A MIXED METHODS INVESTIGATION OF ATTENTION AND

MINDFULNESS AMONG YOUNG ADULTS WITH

A HISTORY OF NONSUICIDAL SELF-INJURY

by

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ABSTRACT

Nonsuicidal self-injury (NSSI) refers to the deliberate and self-inflicted destruction of body tissue without suicidal intent, and is especially prevalent among young adults. NSSI serves a myriad of functions and is maintained by complex transdiagnostic processes. Attentional bias (AB)—the preferential allocation of attentional resources to environmental stimuli related to maladaptive behaviors—is one such transdiagnostic process experienced by self-injuring young adults. Effectively treating NSSI among young adults not only requires an explanation of the complex processes that inform the behavior, but also an understanding of the treatment mechanisms that create change. The purpose of this dissertation was to evaluate the impact of one transtherapeutic mechanism on one transdiagnostic process to further that understanding of addressing NSSI—specifically, the impact of a brief mindfulness induction on NSSI AB. This was done through a baseline analysis of NSSI AB among self-injuring young adults as evaluated by an experimental task, a repeated measures analysis of the impact of a brief mindfulness induction on NSSI AB, and a qualitative description of participants' experiences with and perceptions of completing the experimental task and mindfulness induction.

For my parents.

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CHAPTER 1

INTRODUCTION

Nonsuicidal self-injury (NSSI)—the self-inflicted, socially unsanctioned, and deliberate destruction of body tissue without suicidal intent—is an alarming and increasingly common problem behavior among young people (Angelotta, 2015; Brown & Plener, 2017; Nock & Favazza, 2009). When individuals cut, burn, hit, or otherwise injure themselves in response to complex affective, cognitive, and interpersonal antecedents, responding in helpful ways can be challenging. Effectively treating NSSI requires insight into the processes that motivate individuals to express their psychological pain through visceral means.

NSSI typically begins in youth between 12 and 15 years old (Andrews, Martin, Hasking, & Page, 2013, 2014; Brown & Plener, 2017; Klonsky, 2011; Klonsky & Muehlenkamp, 2007), although age of onset can range from 6 to 24 years old (Klonsky, 2007; Nock, Teper, & Hollander, 2007). The prevalence of NSSI in adolescent samples can range from 12% to 37.2% (Brown & Plener, 2017; Jacobson & Gould, 2007; Swannell, Martin, Page, Hasking, & St. John, 2014) and from 9% to 38% in young adult samples (Wester, Trepal, & King, 2018). Although individuals can struggle with NSSI throughout the lifespan (Klonsky, 2011; Klonsky & Muehlenkamp, 2007), I have focused my dissertation specifically on NSSI in young adults. This decision was motivated by the

prevalence of NSSI in young adulthood, as well as the logistics of recruiting a young adult versus adolescent sample. Specifically, young adults have fewer participation barriers when compared to adolescents (e.g., they do not require parental permission nor do they have to be accompanied by a guardian during the study procedures).

Given that NSSI co-occurs in mood, anxiety, stress, substance, and eating disorders (Auerbach et al., 2014; Cucchi et al., 2016; Jacobson & Gould, 2007; Meszaros, Horvath, & Balazs, 2017; Nock, Joiner Jr., Gordon, Lloyd-Richardson, & Prinstein, 2006), utilizing a transdiagnostic perspective when evaluating the functions of NSSI, and more especially identifying transdiagnostic processes that initiate and maintain such behaviors, mitigates the potential bias of associating NSSI with specific diagnoses (Garland & Howard, 2014; Schreiner, Klimes-Dougan, Begnel, & Cullen, 2015). One such transdiagnostic process is attentional bias (AB)—the tendency for attentional resources to be allocated to specific aspects of environmental stimuli that have become disproportionately salient over time (Field & Cox, 2008). As individuals engage in NSSI, their attention may become increasingly drawn toward NSSI-related cues, such as words and images posted to social media or environmental objects such as razors and bandages. Figure 1 outlines a proposed conceptual framework of the mechanisms of NSSI, including AB. This framework combines Nock's integrated model of NSSI (2009), Folkman's transactional model of stress and coping (1984), and Garland's model of the risk chain linking stress to addiction (Garland, 2016).

More than 90% of self-injuring individuals report engaging in self-injury to experience relief from emotional distress (Franklin et al., 2010; Hasking, Whitlock, Voon, & Rose, 2016; Klonsky, 2007; Klonsky & Glenn, 2009). As illustrated in Figure 1,

when individuals encounter a stressful situation and determine they do not have the resources necessary to manage it, they may subsequently respond with intense negative affect, feelings of numbness, or overwhelming feelings brought on by unmanageable social demands. Individuals are then at heightened risk for engaging in NSSI, motivated by ending feelings of numbness by inflicting pain, eliciting reactions from others, or gaining acceptance from peers who engage in NSSI (Klonsky, 2007; Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Klonsky & Muehlenkamp, 2007; Tatnell, Kelada, Hasking, & Martin, 2014). Over time, if individuals engage in NSSI after a period of perseverative cognition, NSSI becomes maintained through a process of behavioral reinforcement. This includes automatic reinforcement (e.g., relieving aversive affective or cognitive states, or generating positive emotions or sensations) and social reinforcement (e.g., facilitating escape from distressing social situations or interpersonal demands, or eliciting emotions from others or communicating internal distress to others) (Nock & Prinstein, 2004).

The roles of the stress response and subsequent behavioral reinforcement in the development of NSSI have received tremendous empirical support (e.g., Beauchaine, 2015; Bresin & Gordon, 2013; Franklin et al., 2010; Klonsky, 2007; Wielgus, Aldrich, Mezulis, & Crowell, 2016). Less is known about the mechanisms outlined in addiction literature, such as automatized action schemas, urge, and AB. The proposed conceptual framework suggests that NSSI might occur in response to automatized NSSI action schemas, similar to the drug action schemas described by Tiffany (1990). These action schemas refer to conditioned responses involving complex behaviors that may be activated in response to environmental cues. For self-injuring individuals, engaging in

NSSI may become so habitual that exposure to NSSI cues may result in engaging in the behavior without conscious choice due to the activation of action schemas. This process is perpetuated by AB, especially as attentional resources become increasingly allocated to NSSI-specific stimuli. Individuals attempting to suppress the urge to engage in NSSI may experience a rebound effect as they exhaust cognitive resources (Wenzlaff & Wegner, 2000), resulting in NSSI and negative reinforcement as they experience relief from the urge.

In addition to behavioral reinforcers of NSSI, the framework outlined in Figure 1 proposes AB as another mechanism that perpetuates NSSI. The role of AB in the development and maintenance of NSSI among young adults warrants particular investigation given the association between AB and other problem behaviors, e.g., drug AB is predictive of relapse among individuals in recovery (Garland, Franken, & Howard, 2012) and suicide AB is predictive of future suicide attempts (Cha, Najmi, Park, Finn, & Nock, 2010). One goal of this dissertation was to determine if a sample of self-injuring young adults exhibited an AB to NSSI cues and whether that AB was associated with any other mechanisms that have been established in NSSI research.

The lack of empirically validated interventions available to treat NSSI (Glenn, Franklin, & Nock, 2015; Ougrin et al., 2015; Stanley, Fineran, & Brodsky, 2014) underscores the urgent need for examining how transtherapeutic approaches can be applied to address the underlying processes driving this problem behavior. Mindfulness—the metacognitive monitoring of present-moment experiences (Keng, Smoski, & Robins, 2011; Vago & Silbersweig, 2012)—is one such transtherapeutic approach that has gained increasing attention and empirical support in recent years due to

its clinical applications across demographics and problem behaviors (Bluth & Blanton, 2014; Brown, Ryan, & Creswell, 2007; Burke, 2010; Garland et al., 2014; Greeson, Garland, & Black, 2014; Keng et al., 2011; Zenner, Herrnleben-Kurz, & Walach, 2014; Zoogman, Goldberg, Hoyt, & Miller, 2015), as well as its ability to disrupt and ultimately decrease AB (e.g., Garland, Baker, & Howard, 2017; Garland, Boettiger, Gaylord, Chanon, & Howard, 2012; Garland, Gaylord, Boettiger, & Howard, 2010; Garland & Howard, 2013; Vago & Nakamura, 2011). Benefits of mindfulness as a transtherapeutic approach include increased self-compassion and emotional wellbeing (Bluth & Blanton, 2014), reduced psychological stress and stress-related health problems (Goldberg et al., 2018; Goyal, Singh, & Sibinga, 2014), increased cognitive performance and stress resiliency (Zenner, Herrnleben-Kurz, & Walach, 2014), and decreased symptoms of psychopathology (Zoogman, Goldberg, Hoyt, & Miller, 2015).

This dissertation was conducted to determine whether self-injuring individuals exhibit an AB toward NSSI-related stimuli and to evaluate the effects of a brief mindfulness induction on self-injury AB and NSSI urge by employing an embedded concurrent mixed methods design (Creswell & Plano Clark, 2011; Fetters et al., 2013; Johnson & Schoonenboom, 2016; O'Cathain et al., 2014). This study was guided by a pragmatist epistemology (Morgan, 2014). The decision to choose methods that were consistent with the research questions, the desire to balance objectivity with subjectivity, and the valuing of outcomes and meaning-making are all consistent with pragmatism as both a research approach and paradigm (Morgan, 2014). Although both postpositivist and interpretivist assumptions (Creswell & Clark, 2011; Fetters, Curry, & Creswell, 2013) were utilized in this study (e.g., data sampling methods were determined based on the

overarching quantitative design, whereas an interpretive analytic was used when approaching the qualitative data), pragmatism guided the design, implementation, and analysis of the study (Castro, Kellison, Boyd, & Kopak, 2010).

Embedded concurrent designs are often employed in intervention studies (Plano Clark et al., 2013), as they are well-suited for enriching understandings of the overarching quantitative results through explanatory qualitative analyses. In this study, the quantitative strand relied on clinical interview data, self-report measures, and an experimental task protocol to answer the following questions: (1) Do self-injuring individuals exhibit an AB toward NSSI-related stimuli? (2) What is the impact of a brief mindfulness induction on self-injury AB among self-injuring individuals? The qualitative strand was embedded within the parallel randomized design in order to deepen participants' abilities to describe their experiences of the quantitative procedures, as well as explicate the meanings they were able to derive through their study participation. Specifically, the qualitative strand relied on semistructured interview procedures to answer the following questions: (1) How do individuals perceive and experience the phenomenon of NSSI AB? (2) How do individuals experience a brief mindfulness induction after viewing images of NSSI?

To that end, this dissertation is organized into three chapters that outline the process and outcomes of this study. Written as independent articles, the chapters cover the following three topics: (1) a baseline analysis of NSSI AB among self-injuring youth as evaluated by an experimental task, (2) a repeated measures analysis of the impact of brief mindfulness training on NSSI AB, and (3) a qualitative description of participants' experiences with and perceptions of completing the experimental task and mindfulness

induction. The final chapter of this dissertation offers a brief conclusion, including

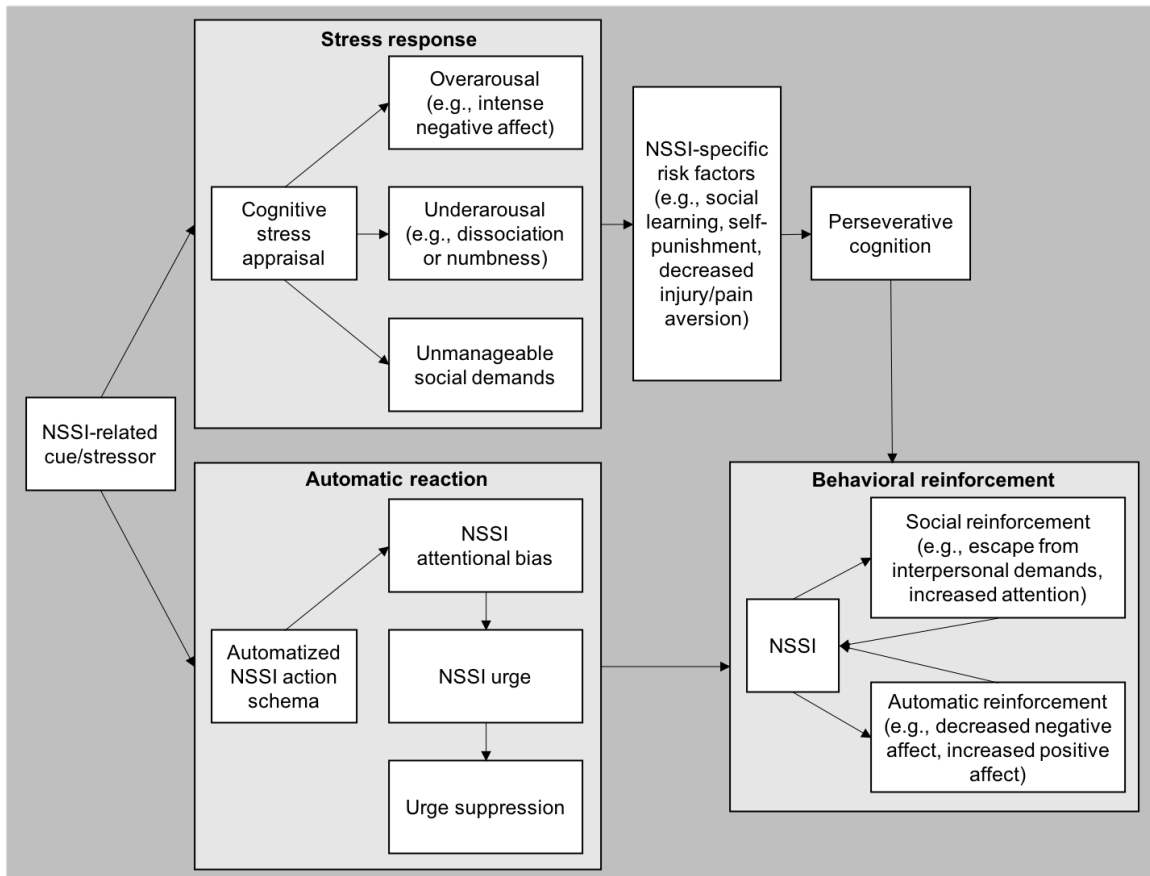recommended future research and applications for social work practice.

Figure 1

The proposed conceptual framework suggests when individuals encounter stressful situations, they may subsequently respond with intense negative affect, feelings of numbness, or overwhelming feelings brought on by unmanageable social demands. Individuals are then at heightened risk for engaging in NSSI, motivated by ending feelings of numbness by inflicting pain, eliciting reactions from others, or gaining acceptance from peers who engage in NSSI. Over time, NSSI becomes maintained through a process of behavioral reinforcement. NSSI may also occur in response to automatized NSSI action schemas. These action schemas refer to conditioned responses involving complex behaviors that may be activated in response to environmental cues. For self-injuring individuals, engaging in NSSI may become so habitual that exposure to NSSI cues may result in engaging in the behavior without conscious choice due to the activation of action schemas. This process is perpetuated by AB, especially as attentional resources become increasingly allocated to NSSI-specific stimuli. Individuals attempting to suppress the urge to engage in NSSI may experience a rebound effect as they exhaust cognitive resources, resulting in NSSI and negative reinforcement as they experience relief from the urge.

CHAPTER 2

ATTENTIONAL BIAS FOR NONSUICIDAL SELF-INJURY CUES AMONG

SELF-INJURING YOUNG ADULTS

Abstract

Nonsuicidal self-injury (NSSI) is a prevalent problem behavior among young

adults that serves a myriad of functions and is maintained by complex transdiagnostic

processes. This study sought to investigate whether attentional bias (AB)—the

preferential allocation of attentional resources to environmental stimuli related to

maladaptive behaviors—is one such transdiagnostic process experienced by self-injuring

young adults. Participants included 30 young adults recruited from a large university and

its surrounding community who completed a dot probe task designed to measure NSSI

AB and AB to negatively valenced stimuli. Participants also provided NSSI urge and

affect ratings during the task. Paired samples t-tests were conducted to determine if

participants exhibited a significant AB to NSSI cues and negatively valenced cues

compared to neutral cues. Participants showed a significant AB to NSSI cues presented

for 200 ms, but not for cues presented for 2000 ms. Participants did not exhibit a

significant AB to negative cues presented for 200 ms or 2000 ms, indicating the NSSI AB

was specific to the NSSI cues rather than a normative AB to negative affective stimuli

observed among individuals with psychopathology symptoms. This study provides the first documented evidence of NSSI AB among self-injuring individuals.

Introduction

Nonsuicidal self-injury (NSSI) refers to the deliberate and self-inflicted destruction of body tissue without suicidal intent (Angelotta, 2015), and is especially prevalent among young adults. A recent systematic review found that 38.9% of university students engage in NSSI (Cipriano, Cella, & Cotrufo, 2017). More than 90% of self-injuring individuals report engaging in self-injury to experience relief from emotional distress (Franklin et al., 2010; Hasking, Whitlock, Voon, & Rose, 2016; Klonsky, 2007; Klonsky & Glenn, 2009). Other functions can include antidissociation (i.e., ending feelings of numbness by inflicting pain), antisuicide (i.e., distraction from suicidal ideation), interpersonal influence (i.e., eliciting reactions from others), and peer bonding (i.e., gaining acceptance from others) (Klonsky, 2007; Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Klonsky & Muehlenkamp, 2007; Tatnell, Kelada, Hasking, & Martin, 2014). Most significantly, NSSI serves the function of emotion regulation—acute negative affect precedes NSSI, is followed by an immediate sense of relief, and is primarily maintained through automatic negative reinforcement (Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Nock & Prinstein, 2004).

The affect regulation theory outlines how relief from emotional distress leads to repeated NSSI: "After engaging in NSSI several times, the behavior becomes an automatic, conditioned response to emotional arousal" (Jacobson & Batejan, 2014, p. 313). In other words, individuals become more likely to engage in NSSI if it provides

relief from emotional distress and, in turn, they become habituated to engaging in NSSI whenever they experience negative affect. A recent systematic review examined the use of ecological momentary assessment in NSSI studies (Rodríguez-Blanco, Carballo, & Baca-García, 2018). The authors found that across samples, self-injuring individuals reported negative affect most often preceded NSSI and that they were motivated to engage in NSSI to relieve emotional distress. They also highlighted several studies that found the relationship between negative affect and impulsivity predicted the urge to engage in NSSI and subsequent NSSI behaviors (e.g., Ammerman, Olino, Coccaro, & McCloskey, 2017; Bresin & Gordon, 2013). This review was especially salient given that NSSI functions have typically been assessed retrospectively.

Buser and Buser (2013) conceptualized NSSI as a process addiction. Process addictions refer to a class of addictive behaviors that do not involve ingesting substances, but include such elements as compulsivity, loss of control, continued engagement in the behavior despite negative consequences, and tolerance. They concluded that while NSSI may have addictive features for some self-injuring individuals, NSSI is multidetermined, serves different functions for different individuals, and is not experienced by all self-injuring individuals as a process addiction. As such, perhaps the most salient method of conceptualizing NSSI from an addiction perspective is identifying transdiagnostic processes that initiate and maintain such behaviors. Attentional bias (AB) is one such transdiagnostic process.

AB refers to the preferential allocation of attentional resources to specific aspects of environmental stimuli (Field & Cox, 2008). The role of AB in the development and maintenance of NSSI among self-injuring individuals warrants particular investigation

given the association between AB and other problem behaviors, e.g., suicide AB is predictive of future suicide attempts (Cha, Najmi, Park, Finn, & Nock, 2010). For self-injuring individuals, exposure to NSSI words or images on social media or other online sources could result in the development of NSSI AB. Current research indicates such online sources may reinforce, validate, or otherwise normalize NSSI (Whitlock et al., 2006). However, there are currently no studies demonstrating NSSI AB among self-injuring individuals.

Assessment and treatment implications found in addiction literature, including the role of AB in maladaptive behaviors, could shed light on the development and maintenance of NSSI. Tiffany's (1990) cognitive model of addiction asserts that drug use action schemas are activated in response to substance cues, i.e., "unitized memory systems that are somewhat self-sufficient in that they contain adequate information for the initiation and coordination of complex sequences of drug-use behavior" (p. 154). The activation of these drug use action schemas results in automatic use of substances without conscious choice. This process of automaticity, or "automatic pilot," is consistent with some self-injuring individuals' reports of engaging in NSSI without conscious control (Buser & Buser, 2013). According to Tiffany's model (1990), craving for substances occurs when the drug use action schema is triggered by substance cues and then the individual is prevented from engaging in the automatic habit—such as what occurs when one consciously tries to avoid using substances. Although Victor et al. (2012) described differences in substance craving versus NSSI urge, the urge to engage in NSSI may be instigated by exposure to NSSI cues. Subsequently, attempts to suppress such thoughts of engaging in NSSI may have the counterproductive effect of exhausting cognitive

resources and increasing the likelihood of engaging in such behaviors (Garland, Brown, & Howard, 2016; Rogojanski, Vettese, & Antony, 2011; Wenzlaff & Wegner, 2000). Regardless of whether individuals experience or exhibit all features of addiction, AB to NSSI cues may predict engaging in NSSI behaviors.

If self-injuring individuals do exhibit an AB to NSSI cues, certain traits might act as protective factors that buffer individuals from developing or suffering from AB. For example, AB has been linked to difficulties with emotion regulation (Todd, Cunningham, Anderson, & Thompson, 2012), a common transdiagnostic trait among self-injuring individuals (Nock, 2009). Individuals with greater emotion regulatory capacity may be less likely to exhibit an AB to NSSI cues or suffer from its effects. Dispositional mindfulness may also serve as a protective factor given its inverse association with addiction AB (Baker & Garland, 2018; Garland, Boettiger, Gaylord, Chanon, & Howard, 2012). Mindfulness can be described as a state of awareness (i.e., metacognitive monitoring of present-moment thoughts, feelings, and sensations without attachment or reactivity), a practice (i.e., efforts, such as meditation practices, focused on inducing the state of mindfulness and cultivating the trait of mindfulness), and a trait or disposition (i.e., the general tendency of attending to and being aware of daily life experiences) (Keng, Smoski, & Robins, 2011; Vago & Silbersweig, 2012). The practice of mindfulness induces a state of mindfulness and ultimately cultivates dispositional mindfulness, or the tendency toward being mindful in everyday life. A recent systematic review (Tomlinson, Yousaf, Vittersø, & Jones, 2018) indicated that dispositional mindfulness is associated with fewer psychopathological symptoms and greater emotion regulation and overall psychological health. Given the relationship between mindfulness

and AB in other samples, it follows that dispositional mindfulness should be inversely associated with NSSI AB.

In the present study, a sample of young adults with a history of NSSI completed a performance-based task—a modified dot probe task (MacLeod & Mathews, 1988)—designed to assess for the presence of AB to NSSI cues. I sought to explore hypotheses based on the extant literature: (1) self-injuring individuals would exhibit a statistically significant NSSI AB and heightened NSSI urge during a dot probe task, (2) individual differences in NSSI AB would be associated with severity of NSSI history, and (3) dispositional mindfulness would be inversely associated with NSSI AB whereas NSSI AB would be positively associated with difficulties in emotion regulation. In order to determine the specificity of these effects, I examined AB toward both NSSI-specific cues and negatively valenced cues relative to neutral cues.

Method

Participants and procedures

Participants were 30 young adults recruited from a large western state university, as well as the greater community. Participants were invited to participate via flyers, social media advertisements, and invitations from mental health professionals who attended in-service presentations and discussions about the study. Individuals were eligible to participate in the study if they were between the ages of 18 and 26, and were currently engaging in NSSI or had a history of NSSI, i.e., 3 or more instances of NSSI in the past year or 5 or more lifetime instances of NSSI as assessed by the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). Individuals

were excluded from participation if they were experiencing a suicidal crisis that required immediate intervention as assessed by the suicidality portion of Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) and the SITBI. None of the individuals assessed met the study exclusion criteria. I conducted all of the assessments. I am a master's level clinician with extensive training in clinical interviewing and crisis management with suicidal and self-injuring individuals.

This study was approved by the university's Institutional Review Board. All study participants provided written informed consent and received compensation in the form of a $50 gift card upon completion of all study procedures. After being assessed for study inclusion and exclusion criteria, participants completed a series of self-report measures, including demographics, before completing an NSSI dot probe task.

Measures

Attentional bias. AB was assessed via a dot probe task measuring reaction times to target probes replacing neutral images compared with reaction times to target probes replacing NSSI-related images (e.g., injuries, bandages, razors) and negatively valenced images unrelated to NSSI (e.g., facial expressions of emotional distress). Neutral and negative images were selected from the Open Affective Standardized Image Set (OASIS; Kurdi, Lozano, & Banaji, 2017) and NSSI-related images were retrieved from publicly available posts on Instagram to reflect the type of stimuli individuals might observe on social media. Each pair of stimuli was presented for 200 or 2000 ms on either side of a fixation cross. Stimulus/target probe position and presentation duration were randomized and counterbalanced across 12 practice trials, 24 NSSI trials, and 24 negative trials. A

target probe (one dot) replaced one of the images after a 50 ms interstimulus interval and remained on the screen for 100 ms. Probe location was counterbalanced. Participants were instructed to indicate the location of the dot as quickly as possible with a button press on a keypad, and reaction times were recorded.

NSSI history. Participant histories of NSSI thoughts and behaviors were assessed by the SITBI during the screening process. Specifically, the SITBI provided data regarding the frequency (e.g., *How many times [in your life, in the past year, month, week] have you engaged in NSSI?*) and duration of NSSI (e.g., *How old were you the [first and last] time you engaged in NSSI?*), as well as forms of NSSI and data regarding thoughts of engaging in NSSI. The SITBI is a reliable and valid (Nock, Holmberg, Photos, & Michel, 2007) measure of both suicidal behaviors and NSSI, and has been administered to both adult and adolescent populations.

Dispositional mindfulness. Dispositional mindfulness was measured with the Five Factor Mindfulness Questionnaire (FFMQ; $\alpha = .77$ in the present sample), which yields five subscale scores and a total score (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The subscales represent elements of dispositional mindfulness: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. Participants responded to such statements as *I perceive my feelings and emotions without having to react to them* on a scale of 1 (*never or very rarely true*) to 5 (*very often or always true*).

Emotion regulation difficulties. Emotion regulation difficulties was measured with the Difficulties in Emotion Regulation Scale (DERS; $\alpha = .81$ in the present sample), which yields six subscale scores and a total score (Neumann, van Lier, Gratz, & Koot,

2009). Subscales include nonacceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Participants responded to such statements as *When I'm upset, I believe there is nothing I can do to make myself feel better* on a scale of 1 (*almost never*) to 5 (*almost always*).

   Urge and affect. Participants were asked to rate how they felt in response to viewing the NSSI cues during the dot probe task by rating their urge to engage in NSSI, as well as their positive and negative affect. They responded to three questions on a Likert-type scale ranging from 0 (*not at all*) to 10 (*completely*), including *How much do you want to hurt yourself right now?*, *How positive do you feel right now?*, and *How negative do you feel right now?* Such rating scales are commonly employed for studies using visual stimuli from affective picture sets such as the OASIS (Lang, Bradley, & Cuthbert, 2008).

Data analysis

   AB was measured by comparing reaction times to target probes replacing neutral images with reaction times to target probes replacing NSSI-related images and negatively valenced images. Specifically, AB scores were calculated by subtracting mean reaction time to target probes replacing NSSI cues or negative cues from mean reaction time to target probes replacing neutral cues, such that positive bias scores indicated an AB toward NSSI cues or negative cues, respectively. Trials with extreme reaction times were eliminated as outliers, i.e., those with reaction times 3 *SD* above or below the individual mean reaction time (Field & Cox, 2008). Trials on which the probe was incorrectly

identified were also omitted from analyses. Participants correctly identified the probe location for 93.0% of NSSI trials, with a range of 70.8% to 100% accuracy, and for 95.3% of negative trials, with a range of 54.2% to 100% accuracy.

Shapiro-Wilk tests revealed that the distributions of the 200 ms NSSI AB scores (*M* = 16.25, *SD* = 25.08; skewness = .03, *SE* = .43; kurtosis = -.04, *SE* = .83) and 2000 ms NSSI AB scores (*M* = -1.84, *SD* = 28.44; skewness = -.47, *SE* = .43; kurtosis = .77, *SE* = .83) did not significantly differ from a normal distribution, *p* = .96, and *p* = .69, respectively. Additionally, Shapiro-Wilk tests revealed that the distributions of the 200 ms negative AB scores (*M* = 9.37, *SD* = 21.86; skewness = -.29, *SE* = .43; kurtosis = 1.29, *SE* = .83) and 2000 ms negative AB scores (*M* = 6.02, *SD* = 21.10; skewness = -.37, *SE* = .43; kurtosis = -.52, *SE* = .83) did not significantly differ from a normal distribution, *p* = .42, and *p* = .53, respectively. To test the first hypothesis, paired samples *t*-tests were used to determine if the reaction times to NSSI cues and negative cues were significantly different from reaction times to neutral cues, and to test whether NSSI urge and affect ratings following the dot probe task increased from baseline levels. To account for multiple comparisons, alpha was set at .0125 using the Bonferroni correction. To test the second and third hypotheses, Pearson correlations were used to examine the associations between NSSI AB and NSSI history, as well as the relationship between NSSI AB, FFMQ, and DERS scores.

Results

Participants characteristics

Summary demographic data are shown in Table 1. The sample ($N = 30$) primarily consisted of university students (63.3%) and individuals who identified as White (73.3%), nonreligious (70.0%), bisexual (43.3%), and female (63.3%). Participants ranged in age from 18 to 25 years old ($M = 20.83$, $SD = 2.07$). Average age of first NSSI incident was 13.57 years old ($SD = 2.64$) and average age of last NSSI incident was 19.80 years old ($SD = 2.50$). The range of self-injurious thoughts and behaviors varied widely in the sample, e.g., participants reported they experienced 12 to 4380 thoughts of engaging in NSSI ($M = 635.25$, $SD = 1170.26$) and 5 to 1000 incidents of NSSI ($M = 120.43$, $SD = 199.06$) in their lifetimes. Shapiro-Wilk tests revealed that the distributions of lifetime self-injurious thoughts (skewness = 2.36, $SE = .43$; kurtosis = 4.56, $SE = .83$) and lifetime self-injurious behaviors (skewness = 3.27, $SE = .43$; kurtosis = 13.13, $SE = .83$) differed significantly from a normal distribution, $p < .001$, and $p < .001$, respectively. The range of NSSI thoughts and behaviors in the past month was 0 to 30 ($M = 5.20$, $SD = 9.07$) and 0 to 20 ($M = .83$, $SD = 3.64$), respectively. Shapiro-Wilk tests revealed that the distributions of self-injurious thoughts in the past month (skewness = 1.92, $SE = .43$; kurtosis = 2.44, $SE = .83$) and self-injurious behaviors in the past month (skewness = 5.39, $SE = .43$; kurtosis = 29.29, $SE = .83$) also differed significantly from a normal distribution, $p < .001$, and $p < .001$, respectively. The most commonly reported forms of NSSI included cutting (96.7%), picking at wounds (83.3%), hitting one's self on purpose (66.7%), skin scraping (56.7%), and biting one's self (56.7%). Summary data of participant NSSI history are shown in Tables 2 and 3.

NSSI attentional bias

Paired samples *t*-tests were conducted to determine if participants exhibited a significant AB to NSSI cues and negatively valenced cues compared to neutral cues. Figure 2 displays reaction times to NSSI and neutral stimuli for the 200 and 2000 ms durations. Consistent with the first hypothesis, participants showed a significant AB to NSSI cues presented for 200 ms, $t(29) = -3.55$, $p = .001$. In other words, at this stimulus duration, participants had significantly shorter reaction times to probes replacing NSSI cues relative to probes replacing neutral cues. However, participants did not show a significant AB to NSSI cues presented for 2000 ms, $t(29) = .35$, $p = .73$. Additionally, paired samples *t*-tests revealed participants did not exhibit a significant AB to negative cues presented for 200 ms, $t(29) = -2.35$, $p = .03$, or 2000 ms, $t(29) = 1.73$, $p = .09$, when accounting for multiple comparisons and an alpha set at .0125. There was no correlation between NSSI AB and negative AB for 200 ms cues, $r = -.19$, $p = .32$. A paired samples *t*-test indicated there was also no significant difference between NSSI AB and negative AB for 200 ms cues, $t(29) = 1.04$, $p = .31$. Despite the nonsignificant difference, on average participants exhibited a greater AB to NSSI cues ($M = 16.25$, $SD = 25.08$) compared to negative cues ($M = 9.37$, $SD = 21.86$). Figure 3 displays the mean AB scores for NSSI and negative cues presented for 200 and 2000 ms. It should be noted that participants only exhibited a significant AB for NSSI cues presented for the 200 ms stimulus duration.

Urge and affect ratings

Paired samples *t*-tests indicated ratings reported before the dot probe were significantly different from those reported after the dot probe for urge, $t(29) = -3.80$, $p = .001$, negative affect, $t(29) = -3.94$, $p < .001$, and positive affect, $t(29) = 5.64$, $p < .001$. Both urge and negative affect increased from baseline after the dot probe task whereas positive affect decreased from baseline. These results are graphically represented in Figure 4. Urge and affect change scores were calculated by subtracting urge and affect ratings reported before the dot probe from urge and affect ratings reported after the dot probe. Urge was not correlated with NSSI AB, $r = .06$, $p = .74$, trait difficulties in emotion regulation as measured by the DERS, $r = .07$, $p = .70$, or trait mindfulness as measured by the FFMQ, $r = -.25$, $p = .18$. Negative affect was not correlated with NSSI AB, $r = .09$, $p = .63$, trait difficulties in emotion regulation, $r = -.08$, $p = .66$, or trait mindfulness, $r = .22$, $p = .25$. Positive affect was inversely correlated with NSSI AB, $r = -.51$, $p = .004$, indicating participants exhibiting higher levels of NSSI AB reported the greatest decreases in positive affect. Positive affect was not correlated with trait difficulties in emotion regulation, $r = .03$, $p = .88$, or trait mindfulness, $r = -.08$, $p = .70$.

Associations between NSSI AB and clinical factors

Associations between NSSI AB and clinical factors were determined using Pearson correlations. Contrary to the second hypothesis, NSSI AB was not associated with NSSI history, including lifetime incidents of NSSI, $r = -.33$, $p = .08$; incidents of NSSI within the past year, $r = -.32$, $p = .09$; or incidents of NSSI within the past month, $r = -.31$, $p = .10$. However, NSSI AB was associated with number of thoughts of engaging

in NSSI within the past year, $r = -.38$, $p = .04$. NSSI AB was not inversely correlated with dispositional mindfulness (FFMQ), as predicted in the third hypothesis. Surprisingly, NSSI AB was positively correlated with dispositional mindfulness, $r = .41$, $p = .02$, suggesting participants exhibiting higher levels of NSSI AB also reported higher levels of dispositional mindfulness. Difficulties in emotion regulation (DERS) were inversely correlated with dispositional mindfulness, $r = -.77$, $p < .001$, such that fewer difficulties in emotion regulation were associated with higher levels of dispositional mindfulness. However, difficulties in emotion regulation were not significantly associated with NSSI AB, $r = -.26$, $p = .16$.

Discussion

Self-injuring individuals in this sample exhibited an AB toward NSSI cues presented for 200 ms, but not for 2000 ms, suggesting that participants exhibited an automatic bias in the *initial orienting* of attention, but not in the *disengagement* of attention (Field & Cox, 2008). Importantly, participants did not exhibit a significant AB toward negatively valenced cues nor were their NSSI AB scores correlated with negative AB scores, indicating the NSSI AB was specific to the NSSI cues and not a mere generalized AB to negative affective stimuli known to be exhibited by individuals with psychopathology (Peckham, McHugh, & Otto, 2010). To my knowledge, this is the first finding in the scientific literature that self-injuring individuals exhibit an AB toward NSSI cues.

Changes in urge and affect ratings before and after the dot probe task served as important manipulation checks regarding the impact of the task. NSSI urge significantly

increased following attention to NSSI cues on the dot probe task. Although NSSI cue-elicited urge was not associated with AB in this sample, cue-reactivity is predictive of relapse in alcohol-dependent individuals (Garland, Franken, & Howard, 2012) and may be associated with NSSI-specific clinical factors that were not assessed in this study. Reported increases in negative affect were also not associated with NSSI AB, but decreases in positive affect were, indicating participants with higher NSSI AB felt significantly less positive after viewing the NSSI cues. When considered in the context of the affect regulation theory described early, this finding may speak to the role of positive versus negative affect in NSSI. Self-injuring individuals have most often described using NSSI as a way to relieve negative affect (Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Nock & Prinstein, 2004), but future studies could explore whether they are also be relying on NSSI to recover from a loss of positive affect.

Perhaps the most surprising finding in this study was the relationship between dispositional mindfulness and NSSI AB, namely that more mindful individuals exhibited significantly higher levels of NSSI AB. Participants exhibited an apparent conditioned response to NSSI cues presented for 200 ms as evidenced by their attention being automatically captured by such cues. Based on my initial hypothesis, I suspected that individuals exhibiting an apparently conditioned response to NSSI cues would be *less* mindful, as AB is typically linked with automaticity and cue-reactivity (Cha, Najmi, Park, Finn, & Nock, 2010; Lattimore & Mead, 2015) whereas mindfulness is associated with reduced addiction attentional bias and cue-reactivity (Garland, Franken, & Howard, 2012; Garland, Froeliger, & Howard, 2014). This particular finding suggests that a mechanism other than or in addition to automaticity may link NSSI AB and behavior

among self-injuring individuals. This variability is reflected in the many functions mentioned in the introduction. For example, one such mechanism might be the relationship between AB and impulsivity (Lattimore & Mead, 2015; Leung et al., 2017), as evidenced by the significant inverse correlation between NSSI AB and thoughts of engaging in NSSI. Given that higher NSSI AB in this sample was associated with fewer thoughts of engaging in NSSI, it is possible that self-injuring individuals who exhibit an AB to NSSI cues may be more prone to reacting to NSSI cues and impulsively acting rather than having more NSSI thoughts prior to the act of engaging in NSSI.

This study should be considered in the context of several limitations. First, the size and nature of the sample, as well as the convenience sampling procedures utilized in this study, limits the generalizability of the results. This study only recruited individuals with a history of NSSI and did not demonstrate whether self-injuring participants have a higher NSSI AB than healthy controls. A follow-up study should be conducted to determine if the NSSI AB is specific to or higher among self-injuring individuals or if it was a function of the images themselves. Second, the NSSI images were unstandardized and participants did not provide ratings of valence and arousal in response to the images. Third, factors impacting attention, such as medication or substance use and attention deficit disorders, were not measured in this study. Future studies exploring NSSI AB should include large samples and measures of psychiatric diagnoses to better characterize the clinical and demographic diversity of self-injuring individuals. Finally, this study was limited by its use of a cross-sectional design. AB can be impacted by myriad state dependent variables (Christiansen, Schoenmakers, & Field, 2015; Liu, Shen, & Li, 2019).

Future studies should employ longitudinal designs to better characterize the role of AB in maintaining NSSI among self-injuring individuals.

Despite these limitations, to my knowledge, this study provides the first documented evidence of NSSI AB among self-injuring individuals. As more research is conducted comparing healthy controls to self-injuring individuals, the dot probe task may become a tool for detecting NSSI risk. This study also utilized clinical interview and self-report data, as well as data from a performance-based task, to further explore the nature of thoughts and feelings related to engaging in NSSI. As described previously, individuals may develop an AB toward NSSI cues when they engage in repeated instances of NSSI. Over time, this AB may influence the mechanisms that lead individuals to engage in NSSI when exposed to NSSI images or words on social media. For example, the significant decline in positive affect observed in this study might motivate individuals to utilize NSSI as a way to recover their affective states. For example, when young adults encounter cues related to NSSI, such as images of NSSI on social media, their attention may be captured by such cues, resulting in decreased positive affect. This change in affect may increase the likelihood of them engaging in NSSI. Although further research is needed to elucidate the interrelationships between AB and related clinical factors, these results provide preliminary evidence for possible avenues of clinical intervention as it relates to the role of exposure to NSSI cues in the development and maintenance of NSSI. These avenues include managing cue-elicited urge and tolerating changes in affective states. As self-injuring individuals learn skills to cope with distressing emotions and urges, like mindfulness or other transtherapeutic approaches

designed to improve affect and manage distress, they may become better equipped to

interrupt the processes that link exposure to NSSI cues to engaging in NSSI behaviors.

Table 1

Participant characteristics

Variable	Total number	Percentage
Age (range = 18-25, $M = 20.83$, $SD = 2.07$)	30	100
Race		
American Indian or Alaska Native	2	6.7
Asian	2	6.7
Native Hawaiian or Pacific Islander	1	3.3
White	22	73.3
Other	3	10.0
Ethnicity		
Hispanic or Latino	6	20.0
Not Hispanic or Latino	23	76.7
Not sure	1	3.3
Gender		
Male	7	23.3
Female	19	63.3
Transgender	2	6.7
Other	2	6.7
Sexuality		
Heterosexual/straight	12	40.0
Gay/lesbian/homosexual	3	10.0
Bisexual	13	43.3
Other	2	6.7
Education		
High school graduate	7	23.3
Undergraduate student	17	56.7
Bachelor's degree	4	13.3
Graduate student	2	6.7

Table 2

NSSI history

Variables	$M \pm SD$ (range)	Distribution, skewness, kurtosis
NSSI thoughts		
Age of onset	13.37 ± 2.71 (8-19)	.23, -.33
Age of last incident	20.27 ± 2.35 (16-25)	.17, -.55
Lifetime incidents	635.25 ± 1170.26 (12-4380)	2.36, 4.56*
Past year incidents	52.13 ± 94.30 (0-340)	2.20, 3.73*
Past month incidents	5.20 ± 9.07 (0-30)	1.92, 2.44*
Past week incidents	1.07 ± 2.05 (0-8)	2.19, 4.37*
NSSI behaviors		
Age of onset	13.57 ± 2.64 (8-20)	.422, .31
Age of last incident	19.80 ± 2.50 (16-25)	.43, -.71
Lifetime incidents	120.43 ± 199.06 (5-1000)	3.27, 13.13*
Past year incidents	11.63 ± 49.88 (0-275)	5.43, 29.63*
Past month incidents	.83 ± 3.64 (0-20)	5.39, 29.29*
Past week incidents	.30 ± 1.29 (0-7)	5.17, 27.49*

*Shapiro-Wilk tests indicated distributions differed significantly from a normal distribution, $p < .001$.

Table 3

NSSI behaviors

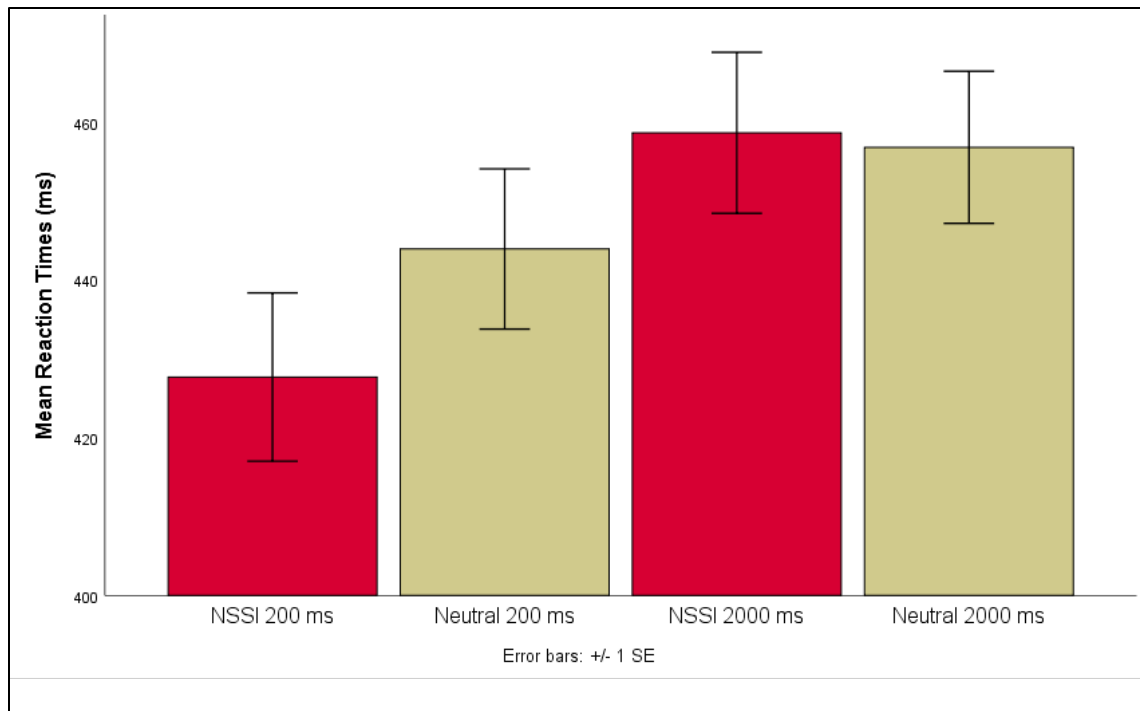| Variable	Total number	Percentage
Cut or carved skin	29	96.7
Picked at a wound	25	83.3
Hit self on purpose	20	66.7
Scraped skin	17	56.7
Bit yourself	17	56.7
Burned skin	15	50.0
Pulled hair out	13	43.3
Picked areas of body to the point of drawing blood	11	36.7
Erased skin to the point of drawing blood	5	16.7
Given self a tattoo	5	16.7
Inserted objects under nails or skin	4	13.3
Other	7	23.3

Figure 2

This chart displays mean reaction times to NSSI versus paired neutral stimuli presented for 200 and 2000 ms.
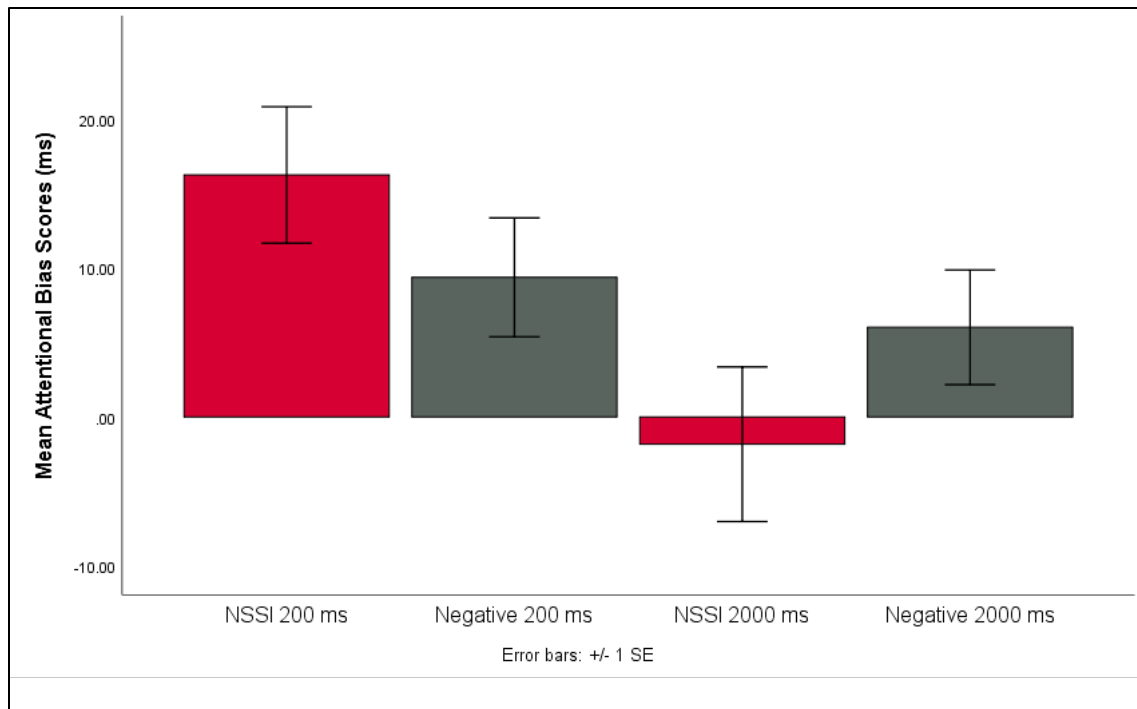
Figure 3

This chart displays the mean AB scores for NSSI and negative cues presented for 200 and 2000 ms. AB was measured by comparing reaction times to target probes replacing neutral images with reaction times to target probes replacing NSSI-related images and negatively valenced images. Specifically, AB scores were calculated by subtracting mean reaction time to target probes replacing NSSI cues or negative cues from mean reaction time to target probes replacing neutral cues, such that positive bias scores indicated an AB toward NSSI cues or negative cues, respectively.
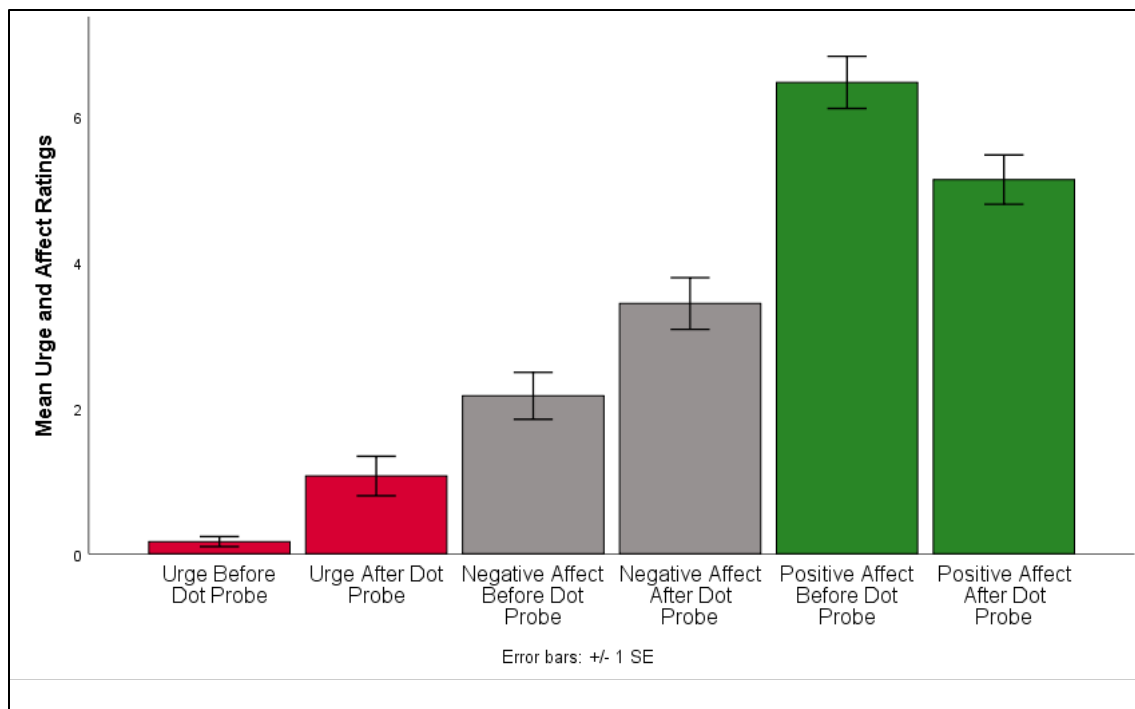
Figure 4

This chart displays mean urge and affect ratings reported before and after the dot probe task.

CHAPTER 3

EVALUATING THE EFFECTS OF A BRIEF MINDFULNESS INDUCTION

ON NONSUICIDAL SELF-INJURY ATTENTIONAL BIAS

Abstract

Despite its prevalence and transdiagnostic presentation, there are currently no empirically supported interventions for treating nonsuicidal self-injury (NSSI). The study described in Chapter 2 of this dissertation identified an attentional bias (AB) toward NSSI cues among self-injuring individuals. The aim of this study was to evaluate the effects of a single session mindfulness induction on NSSI AB. After completing a dot probe task designed to measure NSSI AB, participants were randomized to complete a brief mindfulness induction ($n = 16$) or a control induction ($n = 14$) before completing the dot probe task again. Repeated measures ANOVA revealed there were neither main effects for treatment or time on NSSI AB nor was there a treatment (mindfulness vs. control) × time (baseline vs. postinduction) interaction effect. These null effects may be explained by insufficient power, a failed experimental manipulation, or the possibility that mindfulness is an ineffective way to change NSSI AB. Despite the nonsignificant results, mechanistically focused studies like these remain an important part of understanding what does—and does not—address the underlying processes that inform NSSI when utilizing transtherapeutic approaches to treat self-injuring individuals.

Introduction

Contributors to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association, 2013) have recommended further research to determine if repeated instances of nonsuicidal self-injury (NSSI), or deliberate destruction of body tissue without suicidal intent, should constitute its own diagnosis (Zetterqvist, 2015). While there is preliminary support for creating such a diagnosis, more research is needed to distinguish the proposed diagnosis from other clinical disorders (Glenn & Klonsky, 2013). Given that NSSI co-occurs in mood, anxiety, stress, substance, and eating disorders (Auerbach et al., 2014; Cucchi et al., 2016; Jacobson & Gould, 2007; Meszaros, Horvath, & Balazs, 2017; Nock, Joiner Jr., Gordon, Lloyd-Richardson, & Prinstein, 2006), assessing and treating NSSI from a transdiagnostic approach may be most appropriate (Bentley, Nock, Sauer-Zavala, Gorman, & Barlow, 2017; Garland & Howard, 2014).

Ougrin, Tranah, Stahl, Moran, and Asarnow's (2015) systematic review and meta-analysis revealed that interventions with the largest effect sizes for reducing NSSI are DBT, cognitive-behavioral therapy (CBT), and mentalization-based therapy (MBT). However, they noted that no interventions have had their efficacy independently replicated and "little knowledge exists about the precise mechanism of action for TIs [therapeutic interventions] in the treatment of…self-harm" (Ougrin et al., 2015, p. 105). Their findings are consistent with other reviews that have shown there are currently no empirically supported interventions for treating NSSI (Glenn, Franklin, & Nock, 2015; Stanley, Fineran, & Brodsky, 2014). Developing efficacious treatment options may

require a consideration of transtherapeutic approaches that can address the underlying processes of NSSI.

Regarding those underlying processes, Liu (2017) echoed the need for approaching NSSI from a transdiagnostic perspective: "The study of the neural processes underlying NSSI, however, is still in its infancy, and has predominantly involved assessing this behavior within the context of psychiatric diagnoses rather than as a transdiagnostic clinical phenomenon" (p. 160). Using a transdiagnostic approach when assessing self-injuring individuals, and subsequently employing transtherapeutic approaches to treat them, is also in its infancy. However, such an approach is recommended by reviewers of NSSI research and is beginning to be used in NSSI studies. For example, Bentley et al. (2017) evaluated the effects of two transtherapeutic approaches on NSSI (i.e., mindful emotion awareness training and cognitive reappraisal) using a counterbalanced, combined series (i.e., multiple baseline and data driven phase change) experimental design. This design allowed them to evaluate the functions of each intervention, as well as the combination of both interventions. They concluded that these interventions ultimately reduced NSSI by providing emotion-focused strategies to address the functional processes that maintained the behavior, including emotion dysregulation and NSSI urge. They found no clear advantage for either intervention alone or combined. Although their sample was small ($N = 10$), their design and results highlight the importance of developing targeted interventions that rely on transtherapeutic approaches to more effectively treat NSSI.

The present randomized controlled experiment sought to evaluate the effects of a single session mindfulness induction on one transdiagnostic process relevant to NSSI:

attentional bias (AB). Attentional bias refers to the preferential allocation of attentional

resources to certain environmental stimuli over time (Field & Cox, 2008). In the case of

self-injuring young adults, this AB might include automatically attending to objects and

images related to NSSI. In Chapter 2 of this dissertation, I demonstrated the presence of a

significant NSSI AB among individuals who engage in NSSI. The present study

attempted to test whether a single session of mindfulness training could significantly

reduce this AB. To do so, I drew from self-report and experimental task data to

investigate the following hypotheses:

- *Outcome hypothesis:* Participants allocated to the mindfulness condition would

  experience a statistically significant decrease in NSSI AB compared to

  participants allocated to the control condition.

- *Mediation hypothesis:* The impact of the mindfulness induction on NSSI AB

  would be mediated by emotion regulation difficulties, such that mindfulness

  induction would decrease NSSI AB by reducing emotion regulation difficulties.

Method

Participants and procedures

Individuals were eligible to participate in the study if they were currently

engaging in NSSI or had a history of NSSI, i.e., 3 or more instances of NSSI in the past

year or 5 or more lifetime instances of NSSI as assessed by the Self-Injurious Thoughts

and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). Potential

participants had to be between the ages of 18 and 26. Individuals were excluded from

participation if they were experiencing a suicidal crisis that required immediate crisis

intervention as assessed by the suicidality portion of Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) and the SITBI. Ongoing risk assessment was conducted throughout the study procedures. I conducted all of the assessments. I am a master's level clinician with extensive training in clinical interviewing and crisis management with suicidal and self-injuring individuals.

Participants were recruited from multiple sources, including a large western state university and its surrounding community. Participants were invited to participate via flyers, social media advertisements, and invitations from mental health professionals who attended in-service presentations and discussions about the study. Flyers and advertisements provided a brief description of the study inclusion criteria, compensation, and contact information for those interested in participating. I planned to recruit 72 individuals to be randomized into two conditions (i.e., mindfulness versus control conditions). The proposed sample size was obtained by conducting a power analysis with G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). Assuming a small-to-medium effect size ($f = .2$), alpha of .05, power of .8, and correlation between repeated measures of .3, the sample required to conduct a repeated measures analysis of variance (RM-ANOVA) is $N = 72$. The proposed effect size was drawn from Cohen's (1988) rules of thumb on magnitudes of effect sizes given that no similar studies have been conducted on self-injury AB. Relatedly, the small-to-medium correlation between repeated measures was drawn from a study describing the change in dot probe task results across assessment points (Price et al., 2015). Due to difficulties in recruitment, I was unable to meet study enrollment targets. A total of 30 young adults met eligibility criteria and enrolled in the study. None of the individuals assessed met the study exclusion criteria.

All study procedures were approved by the university's Institutional Review Board. Study participants provided written informed consent and received monetary compensation in the form of a $50 gift card upon completion of all study procedures. After being assessed for study inclusion and exclusion criteria as described above, participants completed a series of self-report measures, including demographics, before being randomized into the mindfulness condition or control condition. Randomization was determined using a random number generator and a randomization ratio of 1:1, which resulted in 16 individuals randomized to the mindfulness condition and 14 individuals to the control condition. Participants in both conditions completed an NSSI dot probe task before being instructed on how to complete either a brief mindfulness or mind wandering exercise. Following the 10-minute inductions, participants in both conditions completed the NSSI dot probe task again and then participated in a semi-structured qualitative interview.

The audio-recorded mindfulness induction was modeled after basic mindfulness skills commonly used in mindfulness-based interventions and tailored to target distressing thoughts and feelings (see Appendix). Specifically, participants listened to a modified version of a 15-minute focused attention mindfulness script that was shown to significantly decrease anxiety and physical pain in a large sample of hospital inpatients (Garland et al., 2017). Participants assigned to the control condition were provided with the validated mind-wandering instruction to "let your mind wander freely without trying to focus on anything in particular" (Arch & Craske, 2006, p. 1852), with variants of these instructions repeated every 30 to 60 seconds. Similar control conditions have been utilized in brief mindfulness induction studies seeking to increase emotion regulation

(Arch & Craske, 2006), decrease dysphoric mood (Broderick, 2005), and manage

addictive urge (Bowen & Marlatt, 2009; Vernig & Orsillo, 2009).

Measures

      Attentional bias. NSSI AB was assessed via a dot probe task measuring reaction

times to target probes replacing neutral images compared with reaction times to target

probes replacing NSSI-related images (e.g., injuries, bandages, razors). Neutral images

were selected from the Open Affective Standardized Image Set (OASIS; Kurdi, Lozano,

& Banaji, 2017) and NSSI-related images were obtained from publicly available posts on

Instagram to reflect the type of stimuli adolescents might observe on social media. Each

pair of stimuli was presented for 200 or 2000 ms on either side of a fixation cross.

Stimulus/target probe position and presentation duration were randomized and

counterbalanced across 12 practice trials and 24 NSSI trials. A target probe (one dot)

replaced one of the images after a 50 ms interstimulus interval and remained on the

screen for 100 ms. Probe location was counterbalanced. Participants were instructed to

indicate the location of the dot as quickly as possible with a button press on a keypad, and

reaction times were recorded.

      Emotion regulation difficulties. Participants completed self-report measures of

emotion regulation difficulties throughout the task and induction procedures. Participants

were asked to complete the State Difficulties in Emotion Regulation Scale (S-DERS;

Lavender, Tull, DiLillo, Messman-Moore, & Gratz, 2015) after the pre and post dot

probe tasks. Similar to the Difficulties in Emotion Regulation Scale (DERS; Neumann,

van Lier, Gratz, & Koot, 2009), this scale was developed to provide reliable and valid measures of emotion regulation over brief intervals.

Negative affect. The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) was used to assess affective states following the pre and post dot probe tasks. Participants were instructed to "indicate to what extent you feel this way right now, that is, at the present moment" on a scale of 0 (*very slightly or not at all*) to 4 (*extremely*). Negative affect items included terms such as distressed, upset, guilty, irritable, and ashamed.

State mindfulness. The Toronto Mindfulness Scale (TMS; Lau et al., 2006) was used to assess state mindfulness following the mindfulness and control inductions as a manipulation check. Participants were asked to describe what they just experienced by responding to statements such as *I experienced myself as separate from my changing thoughts and feelings* and *I was receptive to observing unpleasant thoughts and feelings without interfering with them* on a scale of 0 (*not at all*) to 4 (*very much*).

Data analysis

To test the outcome hypothesis, I conducted a repeated measures analysis of variance (RM-ANOVA) with the treatment (mindfulness vs. control) × time (baseline vs. postinduction) interaction as the primary parameter of interest (i.e., NSSI AB). To test the mediation hypothesis, I intended to conduct a mediation analysis with bootstrapping of the indirect effect in PROCESS (Preacher & Hayes, 2008) to examine the mediating effect of emotion regulation capacity on the relationship between mindfulness and NSSI

AB. However, this was unnecessary due to the nonsignificant results of the outcome

hypothesis.

Results

Participant characteristics

Summary demographic data by condition are shown in Table 4. An independent

samples *t*-test and chi-square tests of independence revealed no between-group

differences in ethnicity, gender, sexuality, or education. However, Fisher's exact test

revealed a significant racial difference between groups, i.e., 13 (81.3%) participants who

identified as White were randomized to the mindfulness condition versus 9 (64.3%)

participants who were randomized to the control condition. Average age of first NSSI

incident was 12.81 years old (*SD* = 2.43) among those assigned to the mindfulness

condition and 14.00 years old (*SD* = 2.96) in the control condition. Average age of last

NSSI incident was 20.38 years old (*SD* = 3.06) and 20.14 years old (*SD* = 2.71) in the

mindfulness and control conditions, respectively. Lifetime incidents of NSSI behaviors

was 133.13 (*SD* = 251.39) for those assigned to the mindfulness condition and 105.93

(*SD* = 122.68) for those in the control condition. Summary data of participant NSSI

history by condition are shown in Table 5. Independent samples *t*-tests revealed

participants did not differ significantly on any NSSI variables.

Induction effects on AB

As described in Chapter 2 of this dissertation, paired samples *t*-tests revealed a

significant AB to NSSI cues presented for 200 ms, $t(29) = -3.55$, $p = .001$, but did not

show a significant AB to NSSI cues presented 2000 ms, $t(29) = .35$, $p = .73$. In the

present study, a 2 (Treatment: mindfulness vs. control) × 2 (Time: baseline vs. post-

induction) RM-ANOVA revealed no significant between-subjects treatment effect, $F(1,$

$28) = .116$, $p = .74$, $\eta \rho^2 = .004$, within-subjects time effect, $F(1, 28) = 21$, $p = .65$, $\eta \rho^2 =$

.007, or treatment × time interaction on 200 ms NSSI AB, $F(1, 28) = 1.01$, $p = .33$, $\eta \rho^2 =$

.04, indicating that the mindfulness induction did not result in significantly greater

decreases in AB than the control condition. These results are displayed in Figure 5. An

independent samples t-test indicated there was no significant between-group difference in

state mindfulness, $t(28) = -.33$, $p = .75$; i.e., the experimental mindfulness induction did

not result in higher state mindfulness than the control induction. Although RM-ANOVA

revealed no significant treatment × time interaction on negative PANAS scores, $F(1, 28)$

$= 1.77$, $p = .19$, $\eta \rho^2 = .06$, the main effect of time was significant, $F(1, 28) = 7.98$, $p =$

.01, $\eta \rho^2 = .22$, with a trend toward greater decreases in negative affect among individuals

assigned to the mindfulness induction. These results are displayed in Figure 6.

Discussion

The aim of the present study way to investigate the effects of a brief mindfulness

induction on NSSI AB. Data analyses revealed there were no main effects of treatment or

time on NSSI AB, nor was there was an interaction effect of treatment × time on NSSI

AB. These null effects may be explained by insufficient power, a failed experimental

manipulation, or the possibility that mindfulness is an ineffective way to change NSSI

AB. An a priori power analysis indicated 72 participants were necessary to detect a

significant change in AB with a small-to-medium effect size, indicating this study was

insufficiently powered with a sample of $N = 30$. Another factor that may explain these results was the poor test-retest reliability of dot probe task. Although participants in the control condition ostensibly experienced no manipulation, there was no correlation between AB scores following the first and second dot probe tasks, $r = .07, p = .80$. There was also no correlation between AB scores for those in the mindfulness condition, $r = -.12, p = .66$. In addition to poor test-retest reliability, the lack of correlations between repeated measures may be due to habituation to NSSI stimuli.

The inductions themselves may also have contributed to the nonsignificant results. The mindfulness and mind wandering conditions may have been too similar, as evidenced by the TMS scores, to create any notable difference between them. Instructing participants to let their minds "wander freely without trying to focus on anything in particular" may have induced a state of mindfulness depending on participants' previous experiences with mindfulness. Part of the mindfulness induction instructs participants "to notice that urges, thoughts, images, and memories are like clouds passing in a clear blue sky," a form of mindfulness referred to as open monitoring that focuses on nonattachment, nonreactivity, and acceptance of present thoughts, feelings, and sensations (Vago & Silbersweig, 2012). Participants randomized to the control condition may also have experienced nonattachment after being instructed not to focus on anything in particular. Alternatively, the TMS scores could be interpreted to mean the mindfulness induction was an ineffective experimental manipulation; however, the downward trend of negative affect induced by mindfulness compared to the control condition as measured by the PANAS suggests the induction was producing an effect (see Figure 5).

In addition to the failed manipulation check per the TMS, the inductions were delivered with a recording rather than being conducted in-person. While this is consistent with procedures used in similar studies (e.g., Arch & Craske, 2006), other studies have utilized in person inductions to great effect (e.g., Garland et al., 2017). The decision to conduct the inductions with a recording was informed by clinical utility, i.e., if the mindfulness induction showed a significant effect, it would be possible to utilize it in clinical setting such as crisis centers where young adults often contact crisis counselors via text or chat. However, both inductions may have been more effective had they been conducted in person.

Another factor that may explain the lack of change in AB is the relationship between trait mindfulness and AB described in Chapter 2, namely that individuals in this sample exhibiting higher levels of NSSI AB also exhibited higher levels of trait mindfulness. This result may explain why a single brief mindfulness induction was not enough to shift this tendency, i.e., the mindfulness induction may have temporarily increased their nonjudgment of viewing the images. This speaks not only to the difficulties of operationalizing the experience of mindfulness, but also the issue of dosage. Mindfulness training and attentional bias modification studies have typically relied on multiple sessions of training to create change in automatized processes such as AB whereas a single session may not be enough (Browning, Holmes, & Harmer, 2010; Field, Duka, Tyler, & Schoenmakers, 2009). One additional limitation that should be considered the lack of structured psychiatric diagnostic interview to determine the presence of psychopathology symptoms. Although demographic factors and NSSI history were assessed and characterized, participants were not screened based on psychiatric

history. In such a small sample, individual mental health factors may have influenced the effects of the mindfulness induction.

Despite these limitations, this study is not without strengths. Utilizing repeated measures self-report data and data from a performance-based task addresses two oft-cited criticisms of NSSI research, namely the sole reliance on self-report measures and the overwhelming use of cross-sectional designs. Although participants did not experience a change in AB, they may have experienced some other clinically relevant change during the mindfulness induction that could be explored in future studies. Alternatively, mindfulness may potentially be an ineffective way of changing NSSI AB. Despite the nonsignificant results, mechanistically focused studies like these remain an important part of understanding what does—and does not—address the underlying processes that inform NSSI when utilizing transtherapeutic approaches like mindfulness to treat self-injuring individuals.

Table 4

Participant characteristics by condition

Variable	Mindfulness condition (*n* = 16)	Control condition (*n* = 14)	Test
Age (*M* ± *SD*)	20.50 ± 1.90	21.21 ± 2.26	$t(28) = .94$
Race (*n*)			$\chi^2(4) = 8.63*$
White	13 (81.3)	9 (64.3)	
Other	3 (18.8)	5 (35.7)	
Ethnicity, *n* (%)			$\chi^2(2) = 1.58$
Hispanic or Latino	4 (25.0)	2 (14.3)	
Not Hispanic or Latino	11 (68.8)	12 (85.7)	
Not sure	1 (6.3)	0 (0.0)	
Gender, *n* (%)			$\chi^2(4) = 5.94$
Male	6 (37.5)	1 (7.1)	
Female	8 (50.0)	11 (78.6)	
Transgender	1 (6.3)	1 (7.1)	
Other	1 (6.3)	1 (7.1)	
Sexuality, *n* (%)			$\chi^2(3) = 2.62$
Heterosexual/straight	7 43.8)	5 (35.7)	
Gay/lesbian/homosexual	2 (12.5)	1 (7.1)	
Bisexual	7 (43.8)	6 (42.9)	
Other	0 (0.0)	2 (14.3)	
Education, *n* (%)			$\chi^2(3) = 5.51$
High school graduate	4 (25.0)	3 (21.4)	
Undergraduate student	11 (68.8)	6 (42.9)	
Bachelor's degree	0 (0.0)	4 (28.6)	
Graduate student	1 (6.3)	1 (7.1)	

*Fisher's exact test indicated a significant difference between groups, $p < .05$.

Table 5

NSSI history by condition

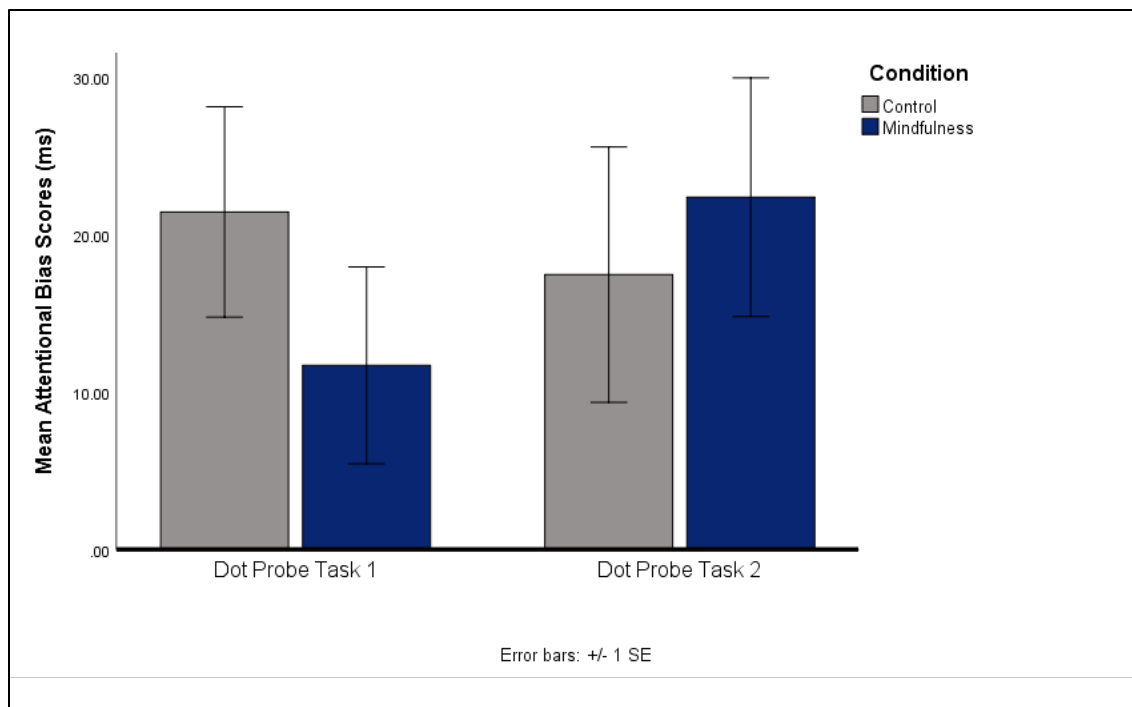| Variable	Mindfulness condition (*n* = 16)	Control condition (*n* = 14)	Test
NSSI thoughts (*M* ± *SD*)			
Age of onset	12.81 ± 2.43	14.00 ± 2.96	*t*(28) = 1.21
Age of last incident	20.38 ± 3.06	20.14 ± 2.71	*t*(28) = -.27
Lifetime incidents	961.44 ± 1526.77	262.43 ± 291.18	*t*(16.24) = -1.79
Past year incidents	68.13 ± 117.79	33.86 ± 56.15	*t*(22.08) = -1.04
Past month incidents	6.38 ± 9.674	38.86 ± 8.48	*t*(28) = -.75
Past week incidents	1.56 ± 2.56	.50 ± 1.09	*t*(20.87) = -1.51
NSSI behaviors (*M* ± *SD*)			
Age of onset	12.94 ± 2.49	14.29 ± 2.70	*t*(28) = 1.42
Age of last incident	19.88 ± 2.09	19.71 ± 2.97	*t*(28) = -.17
Lifetime incidents	133.13 ± 251.39	105.93 ± 122.68	*t*(28) = -.37
Past year incidents	20.38 ± 68.07	1.64 ± 1.69	*t*(28) = -1.03
Past month incidents	1.50 ± 4.95	.07 ± .27	*t*(28) = -1.08
Past week incidents	.56 ± 1.75	.00 ± .00	*t*(15.00) = -1.29

Figure 5

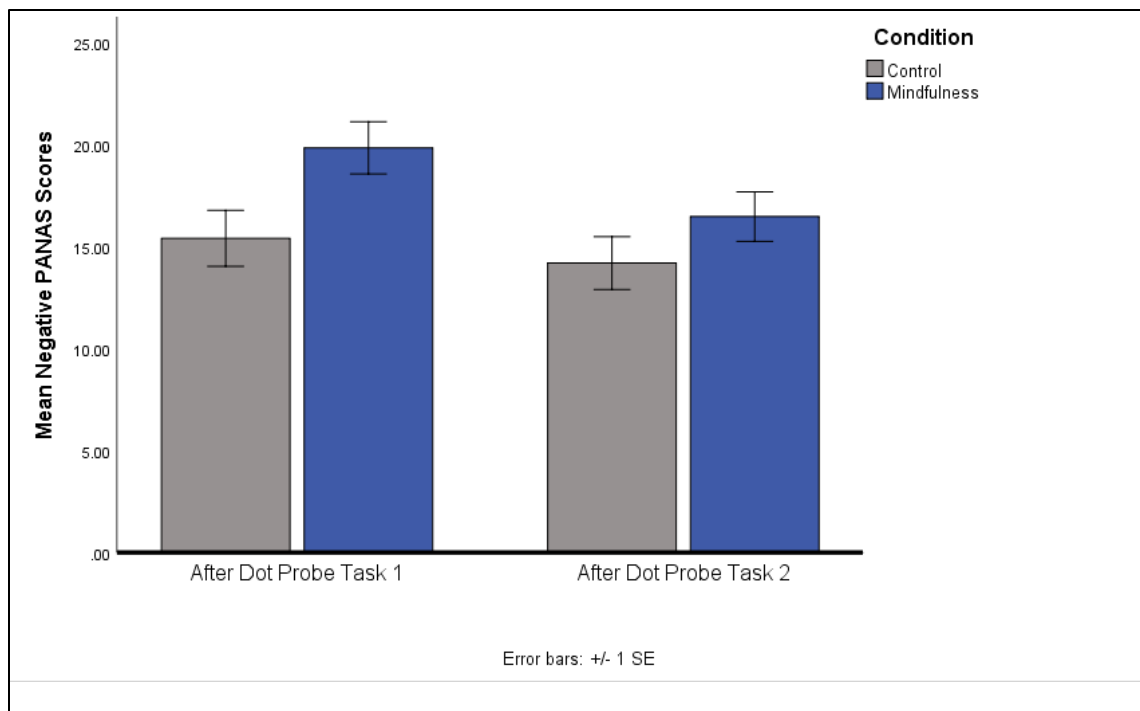This chart displays mean AB scores for NSSI cues by condition.

Figure 6

This chart displays negative affect scores following dot probe tasks.

CHAPTER 4

YOUNG ADULT EXPERIENCES OF VIEWING NONSUICIDAL SELF-INJURY

IMAGES AND COMPLETING A BRIEF MINDFULNESS INDUCTION

Abstract

While a great deal of research has been focused on the prevalence and functions
of nonsuicidal self-injury (NSSI), less consistent focus has been given to the etiology and
treatment of NSSI. A particular lack of focus has been given to understanding NSSI from
the perspectives of those engaging in these behaviors. As part of a larger embedded
mixed methods study, this qualitative study sought to provide insight into the experiences
of self-injuring young adults while viewing images of NSSI and while completing a brief
mindfulness induction. A semistructured interview guide was developed to collect rich
impressions of the dot probe task and brief mindfulness induction from participants, with
a focus on eliciting detailed descriptions of how the participants experienced the
experimental task. Four themes were generated using a thematic analysis approach:
experiences of attentional bias, NSSI memories, changing emotional states, and effects of
the mindfulness induction. This study contributes to the extant qualitative literature on
NSSI by expanding the conversation from functions of NSSI to possible solution and
situating an understanding of NSSI from the perspectives of a diverse group of young
adults, perspectives that have been underrepresented in NSSI research.

Introduction

Nonsuicidal self-injury (NSSI) includes behaviors such as self-inflicted cutting, burning, and hitting, and are commonly used as maladaptive coping mechanisms among young adults (Angelotta, 2015). While a great deal of research has been focused on the prevalence and functions of NSSI, less consistent focus has been given to the etiology and treatment of NSSI (Brown & Plener, 2017). That tendency is especially alarming given the high rates of NSSI among young adults, as well as the role NSSI plays in suicidal behaviors, i.e., longitudinal studies indicate NSSI predicts suicide more strongly than other risk factors (Asarnow et al., 2011; Guan, Fox, & Prinstein, 2012). Perhaps even more alarming is the lack of focus given to understanding NSSI from the perspectives of those engaging in these behaviors. Qualitative methods are notably lacking from the rhetoric on the etiology of NSSI, as well as from explanations of the mechanistic impact of different treatments.

NSSI researchers have noted an overreliance on self-report measures of the contingencies that reinforce NSSI despite the incongruence between self-report and behavioral measures (e.g., Bentley, Nock, & Barlow, 2014; Liu, 2017). This incongruence speaks to the need and appropriateness of employing both quantitative and qualitative research methods to elucidate the etiology and treatment of NSSI. Quantitative analysis of behavioral measures can yield insight into NSSI processes occurring outside of conscious awareness, e.g., NSSI attentional bias, (AB). Qualitative analysis of individual experience can yield insight into the phenomenology of the change process during assessment and treatment. Using both quantitative and qualitative approaches is a pragmatic way to triangulate data and provide converging evidence of the processes that

maintain NSSI and the mechanisms that can alleviate it (Creswell & Plano Clark, 2011; Fetters, Curry, & Creswell, 2013; Johnson & Schoonenboom, 2016).

The relatively few qualitative studies written on NSSI have primarily focused on the functions of NSSI (e.g., Breen, Lewis, & Sutherland, 2013; Deliberto & Nock, 2008), an area of NSSI literature that has already garnered the most empirical research. Alternatively, qualitative data have been obtained to determine the feasibility of intervention programs (e.g., Muehlenkamp, Walsh, & McDade, 2010). The paucity of qualitative research that has been conducted among self-injuring individuals highlights the importance of using this method in the present study. As part of a larger embedded mixed methods study, this qualitative study sought to provide insight into participant experiences of the study procedures by responding to the following research questions: What are the experiences of self-injuring young adults while viewing images of NSSI? What are the experiences of self-injuring young adults while completing a brief mindfulness induction? In general, NSSI literature lacks first-person impressions of transdiagnostic processes and transtherapeutic mechanisms informing NSSI development and treatment, respectively. This study is intended to further contextualize those processes and mechanisms in order to better address NSSI among self-injuring young adults.

Method

Participants and procedures

This data set was derived from a larger data corpus of participants enrolled in a randomized experiment exploring the effects of a brief mindfulness induction on NSSI

AB. Individuals were eligible to participate in the study if they were between the ages of 18 and 26, and were currently engaging in NSSI or had a history of NSSI, i.e., 3 or more instances of NSSI in the past year or 5 or more lifetime instances of NSSI as assessed by the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). Individuals were excluded from participation if they were experiencing a suicidal crisis that required immediate intervention as assessed by the suicidality portion of Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) and the SITBI. I conducted all of the assessments. I am a master's level clinician with extensive training in clinical interviewing and crisis management with suicidal and self-injuring individuals.

Participants were recruited from a large western state university and its surrounding community. Individuals were invited to participate via flyers, social media advertisements, and invitations from mental health professionals who attended in-service presentations and discussions about the study from the PI. In total, 30 young adults contacted the PI to participate in the study and met study eligibility criteria. None of the individuals assessed met the study exclusion criteria. Given the embedded nature of the mixed methods study, the entire sample completed qualitative interviews regarding their experiences and perceptions of the experiment at the end of the study procedures. Qualitative data from participants randomized to the mindfulness condition ($n = 16$) were analyzed in this study. Their demographics can be found in Table 4.

This study was approved by the university's Institutional Review Board. All study participants provided written informed consent and received monetary compensation upon completion of all study procedures. After being assessed for study inclusion and

exclusion criteria, participants completed a series of self-report measures, including demographics, before being randomized into the mindfulness condition or control condition. Participants in both conditions completed an NSSI dot probe task before being instructed on how to complete either a brief mindfulness or mind wandering exercise. Following the 10-minute inductions, participants in both conditions completed the NSSI dot probe task again and then participated in a semistructured qualitative interview.

Interview questions

I developed a semistructured interview guide to collect rich impressions of the dot probe task and brief mindfulness induction from participants. Questions were focused on eliciting detailed descriptions of how the participants experienced the experimental task. All participants were asked the following guiding questions, with probing questions asked as needed:

1. *I would like to talk about what you just experienced with viewing the pictures and completing that computer task. What was it like for you to view those images of self-harm—meaning, what did you notice about your thoughts, feelings, any physical sensations, or urges?*

2. *What was it like for you to do that exercise where you focused your attention on your breathing?*

3. *After you completed the breathing exercise, I asked you to complete the computer task again. What was it like for you to view those images a second time?*

Data analysis

Interview recordings were transcribed and reviewed for accuracy by a bachelor's level research assistant. All transcripts and recordings were subsequently reviewed by the PI for accuracy. Data were analyzed by the PI using thematic analysis, as outlined by Braun and Clarke's (2006) six-phase approach: (1) becoming familiar with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. Due to the novelty of the study procedures, inductive analysis was used throughout the analytic process.

In addition to reviewing transcripts for accuracy, phase one consisted of listening to the recordings at least two times combined with immersive readings of the entire data set to more fully appreciate the meanings and understandings of the participants. Given that my initial exposure to the data occurred while conducting the interviews, I listened to the recordings while reading the transcripts in order to experience them as an observer. Phase two consisted of generating open codes from the participant data. For example, one participant made the following remark while viewing the NSSI images: "I got just kind of like caught up and was waiting for the next one to last a little longer to look at," which was subsequently coded as *getting caught up in NSSI images.* Another participant remarked, "When I was looking at them, I was like, 'What did they do and have I done something like this or have I done worse?' I don't know, kind of comparing," which was subsequently coded as *comparing images to personal NSSI.* This initial open coding process generated a total of 245 codes.

Phases three and four, searching for themes and reviewing themes, involved a recursive process that began with dividing the initial codes into 14 categories. These

categories are listed in Table 6. Codes were compared both within and between categories while consulting the original textual data for context to determine if they fit into more than one category. A total of four themes were generated through this iterative process, which were defined and named in consultation with the peer debriefing team during phase five. Table 7 provides an example of the how a theme connected back to the original textual data through its respective categories and open codes. I used the software package ATLAS.ti throughout the data analysis process, including open coding, as well as developing categories and themes. The writing of this report represents the final phase of Braun and Clark's (2006) six-phase thematic approach.

Results

This section outlines and describes the themes identified during the data analysis process. Those themes include experiences of attentional bias, NSSI memories, changing emotional states, and effects of the mindfulness induction.

Experiences of attentional bias

One of the most consistent comments made by participants was their awareness of how their attention was grabbed by the NSSI images despite knowing their task was to locate the dot behind the pair of images. All of the participants explicitly described this experience of NSSI attentional bias—the tendency to allocate more attentional resources toward NSSI images. As one participant described it, "I was either focused on finding the dot or I was focusing on the image, and there wasn't much in between because the image would either demand all my attention or I'd be looking somewhere else." Further,

participants were aware that this experience of NSSI attentional bias was an automatic process, rather than being driven by conscious choice.

This reportedly led to frequent mistakes among the participants. They reported that they were more likely to choose to the location of the NSSI image whether the dot was there or not. Some participants even described a preference or compulsion for the NSSI images. One participant described it this way: "Obviously you still click where the dot is, but…for self-harm ones there were certain images I would have preferred to click the dot on that side, but then sometimes it would come on the other side." This experience of attentional bias also elicited cognitive and emotional reactions from the participants, especially in the forms of memories, physical sensations, and changes in their emotional states.

NSSI memories

Regarding these cognitive and emotional reactions, the majority of participants also described thinking of past experiences related to NSSI. One participant even described reliving past NSSI experiences. Other participants reported that the images made them think of others in relation to the pictures, such as memories of individuals they have known who have engaged in NSSI. Still others found themselves comparing the images to their own past NSSI. One participant described it like this:

> I don't remember exactly what images they were, but I had this one thought that surprised me and it was that, it was along the lines of, 'Oh, I can do better than that.' So that kind of stressed me out because that's not what I wanted to think, but I thought that person self-harming wasn't as bad as mine or something like that.

These memories reportedly induced a range of emotional reactions, including anxiety, distress, confusion, and disgust. However, not all of the emotional reactions were

negative. Some participants reflected on how they overcome NSSI and associated feelings of confidence, gratitude, and relief. Still others experienced a sense of shame either by looking at the images or thinking about how they have used NSSI in the past to cope. One participant expressed the following thoughts about their past NSSI:

> A feeling of shame, of other people have the same struggles as me, if not worse in some situations, and yet they're able to deal with it differently and I feel like I'm abnormal or unusual because I feel a compulsion to do that in order to release some of the pent up emotions that I might be feeling.

This participant touched on the urge that some participants reported experiencing during the dot probe task. Six participants noted the NSSI images induced either a desire to engage in NSSI or reminded them of past urges to engage in NSSI, whereas two participants explicitly noted they did not experience any urge to engage in NSSI. One participant characterized the experience of urge with the following comment: "There's the pull that, even if there's not really a reason to do it, you just have that familiar thing."

Changing emotional states

All of the participants expressed varying intensities of emotional fluctuations throughout the study procedures. Emotional distress was a common reaction to the first dot probe task, as well as concern for the individuals in the images. Some participants described how the intensity of their reactions depended on the images themselves and whether they were able to relate to the type of NSSI presented in the images. Others simply experienced feelings of curiosity during the task. For example, one participant remarked, "I can't think of any feelings just off the top of my head. I didn't really feel much of anything. It was mostly just curiosity, like hey, let's see which one's which."

Many participants were also conscious of how their changing emotional states were impacting their physiology throughout the task, e.g., feeling tired or having a tight stomach or heavy chest. Negative emotional reactions ranged from numb to unpleasantness to discomfort and even fear of what feelings might be elicited from the task. For example, one participant remarked, "I could still see through my peripheral vision what the images were, but I didn't want to look at it because I was afraid of what feelings might surface up." Despite the intensity of some of these emotions, many participants expressed how the mindfulness induction was able to help restore feelings of calm and relaxation.

Effects of the mindfulness induction

The majority of participants cited multiple benefits from completing the mindfulness exercise, including decreased emotional distress, increased focus and feelings of calm, and overall changes in their approaches to completing the second dot probe task. Participants reflected on the mindfulness induction itself by describing the process of bringing their attention back to their breath, and also noted the pleasantness of paying attention to bodily sensations. One participant even described how the brief induction allowed them to enter a state of nonreactive metacognitive awareness—a state of awareness characterized by recognizing that thoughts and feelings are separate from the self, or the capacity to be aware of awareness itself (Harrison & Vallin, 2018; Teasdale et al., 2002). The participant remarked:

> These thoughts, they're running along up there and I can walk around and look at it, and I can see some thoughts running along the ground, and I'm still paying attention to breathing. This isn't me bringing my attention back, it's just me

bringing attention back to the fact that I'm paying attention. So, I guess it's the difference between paying attention and being aware that I'm paying attention.

While most participants described positive effects from the mindfulness induction, a few expressed difficulties with completing the exercise or found their minds wandering too much to focus on their breathing. However, reports of disliking mindfulness exercises or having previous negative experiences with mindfulness were atypical. More often, participants reported they anticipated the mindfulness exercise would produce positive effects and subsequently experienced those benefits.

In addition to positive experiences during the induction itself, most participants described the lasting benefits of the mindfulness exercise through the second dot probe task. Perhaps most salient to the research questions outlined in the previous chapters were the participants' descriptions of how the induction impacted their attention. Ten participants described how it was easier to focus their attention on identifying the location of the dot following the mindfulness induction rather than having their attention grabbed by the NSSI images. For example, one participant expressed the following: "After kind of having that breathing exercise and comparing that to, you know, bringing back my attention, I felt like I took that into the dot task. Every time I would kind of get distracted from the dots, I would focus my attention back on them." However, three participants explicitly stated they did not notice any change between the two tasks because of the mindfulness induction, and three others specifically mentioned the second dot probe task was more distressing than the first.

Discussion

This study focused on understanding and learning from the perspectives of self-injuring young adults who described their experiences while completing a NSSI dot probe task and brief mindfulness induction. Few studies have investigated young adult perspectives of the transdiagnostic processes that inform NSSI or the transtherapeutic mechanisms that might disrupt them. Thus, findings from this study may inform directions for future research on how to refine interventions targeting NSSI among young adults, as well as the mechanistic role of mindfulness in interventions used to address NSSI that utilize such techniques.

In the course of semistructured interviews, participants were able to provide detailed accounts of how the dot probe task elicited an attentional bias response to NSSI cues, how the mindfulness exercise induced feelings of calm and centeredness, and how they were ultimately able to approach the second dot probe task with decreased reactivity. As some participants described it, the dot probe task was "triggering" insofar as it triggered negative affective states, painful or difficult memories of past NSSI, thoughts of others who have engaged in NSSI, or unpleasant physical sensations in response to seeing such viscerally evocative images. However, most participants expressed that these responses were ameliorated during the brief mindfulness practice wherein they were able to redirect their attention from distressing thoughts and feelings, and instead focus on the sensations of breathing. Many described the practice of mindfulness as calm and relaxing, which in turn allowed them to regulate both the cognitive and emotional distress that were evoked from the dot probe task. A majority of participants reported this regulation persisted through the second dot probe task, that they were less focused on the distressing

NSSI images, that they were less emotionally aroused by the ones that did capture their attention, and that they were able to redirect their attention more easily to accomplishing the task of identifying the location of the dot. Not all participants experienced positive benefits from the mindfulness induction. Some found it difficult to concentrate, others found it boring or uncomfortable, and still others found that it created no change for them when they completed the second task even though they found the induction itself relaxing and regulating.

Findings from this study indicate participants experienced a brief mindfulness practice as helpful in assisting them to disengage attention from distressing emotional stimuli. These findings were surprising given that they diverged from the quantitative results described in Chapter 3, i.e., the mindfulness induction did not result in significantly greater decreases in AB than the control condition. As such, these results highlight the importance of understanding how research participants experience study procedures, as well as how interventions create change for individuals who are struggling with behaviors like NSSI that are informed by complex transdiagnostic processes.

The methods, data analysis, and results should be considered in the context of the researcher's positionality. I am a White, queer, cisgender male with a personal history of NSSI, as well as over a decade of professional experience working with self-injuring individuals in clinical and research capacities. This study was conducted to fulfill the dissertation component of my doctoral studies. The interpretive approach and analytic process that generated the results are not only a reflection of my personal and professional experiences, but are also informed by the perspectives of the peer debriefing

team and research assistant with whom I worked on this study. Our demographics are outlined in Table 8.

One noteworthy strength of this study was the effort given to establishing its rigor through multiple strategies. Those strategies included peer debriefing, negative case analysis, description of reflexivity, and thick description, as recommended by Creswell (2007). While I employed multiple methods to increase the qualitative rigor and trustworthiness of this study, there are several limitations to consider. First, I was the only one who completed open coding of the data. The iterative process of developing categories and themes was done through ongoing peer debriefing, but no one else reviewed the data set in its entirety. The confirmability of the results might have increased if multiple individuals completed open coding before the third phase of data analysis began. Second, only the individuals randomized to the mindfulness condition were included in this analysis. Although this decision was informed by the research questions, the dependability of the results might have increased if there was an opportunity to look for convergence and divergence between the experiences of those in the mindfulness versus control conditions. Finally, as noted earlier, the data analysis and results were informed by the positionalities of the research team. Peer debriefing allowed me the opportunity to explore how my analytic process was informed by experiences as a doctoral student, a licensed therapist, and personal mental health struggles. This process began as early as the recruitment and data collection stages, as I had to continuously balance my roles as Principal Investigator and crisis intervention therapist given that it was my responsibility not only to collect data, but also to assess for changes in level of risk. This reflexive understanding and ongoing peer debriefing process likely represent

strengths rather than limitations of the study; however, transferability is potentially

limited given the unique context in which the study took place, including the social

positionalities of both the participants and research team.

This study is an important contribution to the extant qualitative literature on NSSI

in several important ways. One, this study expands the conversation from functions of

NSSI to possible solutions. Participants descriptions of their experiences while

completing a performance-based task measuring attentional bias, as well a brief

mindfulness induction, speak to the mechanisms by which mindfulness may disrupt the

negative cognitive and affective states self-injuring individuals experience when exposed

to NSSI stimuli. Two, this study situated an understanding of NSSI from the perspectives

of a diverse group of young adults, perspectives that have been underrepresented in NSSI

research. Finally, embedding this qualitative study in the larger mixed methods design

provided qualitative context for the quantitative findings described earlier. Future studies

might consider employing convergent mixed methods designs (Creswell & Clark, 2011;

Fetters, Curry, & Creswell, 2013; Johnson & Schoonenboom, 2016) in order to

emphasize the importance of comparing quantitative and qualitative data during the

analytic process in order to look for convergence or divergence of results.

Table 6

Categories from data analysis

Categories	Codes per category	Participants, n (%)
Awareness of attentional bias	31	16 (100.0)
Awareness of urge	12	8 (50.0)
Memories of personal NSSI	27	14 (87.5)
Memories of thoughts of others	12	7 (43.8)
Awareness of distressing emotions	32	14 (87.5)
Awareness of pleasant emotions	16	10 (62.5)
Awareness of neutral emotions	13	8 (50.0)
Awareness of unpleasant physical sensations	16	11 (68.8)
Awareness of pleasant physical sensations	12	8 (50.0)
Describing the practice of mindfulness	31	15 (93.8)
Positive changes following mindfulness	41	16 (100.0)
Reporting decreased attentional bias	12	10 (62.5)
No change following mindfulness	5	3 (18.8)
Negative changes following mindfulness	4	4 (25.0)

Table 7

Example of how textual data became a theme

Theme	Categories	Open codes	Quotes
NSSI memories	Memories of personal NSSI	Relating images to personal experience	103: "The ones that made me think more were related to me, so like cuts, scars. Like I have scars that look very similar."
		Thinking about personal experiences	109: "I guess I thought about my own experiences with self-harm a lot, and I've seen images like that before on social media."
	Memories or thoughts of others	Remembering another in relation to the images	107: "One time when I was hospitalized for a suicide attempt, my roommate, her body was just covered in scars."
		Relating the images to a friend who experienced NSSI	118: "There were two that stood out in particular that remind me of a friend of mine where their arm was cut up. They had the scars, right, and also the fresh wounds."
	Awareness of urge	Noticing urge	126: "It was a familiar pull to do that again."
		Feeling triggered	128: "Triggering. I felt like it made me think about self-harm. It made me think about self-harming, in regards to myself."

Table 8

Research team positionalities

Initials	Role	Education	Age	Identity descriptors
MRR	Principal investigator	MSW, PhD candidate	31	White, nonreligious, queer, cisgender male
VLN	Peer debriefing team member	MSW, PhD candidate	27	Vietnamese, Buddhist, straight, cisgender female
SER	Peer debriefing team member	MSW, PhD candidate	31	White, nonreligious, straight, cisgender female
JKM	Peer debriefing team member	MSW, PhD	42	White, nonreligious, straight, cisgender female
JRM	Research assistant	BSW student	31	White, nonreligious, straight, cisgender female

CHAPTER 5

CONCLUSION

Effectively treating NSSI among young adults not only requires an explanation of the complex processes that inform the behavior, but also an understanding of the treatment mechanisms that create change. The purpose of this dissertation was to evaluate the impact of one transtherapeutic mechanism on one transdiagnostic process to further that understanding of addressing NSSI—specifically, the impact of a brief mindfulness induction on NSSI AB. This was done through a baseline analysis of NSSI AB among self-injuring young adults as evaluated by an experimental task, a repeated measures analysis of the impact of a brief mindfulness induction on NSSI AB, and a qualitative description of participants' experiences with and perceptions of completing the experimental task and mindfulness induction. This final chapter offers a brief conclusion to these efforts, including recommendations for future research and applications for social work practice.

In Chapter 2, I reported the results of a cross-sectional study wherein participants completed a dot probe task designed to assess NSSI and negative AB. Participants exhibited a significant AB to NSSI cues, but not to negatively valenced cues, consistent with the initial hypothesis. However, NSSI AB was not correlated with NSSI history and was positively correlated with trait mindfulness—the inverse of the predicted

relationship. In Chapter 3, I reported the results of a repeated measures study wherein participants were randomized to complete a mindfulness or a control induction before completing the dot probe task a second time to determine the impact of the induction on NSSI AB. Contrary to the hypothesis, the mindfulness induction had no effect on NSSI AB nor were there any significant differences between inductions in state mindfulness. In Chapter 4, I reported the results of a qualitative study wherein participants randomized to the mindfulness condition described their experiences of viewing NSSI images during the dot probe task and completing the induction during a semistructured interview. Through a process of thematic analysis, their experiences merged into rich descriptions of decreased emotional distress following the induction that carried into the second dot probe task. These experiences reportedly resulted in subjective decreases in NSSI AB.

Interestingly, although I reported null effects of the mindfulness induction in Chapter 3, participants qualitatively described experiences that were consistent with my quantitative hypotheses and align with the extant literature on the benefits of mindfulness (e.g., Creswell & Clark, 2011; Fetters, Curry, & Creswell, 2013; Johnson & Schoonenboom, 2016; O'Cathain et al., 2014). Mindfulness practice encourages openness to present thoughts, feelings, and perceptions, which in turn promotes emotion regulation through a process of nonattachment and nonjudgmental acceptance (Brown et al., 2007; Keng et al., 2011). Because emotion regulation is a primary motivator for self-injuring individuals, employing mindfulness practices during instances of distress may provide an adaptive alternative to NSSI. Likewise, developing a nonjudgmental perspective may alleviate the desire for self-punishment often experienced by young adults. Feelings of worthlessness are also common among self-injuring individuals and

may precede or perpetuate emotion dysregulation. Adopting a mindful perspective may foster feelings of self-worth. Mindfulness-based interventions with a focus on mindfulness training and meditation practice increase attentional control and metacognitive awareness (Keng et al., 2011; Teasdale et al., 2002; Vago & Silbersweig, 2012), which is linked with the capacity to de-identify from negative perceptions and passing emotional or cognitive states. This process of decentering may be useful to self-injuring individuals given that negative affect often leads to reactive behaviors, i.e., rather than slowing down and identifying the circumstances contributing to emotional distress and thoughts of NSSI, young adults may impulsively or compulsively react to emotional stimuli by engaging in NSSI. Increased attention regulation may provide adolescents with greater insight regarding present-moment context and its impact on their emotional states.

While these qualitative results were consistent with my hypotheses, reconciling the divergent quantitative and qualitative findings requires positioning them within the complex NSSI mechanisms described in Chapter 1 and outlined in Figure 1, as well as considering the limitations of this dissertation. In his integrated model of NSSI (2009), Nock describes both proximal NSSI risk factors such as overarousal, underarousal, or unmanageable social demands, as well as distal risk factors that might contribute to the development of NSSI. These distal factors include a history of childhood maltreatment, an invalidating family environment, or a predisposition for high emotional reactivity, among others. While many of these variables were characterized in this sample, it is possible that those proximal or distal risk factors that were not measured in this dissertation might be able to explain the disparate quantitative and qualitative findings. Buser and Buser (2013), who have conceptualized NSSI as a process addiction, have

noted different developmental trajectories of NSSI given that NSSI is not experienced by all self-injuring individuals as a process addiction. While the SITBI is a thorough clinical interview of NSSI history, it does not characterize the development of NSSI nor does it explore whether individuals experience NSSI as an addiction. This particular data set is missing developmental context that might explain the surprising relationships and null effects discussed in Chapters 2 and 3. Although participants could have provided these data during their qualitative interviews, it fell outside of the scope of the research questions being asked.

The divergent findings described earlier may also be understood in the limitations of the dissertation design and methods. First and foremost, several of the quantitative analyses were insufficiently powered. As such, these results are not generalizable given the nonsignificant results of the quantitative data. Additionally, while participants did exhibit a statistically significant AB to NSSI cues, the dot probe task exhibited poor test-retest reliability, suggesting there may have been other factors influencing the experience of AB that were not captured in this study. Finally, stigma was almost universally mentioned by the participants during their qualitative interviews. Those data were not included in this dissertation because they did not relate to the research questions explored in the qualitative study, but they may explain the difficulties associated with recruiting such a vulnerable population.

The strengths of this dissertation stem from its use of an embedded mixed methodology and its diverse sample, as well as the novelty of the findings. This was the first study in the scientific literature to demonstrate that self-injuring individuals exhibit an AB to NSSI cues. Although convenience sampling procedures were utilized to recruit

the same, I focused my recruitment and advertising efforts on collaborations with university and community organizations that provide services to individuals with historically marginalized identities. For example, I lead a weekly support group at a community agency that provides services to youth with diverse sexual and gender identities. I also provided trainings and presentations to organizations that work with self-injuring young adults. Given the diagnostic and demographic heterogeneity associated with NSSI, these community-oriented efforts were intended to invite individuals from all backgrounds to participate in the study, with a particular emphasis on those whose identities have been historically overlooked in NSSI research. These efforts were reflected in the sample despite its relatively small size. The use of mixed methods and focus on young adult experiences, as well as the qualitative results, provide strong explanatory evidence regarding the impact of the mindfulness induction.

Researchers and clinicians alike should consider focusing on mechanistic treatment targets—like AB—in order to more effectively address the cognitive, affective, and interpersonal processes that inform the development and maintenance of NSSI. Additionally, by employing both pragmatist and social constructivist epistemologies, social workers can disrupt and see beyond stigmatized ways of viewing NSSI. This dissertation represents the perspectives and stories of 30 individuals with unique and diverse identities and experiences. Their sexualities, genders, ethnicities, and life circumstances transcend the labels typically associated with self-injuring individuals. While some treatments show promise, there are still no empirically supported interventions for treating NSSI. The biopsychosocial perspective utilized by social

workers is an apt starting place for developing more effective clinical interventions

rooted in a transdiagnostic perspective.

APPENDIX

MINDFULNESS INDUCTION SCRIPT

I want to teach you a concentration exercise to help you to cope with distressing thoughts and feelings. It is just a form of concentration, where you can pay attention, on purpose and nonjudgmentally, to the present moment. Now, when you're ready, you can sit comfortably, but be as alert and aware as possible. Many people find it more comfortable to allow their eyes to close. In a moment, noticing the sensation of your body resting against the chair. Noticing the sensation of contact, between the back and the legs and the chair. And we have this word contact, but what is it really? A sensation of warmth, or heaviness, or tingling. Just noticing that sensation. You can begin to become aware of the state of the body in this moment. Is the body tired or full of energy, right now? Is it relaxed or tense? It really doesn't matter, just noticing the state of the body in this moment. And in a moment noticing the state of the mind. Is it full of thoughts, or mostly empty of thoughts? Are the thoughts moving fast or are they moving slowly? And again, it really doesn't matter. Whatever the state of the mind is in this moment, it's okay, just noticing the state of the mind in this moment. And when you're ready, you can shift the focus of your attention to the sensation of the breathing. Noticing the sensation of the breath as it flows into the nostrils when you inhale. Noticing the warmth or the coolness of that air as you breathe. Noticing perhaps the movements of the tiny muscles in the nostrils as you inhale. And perhaps following the breath more deeply into the body… Noticing the sensation of the breath filling the lungs. And soon you may begin to notice that the mind begins to wander to thoughts, feelings, images, memories, urges or sensations in the body. And when you notice that the mind has wandered, that's okay, because that's what minds do, they wander. You can just notice where the mind has wandered off to, acknowledging that thought or feeling or urge, and gently bringing the

attention back to the breath. Focusing on the sensation of the breath. And whenever the mind wanders to thoughts, emotions, images, memories, urges, or sensations, that's okay, because that is what minds do, they wander. Just noticing where the mind has wandered off to, acknowledging and accepting that thought, feeling, or urge. You might even say to yourself, it's okay to have this thought or feeling, and then let it go, and gently but firmly bringing the attention back to the breath. And it really doesn't matter if the mind wanders a thousand times, because each time that you notice that the mind has wandered, you can become aware of where the mind has wandered off to, and then you can gently but firmly return the focus of your attention back to the breath, again and again. And soon you may begin to notice that urges, thoughts, images, and memories are like clouds passing in a clear blue sky. Like clouds drifting, these thoughts and feelings come out of nowhere, gradually change shape, and then fade into the distance, before disappearing naturally, all on their own. And there is no need to hold onto those thoughts or to push them away. You can just let them go. And a part of the mind is like those thoughts or sensations passing like clouds. But there is a deeper part of the mind that is more like…the space in which the clouds pass, the observing awareness, that is open, vast, and free, just watching, just observing, peacefully. And you can focus your attention on that part of your mind, or you can continue to focus your attention on your breathing, on the sensations of the breath flowing into the nostrils, the sensations of the breath in the lungs. And you can return when you need to this state of mind whenever you need to, simply by bringing your attention back to the breath. Then, slowly and gently, when you are ready, you can complete this experience and open your eyes.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Ammerman, B. A., Olino, T. M., Coccaro, E. F., & McCloskey, M. S. (2017). Predicting nonsuicidal self-injury in borderline personality disorder using ecological momentary assessment. *Journal of Personality Disorders*, *31*, 844–855. https://doi.org/10.1521/pedi_2017_31_278

Andrews, T., Martin, G., Hasking, P., & Page, A. (2013). Predictors of continuation and cessation of nonsuicidal self-injury. *Journal of Adolescent Health*, *53*, 40–46. https://doi.org/10.1016/j.jadohealth.2013.01.009

Andrews, T., Martin, G., Hasking, P., & Page, A. (2014). Predictors of onset for non-suicidal self-injury within a school-based sample of adolescents. *Prevention Science*, *15*, 850–859. https://doi.org/10.1007/s11121-013-0412-8

Angelotta, C. (2015). Defining and refining self-harm: A historical perspective on nonsuicidal self-injury. *The Journal of Nervous and Mental Disease*, *203*, 75–80. https://doi.org/10.1097/NMD.0000000000000243

Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy*, *44*, 1849–1858. https://doi.org/10.1016/j.brat.2005.12.007

Asarnow, J. R., Porta, G., Spirito, A., Emslie, G., Clarke, G., Wagner, K. D., … Brent, D. A. (2011). Suicide attempts and nonsuicidal self-injury in the treatment of resistant depression in adolescents: Findings from the TORDIA study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *50*, 772–781. https://doi.org/10.1016/j.jaac.2011.04.003

Auerbach, R. P., Kim, J. C., Chango, J. M., Spiro, W. J., Cha, C., Gold, J., … Nock, M. K. (2014). Adolescent nonsuicidal self-injury: Examining the role of child abuse, comorbidity, and disinhibition. *Psychiatry Research*, *220*, 579–584. https://doi.org/10.1016/j.psychres.2014.07.027

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*, 27–45. https://doi.org/10.1177/1073191105283504

Baker, A. K., & Garland, E. L. (2019). Autonomic and affective mediators of the relationship between mindfulness and opioid craving among chronic pain patients. *Experimental and Clinical Psychopharmacology*, *27*, 55–63. https://doi.org/10.1037/pha0000225

Beauchaine, T. P. (2015). Respiratory sinus arrhythmia: A transdiagnostic biomarker of emotion dysregulation and psychopathology. *Current Opinion in Psychology*, *1*, 43–47. https://doi.org/10.1016/j.copsyc.2015.01.017

Bentley, K. H., Nock, M. K., & Barlow, D. H. (2014). The four-function model of nonsuicidal self-injury: Key directions for future research. *Clinical Psychological Science*, *2*, 638–656. https://doi.org/10.1177/2167702613514563

Bentley, K. H., Nock, M. K., Sauer-Zavala, S., Gorman, B. S., & Barlow, D. H. (2017). A functional analysis of two transdiagnostic, emotion-focused interventions on nonsuicidal self-injury. *Journal of Consulting and Clinical Psychology*, *85*, 632–646. https://doi.org/10.1037/ccp0000205

Bluth, K., & Blanton, P. W. (2014). Mindfulness and self-compassion: Exploring pathways to adolescent emotional well-being. *Journal of Child and Family Studies*, *23*, 1298–1309. https://doi.org/10.1007/s10826-013-9830-2

Bowen, S., & Marlatt, A. (2009). Surfing the urge: Brief mindfulness-based intervention for college student smokers. *Psychology of Addictive Behaviors*, *23*, 666–671. https://doi.org/10.1037/a0017127

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*, 77–101. https://doi.org/10.1191/1478088706qp063oa

Breen, A. V., Lewis, S. P., & Sutherland, O. (2013). Brief report: Non-suicidal self-injury in the context of self and identity development. *Journal of Adult Development*, *20*, 57–62. https://doi.org/10.1007/s10804-013-9156-8

Bresin, K., & Gordon, K. H. (2013). Endogenous opioids and nonsuicidal self-injury: A mechanism of affect regulation. *Neuroscience and Biobehavioral Reviews*, *37*, 374–383. https://doi.org/10.1016/j.neubiorev.2013.01.020

Broderick, P. C. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy and Research*, *29*, 501–510. https://doi.org/10.1007/s10608-005-3888-0

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*, 211–237. https://doi.org/10.1080/10478400701598298

Brown, R. C., & Plener, P. L. (2017). Non-suicidal self-injury in adolescence. *Current Psychiatry Reports*, *19*, 20. https://doi.org/10.1007/s11920-017-0767-9

Browning, M., Holmes, E., & Harmer, C. (2010). The modification of attentional bias to emotional information: A review of the techniques, mechanisms, and relevance to emotional disorders. *Cognitive, Affective, & Behavioral Neuroscience*, *10*, 8–20. https://doi.org/10.3758/CABN.10.1.8

Burke, C. A. (2010). Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies*, *19*, 133–144. https://doi.org/10.1007/s10826-009-9282-x

Buser, T. J., & Buser, J. K. (2013). Conceptualizing nonsuicidal self-injury as a process addiction: Review of research and implications for counselor training and practice. *Journal of Addictions & Offender Counseling*, *34*, 16–29. https://doi.org/10.1002/j.2161-1874.2013.00011.x

Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of Mixed Methods Research*, *4*, 342–360. https://doi.org/10.1177/1558689810382916

Cha, C. B., Najmi, S., Park, J. M., Finn, C. T., & Nock, M. K. (2010). Attentional bias toward suicide-related stimuli predicts suicidal behavior. *Journal of Abnormal Psychology*, *119*, 616–622. https://doi.org/10.1037/a0019710

Christiansen, P., Schoenmakers, T. M., & Field, M. (2015). Less than meets the eye: Reappraising the clinical relevance of attentional bias in addiction. *Contemporary Perspectives on Cognition in Addictive Behaviors*, *44*, 43–50. https://doi.org/10.1016/j.addbeh.2014.10.005

Cipriano, A., Cella, S., & Cotrufo, P. (2017). Nonsuicidal self-injury: A systematic review. *Frontiers in Psychology*, *8*, 1946. https://doi.org/10.3389/fpsyg.2017.01946

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage Publications, Inc.

Cucchi, A., Ryan, D., Konstantakopoulos, G., Stroumpa, S., Kaçar, A. Ş., Renshaw, S., … Kravariti, E. (2016). Lifetime prevalence of non-suicidal self-injury in patients with eating disorders: A systematic review and meta-analysis. *Psychological Medicine*, *46*, 1345–1358. https://doi.org/10.1017/S0033291716000027

Deliberto, T. L., & Nock, M. K. (2008). An exploratory study of correlates, onset, and offset of non-suicidal self-injury. *Archives of Suicide Research*, *12*, 219–231. https://doi.org/10.1080/13811110802101096

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175–191.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—Principles and practices. *Health Services Research*, *48*, 2134–2156. https://doi.org/10.1111/1475-6773.12117

Field, M., & Cox, W. M. (2008). Attentional bias in addictive behaviors: A review of its development, causes, and consequences. *Drug and Alcohol Dependence*, *97*, 1–20.

Field, M., Duka, T., Tyler, E., & Schoenmakers, T. (2009). Attentional bias modification in tobacco smokers. *Nicotine & Tobacco Research*, *11*, 812–822.

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, *46*, 839–852.

Franklin, J. C., Hessel, E. T., Aaron, R. V., Arthur, M. S., Heilbron, N., & Prinstein, M. J. (2010). The functions of nonsuicidal self-injury: Support for cognitive-affective regulation and opponent processes from a novel psychophysiological paradigm. *Journal of Abnormal Psychology*, *119*, 850–862. https://doi.org/10.1037/a0020896

Garland, E., Franken, I., & Howard, M. (2012). Cue-elicited heart rate variability and attentional bias predict alcohol relapse following treatment. *Psychopharmacology*, *222*, 17–26.

Garland, E.L., Boettiger, C. A., Gaylord, S., Chanon, V. W., & Howard, M. O. (2012). Mindfulness is inversely associated with alcohol attentional bias among recovering alcohol-dependent adults. *Cognitive Therapy and Research*, *36*, 441–450. https://doi.org/10.1007/s10608-011-9378-7

Garland, E.L., Gaylord, S. A., Boettiger, C. A., & Howard, M. O. (2010). Mindfulness training modifies cognitive, affective, and physiological mechanisms implicated in alcohol dependence: Results from a randomized controlled pilot trial. *Journal of Psychoactive Drugs*, *42*, 177–192.

Garland, E.L., & Howard, M. O. (2013). Mindfulness-Oriented Recovery Enhancement reduces pain attentional bias in chronic pain patients. *Psychotherapy and Psychosomatics*, *82*, 311–318. https://doi.org/10.1159/000348868

Garland, Eric L. (2016). Restructuring reward processing with Mindfulness-Oriented Recovery Enhancement: Novel therapeutic mechanisms to remediate hedonic dysregulation in addiction, stress, and pain. *Annals of the New York Academy of Sciences*, *1373*, 25–37.

Garland, Eric L., Baker, A. K., & Howard, M. O. (2017). Mindfulness-Oriented Recovery Enhancement reduces opioid attentional bias among prescription opioid-treated chronic pain patients. *Journal of the Society for Social Work and Research*, *82*, 311-318. https://doi.org/10.1086/694324

Garland, Eric L., Baker, A. K., Larsen, P., Riquino, M. R., Priddy, S. E., Thomas, E., … Nakamura, Y. (2017). Randomized controlled trial of brief mindfulness training and hypnotic suggestion for acute pain relief in the hospital setting. *Journal of General Internal Medicine*, *32*, 1106–1113. https://doi.org/10.1007/s11606-017-4116-9

Garland, Eric L., Brown, S. M., & Howard, M. O. (2016). Thought suppression as a mediator of the association between depressed mood and prescription opioid craving among chronic pain patients. *Journal of Behavioral Medicine*, *39*, 128–138. https://doi.org/10.1007/s10865-015-9675-9

Garland, Eric L., Froeliger, B., & Howard, M. O. (2014a). Effects of Mindfulness-Oriented Recovery Enhancement on reward responsiveness and opioid cue-reactivity. *Psychopharmacology*, *231*, 3229–3238.

Garland, Eric L., Froeliger, B., & Howard, M. O. (2014b). Mindfulness training targets neurocognitive mechanisms of addiction at the attention-appraisal-emotion interface. *Frontiers in Psychiatry*, *4*, 173. https://doi.org/10.3389/fpsyt.2013.00173

Garland, Eric L., & Howard, M. O. (2014). A transdiagnostic perspective on cognitive, affective, and neurobiological processes underlying human suffering. *Research on Social Work Practice*, *24*, 142–151. https://doi.org/10.1177/1049731513503909

Glenn, C. R., Franklin, J. C., & Nock, M. K. (2015). Evidence-based psychosocial treatments for self-injurious thoughts and behaviors in youth. *Journal of Clinical Child & Adolescent Psychology*, *44*, 1–29. https://doi.org/10.1080/15374416.2014.945211

Glenn, C. R., & Klonsky, E. D. (2013). Non-suicidal self-injury disorder: An empirical investigation in adolescent psychiatric patients. *Journal of Clinical Child & Adolescent Psychology*, *42*, 496–507. https://doi.org/10.1080/15374416.2013.794699

Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, *59*, 52–60. https://doi.org/10.1016/j.cpr.2017.10.011

Goyal, M., Singh, S., & Sibinga, E. M. S. (2014). Meditation programs for psychological stress and well-being. *JAMA Internal Medicine*, *174*, 357–368. https://doi.org/10.1001/jamainternmed.2013.13018

Greeson, J., Garland, E. L., & Black, D. (2014). Mindfulness: A transtherapeutic approach for transdiagnostic mental processes. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley handbook of mindfulness* (1st ed., pp. 533–562). Malden, MA: John Wiley & Sons, Ltd.

Guan, K., Fox, K. R., & Prinstein, M. J. (2012). Nonsuicidal self-injury as a time-invariant predictor of adolescent suicide ideation and attempts in a diverse community sample. *Journal of Consulting and Clinical Psychology*, *80*, 842–849. https://doi.org/10.1037/a0029429

Harrison, G. M., & Vallin, L. M. (2018). Evaluating the metacognitive awareness inventory using empirical factor-structure evidence. *Metacognition and Learning*, *13*, 15–38. https://doi.org/10.1007/s11409-017-9176-z

Hasking, P., Whitlock, J. L., Voon, D., & Rose, A. (2016). A cognitive-emotional model of NSSI: Using emotion regulation and cognitive processes to explain why people self-injure. *Cognition & Emotion*, *31*, 1543–1556. https://doi.org/10.1080/02699931.2016.1241219

Jacobson, C. M., & Batejan, K. (2014). Comprehensive theoretical models of nonsuicidal self-injury. In M. K. Nock (Ed.), *The Oxford handbook of suicide and self-injury* (pp. 308–320). New York, NY: Oxford University Press.

Jacobson, C. M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research*, *11*, 129–147. https://doi.org/10.1080/13811110701247602

Johnson, R. B., & Schoonenboom, J. (2016). Adding qualitative and mixed methods research to health intervention studies: Interacting with differences. *Qualitative Health Research*, *26*, 587–602. https://doi.org/10.1177/1049732315617479

Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*, *31*, 1041–1056. https://doi.org/10.1016/j.cpr.2011.04.006

Klonsky, E. D. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review*, *27*, 226–239. https://doi.org/10.1016/j.cpr.2006.08.002

Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography and functions. *Psychological Medicine*, *41*, 1981–1986. https://doi.org/10.1017/S0033291710002497

Klonsky, E. D., & Glenn, C. R. (2009). Assessing the functions of non-suicidal self-injury: Psychometric properties of the Inventory of Statements About Self-injury (ISAS). *Journal of Psychopathology and Behavioral Assessment*, *3*, 215–219. https://doi.org/10.1007/s10862-008-9107-z

Klonsky, E. D., Glenn, C. R., Styer, D. M., Olino, T. M., & Washburn, J. J. (2015). The functions of nonsuicidal self-injury: Converging evidence for a two-factor structure. *Child & Adolescent Psychiatry & Mental Health*, *9*, 44. https://doi.org/10.1186/s13034-015-0073-4

Klonsky, E. D., & Muehlenkamp, J. J. (2007). Self-injury: A research review for the practitioner. *Journal of Clinical Psychology*, *63*, 1045–1056. https://doi.org/10.1002/jclp.20412

Kurdi, B., Lozano, S., & Banaji, M. R. (2017). Introducing the Open Affective Standardized Image Set (OASIS). *Behavior Research Methods*, *49*, 457–470. https://doi.org/10.3758/s13428-016-0715-3

Lang, P., Bradley, M., & Cuthbert, B. (2008). *International affective picture system (IAPS): Affective ratings of pictures and instruction manual* (No. A-8). Retrieved from University of Florida website: http://csea.phhp.ufl.edu/Media.html

Lattimore, P., & Mead, B. R. (2015). See it, grab it, or STOP! Relationships between trait impulsivity, attentional bias for pictorial food cues and associated response inhibition following in-vivo food cue exposure. *Appetite*, *90*, 248–253. https://doi.org/10.1016/j.appet.2015.02.020

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., … Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology*, *62*, 1445–1467.

Lavender, J. M., Tull, M. T., DiLillo, D., Messman-Moore, T., & Gratz, K. L. (2015). Development and validation of a state-based measure of emotion dysregulation: The State Difficulties in Emotion Regulation Scale (S-DERS). *Assessment*, *24*, 197–209. https://doi.org/10.1177/1073191115601218

Leung, D., Staiger, P. K., Hayden, M., Lum, J. A. G., Hall, K., Manning, V., & Verdejo-Garcia, A. (2017). Meta-analysis of the relationship between impulsivity and substance-related cognitive biases. *Drug and Alcohol Dependence*, *172*, 21–33. https://doi.org/10.1016/j.drugalcdep.2016.11.034

Liu, J., Shen, K., & Li, H. (2019). How state anxiety and attentional bias interact with each other: The moderating effect of cognitive appraisal. *Attention, Perception, & Psychophysics*, *81*, 694–706. https://doi.org/10.3758/s13414-018-01650-y

Liu, R. T. (2017). Characterizing the course of non-suicidal self-injury: A cognitive neuroscience perspective. *Neuroscience and Biobehavioral Reviews*, *80*, 159–165. https://doi.org/10.1016/j.neubiorev.2017.05.026

MacLeod, C., & Mathews, A. (1988). Anxiety and the allocation of attention to threat. *The Quarterly Journal of Experimental Psychology*, *40*, 653–670. https://doi.org/10.1080/14640748808402292

Meszaros, G., Horvath, L. O., & Balazs, J. (2017). Self-injury and externalizing pathology: A systematic literature review. *BMC Psychiatry*, *17*, 160. https://doi.org/10.1186/s12888-017-1326-y

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, *20*, 1045–1053. https://doi.org/10.1177/1077800413513733

Muehlenkamp, J. J., Walsh, B. W., & McDade, M. (2010). Preventing non-suicidal self-injury in adolescents: The Signs of Self-Injury Program. *Journal of Youth and Adolescence*, *39*, 306–314. https://doi.org/10.1007/s10964-009-9450-8

Neumann, A., van Lier, P. A. C., Gratz, K. L., & Koot, H. M. (2009). Multidimensional assessment of emotion regulation difficulties in adolescents using the Difficulties in Emotion Regulation Scale. *Assessment*, *17*, 138–149. https://doi.org/10.1177/1073191109349579

Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science*, *18*, 78–83. https://doi.org/10.1111/j.1467-8721.2009.01613.x

Nock, M. K., & Favazza, A. R. (2009). Nonsuicidal self-injury: Definition and classification. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 9–18). Washington, DC: American Psychological Association.

Nock, M. K., Holmberg, E. B., Photos, V. I., & Michel, B. D. (2007). Self-Injurious Thoughts and Behaviors Interview: Development, reliability, and validity in an adolescent sample. *Psychological Assessment*, *19*, 309–317. https://doi.org/10.1037/1040-3590.19.3.309

Nock, M. K., Jr., T. E. J., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, *144*, 65–72. https://doi.org/10.1016/j.psychres.2006.05.010

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology*, *72*, 885–890. https://doi.org/10.1037/0022-006X.72.5.885

Nock, M. K., Teper, R., & Hollander, M. (2007). Psychological treatment of self-injury among adolescents. *Journal of Clinical Psychology*, *63*, 1081–1089. https://doi.org/10.1002/jclp.20415

O'Cathain, A., Thomas, K. J., Drabble, S. J., Rudolph, A., Goode, J., & Hewison, J. (2014). Maximising the value of combining qualitative research and randomised controlled trials in health research: The QUAlitative Research in Trials (QUART) study – a mixed methods study. *Health Technology Assessment*, *18*, 38. https://doi.org/10.3310/hta18380

Ougrin, D., Tranah, T., Stahl, D., Moran, P., & Asarnow, J. R. (2015). Therapeutic interventions for suicide attempts and self-harm in adolescents: Systematic review and meta-analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, *54*, 97–107. https://doi.org/10.1016/j.jaac.2014.10.009

Peckham, A. D., McHugh, R. K., & Otto, M. W. (2010). A meta-analysis of the magnitude of biased attention in depression. *Depression and Anxiety*, *27*, 1135–1142. https://doi.org/10.1002/da.20755

Plano Clark, V. L., Schumacher, K., West, C., Edrington, J., Dunn, L. B., Harzstark, A., … Miaskowski, C. (2013). Practices for embedding an interpretive qualitative approach within a randomized clinical trial. *Journal of Mixed Methods Research*, *7*, 219–242. https://doi.org/10.1177/1558689812474372

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891.

Price, R. B., Kuckertz, J. M., Siegle, G. J., Ladouceur, C. D., Silk, J. S., Ryan, N. D., … Amir, N. (2015). Empirical recommendations for improving the stability of the dot-probe task in clinical research. *Psychological Assessment*, *27*, 365–376. https://doi.org/10.1037/pas0000036

Rodríguez-Blanco, L., Carballo, J. J., & Baca-García, E. (2018). Use of ecological momentary assessment (EMA) in non-suicidal self-injury (NSSI): A systematic review. *Psychiatry Research*, *263*, 212–219. https://doi.org/10.1016/j.psychres.2018.02.051

Rogojanski, J., Vettese, L., & Antony, M. (2011). Coping with cigarette cravings: Comparison of suppression versus mindfulness-based strategies. *Mindfulness*, *2*, 14–26. https://doi.org/10.1007/s12671-010-0038-x

Schreiner, M. W., Klimes-Dougan, B., Begnel, E. D., & Cullen, K. R. (2015). Conceptualizing the neurobiology of non-suicidal self-injury from the perspective of the Research Domain Criteria Project. *Neuroscience and Biobehavioral Reviews*, *57*, 381–391. https://doi.org/10.1016/j.neubiorev.2015.09.011

Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., … Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, *59 Supplement 20*, 22-33.

Stanley, B., Fineran, V., & Brodsky, B. (2014). Psychological treatments for for nonsuicidal self-injury. In M. K. Nock (Ed.), *The Oxford handbook of suicide and self-injury* (pp. 409–418). New York, NY: Oxford University Press.

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & John, N. J. S. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior*, *44*, 273–303. https://doi.org/10.1111/sltb.12070

Tatnell, R., Kelada, L., Hasking, P., & Martin, G. (2014). Longitudinal analysis of adolescent NSSI: The role of intrapersonal and interpersonal factors. *Journal of Abnormal Child Psychology*, *42*, 885–896. https://doi.org/10.1007/s10802-013-9837-6

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: Empirical evidence. *Journal of Consulting and Clinical Psychology*, *70*, 275–287. https://doi.org/10.1037/0022-006X. 70.2.275

Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonamutomatic processes. *Psychological Review*, *97*, 147.

Todd, R. M., Cunningham, W. A., Anderson, A. K., & Thompson, E. (2012). Affect-biased attention as emotion regulation. *Trends in Cognitive Sciences*, *16*, 365–372. https://doi.org/10.1016/j.tics.2012.06.003

Tomlinson, E. R., Yousaf, O., Vittersø, A. D., & Jones, L. (2018). Dispositional mindfulness and psychological health: A systematic review. *Mindfulness*, *9*, 23–43. https://doi.org/10.1007/s12671-017-0762-6

Vago, D. R., & Nakamura, Y. (2011). Selective attentional bias towards pain-related threat in fibromyalgia: Preliminary evidence for effects of mindfulness meditation training. *Cognitive Therapy and Research*, *35*, 1–14.

Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience*, *6*, 296. https://doi.org/10.3389/fnhum.2012.00296

Vernig, P. M., & Orsillo, S. M. (2009). Psychophysiological and self-reported emotional responding in alcohol-dependent college students: The impact of brief acceptance/mindfulness instruction. *Cognitive Behaviour Therapy*, *38*, 174–183. https://doi.org/10.1080/16506070902767563

Victor, S. E., Glenn, C. R., & Klonsky, E. D. (2012). Is non-suicidal self-injury an "addiction"? A comparison of craving in substance use and non-suicidal self-injury. *Psychiatry Research*, *197*, 73–77. https://doi.org/10.1016/j.psychres.2011.12.011

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063.

Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual Review of Psychology*, *51*, 59–91.

Wester, K., Trepal, H., & King, K. (2018). Nonsuicidal self-injury: Increased prevalence in engagement. *Suicide and Life-Threatening Behavior*, *48*, 690–698. https://doi.org/10.1111/sltb.12389

Whitlock, J. L., Powers, J. L., & Eckenrode, J. (2006). The virtual cutting edge: The internet and adolescent self-injury. *Developmental Psychology*, *42*, 407–417. https://doi.org/10.1037/0012-1649.42.3.000

Wielgus, M. D., Aldrich, J. T., Mezulis, A. H., & Crowell, S. E. (2016). Respiratory sinus arrhythmia as a predictor of self-injurious thoughts and behaviors among adolescents. *International Journal of Psychophysiology*, *106*, 127–134. https://doi.org/10.1016/j.ijpsycho.2016.05.005

Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools—a systematic review and meta-analysis. *Frontiers in Psychology*, *5*, 603. https://doi.org/10.3389/fpsyg.2014.00603

Zetterqvist, M. (2015). The DSM-5 diagnosis of nonsuicidal self-injury disorder: A review of the empirical literature. *Child and Adolescent Psychiatry and Mental Health*, *9*, 31. https://doi.org/10.1186/s13034-015-0062-7

Zoogman, S., Goldberg, S. B., Hoyt, W. T., & Miller, L. (2015). Mindfulness interventions with youth: A meta-analysis. *Mindfulness*, *6*, 290. https://doi.org/10.1007/s12671-013-0260-4