



A lab-based study exploring the associations among nonsuicidal self-injury, pain, and emotion among university students



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ABSTRACT

Nonsuicidal self-injury (NSSI; e.g., self-cutting without lethal intent) is a widespread mental health concern among emerging adults in university. Although accumulating evidence suggests that NSSI is primarily an emotion coping behaviour, little is known about variability in emotional response to pain among individuals who self-injure. Recent theory on NSSI suggests that individuals who engage in NSSI to self-punish may experience additional affective gains in response to pain compared to individuals without self-punishment motivations for NSSI and individuals who do not self-injure. To test this hypothesis, 82 undergraduate students (Mage = 21.52 years) were recruited from a mid-sized university, and reported on their emotions three times: at baseline, following a stress-induction task, and after a cold-pressor task. Although all participants showed decreased negative emotions (e.g., hostility, fear) and increased serenity following cold pain, students who engaged in NSSI specifically to self-punish also showed decreased guilt and sadness. The present findings demonstrate that pain may serve to regulate different emotions for students who self-injure depending on their motivations for engaging in NSSI. Additionally, findings suggest that prevention and intervention efforts aimed at reducing the need to self-punish may help to reduce some of the emotionally reinforcing properties of NSSI.

1. Introduction

One out of every five university students has engaged in nonsuicidal self-injury (NSSI) (Swannell et al., 2014), and recent research suggests that the rates of NSSI on university campuses may be increasing (Wester et al., 2017). NSSI is defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as the direct and deliberate destruction or alteration of bodily tissue in the absence of lethal intent, and includes behaviours such as self-cutting, burning, and severe scratching (American Psychiatric Association, 2013). NSSI frequently has its onset in early adulthood (Heath et al., 2008; Whitlock et al., 2011). Moreover, emerging adults in university are twice as likely to engage in NSSI as compared to young adults who are not in university, suggesting that university students may represent a unique at-risk group (Swannell et al., 2014; Whitlock et al., 2011). Studies have consistently underscored the role of NSSI in the regulation of affect (Andover and Morris, 2014; Hamza and Willoughby, 2015; Klonsky 2007); however, less is known about heterogeneity in emotional response to NSSI among individuals who self-injure. In particular, it has

recently been proposed that engaging in NSSI specifically to self-punish may afford individuals unique emotional benefits (Hooley and Franklin, 2017). The present study specifically tests this hypothesis by exploring emotional responses to pain among emerging adults with and without self-punishing motivations for NSSI, and a comparison group of non-injuring students. Elucidating the emotional context in which NSSI occurs, and is reinforced among individuals, is critically important to develop evidenced-informed and targeted prevention and intervention programs for NSSI.

1.1. NSSI and emotion regulation

Emotion dysregulation is a broad construct which includes emotional reactivity (e.g., intensity and duration of an emotion in response to an event), difficulty labelling and expressing emotions, as well as difficulty modulating one's emotional response (Gratz and Roemer, 2004; Gross and Munoz, 1995; Werner and Gross, 2009). Emotion dysregulation has been widely implicated as a contributing factor for NSSI engagement (Andover and Morris, 2014; Chapman et al., 2006;

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Klonsky, 2009). Young adults who engage in NSSI report more frequent negative emotions (Bresin, 2014; Victor and Klonsky, 2014), greater difficulty regulating their emotions (Muehlenkamp et al., 2010; Voon et al., 2014), and greater emotional intensity and reactivity than individuals who do not engage in NSSI (Anderson and Crowther, 2012; Arbuthnott et al., 2015). Emotion regulation is also the most commonly endorsed motivation for engaging in NSSI (Hamza and Willoughby, 2015; Klonsky, 2007, 2009; Turner et al., 2012). For example, when asked why they self-injure, university students overwhelming report that NSSI serves as a way to reduce negative affect (e.g., stress, anxiety, frustration) (Klonsky and Glenn, 2009; Saraff and Pepper, 2014).

Recent research utilizing experience sampling techniques (which capture emotions prior to and after engagement in NSSI in real time) also provide compelling evidence (Davidson et al., 2017). These studies have shown that self-reported negative emotions tend to increase prior to engaging in NSSI (Muehlenkamp et al., 2009), and decrease following the act (Armeij et al., 2011; Kranzler et al., 2017; Nock et al., 2009). In addition, in a recent study NSSI urges were predicted by the intensity of negative emotions experienced, even after taking into account other risk factors for NSSI such as symptoms of depression and borderline personality disorder (Kranzler et al., 2017). Although there is some evidence to suggest that positive emotions, particularly low arousal emotions (e.g., content, calm, relieved) may also increase following an act of NSSI (Kranzler et al., 2017; Muehlenkamp et al., 2009), the link between NSSI and positive emotions is less consistently reported in these studies (Armeij et al., 2011).

In an effort to understand the emotionally reinforcing properties of NSSI, researchers also have utilized pain induction tasks in laboratory settings (Hamza and Willoughby, 2015). For example, Weinberg and Klonsky (2012) showed that undergraduate students reported decreased emotional arousal following low and high intensity pain inductions. However, students who self-injured reported greater declines in arousal following high intensity pain than students who did not self-injure (Weinberg and Klonsky, 2012). Similarly, Bresin et al. (2013) found that self-reported negative affect decreased following cold pain for undergraduate students who engaged in NSSI, as well as a comparison group of participants without a history of NSSI. Notably, students who self-injured showed greater declines in negative affect for painful, rather than non-painful stimulation (i.e., warm water), suggesting painful stimulation was more effective in moderating affect for students who self-injured (Bresin et al., 2013). Franklin et al. (2013) also found that there were affective gains following pain in their study of university students, but they did not find these gains were more pronounced among individuals who self-injured (Franklin et al., 2013). Taken together, these findings are consistent with other research and theory which suggest that pain may provide short-term affective gains among most individuals (Bresin et al., 2010; Franklin et al., 2013; Hooley and Franklin, 2017; Leknes et al., 2008). It has been suggested that because similar neural circuitry may underline both physical and emotional pain, relief from physical pain may also confer emotional benefits (i.e., “pain-offset relief”) (Franklin et al., 2013; Hooley and Franklin, 2017). That said, findings are mixed as to whether the emotional gains associated with pain may be more pronounced for individuals who self-injure.

1.2. NSSI and self-punishment

Despite emerging evidence that the administration of pain may be emotionally reinforcing, it is less clear whether there is heterogeneity in emotional response to pain among individuals who engage in NSSI. Although research and theory on NSSI have long underscored the role of NSSI in the regulation of affect (Chapman et al., 2006; Klonsky and Glenn, 2009; Nock and Prinstein, 2004), another commonly endorsed motivation for engaging in NSSI is to self-punish (Hamza et al., 2013; Klonsky and Glenn, 2009; Taylor et al., 2017). In their new conceptual model on NSSI (i.e., the Benefits and Barriers Model), Hooley and

Franklin (2017) suggest that although brief exposure to pain may provide affective gains to most individuals, individuals who engage in NSSI to self-punish may experience added benefits. Specifically, for individuals who engage in NSSI to express feelings of worthless, self-directed anger, and self-disgust, the physical act of self-derogation may satiate the desire to self-punish (Hooley and Franklin, 2017). In other words, for individuals who believe that they are deserving of pain, NSSI may not only afford pain-offset relief benefits, but also lead to emotional benefits through self-affirmation (also see Fox et al., 2017; Hooley et al., 2010; St. Germain and Hooley, 2012).

Self-beliefs have long been underscored in the onset and maintenance of NSSI. Individuals who engage in NSSI report lower levels of self-esteem (Forrester et al., 2017), and higher levels of self-criticism (Fox et al., 2018; Hooley et al., 2010), self-dissatisfaction (Claes et al., 2010; Victor and Klonsky, 2014), self-hatred (Xavier et al., 2016) and self-disgust (Smith et al., 2015) than individuals who not self-injure. Negative self-evaluations have been associated with self-punishing motivations for engaging in NSSI (Glassman et al., 2007). It is also interesting to note that brief interventions aimed at improving self-worth have been shown to reduce willingness to endure pain in the lab (Hooley and St. Germain, 2014) and reduce NSSI engagement over time in a brief intervention study (Franklin et al., 2016). These findings suggest that satiating the need to self-punish may be a significant motivator for NSSI behaviour, particularly among individuals with low self-worth. It is less clear whether individuals who engage in NSSI specifically to regulate the need to self-punish experience more pronounced affective gains than individuals who engage in NSSI to regulate affect more generally, as proposed by Hooley and Franklin's (2017) Benefits and Barriers Model of NSSI. In one recent study, researchers found that the administration of pressure pain was associated with improved mood during pain (decreased negative mood, increased positive mood), but only for young adults high in self-criticism (Fox et al., 2017). These findings highlight the need for additional research exploring variability in emotional response to pain among individuals who self-injure.

1.3. The present study

To further elucidate the role of pain in NSSI, the present study examined whether individuals who engaged in NSSI to self-punish differed in emotional response to pain from individuals who engaged in NSSI but not to self-punish, and a comparison group of students without a history of NSSI. Given that developmental theory on NSSI suggests that NSSI often occurs following a stressful event (Nock, 2010), and that NSSI overwhelming occurs in the context of a negative mood state (Armeij et al., 2011; Klonsky, 2009; Muehlenkamp et al., 2009), we utilized a stress induction task prior to assessing emotional response to pain. We predicted that all groups would show affective benefits following the administration of cold pain (i.e., pain-offset relief). Consistent with the Benefits and Barriers Model (Hooley and Franklin, 2017), we also expected that individuals who engaged in NSSI to self-punish would experience added affective benefits associated with the administration of pain.

Several researchers have suggested that self-punishment may serve a role in modulating feelings of guilt (Bastian et al., 2011; Chapman et al., 2006; Leibenluft et al., 1987), but it is less clear whether there are other emotions an individual who engages in NSSI to self-punish may experience following the act of pain (and how these emotions may vary for individuals without self-punishment motivations for NSSI). Research suggests that some negative emotions may be differentially related to NSSI engagement; for example, Nock et al. (2009) found that anger towards the self and self-hatred increased risk for NSSI in their daily diary study, but feelings of sadness and worthlessness actually reduced the likelihood of NSSI (even though all of these emotions fall within the spectrum of negative affect) (Nock et al., 2009). To provide a nuanced examination of the emotions involved in pain, we chose to

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