased self-criticism (or vice versa). There is also research to suggest that NSSI serves as a distraction from “cascades” of rumination (Selby, Franklin, Carson-Wong, & Rizvi, 2013), such that NSSI might be a uniquely (temporarily) effective response to high levels of rumination.

4.4.4 Limitations and future directions

There are several important limitations with respect to my findings for the Response component of the modal model, many of which lend themselves to future directions for myself and other researchers. First, as with the other modal model components, there are many ways to measure these constructs, and many different facets of each model component to consider. For example, I chose to assess emotional reactivity, but others might be more interested in emotional instability (e.g., the tendency for emotions to shift quickly), or in the experience of specific affective states, than in emotional reactivity generally. Even within a single construct of interest, there are, of course, a multitude of assessment methodologies, ranging from self-report (used here) to behavioral tasks in the laboratory (Davis et al., 2014) to psychophysiological indicators (Lanteigne, Flynn, Eastabrook, & Hollenstein, 2014) to EMA technologies (Kircanski, Thompson, Sorenson, Sherdell, & Gotlib, 2015).
There are also likely contextual factors that impact each of these constructs, which were not assessed in the present study. For example, I found group differences in measures of problem solving confidence and problem solving style, but these might vary greatly depending on the type of problem to be solved. This also highlights the potential interactions between modal model components; for example, a person who experiences a variety of daily events that he or she objectively has little control over (for example, lack of employment opportunities, chronic medical illness, or significant financial difficulties) might be more likely to report low problem solving confidence and greater avoidance strategies than a person who has fewer of those types of stressors. Further, whether a particular Response component is “good” or “bad” will vary based on a variety of factors. In the case of a person experiencing unchangeable stressors, for example, an avoidant problem solving style might be more helpful than an approach-oriented style, as compared to the styles that might be best suited for problems that actually have potential solutions. Similarly, it might be maladaptive to suppress one’s feelings when interacting with an intimate partner, while it might be adaptive to suppress the expression of one’s feelings when encountering a hostile coworker or boss.

Finally, one specific limitation of my assessment of problem solving is the lack of administration of the relevant measure for sample 2. This choice was made due to the need to eliminate a questionnaire in order to include the Mental Health History Form in sample 2 without overly taxing participants’ energy and time.

4.5 Findings Across Modal Model Components

4.5.1 Hypothesis 5

I hypothesized that, when considered jointly, daily hassles, attributional style, and emotional reactivity would show the greatest value in differentiating the NSSI and No NSSI
groups. In sample 1, only problem solving style was a unique, significant predictor of NSSI group. Negative attributional style and rumination were also associated with NSSI, although these relationships were not statistically significant ($ps = .06$). In sample 2, only rumination was a unique significant predictor of NSSI; emotion reactivity was somewhat related to NSSI, but was not statistically significant ($p = .09$). Thus, this hypothesis was not supported.

In both samples, the full model (using all variables) significantly predicted NSSI group, and accurately identified 75% (sample 1) and 85% (sample 2) of participants into the correct group. This is notable insofar as commonly known correlates of NSSI, such as depression, anxiety, and BPD symptoms, were not included in the model, yet I was able to establish good predictive power with the variables assessed here. In order to evaluate how this model compared to one using psychological symptoms to predict NSSI, I conducted an additional logistic regression in each sample, predicting NSSI group from clinical covariates (depression, anxiety, and BPD symptoms in both samples, as well as current psychiatric diagnoses in sample 2). For both samples, these models were significant, and accurately classified 75.2% (sample 1) and 88.8% (sample 2) of participants into the correct NSSI group. Thus, clinical characteristics that were significantly associated with NSSI in this study and have been robustly associated with NSSI in previous research (Martin et al., 2010; McCloskey et al., 2012; Wilcox et al., 2012) showed similar predictive value in categorizing participants as the modal model components. This result suggests that using the modal model framework to understand NSSI may be fruitful in a way that much previous NSSI research has not yet appreciated.

It is also worth noting that, while only a single predictor showed a unique, statistically significant relationship to NSSI in both samples, the full models with all relevant variables were also significant, suggesting that it will be important to consider potential correlates of NSSI.
across multiple modal model components. This pattern of findings suggests that NSSI is a multidetermined behavior that can develop through a variety of pathways, many of which may contribute jointly to developing and maintaining NSSI behaviors.

In sample 1, problem solving style may have demonstrated a unique relationship to NSSI for several potential reasons. First, it is possible that a tendency to approach problems thoroughly and without avoidance is somehow uniquely associated with NSSI. This explanation, however, would be inconsistent with existing literature on avoidant coping in NSSI, although that literature has typically been limited (see 1.8.2). Second, and perhaps more likely, many of the other constructs assessed were highly correlated with each other; for example, social mistreatment hassles, emotional reactivity, and rumination were significantly associated with all other variables in the regression with the exception of problem solving style, while negative attribution style and reappraisal were significantly associated with all other variables except each other. These suggest that the problem solving style variable, which was only significantly correlated with problem solving confidence ($r = .49$), problem solving control ($r = .48$), and reappraisal ($r = -.23$), may have demonstrated a unique effect due to multicollinearity of the remaining variables. Unfortunately, as the problem solving variables were not assessed in sample 2, I am unable to compare findings between samples to determine if the relationship between problem solving style and NSSI is robust across different sample types.

In sample 2, only rumination was a significant predictor of NSSI group. In this sample, the variables of interest were also highly correlated in many cases; rumination was significantly correlated with all other predictors with $rs$ ranging from -.23 (positive attributional style) to .75 (emotional reactivity). The fact that rumination was still a unique predictor of NSSI group, then, is particularly notable. As described above, there are several potential pathways through which
rumination could be uniquely associated with NSSI, including through emotional cascades (Selby et al., 2013) or through self-criticism (Spasojević & Alloy, 2001).

4.6 Limitations and Future Directions

While I have described specific limitations and future directions in relationship to particular categories of analyses and modal model components above, there are also some general limitations to be discussed for this study as a whole.

First, as described in the introduction, the modal model is not a set of steps through which individuals proceed in a linear fashion. Each component has an impact on and interacts with other components, which further are impacted by and have impacts on other environmental, cultural, and person-level characteristics. For example, people who ruminate more (Response) may chose social relationships with others who ruminate (environment), thus contributing to co-rumination episodes (Situation) that further support or validate a negative attributional style (Appraisal), increasing vigilance towards potentially threatening social interactions (Attention). Cultural values and social norms will also impact all of these components, for example, in relationship to ideal kinds of emotional experiences (Tsai, Knutson, & Fung, 2006). It is also the case that certain aspects of the modal model may play more or less of a role in emotional experiences depending on context; for example, attributional style may have a greater impact on subjective emotional experience for circumstances that are ambiguous as to their cause (e.g., you received a raise but are unsure why), rather than for circumstances with a clear cause (e.g., you get a parking ticket because you parked illegally). Future studies should look more specifically at potential interactions between modal model components, as well as between those components and other relevant variables, such as ethnicity, age, psychiatric disorders, and cultural factors.
Second, there are limitations to each of the assessment methods chosen to capture the aspects of the modal model components. For each component, there are dozens of potential ways to conceptualize and assess variables related to that component, and as such, the study presented here should not be considered an exhaustive evaluation of the modal model with respect to NSSI. Additionally, the measures and methods used here have their own limitations, including biases inherent in self-report measures and the difficulty establishing reliability for the behavioral measure used to assess attention bias. Recent work suggests that NSSI is associated with alexithymia, or difficulty interpreting, naming, identifying, and communicating emotional experiences, among women (Norman & Borrill, 2015), which suggests that researchers investigating NSSI using self-report methods should be particularly wary of the difficulties participants may have in completing emotion-relevant, self-report measures accurately. Future studies can address some of these issues by using behavioral tasks, psychophysiological measures, informant reports, or EMA methodologies to address some of the weaknesses with self-report measures. These measures, like all assessment methods used in research, should also be evaluated for reliability and validity prior to their use in future studies.

Third, because of the cross-sectional nature of this study, I am unable to address the question of whether any of these factors are causally related to NSSI. In many cases, there are potential explanatory pathways from the modal model component of interest to NSSI, from NSSI to the modal model variable, and from a third (or fourth or fifth) variable to both NSSI and the modal model component. I have described some potential pathways for each aspect of the modal model described above, but it is worth repeating here that these findings are based on associations between variables, and do not necessarily imply causality at all, let alone any particular causal relationship. Future researchers should continue to investigate these questions
using longitudinal methods to better understand the potentially causal relationship between the modal model variables of interest and NSSI.

Fourth, and relatedly, this study was not designed to evaluate the developmental pathways that contribute to NSSI. NSSI has been described as an example of equifinality, meaning that the same outcome (NSSI) results from numerous, distinct developmental pathways (Keenan et al., 2014). It is possible that different individuals begin engaging in NSSI due to problems in different components of the modal model, rather than the components each contributing to one other in a single pathway. For example, one person might develop NSSI after exposure to significant traumatic events (Situation) as a way to combat dissociative symptoms, while another might experience excessive emotional reactivity (Response) that contributes to NSSI even in the absence of any significant aversive negative events. Subsequent studies can evaluate these issues by using latent class analysis to determine whether certain groups of self-injurers experience abnormalities in certain domains of the modal model, as compared to others.

Fifth, all the analyses presented here compared individuals with a recent and repeated history of NSSI to individuals with no such history. It is therefore important to understand that these results do not necessarily speak to what aspects of the modal model are associated with actual NSSI engagement for individuals who self-injure. Even self-injurers with very high lifetime frequencies of NSSI do not self-injure constantly, and so there will always be a distinction between times when an individual chooses to engage in NSSI and when they do not. This study, however, was not designed to answer that question, but rather, to compare generally what types of situational, cognitive, and emotional processes are associated with NSSI broadly. For example, knowing that self-injurers, on average, report more social mistreatment hassles (Study 1) does not imply that social mistreatment hassles necessarily precede actual NSSI
episodes, only that they are more common in the daily lives of self-injurers than non-injurers. More time-sensitive data collection methods, such as through EMA technologies, may help clarify what constructs are most related to onset of a specific episode of NSSI within a sample of individuals who engage in NSSI.

Sixth, the demographic and clinical characteristics in these samples have an impact on the generalizability and applicability of the findings. The samples were primarily East Asian and Caucasian, and drawn from a major urban center (Vancouver, British Columbia, Canada); it is therefore possible that these results do not generalize to other racial or ethnic groups, or to other locations in Canada and worldwide. Additionally, the overall age of the samples was low, with a mean age across both samples of 25.84 (SD = 10.11), and only 20% of participants aged 30 or higher. It will be important for subsequent studies to evaluate whether these results generalize to adult samples with a broader range of ages, as well as to younger (adolescent) samples.

Additionally, the nature of recruitment for each study also impacts the generalizability of the results. Sample 1 was drawn from undergraduate students participating in research for course credit; almost by definition, these students are going to be higher functioning than individuals who are unable to maintain school or work enrollment, and may represent a unique set of self-injurers. Similarly, sample 2 was drawn from the community with advertising targeting individuals receiving psychiatric and psychological services; however, only 13 participants (16.05%) were in therapy and only 19 participants (23.46%) were currently taking psychiatric medication at the time of their study session, suggesting a relatively low prevalence of adults with acute psychiatric concerns. Research drawn from outpatient and inpatient clinical settings will help clarify how the modal model components relate to NSSI in diverse groups.
Seventh, low statistical power may have impacted my results. While the size of sample 1 resulted in adequate power to detect medium effects, for sample 2, financial limitations on recruitment resulted in an estimated power level of .61, below the desired threshold of .8. This issue is partially addressed by the use of multiple samples and by using effect size estimates in the discussion of my results, rather than solely focusing on statistical significance; however, it is possible that some actual group differences were not found in this study due to low power for sample 2. Future studies can address this issue by ensuring that sample sizes are large enough to maintain adequate statistical power for all analyses being conducted.

Finally, while I controlled for demographic and clinical characteristics that were related to NSSI in the analyses looking at modal model components, I did not look specifically for interactions between certain types of descriptive characteristics and individual predictor variables. For example, it would be possible to evaluate whether working part time is more associated with work hassles than working full time, or to determine whether depressive symptoms relate to depressogenic attributional style in this sample. I did not complete these analyses because they were outside of the scope of the subject of this work, and would be likely to inflate Type I error rates across the analyses as a whole. Future researchers more interested in these particular constructs should continue to clarify how demographic and clinical characteristics are associated with distinct components of the modal model.

4.7 Clinical Implications

These findings suggest several valuable avenues for potential prevention and intervention targets for NSSI, as well as some directions that appear less likely to be fruitful. With respect to the Situation component, daily hassles were robustly associated with NSSI in bivariate analyses; however, when entered into a regression with other modal model components, hassles were not
at all related to NSSI group when the other components were considered ($ps > .5$ in both samples). This suggests that, while experiencing hassles may be associated with NSSI, those particular experiences may not be the most useful treatment targets for self-injurers. This is, perhaps, fortunate, given that there are no specific treatments developed to address the experience of daily hassles or minor stressors. Similarly, emotional reactivity and emotional reappraisal were significantly associated with NSSI in preliminary analyses, but not in the final regression including other modal model components, and are therefore less likely to be key treatment targets for addressing NSSI.

Attributional style for negative and, to a lesser extent, positive events demonstrated a moderate relationship to NSSI in bivariate analyses, but was not significantly associated with NSSI group in the final regression analyses. Given the multicollinearity between attributional style and other variables of interest, as well as the evidence of a large, but not statistically significant, effect in the final regression analyses, there does seem to be some support for the potential utility of interventions targeting depressogenic cognitive style for NSSI. Consistent with this finding, research suggests that cognitive behavior therapy (CBT), which targets distorted and dysfunctional cognitive processes that contribute to psychopathology along with the maladaptive behaviors that promote and maintain psychological dysfunction, has been shown to reduce NSSI in adolescents (Glenn, Franklin, & Nock, 2015; Labelle, Pouliot, & Janelle, 2015); additionally, DBT, which includes many components of CBT, has demonstrated efficacy in addressing NSSI in adults (Turner, Austin, & Chapman, 2014). Unfortunately, existing research has not clarified which aspects of these treatments are most useful in addressing NSSI, so it is unclear whether it is actually the cognitively focused parts of the therapy that work best, or whether other aspects of the therapy explain positive outcomes for NSSI. One additional issue
to consider is whether participants engaging in NSSI who exhibit depressogenic attributional styles are doing so due to cognitive biases, which might be amenable to cognitive therapies, or whether these attributional styles are actually accurate, based off of feedback self-injurers may have received from other people or their environment about the causes of negative events that occur in their lives. If NSSI is associated with a depressogenic, but accurate, cognitive style, interventions targeting social strategies and functioning, such as the interpersonal skills training component of DBT, might be more appropriate.

Problem solving style and confidence were associated with NSSI in preliminary analyses, and problem solving style was the only significant predictor of NSSI group in the multivariate analysis including all modal model components. Given that the direction of the effect for problem solving style was the opposite of what was expected, with participants in the NSSI group showing more adaptive, approach-focused problem solving, I will not focus extensively on problem solving treatments, except to note that there is evidence that problem solving therapies can improve depression, hopelessness, and perceived life problems among individuals receiving treatment following an episode of deliberate self-harm (Townsend et al., 2001). The utility of this research is somewhat limited, however, insofar as the researchers included participants who had engaged in either NSSI or attempted suicide, without distinguishing between the two. Research also suggests that cognitive therapy can improve problem solving orientation and appraisal among adults following a suicide attempt, although the potential generalizability to NSSI is unclear (Ghahramanlou-Holloway et al., 2012).

Finally, rumination was a significant predictor of NSSI in almost all analyses, with the exception of the final regression for sample 1, where the effect was slightly above the cutoff for statistical significance ($p = .06$). As a result, treatments that target rumination might be
particularly useful for addressing NSSI. While treatments specifically designed to target 
rumination are somewhat lacking, there is evidence that both mindfulness-based and CBT 
interventions can improve rumination (Querstret & Cropley, 2013), suggesting several potential 
avenues for treatments to be developed for NSSI.
### Tables

**Table 1. Descriptive characteristics of modal model components (dependent variables)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th></th>
<th>Sample 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SD)</td>
<td>Median</td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICSRLE</td>
<td>149</td>
<td>50.93 (23.24)</td>
<td>51</td>
<td>0-126</td>
</tr>
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<td>Developmental Challenges</td>
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<td>15.15 (6.69)</td>
<td>15</td>
<td>0-30</td>
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<tr>
<td>Time Pressures</td>
<td>150</td>
<td>10.8 (4.93)</td>
<td>10</td>
<td>0-21</td>
</tr>
<tr>
<td>Academic Alienation</td>
<td>150</td>
<td>3.33 (2.3)</td>
<td>3</td>
<td>0-9</td>
</tr>
<tr>
<td>Romantic Problems</td>
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<td>2.48 (2.36)</td>
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<tr>
<td>Assorted Annoyances</td>
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<td>0-18</td>
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<td>Friendship Problems</td>
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<td>0-9</td>
</tr>
<tr>
<td>DHS-R Count</td>
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<td></td>
<td>79</td>
<td>20.44 (11.91)</td>
</tr>
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<td>Environmental Hassles</td>
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<td></td>
<td>79</td>
<td>1.14 (1.38)</td>
</tr>
<tr>
<td>Family Hassles</td>
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<td></td>
<td>79</td>
<td>0.8 (1.19)</td>
</tr>
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<td>Financial Concerns</td>
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<td></td>
<td>79</td>
<td>4.27 (3.29)</td>
</tr>
<tr>
<td>Health Hassles</td>
<td>-</td>
<td></td>
<td>79</td>
<td>1.58 (1.55)</td>
</tr>
<tr>
<td>Inner Concerns</td>
<td>-</td>
<td></td>
<td>79</td>
<td>7.67 (4.63)</td>
</tr>
<tr>
<td>Time Pressures</td>
<td>-</td>
<td></td>
<td>79</td>
<td>3.61 (2.85)</td>
</tr>
<tr>
<td>Work Hassles</td>
<td>-</td>
<td></td>
<td>79</td>
<td>1.2 (1.8)</td>
</tr>
<tr>
<td>DHS-R Severity</td>
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<td>79</td>
<td>2.93 (0.87)</td>
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<tr>
<td>Environmental Hassles</td>
<td>-</td>
<td></td>
<td>44</td>
<td>2.64 (1.06)</td>
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<tr>
<td>Family Hassles</td>
<td>-</td>
<td></td>
<td>34</td>
<td>2.65 (1.17)</td>
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<td>Financial Concerns</td>
<td>-</td>
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<td>65</td>
<td>2.97 (1.03)</td>
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<td>Health Hassles</td>
<td>-</td>
<td></td>
<td>51</td>
<td>2.85 (1.14)</td>
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<tr>
<td>Inner Concerns</td>
<td>-</td>
<td></td>
<td>73</td>
<td>3.09 (0.9)</td>
</tr>
<tr>
<td>Time Pressures</td>
<td>-</td>
<td></td>
<td>68</td>
<td>2.84 (1)</td>
</tr>
<tr>
<td>Work Hassles</td>
<td>-</td>
<td></td>
<td>40</td>
<td>3.05 (1.09)</td>
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108
<table>
<thead>
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<th>Variable</th>
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<th>Sample 2</th>
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<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>Mean ($SD$)</td>
</tr>
<tr>
<td><strong>Dot Probe Task</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger Attention Bias</td>
<td>154</td>
<td>6.01 (12.66)</td>
</tr>
<tr>
<td>Sadness Attention Bias</td>
<td>154</td>
<td>2.85 (13.31)</td>
</tr>
<tr>
<td><strong>ASQ</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neg. Attribution Style</td>
<td>152</td>
<td>13.33 (2.62)</td>
</tr>
<tr>
<td>Internal Negative</td>
<td>152</td>
<td>4.61 (1.04)</td>
</tr>
<tr>
<td>Stable Negative</td>
<td>152</td>
<td>4.35 (0.97)</td>
</tr>
<tr>
<td>Global Negative</td>
<td>152</td>
<td>4.37 (1.15)</td>
</tr>
<tr>
<td>Importance Negative</td>
<td>152</td>
<td>5.07 (0.9)</td>
</tr>
<tr>
<td>Happened Negative</td>
<td>152</td>
<td>0.63 (0.24)</td>
</tr>
<tr>
<td>Same Cause Negative</td>
<td>151</td>
<td>0.61 (0.32)</td>
</tr>
<tr>
<td>Internal Positive</td>
<td>152</td>
<td>5.06 (0.82)</td>
</tr>
<tr>
<td>Stable Positive</td>
<td>152</td>
<td>5.2 (0.77)</td>
</tr>
<tr>
<td>Global Positive</td>
<td>152</td>
<td>5.12 (0.77)</td>
</tr>
<tr>
<td>Importance Positive</td>
<td>152</td>
<td>5.7 (0.73)</td>
</tr>
<tr>
<td>Happened Positive</td>
<td>151</td>
<td>0.61 (0.18)</td>
</tr>
<tr>
<td>Same Cause Positive</td>
<td>152</td>
<td>0.58 (0.31)</td>
</tr>
<tr>
<td><strong>ERS</strong></td>
<td></td>
<td>33.67 (20.21)</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>138</td>
<td>15.04 (9.82)</td>
</tr>
<tr>
<td>Persistence</td>
<td>138</td>
<td>7.29 (4.33)</td>
</tr>
<tr>
<td><strong>PSI</strong></td>
<td></td>
<td>94.67 (18.23)</td>
</tr>
<tr>
<td>Confidence</td>
<td>144</td>
<td>30.26 (7.44)</td>
</tr>
<tr>
<td>Approach Style</td>
<td>144</td>
<td>46.31 (10.25)</td>
</tr>
<tr>
<td>Control</td>
<td>144</td>
<td>18.1 (4.79)</td>
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<tr>
<td><strong>ERQ</strong></td>
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<td></td>
</tr>
<tr>
<td>Reappraisal</td>
<td>138</td>
<td>4.84 (1.22)</td>
</tr>
<tr>
<td>Suppression</td>
<td>138</td>
<td>3.73 (1.2)</td>
</tr>
<tr>
<td><strong>RRS Total</strong></td>
<td>147</td>
<td>45.48 (16.55)</td>
</tr>
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</table>
Table 2. Descriptive characteristics of NSSI among self-injurers in samples 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Median</td>
</tr>
<tr>
<td>Cut</td>
<td>30.77 (81.51)</td>
<td>0</td>
</tr>
<tr>
<td>Bite</td>
<td>23.97 (107.38)</td>
<td>0</td>
</tr>
<tr>
<td>Burn</td>
<td>0.91 (3.68)</td>
<td>0</td>
</tr>
<tr>
<td>Carve</td>
<td>2.20 (12.53)</td>
<td>0</td>
</tr>
<tr>
<td>Pinch</td>
<td>28.82 (104.23)</td>
<td>0</td>
</tr>
<tr>
<td>Pull hair</td>
<td>59.65 (275.82)</td>
<td>0</td>
</tr>
<tr>
<td>Severe scratch</td>
<td>66.97 (264.18)</td>
<td>0</td>
</tr>
<tr>
<td>Bang/hit</td>
<td>23.62 (71.16)</td>
<td>3</td>
</tr>
<tr>
<td>Interfere with wound healing</td>
<td>80.22 (162.76)</td>
<td>10</td>
</tr>
<tr>
<td>Rub rough surfaces</td>
<td>7.11 (27.48)</td>
<td>0</td>
</tr>
<tr>
<td>Stick with needles</td>
<td>0.23 (1.06)</td>
<td>0</td>
</tr>
<tr>
<td>Swallow dangerous substances</td>
<td>154.14 (1240.31)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0.23 (1.38)</td>
<td>0</td>
</tr>
<tr>
<td>Total # Methods</td>
<td>3.78 (2.12)</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: All values reported are based on the raw frequency of NSSI reported by participants for each method, with the exception of total number of methods, which is the count of how many methods an individual reported engaging in at least once. The columns labeled “N endorse” provide the count of how many participants reported using that method at any frequency or, for total number of methods, the number of individuals endorsing at least one NSSI method. The participants who endorsed “other” methods of NSSI reported binging and purging, punching walls or hard surfaces, drowning, eating to stuff myself to explode, restricting breath, and rubbing bleach into skin as their “other” NSSI methods.
Table 3. Demographic characteristics in samples 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Male</td>
<td>25 (16.67%)</td>
<td>26 (32.1%)</td>
</tr>
<tr>
<td>Female</td>
<td>124 (82.67%)</td>
<td>55 (67.9%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.67%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>East Asian</td>
<td>74 (49.33%)</td>
<td>18 (22.22%)</td>
</tr>
<tr>
<td>European</td>
<td>32 (21.33%)</td>
<td>47 (58.02%)</td>
</tr>
<tr>
<td>South Asian</td>
<td>11 (7.33%)</td>
<td>1 (1.23%)</td>
</tr>
<tr>
<td>Bi/Multiracial</td>
<td>16 (10.67%)</td>
<td>10 (12.35%)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>8 (5.33%)</td>
<td>2 (2.47%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1 (0.67%)</td>
<td>2 (2.47%)</td>
</tr>
<tr>
<td>First Nations</td>
<td>0 (0%)</td>
<td>1 (1.23%)</td>
</tr>
<tr>
<td>Other</td>
<td>8 (5.33%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Heterosexual</td>
<td>132 (88%)</td>
<td>53 (65.43%)</td>
</tr>
<tr>
<td>Bisexual</td>
<td>7 (4.67%)</td>
<td>13 (16.05%)</td>
</tr>
<tr>
<td>Questioning</td>
<td>3 (2%)</td>
<td>7 (8.64%)</td>
</tr>
<tr>
<td>Gay</td>
<td>2 (1.33%)</td>
<td>1 (1.23%)</td>
</tr>
<tr>
<td>Lesbian</td>
<td>0 (0%)</td>
<td>3 (3.7%)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (4%)</td>
<td>4 (4.94%)</td>
</tr>
<tr>
<td>Born in Canada</td>
<td>76 (50.67%)</td>
<td>51 (62.96%)</td>
</tr>
<tr>
<td>Not Born in Canada</td>
<td>74 (49.33%)</td>
<td>30 (37.04%)</td>
</tr>
<tr>
<td>Native English Speaker</td>
<td>97 (64.67%)</td>
<td>62 (76.54%)</td>
</tr>
<tr>
<td>Not Native English Speaker</td>
<td>53 (35.33%)</td>
<td>19 (23.46%)</td>
</tr>
<tr>
<td>Single</td>
<td>105 (70%)</td>
<td>43 (53.09%)</td>
</tr>
<tr>
<td>In a relationship (unmarried)</td>
<td>43 (28.67%)</td>
<td>19 (23.46%)</td>
</tr>
<tr>
<td>Married/common-law</td>
<td>2 (1.33%)</td>
<td>12 (14.81%)</td>
</tr>
<tr>
<td>Divorced/separated</td>
<td>0 (0%)</td>
<td>4 (4.94%)</td>
</tr>
<tr>
<td>Widowed</td>
<td>0 (0%)</td>
<td>2 (2.47%)</td>
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<tr>
<td>Other</td>
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<td>1 (1.23%)</td>
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<td>Some high school</td>
<td>0 (0%)</td>
<td>4 (4.94%)</td>
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<tr>
<td>High school/GED</td>
<td>6 (4%)</td>
<td>11 (13.58%)</td>
</tr>
<tr>
<td>Some college/university</td>
<td>137 (91.33%)</td>
<td>23 (28.4%)</td>
</tr>
<tr>
<td>College/university grad</td>
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<td>26 (32.1%)</td>
</tr>
<tr>
<td>Some professional school</td>
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<tr>
<td>Master’s degree</td>
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<td>13 (16.05%)</td>
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<tr>
<td>Doctoral degree</td>
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<tr>
<td>Unemployed</td>
<td>71 (47.33%)</td>
<td>32 (39.51%)</td>
</tr>
<tr>
<td>On disability</td>
<td>1 (0.67%)</td>
<td>7 (8.64%)</td>
</tr>
<tr>
<td>Part-time employment</td>
<td>74 (49.33%)</td>
<td>26 (32.1%)</td>
</tr>
<tr>
<td>Full-time employment</td>
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Table 4. Group comparisons for demographic characteristics in samples 1 and 2

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<th>Variable</th>
<th>Sample 1</th>
<th>Sample 2</th>
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<tr>
<td></td>
<td>No NSSI</td>
<td>NSSI</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Age</td>
<td>21.32 (3.23)</td>
<td>21.14 (2.59)</td>
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<td>Female</td>
<td>73 (51)</td>
<td>24 (14)</td>
</tr>
<tr>
<td>Male</td>
<td>14 (11)</td>
<td>9 (6)</td>
</tr>
<tr>
<td>East Asian</td>
<td>50 (24)</td>
<td>9 (5)</td>
</tr>
<tr>
<td>Not East Asian</td>
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<td>30 (33)</td>
</tr>
<tr>
<td>Caucasian</td>
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<td>23 (24)</td>
</tr>
<tr>
<td>Not Caucasian</td>
<td>71 (47)</td>
<td>16 (18)</td>
</tr>
<tr>
<td>Heterosexual</td>
<td>87 (45)</td>
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</tr>
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<td>Sexual Minority</td>
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<td>4 (24)</td>
</tr>
<tr>
<td>Born in Canada</td>
<td>37 (39)</td>
<td>20 (31)</td>
</tr>
<tr>
<td>Not Born in Canada</td>
<td>50 (24)</td>
<td>19 (11)</td>
</tr>
<tr>
<td>Native English</td>
<td>46 (51)</td>
<td>28 (34)</td>
</tr>
<tr>
<td>Non-Native English</td>
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<td>11 (8)</td>
</tr>
<tr>
<td>Single</td>
<td>62 (43)</td>
<td>19 (24)</td>
</tr>
<tr>
<td>Not Single</td>
<td>25 (20)</td>
<td>20 (18)</td>
</tr>
<tr>
<td>&lt; Coll./Univ. Grad</td>
<td>83 (60)</td>
<td>13 (25)</td>
</tr>
<tr>
<td>&gt;= Coll./Univ. Grad</td>
<td>4 (3)</td>
<td>26 (17)</td>
</tr>
<tr>
<td>Employed</td>
<td>42 (36)</td>
<td>25 (17)</td>
</tr>
<tr>
<td>Not Employed</td>
<td>45 (27)</td>
<td>14 (25)</td>
</tr>
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</table>

Note: The “statistical test” values for variables that were measured on an interval scale (e.g., age) is the t value with the degrees of freedom in parentheses. For binary variables, this column represents the χ² value with 1 degree of freedom. No effect size could be calculated for the comparison between heterosexual and sexual minority participants in sample 1, as no sexual minority participants were in the No NSSI group.
Table 5. Characteristics of covariates in samples 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th></th>
<th>Sample 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$n$</td>
<td>Mean ($SD$)</td>
<td>Median</td>
</tr>
<tr>
<td>MSI-BPD No NSSI</td>
<td>137</td>
<td>2.88 (2.52)</td>
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<tr>
<td>DASS-SF</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Anxiety</td>
<td>150</td>
<td>8.68 (8.51)</td>
<td>6</td>
<td>0-40</td>
</tr>
<tr>
<td>Depression</td>
<td>150</td>
<td>10.36 (10.63)</td>
<td>6</td>
<td>0-40</td>
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<tr>
<td>SAM</td>
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<tr>
<td>Pre-Task Valence</td>
<td>153</td>
<td>6.23 (1.58)</td>
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<tr>
<td>Pre-Task Arousal</td>
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<td>4.01 (1.73)</td>
<td>4</td>
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<tr>
<td>Post-Task Valence</td>
<td>153</td>
<td>5.76 (1.42)</td>
<td>6</td>
<td>1-9</td>
</tr>
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<td>Post-Task Arousal</td>
<td>153</td>
<td>4.56 (1.98)</td>
<td>5</td>
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Table 6. Group comparisons for covariates in samples 1 and 2

<table>
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<th>Sample 2</th>
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<td>No NSSI M (SD)</td>
<td>NSSI M (SD)</td>
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<td>MSI-BPD (No NSSI)</td>
<td>2.04 (2.27)</td>
<td>4.02 (2.41)</td>
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<tr>
<td>DASS-SF</td>
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<tr>
<td>Anxiety</td>
<td>5.70 (5.25)</td>
<td>12.79 (10.30)</td>
</tr>
<tr>
<td>Depression</td>
<td>5.95 (6.69)</td>
<td>16.44 (12.03)</td>
</tr>
<tr>
<td>SAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Valence</td>
<td>6.63 (1.41)</td>
<td>5.69 (1.65)</td>
</tr>
<tr>
<td>Pre Arousal</td>
<td>3.90 (1.75)</td>
<td>4.17 (1.70)</td>
</tr>
<tr>
<td>Post Valence</td>
<td>5.93 (1.38)</td>
<td>5.54 (1.46)</td>
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<tr>
<td>Post Arousal</td>
<td>4.40 (2.08)</td>
<td>4.77 (1.83)</td>
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Note: “Pre” refers to the SAM administered before the dot-probe computer task, while “post” refers to the SAM following the dot-probe task (and before the administration of questionnaires).
Table 7. Characteristics of clinical covariates in sample 2

<table>
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<tr>
<th>Variable</th>
<th>n</th>
<th>(%)</th>
<th>Mean (SD)</th>
<th>Median</th>
<th>Range</th>
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<td>No</td>
<td>15</td>
<td>(18.52%)</td>
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<td>Yes, past</td>
<td>53</td>
<td>(65.43%)</td>
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<td></td>
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<tr>
<td>Yes, current</td>
<td>13</td>
<td>(16.05%)</td>
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<tr>
<td>Psychiatric Medication</td>
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<td>No</td>
<td>39</td>
<td>(48.15%)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes, past</td>
<td>23</td>
<td>(28.4%)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Yes, current</td>
<td>19</td>
<td>(23.46%)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Psychiatric Hospitalization</td>
<td>17</td>
<td>(20.99%)</td>
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<td></td>
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<tr>
<td>No Psychiatric Hospitalization</td>
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<td>(79.01%)</td>
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<tr>
<td>Lifetime Psychiatric Diagnoses</td>
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<td>0.9 (1.22)</td>
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<td>Mood disorder</td>
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<tr>
<td>Anxiety disorder</td>
<td>21</td>
<td>(26.25%)</td>
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<tr>
<td>Substance use disorder</td>
<td>5</td>
<td>(6.25%)</td>
<td></td>
<td></td>
<td></td>
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<td>Psychotic disorder</td>
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<tr>
<td>Eating disorder</td>
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<td>(6.25%)</td>
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<tr>
<td>Personality disorder</td>
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<td>(11.25%)</td>
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<td></td>
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<tr>
<td>Other disorder</td>
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<td>(3.75%)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Current Psychiatric Diagnoses</td>
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<td>(23.75%)</td>
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<tr>
<td>Anxiety disorder</td>
<td>16</td>
<td>(20%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Substance use disorder</td>
<td>2</td>
<td>(2.5%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Psychotic disorder</td>
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<td>(0%)</td>
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<tr>
<td>Eating disorder</td>
<td>2</td>
<td>(2.5%)</td>
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</tr>
<tr>
<td>Personality disorder</td>
<td>5</td>
<td>(6.25%)</td>
<td></td>
<td></td>
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<tr>
<td>Other disorder</td>
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<td>(1.25%)</td>
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Table 8. Group comparisons for clinical covariates in sample 2

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<tr>
<th>Variable</th>
<th>No NSSI M (SD) n (%)</th>
<th>NSSI M (SD) n (%)</th>
<th>Statistical Test</th>
<th>d</th>
<th>p</th>
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<tbody>
<tr>
<td>Psychological Therapy</td>
<td>26 (40)</td>
<td>10.94 .79</td>
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<td>13 (2)</td>
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<tr>
<td>Psychiatric Medication</td>
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<td>10.33 .76</td>
<td>&lt; .001</td>
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<td></td>
</tr>
<tr>
<td>No Psychiatric Medication</td>
<td>26 (13)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Psychiatric Hospitalization</td>
<td>3 (14)</td>
<td>8.02 .66</td>
<td>&lt; .001</td>
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<td></td>
</tr>
<tr>
<td>No Psychiatric Hospitalization</td>
<td>36 (28)</td>
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<td></td>
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</tr>
<tr>
<td>Lifetime Psych. Diagnoses (#)</td>
<td>.31 (.69)</td>
<td>1.45 (1.35)</td>
<td>4.86 (62)</td>
<td>1.06</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Any Psychiatric Diagnosis</td>
<td>7 (28)</td>
<td>19.56 1.13</td>
<td>&lt; .001</td>
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<td></td>
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<td>No Psychiatric Diagnosis</td>
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<td>Lifetime Mood disorder</td>
<td>6 (21)</td>
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<td>&lt; .001</td>
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<td>No Lifetime Mood Disorder</td>
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<td>Lifetime Anxiety disorder</td>
<td>3 (18)</td>
<td>12.60 .86</td>
<td>&lt; .001</td>
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<tr>
<td>No Lifetime Anxiety Disorder</td>
<td>35 (24)</td>
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<tr>
<td>Current Psych. Diagnoses (#)</td>
<td>.15 (.43)</td>
<td>.93 (.95)</td>
<td>4.79 (58)</td>
<td>1.06</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Current Mood Disorder</td>
<td>4 (15)</td>
<td>6.99 .62</td>
<td>.01</td>
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<td>No Current Mood Disorder</td>
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<td>Current Anxiety disorder</td>
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<td>&lt; .001</td>
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<tr>
<td>No Current Anxiety Disorder</td>
<td>36 (28)</td>
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</tbody>
</table>

Note: The “statistical test” values for variables that were measured on an interval scale (e.g., number of lifetime diagnoses) is the t value with the degrees of freedom in parentheses. For binary variables, this column represents the $\chi^2$ value with 1 degree of freedom.
Table 9. Group comparisons for component 1 (Situation) in samples 1 and 2

<table>
<thead>
<tr>
<th></th>
<th>No NSSI M (SD)</th>
<th>NSSI M (SD)</th>
<th>t (df)</th>
<th>d</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td><strong>Sample 1 (ICSRLE)</strong></td>
<td></td>
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<tr>
<td>Developmental Challenges</td>
<td>13.71 (6.72)</td>
<td>17.14 (6.15)</td>
<td>3.20 (148)</td>
<td>.53</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Time Pressures</td>
<td>10.03 (4.65)</td>
<td>11.86 (5.15)</td>
<td>2.26 (148)</td>
<td>.38</td>
<td>.03</td>
</tr>
<tr>
<td>Academic Alienation</td>
<td>2.80 (2.06)</td>
<td>4.05 (2.43)</td>
<td>3.38 (148)</td>
<td>.57</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Romantic Problems</td>
<td>2.18 (2.31)</td>
<td>2.89 (2.39)</td>
<td>1.82 (148)</td>
<td>.30</td>
<td>.07</td>
</tr>
<tr>
<td>Assorted Annoyances</td>
<td>2.40 (2.11)</td>
<td>3.13 (2.47)</td>
<td>1.93 (148)</td>
<td>.32</td>
<td>.06</td>
</tr>
<tr>
<td>Social Mistreatment</td>
<td>4.08 (3.17)</td>
<td>7.42 (4.74)</td>
<td>4.83 (148)</td>
<td>.86</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Friendship Problems</td>
<td>2.14 (1.84)</td>
<td>2.77 (2.47)</td>
<td>1.72 (107)</td>
<td>.30</td>
<td>.09</td>
</tr>
<tr>
<td>Overall</td>
<td>44.82 (20.99)</td>
<td>59.50 (23.69)</td>
<td>3.99 (147)</td>
<td>.67</td>
<td>&lt; .001</td>
</tr>
<tr>
<td><strong>Sample 2 (DHS-R)</strong></td>
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<td>Hassles Count</td>
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<td>Environmental Hassles</td>
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<td>1.35 (1.29)</td>
<td>1.38 (77)</td>
<td>.31</td>
<td>.17</td>
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<tr>
<td>Family Hassles</td>
<td>.79 (1.10)</td>
<td>.80 (1.29)</td>
<td>.02 (77)</td>
<td>.00</td>
<td>.98</td>
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<tr>
<td>Financial Concerns</td>
<td>3.10 (2.85)</td>
<td>5.40 (3.33)</td>
<td>3.30 (77)</td>
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<td>Health Hassles</td>
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<td>2.23 (1.59)</td>
<td>4.11 (72)</td>
<td>.923</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Inner Concerns</td>
<td>5.72 (4.34)</td>
<td>9.58 (4.11)</td>
<td>4.06 (77)</td>
<td>.92</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Time Pressures</td>
<td>2.79 (2.75)</td>
<td>4.40 (2.74)</td>
<td>2.59 (77)</td>
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<td>.01</td>
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<td>Work Hassles</td>
<td>1.03 (1.35)</td>
<td>1.38 (2.16)</td>
<td>.86 (77)</td>
<td>.20</td>
<td>.39</td>
</tr>
<tr>
<td>Overall</td>
<td>15.48 (10.74)</td>
<td>25.28 (11.09)</td>
<td>3.98 (77)</td>
<td>.91</td>
<td>&lt; .001</td>
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<td>Hassles Severity</td>
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<td>Environmental Hassles</td>
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<td>2.60 (1.13)</td>
<td>-.28 (42)</td>
<td>-.09</td>
<td>.78</td>
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<td>Family Hassles</td>
<td>2.56 (1.16)</td>
<td>2.74 (1.20)</td>
<td>.42 (32)</td>
<td>.15</td>
<td>.68</td>
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<td>Financial Concerns</td>
<td>2.50 (1.11)</td>
<td>3.34 (.80)</td>
<td>3.43 (49)</td>
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<td>3.17 (1.11)</td>
<td>2.77 (49)</td>
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<td>.008</td>
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<tr>
<td>Inner Concerns</td>
<td>2.57 (.79)</td>
<td>3.55 (.74)</td>
<td>5.44 (71)</td>
<td>1.29</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Time Pressures</td>
<td>2.31 (.92)</td>
<td>3.32 (.83)</td>
<td>4.74 (66)</td>
<td>1.17</td>
<td>&lt; .001</td>
</tr>
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<td>Work Hassles</td>
<td>2.71 (1.02)</td>
<td>3.39 (1.07)</td>
<td>2.07 (38)</td>
<td>.67</td>
<td>.05</td>
</tr>
<tr>
<td>Overall</td>
<td>2.45 (.83)</td>
<td>3.40 (.63)</td>
<td>5.76 (77)</td>
<td>1.31</td>
<td>&lt; .001</td>
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Table 10. Group comparisons for component 2 (Attention) in samples 1 and 2

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<th>Sample 2</th>
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<td>$M \ (SD)$</td>
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<td>$M \ (SD)$</td>
<td>$M \ (SD)$</td>
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<tr>
<td>Anger Attention Bias</td>
<td>6.70 (13.01)</td>
<td>5.07 (12.21)</td>
<td>-.79 (152)</td>
<td>-.13 .43</td>
<td>5.77 (13.58)</td>
<td>11.47 (16.65)</td>
<td>1.69 (79)</td>
</tr>
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<td>Sadness Attention Bias</td>
<td>4.47 (12.60)</td>
<td>0.63 (14.03)</td>
<td>-1.78 (152)</td>
<td>-.29 .08</td>
<td>-1.37 (14.63)</td>
<td>2.12 (16.92)</td>
<td>.99 (79)</td>
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<td>Fear Attention Bias</td>
<td>6.52 (13.39)</td>
<td>6.17 (13.80)</td>
<td>-.16 (152)</td>
<td>-.03 .87</td>
<td>3.69 (13.23)</td>
<td>8.53 (12.61)</td>
<td>1.69 (79)</td>
</tr>
<tr>
<td>Disgust Attention Bias</td>
<td>9.43 (14.81)</td>
<td>9.18 (13.92)</td>
<td>-.70 (152)</td>
<td>-.02 .92</td>
<td>12.07 (19.63)</td>
<td>11.82 (17.26)</td>
<td>.06 (79)</td>
</tr>
<tr>
<td></td>
<td>Sample 1</td>
<td>Sample 2</td>
<td></td>
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<td>M (SD)</td>
<td>t (df)</td>
<td>d</td>
<td>p</td>
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<td>12.64 (2.37)</td>
<td>14.29 (2.65)</td>
<td>4.05(150)</td>
<td>.67 &lt; .001</td>
<td>12.55 (1.92)</td>
<td>14.82 (3.09)</td>
<td>4.01(69)</td>
</tr>
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<td>Internality</td>
<td>4.38 (0.95)</td>
<td>4.94 (1.08)</td>
<td>3.39(150)</td>
<td>.56 .001</td>
<td>4.44 (.74)</td>
<td>4.94 (1.21)</td>
<td>2.24(69)</td>
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<td>Stability</td>
<td>4.17 (0.87)</td>
<td>4.61 (1.05)</td>
<td>2.75(119)</td>
<td>.47 .007</td>
<td>4.17 (.96)</td>
<td>4.80 (1.11)</td>
<td>2.70(79)</td>
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<td>Globality</td>
<td>4.09 (1.19)</td>
<td>4.75 (0.97)</td>
<td>3.72(148)</td>
<td>.60 &lt; .001</td>
<td>3.93 (1.11)</td>
<td>5.08 (1.12)</td>
<td>4.66(79)</td>
</tr>
<tr>
<td>Importance</td>
<td>4.84 (0.94)</td>
<td>5.38 (0.75)</td>
<td>3.80(150)</td>
<td>.63 &lt; .001</td>
<td>4.95 (1.07)</td>
<td>5.33 (1.08)</td>
<td>1.59(79)</td>
</tr>
<tr>
<td>Happened</td>
<td>0.61 (0.24)</td>
<td>0.66 (0.23)</td>
<td>-1.31(150)</td>
<td>-.22 .19</td>
<td>.71 (.22)</td>
<td>.82 (.19)</td>
<td>2.49(79)</td>
</tr>
<tr>
<td>Same Cause</td>
<td>0.61 (0.32)</td>
<td>0.61 (0.31)</td>
<td>-.06(149)</td>
<td>-.01 .95</td>
<td>.70 (.32)</td>
<td>.54 (.28)</td>
<td>-2.44(79)</td>
</tr>
<tr>
<td><strong>ASQ Positive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attribution Style</td>
<td>15.57 (1.76)</td>
<td>15.13 (2.37)</td>
<td>-1.27(111)</td>
<td>-.22 .21</td>
<td>15.35 (1.90)</td>
<td>14.08 (2.21)</td>
<td>-2.77(79)</td>
</tr>
<tr>
<td>Internality</td>
<td>5.18 (0.71)</td>
<td>4.90 (0.92)</td>
<td>-2.03(114)</td>
<td>-.35 .04</td>
<td>5.00 (.90)</td>
<td>4.46 (1.08)</td>
<td>-2.49(78)</td>
</tr>
<tr>
<td>Stability</td>
<td>5.25 (0.68)</td>
<td>5.12 (0.88)</td>
<td>-.97(115)</td>
<td>-.17 .34</td>
<td>5.20 (.75)</td>
<td>4.67 (.91)</td>
<td>-2.81(79)</td>
</tr>
<tr>
<td>Globality</td>
<td>5.14 (0.84)</td>
<td>5.10 (1.07)</td>
<td>-.23(116)</td>
<td>-.04 .82</td>
<td>5.15 (1.09)</td>
<td>4.95 (.93)</td>
<td>-1.90(79)</td>
</tr>
<tr>
<td>Importance</td>
<td>5.66 (0.74)</td>
<td>5.75 (0.72)</td>
<td>.75(150)</td>
<td>.12 .46</td>
<td>5.71 (.72)</td>
<td>5.60 (.92)</td>
<td>-1.57(79)</td>
</tr>
<tr>
<td>Happened</td>
<td>0.60 (0.17)</td>
<td>0.63 (0.19)</td>
<td>.77(149)</td>
<td>.13 .44</td>
<td>.71 (.18)</td>
<td>.67 (.21)</td>
<td>-1.91(79)</td>
</tr>
<tr>
<td>Same Cause</td>
<td>0.61 (0.30)</td>
<td>0.54 (0.32)</td>
<td>-1.41(150)</td>
<td>-.23 .16</td>
<td>.70 (.30)</td>
<td>.51 (.32)</td>
<td>-2.66(79)</td>
</tr>
</tbody>
</table>
Table 12. Group comparisons for component 4 (Response) in samples 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No NSSI</td>
<td>NSSI</td>
<td>t (df)</td>
<td>d</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>(df)</td>
<td>p</td>
</tr>
<tr>
<td>ERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>12.61 (9.09)</td>
<td>18.29 (9.91)</td>
<td>3.50(136)</td>
<td>.61</td>
</tr>
<tr>
<td>Arousal/</td>
<td>9.37 (6.58)</td>
<td>14.00 (6.66)</td>
<td>4.07(136)</td>
<td>.71</td>
</tr>
<tr>
<td>Intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistence</td>
<td>6.28 (4.02)</td>
<td>8.64 (4.39)</td>
<td>3.29(136)</td>
<td>.57</td>
</tr>
<tr>
<td>Overall</td>
<td>28.25 (18.84)</td>
<td>40.93 (19.84)</td>
<td>3.82(136)</td>
<td>.66</td>
</tr>
<tr>
<td>PSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td>28.90 (6.50)</td>
<td>32.17 (8.28)</td>
<td>2.65(142)</td>
<td>.45</td>
</tr>
<tr>
<td>Approach</td>
<td>47.71 (8.27)</td>
<td>44.35 (12.31)</td>
<td>-1.84(96)</td>
<td>-.33</td>
</tr>
<tr>
<td>Style</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>17.46 (4.63)</td>
<td>18.98 (4.91)</td>
<td>1.89(142)</td>
<td>.32</td>
</tr>
<tr>
<td>Overall</td>
<td>94.08 (15.22)</td>
<td>95.50 (21.87)</td>
<td>.43(98)</td>
<td>.08</td>
</tr>
<tr>
<td>ERQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reappraisal</td>
<td>5.02 (1.08)</td>
<td>4.60 (1.37)</td>
<td>-1.98(107)</td>
<td>-.36</td>
</tr>
<tr>
<td>Suppression</td>
<td>3.68 (1.09)</td>
<td>3.81 (1.33)</td>
<td>.64(136)</td>
<td>.11</td>
</tr>
<tr>
<td>RRS Total</td>
<td>39.34 (13.52)</td>
<td>54.13 (16.64)</td>
<td>5.73(112)</td>
<td>1.00</td>
</tr>
</tbody>
</table>
### Table 13. Multivariate analyses for all modal model components in samples 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>$b$</th>
<th>$SE$</th>
<th>Wald</th>
<th>df</th>
<th>$p$</th>
<th>OR [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.22</td>
<td>2.00</td>
<td>.37</td>
<td>1</td>
<td>.54</td>
<td>.295 [0.29, 1.29]</td>
</tr>
<tr>
<td>Social Mistreatment (ICSRLE)</td>
<td>.04</td>
<td>.07</td>
<td>.37</td>
<td>1</td>
<td>.54</td>
<td>1.05 [1.00, 1.10]</td>
</tr>
<tr>
<td>Negative Attributional Style (ASQ)</td>
<td>.20</td>
<td>.10</td>
<td>3.65</td>
<td>1</td>
<td>.06</td>
<td>1.22 [1.00, 1.49]</td>
</tr>
<tr>
<td>Emotional Reactivity (ERS)</td>
<td>-0.03</td>
<td>.02</td>
<td>.03</td>
<td>1</td>
<td>.86</td>
<td>1.00 [0.97, 1.03]</td>
</tr>
<tr>
<td>Emotional Reappraisal (ERQ)</td>
<td>-.29</td>
<td>.21</td>
<td>1.81</td>
<td>1</td>
<td>.18</td>
<td>.75 [.60, 1.15]</td>
</tr>
<tr>
<td>Rumination (RRS)</td>
<td>.04</td>
<td>.02</td>
<td>3.43</td>
<td>1</td>
<td>.06</td>
<td>1.04 [1.00, 1.08]</td>
</tr>
<tr>
<td>Problem Solving Confidence (PSI)</td>
<td>.05</td>
<td>.04</td>
<td>1.67</td>
<td>1</td>
<td>.20</td>
<td>1.05 [0.97, 1.14]</td>
</tr>
<tr>
<td>Approach Avoidance Style (PSI)</td>
<td>-.09</td>
<td>.03</td>
<td>8.11</td>
<td>1</td>
<td>.004</td>
<td>.92 [.86, .97]</td>
</tr>
<tr>
<td>Problem Solving Control (PSI)</td>
<td>.02</td>
<td>.07</td>
<td>.09</td>
<td>1</td>
<td>.77</td>
<td>1.02 [0.90, 1.16]</td>
</tr>
<tr>
<td><strong>Sample 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-4.78</td>
<td>3.90</td>
<td>1.50</td>
<td>1</td>
<td>.22</td>
<td>.008 [0.00, 0.00]</td>
</tr>
<tr>
<td>Total Hassles (DHS-R)</td>
<td>-.01</td>
<td>.04</td>
<td>.08</td>
<td>1</td>
<td>.78</td>
<td>.99 [0.91, 1.07]</td>
</tr>
<tr>
<td>Negative Attributional Style (ASQ)</td>
<td>.17</td>
<td>.17</td>
<td>.96</td>
<td>1</td>
<td>.33</td>
<td>1.18 [0.85, 1.66]</td>
</tr>
<tr>
<td>Positive Attributional Style (ASQ)</td>
<td>-.22</td>
<td>.17</td>
<td>1.62</td>
<td>1</td>
<td>.20</td>
<td>.80 [0.57, 1.13]</td>
</tr>
<tr>
<td>Emotional Reactivity (ERS)</td>
<td>.04</td>
<td>.02</td>
<td>2.97</td>
<td>1</td>
<td>.09</td>
<td>1.04 [1.00, 1.09]</td>
</tr>
<tr>
<td>Emotional Reappraisal (ERQ)</td>
<td>-.19</td>
<td>.38</td>
<td>.25</td>
<td>1</td>
<td>.62</td>
<td>.83 [.39, 1.74]</td>
</tr>
<tr>
<td>Rumination (RRS)</td>
<td>.11</td>
<td>.04</td>
<td>5.84</td>
<td>1</td>
<td>.02</td>
<td>1.11 [1.02, 1.21]</td>
</tr>
</tbody>
</table>
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doi:10.1007/s10964-009-9482-0


doi:10.4088/jcp.v68n0117


doi:10.1016/j.comppsych.2011.11.008


doi:10.1177/2167702613503140


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doi:10.1017/S0033291711001814


doi:10.1016/j.brat.2010.08.004


Appendices

Appendix A. Sample 1 Advertisements and Recruitment Materials

Emotion and Self-Injury Study

The Personality, Emotion, and Behaviour Lab (PEBL) in the UBC Psychology Department is conducting a study on the emotions, thoughts, and experiences of people who have engaged in non-suicidal self-injury (e.g., intentionally harming yourself without intending to die). If you are interested in participating in the study, sign up for the ESI Study on the HSP system or contact us for more information at:

PEBL@psych.ubc.ca or 604-822-6252

To be eligible, you must be age 19 or over, enrolled in the Psychology Human Subjects Pool (HSP), and have engaged in non-suicidal self-injury in the past 6 months. All information you provide will be kept strictly confidential.

The study will consist of a 1 hour session, where you will do a short computer task and fill out questionnaires. You will receive 1 research credit for your time.
Emotion and Self-Injury (ESI) Study

This study is investigating how emotions, thoughts and beliefs, and life experiences are related to self-harmful behaviors such as non-suicidal self-injury (e.g., intentionally harming oneself without the intent to die). For this study, we are seeking adults (19 and over) who have engaged in non-suicidal self-injury in the last six months, as well as individuals who have never engaged in these behaviours. Eligible participants will be asked to complete a 1 hour laboratory session involving questionnaires and a short computer task to find out more about your personality, background, and emotional experiences. Participants who complete the study will receive 1 HSP credit for their time.
Email Text for HSP Prescreening Targeted Recruitment

Subject: Recruitment for HSP Study

Dear (PARTICIPANT),

You recently completed the prescreening assessment as part of the Psychology Department’s Human Subjects Pool (HSP). After completing this assessment, you indicated that you would be willing to have researchers contact you directly about studies for which you may be eligible. The Personality, Emotion, and Behaviour Laboratory (PEBLab) is conducting a research study this summer for which you are eligible, based on your answers to the prescreening assessment. If you are interested in participating in this study, we would love to hear from you!

This study is a one-credit, in-lab study that will last approximately one hour and takes place in the Kenny Building (Psychology Department). The study involves completing questionnaires and a short computer task to find out more about your personality, background, and emotional experiences. If you are interested in the study, you can sign up for the study on the HSP system (look for the ESI Study). If none of the available times work for you, or if you have questions about the study, please email us and a researcher will get back to you promptly.

Thank you for your time!

Best,

Sarah Victor
Research Coordinator and Graduate Student
Personality, Emotion, and Behaviour Lab
ESI Study
Reminder and Directions Email for HSP Participants

Subject: Reminder – HSP Study Tomorrow

Hi (PARTICIPANT NAME),

Thank you for your willingness to participate in our study! This is just a quick email to remind you of your session with the ESI study tomorrow, (DAY OF WEEK) at (TIME). The session will last approximately one hour. If you need to cancel this session, please let the research team know as soon as possible by replying to this email; unfortunately, cancellations of study sessions with less than 24-hours' notice or not attending a scheduled session result in being marked as an "unexcused no-show" in the HSP system.

The session will take place in the Kenny (Psychology Department) building, which is located at 2136 West Mall (near the intersection of West Mall and University Blvd on UBC campus). The laboratory is located in room 1703, which is on the first (basement) floor of the building, down the hallway that directly faces the Psychology Clinic Reception Desk. Because of construction, access to the building is a bit tricky; please allow yourself a few extra minutes to find our room. If you find that you are lost or need help reaching the lab, please contact us by phone at 604-822-6252.

We look forward to seeing you at the study tomorrow!

Best,
Sarah Victor
Graduate Student Coordinator
ESI Study
Appendix B. Sample 2 Advertisements and Recruitment Materials

Emotion and Self-Injury Study

The Personality, Emotion, and Behaviour Lab (PEBL) in the UBC Psychology Department is conducting a study on the emotions, thoughts, and experiences of people who have engaged in non-suicidal self-injury (e.g., intentionally harming yourself without intending to die). If you are interested in participating in the study, please contact us for more information at:

PEBL@psych.ubc.ca or 604-822-6252

To be eligible, you must be age 19 or over and have engaged in non-suicidal self-injury in the past 6 months. All information you provide will be kept strictly confidential. You do not need to provide any sensitive personal information (e.g., mental health history) when contacting us.

The study will consist of a 1 hour session, where you will do a short computer task and fill out questionnaires. You will receive $20 for your time.
The Personality, Emotion, and Behaviour Lab in the UBC Psychology Department is conducting a study on the emotions, thoughts, and experiences of people who have never engaged in non-suicidal self-injury, or who have struggled with non-suicidal self-injury in the past six months. If you are interested in participating in the study, contact us for more information at:

PEBL@psych.ubc.ca or 604-822-6252

To be eligible, you must: 1) be age 19 or over, and 2) either have never engaged in non-suicidal self-injury (intentionally harming yourself without intending to die), or have engaged in self-injury in the past six months.

All information you provide will be kept strictly confidential. You do not need to provide any sensitive personal information (e.g., mental health history) when you contact us.

The study will consist of a 1 hour session, where you will do a short computer task and fill out questionnaires. You will receive $20 and parking or transit reimbursement for your time.
Study Descriptions for Community Online Recruitment

Title: Emotion and Self-Injury Study at UBC

The Personality, Emotion, and Behaviour Lab in the UBC Psychology Department is conducting a study on the emotions, thoughts, and experiences of people who have struggled with non-suicidal self-injury in the past six months.

If you are interested in participating in the study, contact us for more information at: PEBL@psych.ubc.ca or 604-822-6252.

To be eligible, you must: 1) be age 19 or over, and 2) have engaged in non-suicidal self-injury (intentionally harming yourself without intending to die) in the past six months.

All information you provide will be kept strictly confidential. You do not need to provide any sensitive personal information (e.g., mental health history) when you contact us.

The study will consist of a 1 hour session, where you will do a short computer task and fill out questionnaires. You will receive $20 and parking or transit reimbursement for your time.

Title: Emotion Study at UBC

The Personality, Emotion, and Behaviour Lab in the UBC Psychology Department is conducting a study on the emotions, thoughts, and experiences of people who have never engaged in non-suicidal self-injury, or who have struggled with non-suicidal self-injury in the past six months.

If you are interested in participating in the study, contact us for more information at: PEBL@psych.ubc.ca or 604-822-6252.

To be eligible, you must: 1) be age 19 or over, and 2) either have never engaged in non-suicidal self-injury (intentionally harming yourself without intending to die), or have engaged in self-injury in the past six months.

All information you provide will be kept strictly confidential. You do not need to provide any sensitive personal information (e.g., mental health history) when you contact us.

The study will consist of a 1 hour session, where you will do a short computer task and fill out questionnaires. You will receive $20 and parking or transit reimbursement for your time.
Phone Script in Response to First Contact from Community Participants

Hi ________, thank you for your interest in our study! My name is Sarah, and I am the graduate student conducting this research at UBC. If you have a few minutes now, I would like to explain the study to you in a bit more detail and then, hopefully, schedule a time for you to participate in the study. Would that be alright?

[IF BUSY]: When would be a good time to contact you to discuss the study? Would you prefer me to send you more details on the study via email? [Coordinate follow-up with potential participant]

[IF YES]: Great, thank you!

If it is alright with you, I’ll just take a minute or two to describe what we are interested in learning with this study, and our eligibility criteria. If you have any questions, please feel free to let me know. Participation in the study is completely voluntary, so if you are not interested in the study after I describe it, that is perfectly fine.

For this study, we are interested in better understanding the life circumstances, thoughts, and emotions of individuals with a history of non-suicidal self-injury (NSSI). Non-suicidal self-injury is associated with negative emotional experiences and distress for many individuals, and we hope that our research can help understand those experiences and ultimately contribute to research on, and treatment for, NSSI.

To do this research, we are looking for two groups of adults (at least 19 years old). In the first group are individuals who are struggling with NSSI. To be eligible as a member of this group, individuals must have engaged in at least five instances of NSSI in their lifetime (for example, cutting, burning, or hitting), and at least one of these instances must have been in the past six months. In the second group are individuals who have never struggled with NSSI. To be eligible as a member of this group, people must not have had any experience with self-injury now or in the past.

Does that information make sense? Do you have any questions about the study?

[Answer any questions the potential participant has about the study]

So, if that study sounds like it is of interest to you, and you believe you are eligible to participate, the next step would be to schedule a time for you to come in and participate in the study. The session will take approximately 1 hour of your time, and you will be compensated $20, plus bus fare or parking reimbursement, if applicable. What days or times work well for you?

[Schedule timeslot around potential participant availability]

Great, we will see you [Date and Time]. If you have any other questions about the study, please do not hesitate to contact me and I will do my best to answer them before you arrive. Thank you again for your interest in our research!
Email Script in Response to First Contact from Community Participants

Dear __________________.

Thank you for your interest in our study! I hope to be able to provide you with more information about the study’s goals and procedures, so you can decide if you would like to participate.

For this study, we are interested in better understanding the life circumstances, thoughts, and emotions of individuals with a history of non-suicidal self-injury (NSSI). Non-suicidal self-injury is associated with negative emotional experiences and distress for many individuals, and we hope that our research can help understand those experiences and ultimately contribute to research on, and treatment for, NSSI.

To do this research, we are looking for two groups of adults (at least 19 years old). In the first group are individuals who are struggling with NSSI. To be eligible as a member of this group, individuals must have engaged in at least five instances of NSSI in their lifetime (for example, cutting, burning, or hitting), and at least one of these instances must have been in the past six months. In the second group are individuals who have never struggled with NSSI. To be eligible as a member of this group, people must not have had any experience with self-injury now or in the past.

If you believe you are eligible to participate in this study, based on the criteria described above, please email us back with your general availability (days of the week, times of the day) or specific times you would like to meet, and a researcher will contact you to schedule a study timeslot. The study will take approximately 1 hour of your time, and you will be compensated $20, plus bus fare or parking reimbursement, if applicable.

If you have any other questions about the study, please do not hesitate to contact me and I will do my best to answer them. Thank you again for your interest in our research!

Best,
Sarah Victor
Research Coordinator and Graduate Student
Personality, Emotion, and Behaviour Lab
ESI Study
Hi (PARTICIPANT),

Thank you again for your interest in the study! I have scheduled your appointment for (DAY OF WEEK), (DATE) at (TIME).

The study takes place in room 1703 in the Psychology Department (2136 West Mall) at UBC. I've attached maps to help direct you to the building and to the room within the building, as the campus is quite busy with construction and our building is complicated, even for people who are here often. We recommend that you leave a few extra minutes to find us in the building when you arrive. Also, please bring your parking lot ticket (if you drive) or your bus pass (if you take transit) to the session with you, as this helps with transit reimbursement.

If you have questions about the study or if you need to reschedule before your session, please send us an email to this address. If you are running late or are lost on the day of the session, give us a call at 604-822-6252. Thanks so much for your willingness to participate!

Best,
Sarah Victor
Graduate Student Coordinator
ESI Study
Reminder Email for Community Participants

Hi (PARTICIPANT NAME),

Thank you again for your interest in our study! This is just a quick reminder of your session with our study tomorrow, (DAY) at (TIME), in room 1703 of the Psychology Department (2136 West Mall) at UBC. If you cannot make this appointment, please email me back as soon as possible to let me know. If you find that you are running late tomorrow or need help finding our building, please give me a call at 604-822-6252. Look forward to meeting you tomorrow!

Best,
Sarah Victor
Graduate Student Coordinator
ESI Study
Appendix C. Documentation for Sample 1 Consent and Debriefing Procedures

THE UNIVERSITY OF BRITISH COLUMBIA

Personality, Emotion, & Behaviour Lab
Department of Psychology
2136 West Mall
Vancouver, B.C. Canada  V6T 1Z4

RESEARCH CONSENT FORM

Project Title: Emotion and Self-Injury (ESI) Study
Principal Investigator: E. David Klonsky, PhD, Associate Professor of Psychology, UBC
Contact: 604-822-5972
Co-Investigator: Sarah Victor, M.A., Graduate Student in Clinical Psychology, UBC
Contact: 604-822-6252

You are being asked to be a volunteer in a research study.

A. Purpose
This study explores a wide variety of psychological phenomena related to emotional experiences, personality, life experiences and stresses, thoughts, and self-directed harmful behaviours such as self-injury and suicide. This study examines how individuals describe their emotions and their personality, and how that relates to their thoughts and to their behaviours, such as self-harm. The data we collect will help mental health professionals better understand different psychological experiences.

B. Procedure
If you decide to participate in this study, your participation will involve answering a variety of questions on the computer about how you have been feeling lately, your personality, experiences you may have had throughout your life, and your views about yourself and about others. You will also be asked to complete a computer task in which you respond to pictures of faces presented on a screen.

C. Study Duration
Participation in this study will take approximately 1 hour of your time.

D. Potential Risks / Discomforts
One possible risk is that some participants may experience distress when answering personal questions or become tired after answering many questions. If you experience distress at any time, you should feel free to stop the study at any point and to let the interviewer know. It is ok to stop participating in the study at any time. We will provide you with a list of resources where you can get support should you feel distressed.

E. Potential Benefits
There may be no direct benefit for your participation in this study. Some people report that they enjoy the experience of thinking about their life experiences and that they learn something about themselves in the process. Information obtained from this study will further our knowledge of...
emotional experiences and personality. If you are interested in receiving a report on the findings of this study, please provide your contact information on the last page of this consent form.

**F. Compensation**
If you are participating in the study for course credit, you will receive 1 HSP credit for participation in the study in lieu of monetary compensation.

**G. Confidentiality / Protecting the Privacy of Your Information**
Protecting your privacy in this study is very important to us.

We will take steps to help make sure that all the information we get about you is kept secure. Your name will not be used wherever possible. We will use a number (that is not your student number) instead. All the study data that we get from you will be kept locked up. The code will be locked up too. Any computer files that include your information will be identified by a number and will be kept in a password-protected file. If any papers and talks are given about this research, your name will not be used.

If you withdraw from the study before you leave the appointment we can destroy your data. After that time, your data will only be identified by number and we will not be able to discard it.

We want to make sure that this study is being done correctly and that your rights and welfare are being protected. However, if you tell us you are in immediate danger of hurting yourself, hurting someone else, or if we believe the safety of a child is at risk, we will have to report this and may break confidentiality to ensure safety.

**H. Costs to You**
You do not have to pay anything to be in this study.

**I. Alternatives**
Your alternative is to not participate in this study.

**J. Consequences**
You may refuse to participate or withdraw from the study at any time without penalty. If you are currently a student at the University of British Columbia, your refusal to participate in the study or your withdrawal from the study will have no impact on your academic standing, marks, or any other aspect of your education.

**K. Your Rights**
Your participation in this study is voluntary. You do not have to be in this study if you don’t want to be.

You have the right to change your mind and leave the study at any time without giving any reason, and without penalty.

Any new information that may make you change your mind about being in this study will be given to you.

You will get a copy of this consent form to keep.

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- If you have any questions about the study, you may contact the Principal Investigator, Dr. E. David Klonsky at (604) 822-5972.

- If you are feeling unsafe, please call the Crisis Centre at 1-800-784-2433 (available 24 hours) or 911.

If you sign this page, it means that you have read this form, have been given a copy to keep and you that consent to be in this study.

M. Future Research Studies

Our research team conducts many studies investigating the relationship between personality, emotion, and behaviours. If you are interested in being contacted at a later date regarding future available studies for which you might qualify, please indicate that here and provide contact information below.

Do you wish to be contacted for future research studies in the lab? _____ Yes _____ No (Initial)

Participant Name (printed)

Participant Signature Date

Contact Information (Email or Mailing Address) (optional)
Please circle all the positive coping strategies that you might use when you are feeling stressed or upset:

Meditate  
Cook a good meal  
Write in my journal

Call a family member  
Take a bubble bath or hot shower  
Talk to a religious/spiritual leader

Take a leisurely walk  
Draw/doodle  
Play a sport

Listen to music  
Go for a run  
Watch my favorite movie

Go fishing  
Watch the sunset  
Go to a yoga class

Watch silly youtube videos  
Play a computer game  
Get a manicure

Call a friend  
Work on a puzzle/game  
Treat myself to take-out

Go to a sports game  
Play my favorite instrument  
Call a distress/crisis line

Watch something funny on TV  
Read a book or magazine  
Read the comics

Hang out with my friends  
Get a massage  
Go shopping

Savor a cup of tea  
Do a deep breathing exercise  
Bake cookies

Take a nap  
Go swimming  
Sit on the beach

Go rock climbing  
Go to church/temple  
Take a ceramics class

Go to a video arcade  
Take photos  
Visit an aquarium/museum

Work in the garden  
Play with my pet  
Other:____________________
Past research suggests that non-suicidal self-injury (NSSI) is often used to help manage negative emotions (affect), such as sadness and anxiety. While we know a lot of information about how NSSI is related to emotions, we know much less about the other parts of a person’s experience that contribute to their emotions. Some of the things that contribute to our emotional experiences are personality or background, situations or events, attention to events, and appraisal or interpretation of events. Two people could experience the same type of event, but have very different responses depending on their personality, the specific nature of the event, whether they were paying attention to the event, and how they interpret what happened during the event.

In this study, we wanted to find out what types of cognitive factors (thoughts or beliefs) and what types of experiences (stressors or life events) people with and without self-injury were experiencing, to determine whether NSSI is better understood as a problem with emotions (affect), a problem with thoughts (cognition), or a problem with life events (experiences). In order to look at this question, we asked you to do a variety of things. Primarily, we asked you to complete questionnaires about your self-injury history, emotional experiences, personality, and life events. We also asked you to think about some situations and tell us what your interpretation of the situation would be.

We also asked you to complete a computer task that measures what we call attentional bias. Certain types of faces can be more attention-grabbing than others; if a person regularly pays attention to a certain type of face more than others, this is called attentional bias. This bias can be measured by asking people to respond to a dot that appears behind one of two faces and seeing how long it takes a person to respond. Faster responses when the dot is under a certain type of face indicate that the person was already looking at the face, suggesting attentional bias. We asked you to complete this task in order to measure whether you have a tendency to pay attention to certain negative emotion faces (sad, angry, scared) compared to more neutral faces.

We expected that self-injurers will show a bias towards angry faces, as compared to sad or scared faces. We also expect that self-injurers will give more negative interpretations of ambiguous situations, and that they will have experienced more stressful life events.

If you have any further questions, please feel free to ask the experimenter or use the contact information below to contact a member of the research team at a later time.

Contact Information about the Experiment
This experiment is being conducted under the supervision of Dr. E. David Klonsky (604-822-5972), the Principal Investigator, with Sarah Victor (604-822-6252) as the co-investigator. Please call one of them if you have any questions about the study.

More Information about the Experiment
If you would like to read more about what we know about the research questions, please check out the following articles:

HSP Debriefing Survey – Spring 2015

Thank you for participating in this study. The research portion of the session is now over, and the research assistant will next spend some time telling you more about this study to help clarify the larger goals of the research. The following review survey is designed by the Psychology Department Subject Pool to help you follow along as you learn more about this study and the nature of scientific inquiry in psychology. Although completing this worksheet is voluntary, your responses will help maximize what you learn from your experience as a participant in the Department Subject Pool. Responses can also help researchers refine their procedures and allow the Psychology Department to recognize study review sessions that participants find most educational. Your responses are completely anonymous, will not be used for research purposes or have any bearing on receiving credit for your participation.

1. Principal Investigator (Core Faculty):
2. Full Study Name:
3. Date of participation: 4. Research Assistant (Full Name)
5. What was the main purpose and/or broader implication of the current study?
6. This study relies primarily on an experimental or correlational design?
7. The primary independent or predictor variable in this study is:
8. The primary dependent or outcome variable in this study is:
9. The primary hypothesis being tested is:
10. If you were going to do a study like this, what would you change/add/modify?
11. If this study was published in an Introductory Psychology textbook, it would be in a chapter on (select at least one):

168
12. Please answer the following questions using a 1-5 rating scale (with 1 meaning "not at all" and 5 meaning "extremely"):

How clear and informative was the debriefing for this study?

How interesting and engaging was the debriefing for this study?

13. Were you orally debriefed by the researcher?
Resources and Referrals

24-Hour Resources

911
If you are feeling suicidal and not able to keep yourself safe, please call 911.

Crisis Centre
1-800-784-2433
http://www.crisiscentre.bc.ca/get-help/
The Distress Phone Services provide confidential, non-judgmental, free emotional support, 24 hours a day, 7 days a week, for people experiencing feelings of distress or despair.

Vancouver General Hospital Emergency Department
604-875-4111
VGH can provide assessment, inpatient, and outpatient treatment for mental health difficulties.

Fraser Health Emergency Mental Health Services
877-384-8062
This service provides clinical and emotional support to individuals in crisis.

On-Campus Resources

Counselling Services
(604) 822-3811
http://students.ubc.ca/livewell/services/counselling-services
UBC students can receive free individual therapy and low-cost group therapy at Counselling Services, located in Brock Hall. It is recommend that students call ahead for an appointment. Additionally, drop-in hours are available every weekday for several hours.

Student Health Services
(604) 822-7011
http://students.ubc.ca/livewell/services/student-health-service
UBC students can access free psychiatric consultation through SHS. There is often a waitlist for these services.

Speakeasy Peer Support, Information, and Referral
(604) 822-9246
http://www.ams.ubc.ca/services/speakeasy/
Please note this service is only available during the school year (September-April). Speakeasy provides drop-in support and referrals for students by peers and is located in the SUB. In addition you can phone or email them (speak@ams.ubc.ca). Volunteers are caring and resourceful individuals who would love to help.
Resources and Referrals

Resources During Business Hours

Vancouver Community Mental Health Services
VCMHS has a multidisciplinary team offers diagnosis, treatment, individual and group therapy, rehabilitation, and consultation to children, youth, adults, and older adults with persistent mental health issues. They are divided by geographic area.

<table>
<thead>
<tr>
<th>Area</th>
<th>Phone Number</th>
<th>Area</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitsilano/Fairview</td>
<td>604-736-2881</td>
<td>Grandview/Woodlands</td>
<td>604-251-2264</td>
</tr>
<tr>
<td>Midtown</td>
<td>604-872-8441</td>
<td>Northeast</td>
<td>604-253-5353</td>
</tr>
<tr>
<td>South</td>
<td>604-266-6124</td>
<td>Strathcona</td>
<td>604-253-4401</td>
</tr>
<tr>
<td>West End</td>
<td>604-687-7994</td>
<td>West Side</td>
<td>604-873-6733</td>
</tr>
</tbody>
</table>

Fraser Health Mental Health Care Programs
These programs, divided by geographic area, offer assessment, treatment, crisis intervention, and community support to youth, adults, and older adults with mental health issues.

<table>
<thead>
<tr>
<th>Area</th>
<th>Phone Number</th>
<th>Area</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbotsford</td>
<td>604-870-7800</td>
<td>Agassiz</td>
<td>604-793-7160</td>
</tr>
<tr>
<td>Burnaby North</td>
<td>604-949-7730</td>
<td>Burnaby South</td>
<td>604-777-6870</td>
</tr>
<tr>
<td>Burnaby Central</td>
<td>604-453-1900</td>
<td>Chilliwack</td>
<td>604-702-4860</td>
</tr>
<tr>
<td>Delta North</td>
<td>604-592-3700</td>
<td>Delta 56th St</td>
<td>604-948-7010</td>
</tr>
<tr>
<td>Hope</td>
<td>604-860-7733</td>
<td>Langley</td>
<td>604-514-7940</td>
</tr>
<tr>
<td>Maple Ridge</td>
<td>604-476-7165</td>
<td>Mission</td>
<td>604-814-5600</td>
</tr>
<tr>
<td>New Westminster</td>
<td>604-777-6800</td>
<td>Tri Cities</td>
<td>604-777-8400</td>
</tr>
<tr>
<td>Surrey</td>
<td>604-953-4900</td>
<td>White Rock</td>
<td>604-541-6844</td>
</tr>
</tbody>
</table>

Online Resources

British Columbia Psychological Association (http://www.psychologists.bc.ca)
This website allows you to search for a psychologist based on location, gender, type of problem, and type of treatment offered.

Crisis Centre (http://www.crisiscentre.bc.ca/get-help)
This website provides more information about the Distress Line, the YouthBC online chat service, and other resources for those in crisis.

Self Abuse Finally Ends (S.A.F.E. Alternatives) (http://www.selfinjury.com)
This website provides information about self-injury, treatment options, and resources.

Self-Injury Outreach & Support (http://www.sioutreach.org/)
This website provides information about self-injury, treatment options, and resources to help cope with self-injury urges.
Appendix D. Documentation for Sample 2 Consent and Debriefing Procedures

THE UNIVERSITY OF BRITISH COLUMBIA

Personality, Emotion, & Behaviour Lab
Department of Psychology
2136 West Mall
Vancouver, B.C. Canada V6T 1Z4

RESEARCH CONSENT FORM

Project Title: Emotion and Self-Injury (ESI) Study
Principal Investigator: E. David Klonsky, PhD, Associate Professor of Psychology, UBC
Contact: 604-822-5972
Co-Investigators: Sarah Victor, M.A., Graduate Student in Clinical Psychology, UBC
Contact: 604-822-6252
Diana Damstrom-Albach, MSW, MA, Vancouver Coastal Health
Contact: 604-675-3985

You are being asked to be a volunteer in a research study.

A. Purpose
This study explores a wide variety of psychological phenomena related to emotional experiences, personality, life experiences and stresses, thoughts, and self-directed harmful behaviours such as self-injury and suicide. This study examines how individuals describe their emotions and their personality, and how that relates to their thoughts and to their behaviours, such as self-harm. The data we collect will help mental health professionals better understand different psychological experiences.

B. Procedure
If you decide to participate in this study, your participation will involve answering a variety of questions on the computer about how you have been feeling lately, your personality, experiences you may have had throughout your life, and your views about yourself and about others. You will also be asked to complete a computer task in which you respond to pictures of faces presented on a screen.

C. Study Duration
Participation in this study will take approximately 1 hour of your time.

D. Potential Risks / Discomforts
One possible risk is that some participants may experience distress when answering personal questions or become tired after answering many questions. If you experience distress at any time, you should feel free to stop the study at any point and to let the interviewer know. It is ok to stop participating in the study at any time. We will provide you with a list of resources where you can get support should you feel distressed.

E. Potential Benefits
There may be no direct benefit for your participation in this study. Some people report that they enjoy the experience of thinking about their life experiences and that they learn something about
themselves in the process. Information obtained from this study will further our knowledge of emotional experiences and personality. If you are interested in receiving a report on the findings of this study, please provide your contact information on the last page of this consent form.

F. Compensation
As an honorarium for your time, you will receive $20, plus bus fare or parking reimbursement, for participation in the study in lieu of monetary compensation.

G. Confidentiality / Protecting the Privacy of Your Information
Protecting your privacy in this study is very important to us.

We will take steps to help make sure that all the information we get about you is kept secure. Your name will not be used wherever possible. We will use a number (that is not your student number) instead. All the study data that we get from you will be kept locked up. The code will be locked up too. Any computer files that include your information will be identified by a number and will be kept in a password-protected file. If any papers and talks are given about this research, your name will not be used.

If you withdraw from the study before you leave the appointment we can destroy your data. After that time, your data will only be identified by number and we will not be able to discard it.

We want to make sure that this study is being done correctly and that your rights and welfare are being protected. However, if you tell us you are in immediate danger of hurting yourself, hurting someone else, or if we believe the safety of a child is at risk, we will have to report this and may break confidentiality to ensure safety.

H. Costs to You
You do not have to pay anything to be in this study.

I. Alternatives
Your alternative is to not participate in this study.

J. Consequences
You may refuse to participate or withdraw from the study at any time without penalty. If you are currently a student at the University of British Columbia, your refusal to participate in the study or your withdrawal from the study will have no impact on your academic standing, marks, or any other aspect of your education.

K. Your Rights
Your participation in this study is voluntary. You do not have to be in this study if you don’t want to be.

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L. Questions about the Study or Your Rights as a Research Subject

• If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

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• If you are feeling unsafe, please call the Crisis Centre at 1-800-784-2433 (available 24 hours) or 911.

If you sign this page, it means that you have read this form, have been given a copy to keep and you that consent to be in this study.

M. Future Research Studies

Our research team conducts many studies investigating the relationship between personality, emotion, and behaviours. If you are interested in being contacted at a later date regarding future available studies for which you might qualify, please indicate that here and provide contact information below.

Do you wish to be contacted for future research studies in the lab? _____ Yes _____ No (Initial)

________________________________________________________________
Participant Name (printed)

________________________________________________________________
Participant Signature Date

Contact Information (Email or Mailing Address) (optional)
Resources and Referrals

24-Hour Resources

911
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Hope 604-860-7733
Langley 604-514-7940
Maple Ridge 604-476-7165
Mission 604-814-5600
New Westminster 604-777-6800
Tri Cities 604-777-8400
Surrey 604-953-4900
White Rock 604-541-6844

Other Resources

Please use this space to record any additional sources of support you prefer to use, including case managers, therapists, friends, or family members:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Version: October 30, 2014
Appendix E. Crisis Response Protocol

Crisis Response Plan
ESI Study

1. At the end of the research session, the research assistant will begin by reviewing the participants’ Coping Questionnaire, reminding them of their positive coping strategies.

2. The research assistant will then acknowledge that answering questions about some difficult topics can bring up a number of emotions and ask the participant if he or she is feeling emotionally well.

3. If the participant indicates either directly or indirectly intimates that he or she is currently a risk to him/herself or others, the research assistant will proceed with a risk assessment including the following questions:
   a. How intense are the current thoughts?
   b. How frequently have the thoughts been occurring?
   c. Does the participant have a plan as to how they would carry out a suicide attempt?
   d. If so, do they have access to the means? Do they have a specific time in mind?
   e. Are there any things preventing the participant from making an attempt?

4. After a thorough risk assessment, if the participant expresses an imminent intention to attempt suicide, then the research assistant will assist the participant in receiving emergency psychiatric assessment and care. If the participant is a UBC student, the research assistant will walk him or her to UBC Counselling Services (Room 1040 – Brock Hall). If UBC Counselling Services is not open, or if the participant is not a UBC student, the research assistant will either instruct the participant to call a friend or family member to come pick them up or personally to escort the participant to Vancouver General Hospital Emergency Department (920 W. 10th Avenue), depending on the participant’s preference.

5. As is standard practice in clinical and research protocols, if the participant expresses imminent risk, but refuses offered interventions, confidentiality will be broken and the proper authorities (i.e. 911) will be notified.

6. The research assistant will consult with the co-investigator, Sarah Victor, and the Primary Investigator, Dr. E. David Klonsky, regarding any critical incidents and necessary follow-up.
Appendix F. Dot-Probe Computer Task Diagram

Incongruent Trial (dot “behind” neutral face)

Press key or 1000 milliseconds

Congruent Trial (dot “behind” emotional face)

Press key or 1000 milliseconds
Appendix G. Unpublished or Modified Questionnaires for Samples 1 and 2

Items Added to the Attributional Style Questionnaire (ASQ)

5) How important would this situation be if it happened to you?

| Not at all important | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely important |

6) Has a situation like this ever happened to you?

- No
- Yes, in the distant past (> 1 year ago)
- Yes, relatively recently (between 1 month and 1 year ago)
- Yes, very recently (in the last month)

7) When this situation happened to you, was the cause the same as what you wrote down above?

- Has never happened to me
- No, different cause
- Yes, same cause
- I’m not sure
- Has happened multiple times, sometimes with the same cause and sometimes with a different cause
Demographics Form

1. Gender: ______________________________

2. Date of Birth (YYYY/MM/DD): __________________________

3. Were you born in Canada?  ❑ No  ❑ Yes
   3b. If no, when did you move to Canada (year): __________________________

4. Are you a native speaker of English?  ❑ No  ❑ Yes
   4b. If no, when did you begin to learn English (year): __________________________

5. Race/Ethnicity:
   ❑ African descent
   ❑ East Asian descent
   ❑ European descent/Caucasian
   ❑ First Nations
   ❑ Indian-South Asian descent
   ❑ Hispanic/Latino descent
   ❑ Middle Eastern Descent
   ❑ Biracial/Multiracial
   ❑ Other: __________________________

6. Sexual Orientation:
   ❑ Bisexual
   ❑ Gay
   ❑ Lesbian
   ❑ Questioning
   ❑ Straight
   ❑ Other: __________________________

7. Marital Status:
   ❑ Single
   ❑ Unmarried, in a relationship
   ❑ Married/Common-law
   ❑ Divorced/Separated
   ❑ Widowed
   ❑ Other: __________________________

8. Education Level:
   ❑ Grade 8 or less
   ❑ Some high school
   ❑ High school graduate/GED
   ❑ Some college or university (current university student)
   ❑ College or university graduate
   ❑ Some graduate or professional school
   ❑ Masters degree
   ❑ Doctoral degree

9. Are you currently working outside the home?  ❑ No, unemployed
   ❑ No, on disability
   ❑ Yes, part-time
   ❑ Yes, full-time
Mental Health History Form

1. Have you ever received counseling, therapy, or any other kind of psychological treatment? ❑ No ❑ Yes, in the past ❑ Yes, currently

2. Have you ever used a psychiatric medication (e.g., antidepressant, anti-anxiety drug)? ❑ No ❑ Yes, in the past ❑ Yes, currently

3. Have you ever received inpatient psychiatric care (e.g., stayed overnight for mental health reasons)? ❑ No ❑ Yes

4. Have a mental health professional ever given you a diagnosis of a mental illness or psychiatric disorder? ❑ No ❑ Yes

Please continue if you have ever (past or present) been given a psychiatric diagnosis.

5. What psychiatric diagnoses have you ever received? Please only mark those given to you by a mental health professional or doctor. Check all that apply:

❑ Mood disorder (examples: depression, bipolar disorder)
❑ Anxiety disorder (examples: social anxiety, post-traumatic stress)
❑ Substance-related disorder (examples: alcohol or drug abuse or dependence)
❑ Psychotic disorder (examples: schizophrenia, hallucinations, delusions)
❑ Eating disorder (examples: bulimia, anorexia, binge-eating)
❑ Personality disorder (examples: borderline, avoidant personality)
❑ Other disorders (examples: ADHD/ADD, impulse control disorders)

Please specify: ___________________ _______________________

6. Out of the diagnoses you marked above, which do you consider your primary current diagnosis or diagnoses? This should only include diagnoses that your current treatment team (e.g., psychiatrist, general practitioner, psychologist, case manager) believes apply to you. Check all that apply:

❑ Not applicable (I had a diagnosis before, but I do not have a current primary diagnosis)
❑ Mood disorder
❑ Anxiety disorder
❑ Substance-related disorder
❑ Psychotic disorder
❑ Eating disorder
❑ Personality disorder
❑ Other disorders

Please specify: ___________________ _______________________

Version: January 23, 2015