From Affect to Action: Daily Emotions and Non-Suicidal Self-Injury

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Abstract

Non-suicidal self-injury (NSSI) is the intentional, direct injury to one’s body that results in tissue damage, is not socially sanctioned, and is not suicidal in nature. Individuals who engage in NSSI experience elevated levels of emotion dysregulation (Gratz & Tull, 2010) and negative emotional experiences (Andover & Gibb, 2010; Ross & Heath, 2002); these difficulties help explain the consistent finding that individuals typically engage in NSSI as a way to regulate emotional experiences (Klonsky, 2007).

Research on emotional experiences in this population has focused primarily on broad measures of positive versus negative emotion. Little research has been done on specific emotional experiences – including the particular emotions and dimensions of emotional reactivity -- that characterize the daily lives of individuals who engage in NSSI compared to those who do not. Additionally, research is lacking regarding the specific emotional states related to prospective risk of NSSI.

This study investigated specific emotions and three dimensions of emotional reactivity – frequency, intensity, and duration -- in a sample of primarily university undergraduates with either no history of NSSI or a recent history of NSSI. Participants completed baseline measures of specific emotional experiences and NSSI behaviors, as well as potentially relevant confounds such as personality disorder symptoms. Participants then completed daily diary measures of specific emotional experiences and NSSI behaviors over fourteen days.

Results indicated that individuals with a history of NSSI experience significantly greater levels of several negative emotional states, and significantly lower levels of several positive emotional states, than individuals with no NSSI history. The emotion that best differentiated current self-injurers was high self-dissatisfaction. Prospectively, baseline report of duration of
negative emotional experiences best predicted performance of NSSI during the subsequent diary period. These results suggest that self-dissatisfaction may be a specific emotional experience associated with the decision to engage in NSSI, while the duration of negative emotional experiences may be related to continuing NSSI behaviors in individuals with a history of NSSI.
Preface

This research was conducted in accordance with the protocol submitted to and approved by the University of British Columbia – Vancouver Behavioural Research Ethics Board (BREB), number H11-00626. Some components of the data presented in sections “Baseline Emotion and NSSI Status” and “Diary Emotions and NSSI Status” (pages 43-46) were presented in a poster on June 30th, 2012, at the University of North Carolina – Chapel Hill. The citation for this publication is below.

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Introduction

Defining NSSI

Non-suicidal self-injury (NSSI) is the intentional, direct injury to one’s body that results in tissue damage, is not socially sanctioned, and is not suicidal in nature. Non-suicidal self-injury (NSSI) has been documented and studied in the context of a variety of psychiatric conditions and, only recently, as a distinct clinical phenomenon. Early seminal works by Favazza (1987) and Walsh and Rosen (1988) described classification systems for “self-mutilation” that encompassed a wide range of self-harmful behaviors. While previous research in NSSI had focused on either the severe NSSI that can occur in acute psychosis or substance intoxication (Jones, 1990) or the stereotypic self-injury that occurs in developmentally disabled populations (e.g., Repp & Dietz, 1974), these authors also discussed NSSI that occurs as its own cluster of behaviors in “typical” populations, particularly among female adolescents and young adults. While the first inclusion of NSSI in the Diagnostic and Statistical Manual of Mental Disorders was with the addition of Borderline Personality Disorder to the DSM-III (APA, 1980), Favazza, Walsh, and Rosen were among the first to describe and discuss NSSI that occurred outside of the confines of an existing diagnostic category (e.g., schizophrenia, mental retardation, or borderline personality disorder).

This shift from viewing NSSI as a symptom to a phenomenon sparked further research in the prevalence of NSSI, the characteristics of individuals who engage in NSSI, and the functions of NSSI. For the purposes of this work, NSSI will be outlined based on the definition from the International Society for the Study of Self-Injury (ISSS): NSSI is “the deliberate, self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned” (2007). This definition includes behaviors such as self-cutting, self-hitting, and self-burning for
non-suicidal purposes, but would not include suicide attempts or societally-approved body modification, such as tattoos and piercings. Additionally, the study of NSSI traditionally only includes assessment of behaviors that result in definite and immediate physical tissue damage, rather than behaviors that are only potentially physically risky (e.g., reckless driving) or behaviors with physical consequences only over an extended period of time (e.g., disordered eating behavior). In this work, NSSI is discussed and investigated in developmentally typical, non-psychotic individuals.

**Prevalence of NSSI**

While the deliberately harmful nature of NSSI would suggest that these behaviors occur relatively infrequently, research suggests that NSSI is prevalent in a variety of populations. The recent large-scale study of NSSI prevalence conducted by Klonsky (2011) indicated that approximately 6% of adults in the United States have a lifetime history of NSSI; the prevalence reported by Bebbington et al (2010) based on the 2000 British National Psychiatric Morbidity Survey using a similar methodology was 2.2%. Among adults receiving inpatient psychiatric treatment, the prevalence of NSSI is much higher, ranging from 41 to 45% (Andover & Gibb, 2010; Claes, Vandereycken, & Vertommen, 2007). NSSI is found in a variety of clinical populations, including adults with opiate addiction (49%; Oyefeso, Brown, Chiang, & Clancy, 2008), complex PTSD (66%; Dyer et al., 2009), and Borderline Personality Disorder (93%; Coid, 1993), as well as in adolescents with Bipolar Disorder (34-37%; Esposito-Smythers et al., 2010).

Compared to research in adults, NSSI prevalence has been more frequently studied among adolescents; large community-based surveys in the US and Canada indicate a lifetime prevalence of NSSI between 15% and 21%, with reported prevalence rates increasing over the
last decade (Barnes, Eisenberg, & Resnick, 2010; Brausch & Gutierrez, 2010; Laye-Gindhu & Schonert-Reichl, 2005; Nixon, Cloutier, & Jansson, 2008). High rates of NSSI have been found in countries outside of North America as well, primarily in Europe and Asia (see, for example, Plener, Libal, Keller, Fegert, & Muehlenkamp, 2009 (Germany); You, Leung, Fu, & Lai, 2011 (Hong Kong); and Zoroglu et al., 2003 (Turkey)).

Similar to adults, adolescents receiving psychiatric treatment have significantly higher prevalence rates of NSSI than their broader community cohort. These lifetime prevalence rates vary from 56% of a general adolescent inpatient sample (Boxer, 2010) to 78.5% of a sample of inpatient adolescent females (Adrian, Zeman, Erdley, Lisa, & Sim, 2011). In one study investigating cutting behavior only, 61% of hospitalized adolescents reported a lifetime history of cutting behavior (DiClemente, Ponton, & Hartley, 1991).

Several studies of NSSI have investigated its prevalence in undergraduate university populations, as these young adults vary in life circumstances and developmental stages from both adolescents and adults. Lifetime prevalence rates as low as 17% (Whitlock, Eckenrode, & Silverman, 2006) and as high as 44% (male undergraduates; Gratz & Chapman, 2007) have been reported, with additional studies suggesting prevalence rates between 26 and 28% (Brown, Williams, & Collins, 2007; Glenn & Klonsky, 2009).

**Psychological and Physical Concomitants of NSSI**

NSSI is both psychologically and physically harmful. Non-suicidal self-injury, by definition, involves physical damage to one’s own body; while NSSI behaviors are typically low-lethality, there are some instances of NSSI in which the injury is severe enough to warrant medical attention (Klonsky, 2009). Additionally, research on large samples of undergraduate students indicates that over 20% of those with a history of NSSI had at some point hurt
themselves more severely than expected, and over 7% had at some time hurt themselves badly enough that they should have received medical care (Whitlock et al., 2006; Whitlock et al., 2011). There is also some evidence that NSSI behaviors can resemble aspects of addictive behavior, in which, over time, the frequency or severity of NSSI increases (Nixon, Cloutier, & Aggarwal, 2002).

NSSI is also associated with a variety of negative psychological experiences, including depression, anxiety, and eating disorders (Favazza & Conterio, 1989; Klonsky, Oltmanns, & Turkheimer, 2003). While these difficulties may give rise to NSSI, there is also longitudinal evidence suggesting that early NSSI can be a precursor to future psychopathology. In a German sample, adolescent self-harm behavior was predictive of mood disorders and global functional impairment at 18-year follow-up (Kohlboeck, Quadflieg, & Fichter, 2011), while a two-year prospective study of adolescents found a bidirectional relationship between NSSI and psychological problems in girls, but not boys (Lundh, Wangby-Lundh, & Bjarehed, 2011). Of particular concern, converging evidence indicates that a history of NSSI is a strong predictor of suicidality, including suicidal ideation and suicide attempts (Brausch, Decker, & Hadley, 2011; Dougherty et al., 2009; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007; Muehlenkamp & Gutierrez, 2007; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Whitlock & Knox, 2007).

**NSSI and Emotion Regulation**

One of the most frequently noted concomitants of NSSI is the experience of emotion dysregulation. While different conceptualizations of emotion dysregulation exist in the literature, much research in the field of NSSI has been based on the conceptualization put forth by Gratz and Roemer (2004); that is, that emotion dysregulation is the absence of any or all of the
following abilities: “(a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands” (p. 42-43). Research into the relationship between emotion dysregulation and NSSI began in the study of individuals with Borderline Personality Disorder, as emotion dysregulation is a core feature of this disorder (Glenn & Klonsky, 2009; Putnam & Silk, 2005). However, research suggests that elevated levels of emotion dysregulation are related to NSSI above and beyond any shared variance accounted for by BPD diagnosis; among a sample of adults receiving inpatient drug and alcohol treatment, overall levels of emotion dysregulation were significantly higher among individuals with a history of NSSI than those without, after controlling for BPD status (Gratz & Tull, 2010).

Similar results have been found among adolescent and young adult populations, suggesting that NSSI history is related to emotion dysregulation in a variety of developmental periods. Most research in adolescent populations investigating the relationship between emotion dysregulation and NSSI has occurred in inpatient settings; given that adolescents experiencing psychopathology are likely to exhibit higher levels of emotion dysregulation than non-clinical adolescents (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011), significant differences related to NSSI history are particularly noteworthy. Among a sample of adolescent females admitted to an inpatient facility, overall level of emotion dysregulation measured by self-report was significantly correlated with lifetime NSSI frequency (Adrian et al., 2011). A study with similar methods using a larger sample of both genders found that adolescents with a history of NSSI had significantly poorer emotional awareness and greater expressive reluctance
(e.g., unwillingness or inability to describe emotions) than those without a history of NSSI (Sim, Adrian, Zeman, Cassano, & Friedrich, 2009).

This pattern holds among young adult (undergraduate) samples as well. Results comparing those with and without a history of NSSI among males (Gratz & Chapman, 2007) and females (Gratz, 2006) indicate that measures of emotion dysregulation are related to NSSI, but perhaps with different patterns across genders. Among female undergraduates, NSSI frequency was significantly correlated with a measure of emotional inexpressivity (similar to the expressive reluctance measure described above), but this relationship did not hold when comparing those with and without any history of NSSI. Logistic regression analyses to predict group membership (no NSSI history or recent NSSI history) suggested that emotional inexpressivity in this population did not exert a direct effect on self-harm status, but did interact with childhood maltreatment history and emotional intensity to predict self-harm history (Gratz, 2006). Among the (substantially smaller) sample of males, emotional inexpressivity was unrelated to NSSI presence/absence or frequency, but overall measures of emotion dysregulation differed significantly between males with and without an NSSI history, and acted as a significant predictor of self-harm status using logistic regression (Gratz & Chapman, 2007). Similar results have been demonstrated in longitudinal research; emotion dysregulation measured among undergraduates in their first year of university was a significant prospective predictor of past-year NSSI assessed four years later (Wilcox et al., 2011).

While NSSI serves a variety of functions across and within individuals (see Klonsky, 2007 for review), the most frequently cited function of NSSI, and the function with the most empirical and theoretical support, is the use of NSSI as an emotion regulation strategy, particularly as a strategy to reduce or decrease negative emotional experiences. This question has
been most frequently studied in adult female clinical samples using retrospective self-report. In two separate samples of adult women with Borderline Personality Disorder, over half of participants indicated that their NSSI behavior was related to the experience of negative emotions or aversive tension (Coid, 1993; Kleindienst et al., 2008); among the entirely inpatient sample, 94% of participants with a history of NSSI indicated that their NSSI behavior relieved their negative mood symptoms (Coid, 1993).

The use of NSSI as an emotion regulation strategy is also common in non-BPD samples of adults. Among an inpatient sample of women with eating disorders, the use of NSSI to reduce or eliminate negative feelings was endorsed by a significant majority of participants, regardless of NSSI method (Claes, Klonsky, Muehlenkamp, Kuppens, & Vandereycken, 2010). Results obtained from female members of a Dutch self-harm support group showed that emotion regulation was the most highly endorsed function of NSSI in this sample as well (Kamphuis, Ruyling, & Reijntjes, 2007). It is also true that the emotion regulation function of NSSI is not exclusive to females; a mostly male sample of treatment-seeking opiate addicts found that the vast majority of participants used NSSI to cope with emotional pain (Oyefeso et al., 2008). The regulation of negative emotions was also the most frequently endorsed motivation for NSSI in two mixed-gender general inpatient samples (Claes et al., 2007; Herpertz, 1995); this result was the case regardless of BPD diagnosis (Herpertz, 1995) or gender (Claes et al., 2007).

While it is possible that the emotion regulation function of NSSI is overrepresented in treatment-seeking samples, two samples of adults from the broader community yielded similar findings. An early study by Briere and Gil (1998) sampled adults with NSSI from general interest magazines as well as through advertisements targeted at abuse survivors; in this sample, emotion regulation motivations such as distraction from painful feelings, reduction of tension,
managing stress, and the release of pent-up feelings were all endorsed by over three-quarters of participants. In a more broadly sampled population, a majority of adults with a history of NSSI contacted through random-digit dialing reported engaging in NSSI to “release emotional pressure that has built up inside of you” and to “get rid of bad feelings” (Klonsky, 2011).

This pattern of results, suggesting the use of NSSI as an emotion regulation strategy, is also evident in research with adolescents. Among an inpatient sample of adolescents, the most common self-reported reason for engaging in NSSI was to “cope with feelings of depression;” this result was true for the entire sample as well as males and females assessed separately (Nixon et al., 2002). A larger sample of inpatient adolescents found the same result, with a majority of participants endorsing the statement that they engage in NSSI “to stop bad feelings” (Nock & Prinstein, 2004). The same measure used in this sample was subsequently used with a sample of incarcerated and clinically-referred youths, and yielded the same results (Penn, Esposito, Schaeffer, Fritz, & Spirito, 2003); this finding is particularly noteworthy given the possible influence of secondary gains in the correctional system as a potential motivator of NSSI (Franklin, 1988).

While functions of NSSI are less frequently assessed in community populations of adolescents, a large study of high school students reached the same conclusions as studies with adults and inpatient adolescents. When participants were asked to endorse a variety of motivations for NSSI, the most frequently endorsed reason was feeling unhappy or depressed (80% of the sample) (Laye-Gindhu & Schonert-Reichl, 2005). While this was the most frequent motivation in the sample as a whole and among females (88%), this result was not the case for males, suggesting that the emotion regulation function of NSSI might be more salient among adolescent females than among males.
The use of NSSI as an emotion regulation strategy is also common among young adult and university populations. In a sample of undergraduates selected for a frequent history of cutting behavior, the four reasons for NSSI that were endorsed by more than half the sample were all related to attempts to control or reduce emotional experiences (e.g., “to release emotional pressure that builds up inside of me,” “to control how I am feeling”) (Klonsky, 2009). Similar results have been found in research studies of undergraduates assessing motivations for NSSI through face-to-face interviews, in which the most frequently endorsed reasons given for NSSI were related to mental distress, including negative emotional states and mental illness (Wilcox et al, 2011). The largest sample of undergraduate self-injurers to date ($N = 1776$), collected via internet surveys distributed at eight universities in the US, also yielded results consistent with these findings (Whitlock et al., 2011). In that study, the most frequently endorsed reason for NSSI was to regulate negative emotions; this result was true both for the full sample as well as within males and females assessed separately.

**NSSI and Negative Emotional Experiences**

Given our knowledge about the relationship between psychopathology, emotion dysregulation, and NSSI as an emotion regulation strategy, it is perhaps unsurprising that dozens of studies have indicated that NSSI is correlated with elevated levels of at least some types of negative emotions. The relationship between a history of NSSI and high levels of negative emotional experience has been found across assessment methodology (self-report, other-report, diagnostic interview), source of the sample (community, clinical, inpatient), genders included in the sample, and age of the population being investigated (adolescents, young adults, adults). The magnitude of the relationship between NSSI and different types of negative emotion, however, is
not completely consistent, indicating that the relative significance of various types of negative emotions may vary across individuals or populations.

A history of NSSI has been correlated with self-reported levels of depression in several adult samples. The most frequently used instrument to assess depressive symptoms in this literature is the Beck Depression Inventory (BDI-II; Beck, Steer, Ball, & Ranieri, 1996), an assessment of recent (last two weeks) depressive symptoms. In three inpatient samples of adults, individuals with a history of NSSI had significantly higher scores on the BDI-II than those without (Andover & Gibb, 2010; Evren, Cinar, Evren, & Celik, 2012; Matsumoto et al., 2004); NSSI frequency was also correlated with BDI-II score in one sample (Andover & Gibb, 2010). Adults receiving outpatient treatment with a history of NSSI have also been shown to have significantly higher BDI-II scores than a comparison treatment-seeking sample at the same clinic (Selby, Bender, Gordon, Nock, & Joiner, 2012). This pattern holds in nonclinical populations as well, including among US Air Force recruits (Klonsky et al., 2003).

These findings do not appear to be specific to the BDI-II; several other self-report measures have been used to assess depressive symptoms in relationship to NSSI, with consistent results. In a large inpatient sample in Belgium, self-reported depression symptoms on the Symptom Report Checklist-90 (SCL-90; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) were significantly higher among those with a history of NSSI than those without. This pattern was also true in a sample of outpatients receiving treatment for bulimia for those engaging in “impulsive” NSSI (cutting, burning), but not “compulsive” NSSI (skin picking, nail biting) (Favaro & Santonastaso, 1999). In a study using several clinical samples, significant differences between those with and without a history of NSSI were found on depression scores as assessed by the Trauma Symptom Inventory (TSI; Briere, 1995; Briere & Gil, 1998).
Clinician ratings of depressive symptoms evidence more mixed results, although these analyses have only been conducted in studies that focused on individuals with BPD. In one study, an inpatient sample with BPD was divided into those with no, infrequent, or frequent history of NSSI; no significant differences in Hamilton Depression Rating Scale (HDRS; Hamilton, 1960) scores were found (Dulit, Ryer, Leon, & Brodsky, 1994). However, in a study of adults oversampling, but not solely including, participants with BPD, the recurrent depression subscale on the MINI (Sheehan et al., 1998) was significantly correlated with lifetime NSSI frequency (Anestis et al., 2011).

Several studies have assessed participants for the presence of a mood disorder diagnosis; while this method reduces statistical power by dichotomizing participants instead of using a dimensional measure, the use of a diagnostic assessment may indicate more clinically relevant levels of negative emotion. In a large sample of adults presenting to an outpatient psychology clinic, those with a history of NSSI were significantly more likely to receive diagnoses of Major Depressive Disorder, Dysthymic Disorder, or Bipolar Disorder (as assessed via the SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002) than a comparison outpatient sample (Selby et al., 2012). In a large population-based survey of US adults, individuals reporting a history of NSSI were more likely to also report having received a diagnosis of a mood disorder in the past (Chartrand, Sareen, Toews, & Bolton, 2011); these results, however, should be interpreted with caution given the possibility of reporting bias. Of note, in this study, participants with a history of NSSI were more likely to have received a mood disorder diagnosis than individuals with no history of self-harm, but were also more likely to receive such a diagnosis than individuals with no history of NSSI who had a history of suicidal ideation (without a suicide attempt). In an inpatient sample of patients with BPD, a diagnosis of Major Depressive Disorder was
significantly more frequent among those with a frequent history of NSSI than those with no history; the presence of this diagnosis was indicative of a more than three-fold increase in the likelihood of frequent NSSI (Dulit et al., 1994).

While the literature is relatively clear on the relationship between depression and NSSI, the findings relating NSSI to anxiety are somewhat mixed. Studies using self-report measures have frequently found differences in anxiety between those with and without a history of NSSI. In a non-clinical sample of US Air Force recruits, those with a history of NSSI had significantly higher Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) scores than those without (Klonsky et al., 2003). This finding was replicated in an outpatient clinical sample when individuals with a history of NSSI were compared to a no-NSSI treatment-seeking control group (Selby et al., 2012). Other self-report measures that include an assessment of anxiety have also been used in this research. In several clinical samples, those with NSSI had higher anxious arousal scores on the TSI than those without (Briere & Gil, 1998), and in an inpatient sample in Belgium, those with NSSI had significantly higher anxiety scores on the SCL-90 than those without (Claes et al., 2007).

Other self-report findings, however, indicate a small or nonexistent relationship between anxiety and NSSI. Among male inpatients with drug or alcohol dependency, NSSI was related to higher trait levels of anxiety on the Speilberger State-Trait Anxiety Inventory (STAI; Speilberger, Gorsuch, & Lushene, 1970), but not to state levels of anxiety (Evren et al., 2012). Among a sample of outpatients receiving treatment for bulimia, anxiety, as measured by the SCL-90, did not reliably differentiate between those with no NSSI, impulsive NSSI, and compulsive NSSI (Favaro & Santonastaso, 1999). In studies that included assessment of both anxiety and depression, the effect of depression was often stronger (e.g., Favaro & Santonastaso,
1999; Selby et al., 2012); this suggests that the mixed findings with regard to anxiety may be related to an overall smaller effect of anxiety on NSSI.

Similarly, findings regarding anxiety disorder diagnoses in those with and without a history of NSSI are not consistent in the literature. While a large population-based sample found that individuals with a history of NSSI reported a history of receiving an anxiety disorder diagnosis more frequently than those without a history of NSSI (Chartrand et al., 2011), there were no differences in the rates of an anxiety disorder diagnosis between those with and without NSSI in either an inpatient sample of patients with BPD (Dulit et al., 1994) or a general outpatient sample (Selby et al., 2012).

A pattern of findings similar to the results described above for research on depression, anxiety, and NSSI in adults emerges when investigating these relationships in adolescents. Self-reported depressive symptoms are typically elevated in those with a history of NSSI in adolescent clinical and community samples; these relationships have been demonstrated using a variety of self-report assessment tools. The Reynolds Adolescent Depression Scale (RADS; Reynolds, 2002) is one of the most common measures, and has reliably differentiated between those with and without a history of NSSI in two high school samples (Muehlenkamp & Brausch, 2012; Muehlenkamp & Gutierrez, 2007) and those with a history of “threshold” self-cutting from those with no history of NSSI in an inpatient sample (Swenson, Spirito, Dyl, Kittler, & Hunt, 2008). Other studies using the BDI-II have found significant differences between those with and without NSSI among outpatient adolescents with depression (Tuisku et al., 2009) as well as among high school students (Ross & Heath, 2002). Two studies have found similar differences using the SCL-90 in a sample of female adolescent outpatients (Kaess et al., 2012), as well as with a large sample of Chinese high school students (You & Leung, 2011); this latter study is
particularly notable in that depressive symptoms measured at the start of the study were not only related to NSSI cross-sectionally, but also prospectively over a one-year interval for both genders. Two studies using the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1991) replicated the finding that individuals with a history of NSSI report greater depressive symptoms than those without in a Chinese high school sample (Wong, Stewart, Ho, & Lam, 2007) as well as among adolescents presenting to a hospital emergency room (Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001). This finding is of particular note given that participants were recruited immediately following a suicide attempt, indicating a population in which individuals would be expected to have relatively high levels of depressive symptoms. Additional studies using other depression assessment tools have also found this relationship in a psychiatric sample (Cloutier, Martin, Kennedy, Nixon, & Muehlenkamp, 2010) and several community samples (Nixon et al., 2008; Plener et al., 2009; Wan et al., 2011; Wichstrøm, 2009; You, Leung, & Fu, 2011a); in two of these studies, depressive symptoms were related to engagement in NSSI both cross-sectionally and longitudinally over a period of six months (You et al., 2011a) and two years (Wichstrøm, 2009).

Measures of depression that were dichotomous (either diagnostic assessment by clinicians or single-item self-report measures) were somewhat less consistent in variation between those with and without NSSI, but in several samples the relationship was evident. In four samples, participants’ self-report was used to make an assessment about the presence or absence of depression. In a sample of female adolescents in drug treatment, endorsement of depressed mood did not differ significantly between those with and without NSSI (Schwartz et al., 1989). In two community samples, one of sexual minority youth and one of high school students, a history of a self-reported depression was significantly more likely among youth with
a history of NSSI than those without (Garrison et al., 1993; Walls, Laser, Nickels, & Wisneski, 2010); in the school sample, a history of major depression was the best predictor of NSSI using multivariate modeling (OR = 3.62). Among inpatient female adolescents, those with a history of NSSI were significantly more likely than those with no history to meet criteria for a mood disorder on the Achenbach Youth Self-Report (YSR; Achenbach & Rescorla, 2001; Adrian et al., 2011).

The pattern of findings regarding clinician assessments of depression was clearer, in that in each case the “high depression” groups (whether or not that corresponded with DSM-IV-TR criteria) was significantly more likely to have a history of NSSI than the “low depression” group. This pattern was the case for youth presenting to an emergency room for psychiatric reasons (Cloutier et al., 2010) as well as two samples of adolescent inpatients (Riala, Juutinen, Hakko, & Rasanen, 2011; Swenson et al., 2008).

Fewer studies have investigated the relationship between anxiety symptoms and NSSI in adolescents, and with less consistent results. Self-reported anxiety been assessed in three clinical samples; in one outpatient sample of female adolescents, those with a history of NSSI had significantly higher anxiety scores on the SCL-90 (Kaess et al., 2012), while in another outpatient sample of adolescents with depression, there were no self-reported differences in anxiety as measured by the BAI (Tuisku et al., 2009). Among inpatient adolescents, no significant differences between those with and without NSSI were found on the Multidimensional Anxiety Scale for Children (MASC: March, Parker, Sullivan, Stallings, & Conners, 1997; Swenson et al., 2008). More research has investigated this question in community samples, however, and results from several populations indicate that self-reported anxiety is higher among adolescents with a history of NSSI. This result has been found in
Canadian high school students (Nixon et al., 2008; Ross & Heath, 2002) as well as in Chinese adolescents and young adults (Wan, Hu, Hao, Sun, & Tao, 2011; Wong et al., 2007; You et al., 2011a). Among Chinese samples, anxiety measures not only differed between those with and without NSSI, but also suggested a relationship between frequency of NSSI and level of anxiety (Wan et al., 2011); additionally, one study demonstrated a link between anxiety and NSSI both cross-sectionally and longitudinally over a six-month interval (You et al., 2011a). However, it may be that, when accounting for other predictor variables, anxiety is not an essential correlate of NSSI; in a large Canadian community sample, anxiety did not significantly predict NSSI group status once gender and other covarying symptoms were added to the regression model (Nixon et al., 2008).

Similar to the findings regarding depressive symptoms, assessments of anxiety that rely on dichotomous measures showed a more mixed pattern of findings than those using continuous measures. In two inpatient samples, no differences in rates of anxiety disorder diagnoses were found between those with and without a history of NSSI (Riala et al., 2011; Swenson et al., 2008). However, in a sample of youth presenting to an emergency room for psychiatric issues, clinician ratings of “high” versus “low” anxiety using the Childhood Acuity of Psychiatric Illness (CAPI; Lyons, 1998) were significantly related to a history of NSSI (Cloutier et al., 2010).

While fewer studies have investigated the relationship between negative emotion and NSSI in young adults, the pattern of findings regarding the experience of depression and anxiety are similar to those in adults and adolescents. Undergraduates with a history of NSSI are significantly more likely to report receiving a diagnosis of Major Depressive Disorder than those without (Wilcox et al., 2011), and self-reported anxiety and depression scores are significantly
higher among undergraduates with a history of NSSI (Glenn & Klonsky, 2009). Fitting with the
general pattern of more robust findings in the relationship between depressive symptoms and
NSSI than anxiety symptoms and NSSI, in this study, the difference between the NSSI and
control groups was larger for the depression measure than the anxiety measure.

It is useful to note that, in addition to finding elevated levels of negative emotion among
samples that vary by age, gender, and psychiatric treatment status, results demonstrating the
relationship between negative emotion and NSSI have been found in a variety of countries and
cultural contexts, including Japan (Matsumoto et al., 2004), Turkey (Evren et al., 2012), the US
(Klonsky et al., 2003), Belgium (Claes et al., 2007), Germany (Plener et al., 2009), Canada
(Cloutier et al., 2010), Finland (Riala et al., 2011), Norway (Wichstrøm, 2009), and China
(Wong et al., 2007).

**NSSI and Self-Derogation**

In addition to the research indicating high levels of negative emotion among those
engaging in NSSI, evidence suggests that these individuals also have specific difficulties with
self-directed negative feelings, such as low self-esteem and self-derogation. Much of this
research has been conducted among samples of adolescents from the community, although the
finding has been replicated in adults. Among a representative sample of high school students in
Norway, a measure of self worth from the Self-Perception Profile for Children, (SPPC, Harter,
1982) indicated that adolescents with a history of NSSI reported significantly reduced global
self-worth than those without (Wichstrøm, 2009). In a comparison of individuals with and
without a history of NSSI in a US high school sample, two measures of self-evaluation (the
negative self-evaluation scale from the RADS, and the overall self-esteem score from the
Rosenberg Self-Esteem Scale) reliably differentiated adolescents with a history of NSSI from
those with a history of no self-harm (Brausch & Gutierrez, 2010). Levels of negative self-evaluation were also significantly elevated among those with a history of NSSI in a large sample of Canadian adolescents (Laye-Gindhu & Schonert-Reichl, 2005). These findings were not replicated in an adolescent inpatient sample, however, in which no differences in SPPC global self-worth nor in a separate measure of negative self-evaluation were found (Swenson et al., 2008); this result is perhaps a ceiling effect related to overall high levels of negative self-evaluation in this clinical sample. A final study of adolescents from the community using the Self-Rating Scale (SRS, Hooley, Ho, Slater, & Lockshin, 2002), a specific measure of self-criticism, found that individuals with a history of NSSI had significantly higher levels of self-criticism than those without; additionally, higher levels of self-criticism were related to endorsement of the self-punishment function of self-injury (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007). This same measure was used in a study of adults from the community, with similar results; those with a history of NSSI had significantly higher self-criticism scores than those without, and levels of self-criticism were significantly related to pain endurance (but not pain tolerance) in a pain induction laboratory task (Hooley, Ho, Slater, & Lockshin, 2010).

Elevated levels of self-directed negative emotions in this population are consistent with the finding that self-punishment is a frequent reason individuals engage in NSSI (see Klonsky, 2007, for review). Research suggests that, while the most frequently endorsed function of NSSI is affect regulation, NSSI is also often used to engage in self-punishment; this finding has been recently demonstrated in female inpatients (Claes et al., 2010), a sample of young adults (Klonsky, 2009), and a large population-based sample of adults (Klonsky, 2011).
**Unresolved Issues in the Relationship between Emotion and NSSI**

While the literature indicating a relationship between elevated levels of negative emotion and NSSI is a valuable starting point, current research is lacking in specificity regarding the types of emotional experiences and the aspects of emotional reactivity that are most relevant in NSSI. This limitation is largely due to the nature of measures applied to the study of emotion in NSSI. For example, commonly used self-report measures of depression have overlapping, but not identical, factor structures (Shafer, 2006). Additionally, specific items targeting a variety of emotional states are not uniformly assessed across measures; for example, loneliness and fearfulness are assessed as part of the CES-D, but neither is included in the BDI-II; while anxiety is included in the HDRS, the HDRS and the BDI-II include measures of irritability, which are not measured by the CES-D. Research also suggests significant overlap between measures intended to assess depression and those intended to assess anxiety (Gotlib, 1984), making discriminating between various types of negative emotions difficult in the existing literature.

While a majority of specific emotional states can be subsumed within the two-factor model of (positive and negative) emotion, a strong body of neuropsychological literature supports the conclusion that specific emotional processes are distinct and not simply points on a continuum of emotional valence (Panksepp, 2007). These emotional states are associated with distinct cognitions, neurobiological substrates, and behavioral responses (Izard, 2007), indicating that broad assessment of negative or positive emotion likely misses important distinctions between types of emotions as well as the distinct mechanisms that correspond with unique emotional states.

In addition to a gap in the literature regarding the experience of specific affective states in individuals engaging in NSSI, there is also reason to believe that the components of emotional
experience (such as intensity, duration, and frequency; Davidson, 1998) are not accurately assessed in the existing research. Typically, measures of emotional experience assess one of the three components of broad measures of positive and negative emotion; for example, the Positive and Negative Affect Schedule (PANAS; Watson & Clark, 1999) only assesses emotional frequency, while the Affective Intensity Measure (AIM; Larsen & Diener, 1987) only assesses emotional intensity. No theoretical rationale, however, suggests that each dimension of emotional experience should be consistent across specific emotional states; for example, we have no reason to believe that, in a given person, the average intensity of their feelings of sadness would be equivalent to the average intensity of their feelings of anger. Several studies have begun to assess one aspect of emotion (intensity) in individuals with NSSI, and results suggest differences in positive and negative emotional intensity that suggest additional differences may be found at the level of specific affective states.

A majority of research on emotional intensity has used self-report measures (specifically the Affective Intensity Measure, AIM, Larsen & Diener, 1987) to investigate overall levels of positive and negative emotional intensity. In one sample, overall emotional intensity (combining positive and negative emotional intensity) was greater among adults with a history of NSSI (Anestis et al., 2011), but this finding has not been replicated in other samples. In some studies, findings differ for positive and negative intensity; for example, among a sample of female undergraduates, positive emotional intensity was significantly higher among those with a history of NSSI, but was unrelated to NSSI frequency, whereas negative emotional intensity was related to neither (Gratz, 2006). Among male undergraduates, however, overall emotional intensity was not a significant predictor of NSSI status, but higher emotional intensity was significantly negatively correlated with NSSI frequency (Gratz & Chapman, 2007). There is also some
evidence of greater physiological reactivity among adolescents in response to a distressing task (Nock & Mendes, 2008), but it is unclear how physiological arousal may map onto emotional intensity. Finally, at least one study has investigated emotional intensity immediately preceding and following episodes of NSSI, finding that female inpatients reported higher emotional intensity before and after NSSI than male inpatients (Claes et al., 2007).

**Specific Affect States Preceding and Following NSSI**

Because of the inconsistent and difficult-to-interpret findings regarding elevated negative emotion and (perhaps) elevated emotional intensity among individuals with NSSI, some researchers have begun investigating how specific affect states are related to the experience of NSSI. The vast majority of these studies have focused exclusively on specific affect states immediately preceding and following an episode of self-injury.

The most frequent method of investigating affect preceding and following NSSI is through retrospective self-report. This topic has been studied in a variety of adult populations, with a clear pattern of results indicating that a variety of negative affective states increase preceding NSSI, and that NSSI leads to either a reduction in some types of negative affect or an increase in some types of positive affect (or both). In a sample of adults from the community with a history of NSSI, the greatest changes in affective experience from pre-NSSI to post-NSSI were an increase in relief and a decrease in anger at others (Briere & Gil, 1998). A later study of community adults with a history of chronic skin-picking found that the most intense affective states experienced prior to NSSI were tension and loss of control, while the most intense experiences following NSSI were shame and guilt (Wilhelm et al., 1999). Members of a Dutch support group showed a similar pattern, where the most common affective states reported before NSSI were depression and tension, while the most common following NSSI were vigor and
depression (at lower levels than pre-NSSI; Kamphuis et al., 2007). An undergraduate sample with a history of recurrent cutting demonstrated the biggest changes from pre-NSSI to post-NSSI in increases in feelings of relief and calmness; the most common affect states reported before NSSI were feeling overwhelmed and sad (Klonsky, 2009).

Results from clinical samples of adults show a similar pattern, but these studies are most commonly limited to females. In a combined outpatient and inpatient sample of women with BPD, the most frequently reported affective states preceding NSSI were strong tension and strong pressure; these significantly decreased after NSSI, with the most common affective states post-NSSI being relieved and relaxed (Kleindienst et al., 2008). In an all-female inpatient sample of individuals with eating disorders, affect states were grouped by valence (negative/positive) and arousal (high/low); NSSI was associated with increases in positive low arousal affective states (e.g., relief) and decreases in negative high arousal affective states (e.g., nervous, angry) (Claes et al., 2010). A correctional sample of clinically-referred women reported that NSSI was most frequently preceded by anger or anxiety, and most frequently followed by relief or calmness (Chapman & Dixon-Gordon, 2007). Across the entire sample, no women reported a negative affective shift from pre- to post-NSSI, while 55% reported a positive change in their affective state.

In two cases, adult clinical samples have been investigated using individuals from both genders. Patients in a general inpatient sample rated the most common affective states before NSSI as angry with oneself and sad, with the highest ratings after NSSI angry with oneself and guilty (Claes et al., 2007). Among a sample of treatment-seeking opiate addicts, the most frequently reported NSSI triggers were “feeling upset or angry” and “feeling lonely or
abandoned,” while the most frequent feelings after NSSI were frustration and shame (Oyefeso et al., 2008).

Affect states preceding and following NSSI have been less frequently investigated in adolescents, although the published studies follow a similar pattern to the findings for adults. Among a sample of inpatient adolescents, the most frequent affective states preceding NSSI were feeling overwhelmed and sad; both of these decreased significantly following NSSI (Sim et al., 2009). In a smaller sample of adolescent females in drug treatment, those with a history of carving behavior reported that NSSI was most frequently preceded by depression and anger, and followed by embarrassment or shame (Schwartz, Cohen, Hoffmann, & Meeks, 1989). Similarly, in a community sample of adolescents, negative affective states showed significant reductions from pre-NSSI to post-NSSI, while self-conscious negative affective states (e.g., shame) increased following NSSI (Laye-Gindhu & Schonert-Reichl, 2005). In this sample, the only positive affect state to show a significant change was relief, which increased after NSSI.

Recently, investigators have begun to assess affective states preceding and following NSSI using ecological momentary assessment (EMA) technology. These methods allow for assessment of affect “in the moment,” which avoids the possibility of recall bias present in self-report retrospective measures of affect. In each sample, participants were given a list of specific affective states each time they used the EMA device, but in two cases the specific affect states were only reported as part of larger positive and negative affect scales. In these studies, results were contradictory; in a sample of undergraduates, NSSI was associated with a significant increase in negative affect preceding NSSI and a significant decrease following NSSI, with no significant changes in positive affect (Armey, Crowther, & Miller, 2011). Among a community sample of women with bulimia, however, while negative affect significantly increased before
NSSI, it did not significantly decrease with NSSI behavior; instead, the researchers found a significant increase in positive affect (Muehlenkamp et al., 2009). Finally, an EMA study using adolescents and young adults reported specific affective experiences that coincided with NSSI thoughts and behaviors; in this sample, the most common feelings associated with NSSI behaviors were feeling angry at oneself or overwhelmed; the feelings that best predicted the transition from NSSI thoughts to NSSI behaviors were feeling numb/nothing and feeling angry at oneself (Nock, Prinstein, & Sterba, 2009). Interestingly, in this population, feelings of sadness that accompanied NSSI thoughts were related to a significant decreased likelihood of engaging in NSSI behaviors.

**Daily Emotional Experiences and NSSI**

While the existing literature provides us with a reasonably consistent picture of specific affect states immediately preceding and following NSSI, the field is still lacking in research that characterizes the emotional experience of individuals who engage in NSSI throughout their daily life. Knowledge of these specific emotional experiences add to our existing knowledge about overall levels of elevated negative emotion for several reasons. First, research investigating the specific emotional antecedents of NSSI necessitates investigation of the “baseline” emotional experiences that individuals who engage in NSSI have on a daily basis; if, for example, we know that individuals with NSSI frequently feel tense prior to NSSI, this information is not particularly useful for predicting NSSI behaviors if these individuals feel tense frequently, including when not experiencing urges to engage in NSSI. Second, knowledge of specific emotional experiences among individuals who engage in NSSI helps better describe which individuals might choose self-injury; e.g., if we can compare specific emotional states in daily life between those with and without a history of NSSI, we can possibly determine whether certain emotional experiences
increase the likelihood of turning to NSSI as an emotion regulation strategy. Third, measuring specific emotions in the context of daily life is more representative of the experience of individuals who engage in NSSI than focusing only on specific affect states immediately preceding and following NSSI. Even in the most frequent self-injurers, the vast majority of an individual’s time is not spent engaging in NSSI behaviors, and individuals frequently spend time experiencing and resisting urges to engage in NSSI (Klonsky & Glenn, 2008).

To our knowledge, only two studies have investigated specific emotional experiences in the daily life of individuals with a history of NSSI. In one case, adult inpatients with a history of NSSI and a diagnosis of Borderline Personality Disorder were compared with a group of healthy controls on five measures of specific emotions from the PANAS: sadness, anger, fear, disgust, and happiness (Berlin & Rolls, 2004). Perhaps unsurprisingly, significant differences were found on all subscales, with higher levels of the negative emotions and lower levels of the positive emotion found in the BPD group. This study, while perhaps suggestive of specific emotional differences related to NSSI, is difficult to extend to the larger population of individuals with such a history due the unique nature of the clinical sample (all diagnosed with BPD, all receiving inpatient treatment).

A second study, using a sample of undergraduates, compared specific emotions (again using the PANAS) between individuals with no history of NSSI, a past history of NSSI, or a recent (within the last six months) history of NSSI (Brown, Williams, & Collins, 2007). In this sample, significant differences between those with recent and no history of NSSI were found on each of the four negative emotion subscales (fear, hostility, guilt, sadness), with the recent NSSI group exhibiting higher levels of negative emotion, and on one positive emotion subscale (joviality), with the recent NSSI group exhibiting lower levels of positive emotion. Differences
between the recent and past NSSI groups and the past and never NSSI groups were also found on three of the four negative emotion subscales (hostility, guilt, sadness) in the expected directions. No significant group differences were found on the two remaining positive emotion subscales (self-assurance, attentiveness) or the four other emotion subscales (shyness, fatigue, serenity, surprise). These results indicate that specific emotional experiences may show different patterns of results within the umbrella categories of positive and negative emotions; additionally, it suggests that the emotional experiences of individuals with recent NSSI as compared to a past history of NSSI may be different.

Given the state of the literature regarding emotional experiences among individuals with a history of NSSI, several avenues of research are necessary to better conceptualize daily emotional experiences in this population. This work is necessary to better understand what emotional experiences characterize individuals who choose NSSI, as well as the baseline emotional state of individuals with a history of NSSI who, in the presence of aversive emotion, are more likely to continue to use NSSI as an emotion regulation strategy. In addition to research focusing on the nature of specific emotional states, investigation of the three components of emotion (intensity, frequency, and duration) will prove fruitful given the lack of understanding of how these factors impact emotional experience in individuals who engage in NSSI. Finally, research must attempt to use more ecologically valid and reliable measures of daily emotional experiences in addition to self-reported emotional states. Given these three areas of potential expansion of the field, the following study was proposed and conducted to investigate the specific emotional experiences in the daily life of individuals who engage in NSSI.
Methods

Participant Recruitment Methodology

Participants were recruited from the University of British Columbia student population and the surrounding community. This population was selected for convenience and was acceptable for the study purpose given the high prevalence of NSSI among university students (Whitlock & Knox, 2007). To participate, individuals had to be at least nineteen years of age and understand English well enough to complete the informed consent process as well as the questionnaire and interview portions of the study. Recruitment was focused on individuals with no history of NSSI and those with a history of NSSI in the last six months. While many studies of NSSI have included individuals with any lifetime history in one group, and those without NSSI history in another (Berlin & Rolls, 2004; Chapman & Dixon-Gordon, 2007; Franklin et al., 2010; Klonsky et al., 2003; Nock & Mendes, 2008), this strategy results in significant heterogeneity among individuals engaging in NSSI in terms of recency of these behaviors that may render between-group differences so small as to be undetectable.

Three methods of recruitment were used: advertisements posted on bulletin boards on the campus of the University of British Columbia-Vancouver, advertisements on an email list and webpage for paid psychology studies, and advertisements through the Human Subjects Pool recruitment system for undergraduate students enrolled in selected psychology courses.

Advertisements posted on bulletin boards described a study on emotional experiences in non-suicidal self-injury in which individuals could participate for a $30 honorarium in addition to bus fare or parking compensation. Two advertisements were drafted; one requested participants who had never engaged in NSSI, while the other requested participants who had engaged in NSSI in the preceding six months. The advertisements included the phone number
and email address for the research team, which interested individuals were directed to use to find out more information about the study.

The advertisement used for distribution on the email list and webpage for paid psychology studies was an abbreviated version of the advertisement described above seeking participants with a recent history of non-suicidal self-injury. Because of our desire to oversample participants with a history of NSSI, no advertisement for control participants was used in this method of recruitment. The advertisement also included the phone number and email address for the research team for interested individuals to use to find out more information about the study.

Students were recruited through the Human Subjects Pool system, an online system that allows undergraduate students to view research opportunities for which they can receive credit in select psychology courses. Participants were able to view a brief description of the study that included a request for participants with either no history of NSSI or a history in the last six months. Due to the length of the sessions, students were compensated $10 in addition to receiving two research credits for use towards extra credit in psychology courses. Interested individuals were able to sign up for a timeslot to participate in the study directly through the online system; in addition, the phone number and email address for the research team was provided if interested individuals had additional questions about the study prior to participation.

Interested individuals either enrolled in the study online (through the Human Subjects Pool system) or contacted the research team to find out more about the study. Upon receiving a thorough description of the study, participants were scheduled for an appointment to participate.

**Study Protocol**

Upon arriving in the laboratory for the research session, the researcher provided the participant with a consent form approved by the Behavioural Research Ethics Board (BREB) at
UBC. A member of the research team answered questions regarding study procedure, confidentiality, estimated time of participation, and compensation. Individuals who agreed to participate signed the consent form and were provided with a copy of the form for their records. The signed consent form was stored separately from all other study materials, which were identified by a randomly assigned ID number. No participants who attended the research session declined to participate during the consenting process.

Following the informed consent procedure, participants completed a battery of questionnaires (described in more detail below). These questionnaires took between 30 and 50 minutes, depending on the participant’s history of psychopathology and their reading speed. When the participant had completed the first battery of questionnaires, two interviews were conducted by the researcher (described in more detail below). These interviews took between 30 minutes and 90 minutes, varying on the participant’s level of psychopathology. Participants then completed an additional questionnaire that took approximately 20 minutes to complete. Because of the wide range of potential time involvement in the study, all participants were compensated for the maximum amount of time the session would entail (three hours).

Upon completion of the protocol described above, the researcher reviewed the Coping Questionnaire (see below) with the participant to identify positive coping strategies that the individual uses when they are feeling stressed or upset; a copy of this questionnaire was provided to the participant to keep. The researcher asked each participant before completion of the session about his or her emotional state and sense of safety and well-being after completing the study session; this protocol was implemented due to the potentially sensitive nature of the questionnaire and interview items. All participants were provided with a list of resources and referrals appropriate to their recruitment group (e.g., student participants received a list that
included UBC specific referrals, while community participants received a list that only included off-campus resources). A crisis response plan was established before the study commenced and approved by the UBC-Vancouver BREB to standardize researcher response in case of a participant experiencing significant emotional distress or significant suicidal ideation.

Participants were asked at the end of the session about their interest in participating in the daily diary portion of the study (described below). If they were interested, the researcher provided oral and written instructions to the participant regarding how to access and complete the diary from home using a secure online system. The researcher then ensured that participants understood the diary instructions, as well as the importance of completing the diary each day and focusing on the emotional states and behaviors specific to that day only. The participant then received his or her compensation for their participation in the session ($30 or 2 Human Subject Pool credits and $10), at which time the session terminated.

If participants were not interested in the daily diary portion of the study, the researcher conducted the debriefing procedure with the participant at the end of this session. This involved explaining the purpose and research question of the study, as well as our hypotheses and expected results. Any questions the participant had regarding the study were addressed. After the debriefing procedure, the participant received his or her compensation for participation in the session ($30 or 2 Human Subject Pool credits and $10), and the session was terminated.

Participants who participated in the daily diary portion of the study were asked to complete a series of measures regarding emotional experience and NSSI once a day for fourteen days. These measures took approximately five minutes per day to complete, for a total maximum commitment of 70 minutes over the fourteen days. The participant accessed the measures through an online survey service each day as close to the end of the day (before bed) as possible.
Participants were provided with an ID number to access the daily diary; participants’ names were not transmitted or stored as part of the diary process. In the case of participants who were unable or uninterested in completing the diary through the online service, paper copies of the diary questionnaires were provided.

Participants were given the option to receive email reminders to complete the daily diary; participants could select no reminders, weekly reminders, or daily reminders. When ten of the fourteen days of the diary had passed, participants were contacted to schedule their debriefing and compensation appointment for the diary portion of the study.

Participants who participated in the diary portion of the study returned to the lab to complete the debriefing procedure described above. Participants were then compensated for the daily diary portion of the study ($10 or 1 credit through the Human Subjects Pool system). Participants received the full compensation amount regardless of the number of diary entries completed.

**Participant Recruitment and Retention**

A total of 168 individuals completed the informed consent process with a member of the research team; 105 of these participants enrolled for payment, while 63 enrolled for course credit. Of these, eight participants failed to complete the laboratory session, typically due to eligibility determined after the consent process (age younger than 19, inability to appropriately communicate in English).

Of the 160 participants who completed the research session, 57 had no lifetime history of any NSSI behaviors, while 53 had a history of NSSI in the last six months; the remaining participants had a history of NSSI prior to the past six months and were not included as part of these analyses. To be included in the data analyses using the daily diary portion of the study,
participants had to enroll in that portion of the study and complete half or more of the possible diary entries (7 of 14). Based on these criteria, of the 57 participants who reported no history of NSSI, 31 completed the diary portion; of the 53 participants with a recent history of NSSI, 36 completed the diary portion.

Measures

**Self-report retrospective measures.**

To assess lifetime history of NSSI, participants completed the Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009; Klonsky & Olino, 2008). This measure includes assessment of lifetime frequency of twelve methods of NSSI, as well as an “other” category. Additionally, 39 items are presented to assess functions of NSSI. These items load onto thirteen functions of NSSI, which can then be combined into two superordinate factors, intrapersonal functions and interpersonal functions. Functions are measured on a scale from 0 to 6, with higher scores indicating greater relevance of the function to the individual. In addition to these questions, the ISAS includes questions to determine the date of onset and offset of NSSI, in order to ascertain whether NSSI behaviors occurred in the last six months. The ISAS has high internal consistency as well as convergent validity and good test-retest reliability (Glenn & Klonsky, 2011; Klonsky & Glenn, 2009).

To assess for demographic covariates, participants completed a demographics form developed by the research team. This measure includes assessment of gender, sexual orientation, and ethnic background.

The principal self-report measure used to assess specific emotions was the Multidimensional Emotion Questionnaire (MEQ; Klonsky, 2012, under review), a measure of the frequency, intensity, duration, and difficulty in regulating twenty emotions. Preliminary data
suggest this measure is both reliable and valid (Klonsky, 2012, under review). The structure of the measure allows for assessment of a variety of constructs. The sum of the frequency, intensity, and duration scores for each emotion are used to create an overall measure of each specific emotional state; additionally, the frequency, intensity, duration, and difficulty of regulation scores can each be summed across emotional states to create composite reactivity measures of positive and negative frequency, duration, intensity, and difficulty of regulation. Each aspect of each specific emotion is rated on a scale from 1 to 5, with 5 indicated greater frequency, intensity, duration, or difficulty with regulation. Therefore, scores on the specific emotion scales range from a minimum of 3 to a maximum of 15. For the composite measures of frequency, intensity, duration, and difficulty with regulation, each construct is summed across the ten emotions that characterize either the positive or negative emotion subscale of the MEQ; for this reason, each of these scales can range in value from 10 to 50.

To assess emotion regulation, participants completed the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This 36-item self-report measure includes six facets of emotion dysregulation: nonacceptance of emotional responses, difficulties engaging in goal-directed behavior when upset, impulse control difficulties, lack of emotional awareness, lack of access to emotion regulation strategies, and lack of emotional clarity. Each DERS item is scored from 1 to 5, resulting in an overall DERS scale score that ranges from 36 to 180, with higher scores indicating greater levels of emotion dysregulation. The total scale has high internal consistency, and the six subscales have adequate internal consistency (Gratz & Roemer, 2004). Additionally, the DERS shows convergent validity with the Generalized Expectancy for Negative Mood Regulation Scale (Catanzaro & Mearns, 1990) for overall scores and each of the subscales (Gratz & Roemer, 2004). The DERS shows good test-retest reliability for the overall
score and adequate test-retest reliability for the subscale scores when assessed between four and eight weeks apart (Gratz & Roemer, 2004).

While most research investigating emotion dysregulation in NSSI has used the DERS, this measure does not include some relevant constructs in the emotion regulation literature, such as emotional reappraisal. For this reason, participants also completed the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). This ten-item self-report measure assesses two specific types of emotion regulation strategies, emotional reappraisal (six items) and emotional suppression (four items). Each item is assessed on a scale from 1 (strongly disagree) to 7 (strongly agree), resulting in a reappraisal subscale score from 6 to 42 and a suppression subscale score from 4 to 28, with higher scores indicating greater endorsement of that emotion regulation strategy. Each factor has high internal consistency and strong evidence of convergent and discriminant validity, and test-retest reliability is good for both factors (Gross & John, 2003).

Because of the frequent relationship between NSSI and childhood trauma (for review, see Lang & Sharma-Patel, 2011), this study also included a measure of difficulties encountered as a child or adolescent, the Adverse Childhood Experiences measure (ACE; Felitti et al., 1998). The ACE is a ten-item self-report measure of childhood difficulties, including verbal, emotional, physical, or sexual abuse, neglect, witnessing abuse towards a family member, and living with individuals who had legal, substance use, or mental health difficulties. The “yes” responses to the ten items are summed for a total ACE score ranging from 0 to 10, with higher scores indicating greater childhood adversity.

Because NSSI and emotion difficulties are both hallmarks of Borderline Personality Disorder (BPD), symptoms of BPD were assessed through the McLean Screening Instrument for BPD (MSI-BPD; Zanarini et al., 2003). This ten-item self-report measure asks respondents to
indicate their lifetime history of each of the nine BPD symptoms described in the DSM-IV-TR. This measure has good sensitivity and specificity when identifying cases of BPD determined via diagnostic interview; sensitivity and specificity are especially high when investigating individuals less than 25 years of age (Zanarini et al., 2003). The MSI-BPD score is the sum of the number of “yes” responses to the ten items, resulting in a score from 0 to 10, with higher scores indicating greater BPD features.

To investigate the relationship between comorbid depression and anxiety symptoms and their influence on emotional states, participants also completed the Depression, Anxiety, and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995a). The DASS-21 is a 21-item self-report measure (short form of the original DASS, which has 42-items) used to assess emotional and physical symptoms of depression, anxiety, and stress in the past week. This measure has demonstrated strong internal consistency and convergent validity, and shows greater ability to distinguish between depression and anxiety than other instruments (Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995b). Each scale is the sum of seven items, each of which is scored from 0 to 3, resulting in scale scores from 0 to 21; higher scores indicate greater levels of depression, anxiety, or stress.

Finally, participants completed a measure of coping strategies designed to provide participants with potential avenues to deal with difficult emotions (Coping Questionnaire, unpublished). This measure is primarily intended to increase positive emotion and self-efficacy at the end of the research protocol, as well as to provide the researchers with information about an individual’s coping skills that may be helpful when engaging in safety planning and risk assessment.
Interview measures.

Following administration of the self-report measures, a member of the research team conducted the Structured Clinical Interview for DSM-IV Disorders (SCID-I/P; First et al., 2002). This semi-structured interview is used to assess Axis I psychopathology in adults, including mood, anxiety, substance use, psychotic, and eating disorders. Research indicates that the SCID-I/P has greater diagnostic validity than chart-review diagnoses alone or those made by psychiatrists using unstructured diagnostic techniques (Basco et al., 2000). The SCID-I/P shows fair to excellent inter-rater reliability (Lobbestael, Leurgans, & Artnz, 2011; Zanarini et al., 2000) and generally fair to excellent test-retest reliability (with the exception of dysthymia; Zanarini et al., 2000).

Because of the particular relevance of Borderline Personality Disorder to the experience of NSSI and emotional dysregulation, a member of the research team also administered the Borderline Personality Disorder assessment items from the Structured Interview for DSM-IV Personality (SIDP-IV; Pfohl, Blum, & Zimmerman, 1997). This semi-structured interview assesses each of the nine symptoms of BPD listed in the DSM-IV. The SIDP-IV has demonstrated good reliability and validity (Rogers, 2001). Each symptom of BPD is assessed on a scale from 0 (not present) to 3 (strongly present); scores can be calculated either as the sum of the ratings for each item (ranging from 0 to 27) or the number of items with a score of 2 or higher (2 indicating that a symptom is present), resulting in a range from 0 to 9.

Daily diary measures.

Because retrospective reporting of emotional experiences can be subject to a variety of recall biases, the researcher sought to include a more ecologically valid measure of daily emotional experiences through use of a daily diary method. This aspect of the study is
particularly important given research suggesting that the type and direction of emotional recall biases can be influenced by the presence of psychiatric diagnoses (for example, Borderline Personality Disorder; Ebner-Priemer et al., 2006) and by demographic factors (for example, age; Ready, Weinberger, & Jones, 2007), such that laboratory-based self-report measures of emotion may be more or less accurate depending on variables distinct from emotional experience. In particular, research suggests that individuals who engage in NSSI may have difficulty naming and expressing emotions (alexithymia; Garish & Wilson, 2010; Zlotnick et al., 1996), suggesting a particular importance for measurement tools that can minimize additional sources of bias.

The diary included two measures, a modified version of the ISAS and a modified version of the MEQ (both measures are described above). The modified ISAS measure was reworded to assess frequency of thirteen methods of NSSI behaviors over the course of a single day, rather than throughout an individual’s lifetime; additionally, the functional assessment of NSSI was adapted to assess the functions of NSSI behaviors on that particular day only. The MEQ was similarly adapted to assess frequency, duration, intensity, and difficulty of regulation of the twenty emotions over the course of the single day being assessed. These two diary measures were administered daily over the course of a two-week (14 day) period. Because of concerns regarding ease of administration, as well as recent research suggesting equivalence between paper and pencil and electronic diaries (Green, Rafaeli, Bolger, Shrout, & Reis, 2006), the diary component of this study was completed using an electronic data collection system that participants accessed from a computer at home. Scores for each daily specific emotion were calculated, after averaging scores for each item across the number of days completed in the diary, in the same method as the laboratory session MEQ.
Power Analysis

In the study described earlier comparing individuals with BPD and NSSI with healthy controls, differences in all specific emotions assessed were found, with effect sizes ranging from $r = .55$ (disgust, higher in BPD+NSSI group) to $r = .78$ (happiness, higher in control group) (Berlin & Rolls, 2004). In a sample of undergraduates with recent or no history of NSSI, results were more varied, with effect sizes ranging from $r = .09$ (surprise, higher in those with recent NSSI) to $r = .55$ (guilt, higher in those with recent NSSI) (Brown et al., 2007). Because findings in both patient and undergraduate samples suggest that differences in specific emotions are of a medium to large effect size, power calculations were conducted using a medium effect size ($r = .40$). With the included number of participants ($N = 110$) and this effect size, the expected power for the analyses was 96.6% (for $p < .01$, two-tailed). Required significance value for all results was set at $p < .01$ to correct for multiple comparisons.
Results

Characteristics of the Sample

Descriptive statistics.

Of the 110 participants included in these analyses, 76 (69.1%) were female. Participants’ ages ranged from 19 to 49, with an average age of 23.42 (SD = 5.83). A majority of participants identified their ethnicity as East Asian (n = 62, 56.4%), with a significant minority identifying as Caucasian (n = 29, 26.4%). Other ethnic backgrounds included in the sample were South Asian (n = 9, 8.2%), Other or Bi/Multiracial (n = 5, 4.5%), Hispanic (n = 2, 1.8%), Middle Eastern (n = 2, 1.8%), and African (n = 1, 0.9%). A large majority of participants identified their sexual orientation as heterosexual (n = 103, 93.6%), with additional participants reporting bisexual (n = 3, 2.7%), questioning (n = 3, 2.7%) and lesbian (n = 1, 0.9%) sexual orientations. None of these demographic measures varied significantly between those with and without a history of NSSI.

Non-suicidal self-injury.

Among the participants with a recent history of NSSI, the mean number of lifetime acts of NSSI was 476.62 (SD = 1065.73); the median number of lifetime NSSI acts was 112.

The average number of methods of NSSI was 5.38 (SD = 2.75), indicating a substantial variety of NSSI methods used in this population. The most common method endorsed was interfering with wound healing (73.58%), but this method was the sole method of NSSI for only one participant, who reported engaging in the behavior 50 times. Other methods endorsed by over half the sample include biting (52.83%), severe pinching (66.04%), hairpulling (54.72%), and banging (64.15%). Consistent with existing literature, the most highly endorsed function of NSSI was affect regulation. Additional descriptive data on NSSI characteristics in the sample can be found in Table 1.


**Emotional experiences.**

Across the entire sample, the most highly endorsed specific emotions were interested ($M = 10.25, SD = 2.17$) and happy ($M = 10.23, SD = 1.47$); the least endorsed specific emotions were ashamed ($M = 7.12, SD = 2.90$) and disgusted ($M = 6.32, SD = 2.17$). Mean frequency, intensity, and duration of positive and negative emotions differed significantly across valence. In each case, the positive scale was rated more highly than the negative scale, intensity: paired $t(109) = -3.05$, $p = .003$, Cohen’s $d = .30$; duration: paired $t(109) = -3.88$, $p < .001$, Cohen’s $d = .37$; frequency: paired $t(109) = -5.61$, $p < .001$, Cohen’s $d = .54$. Mean levels for each of the MEQ subscales can be found in Table 2.

**Covariates**

**Adverse childhood experiences.**

In this sample, the mean ACE score was 1.30 ($SD = 1.71$); the median score was 1. While these results indicate a relatively low prevalence of adverse childhood experiences in this sample, the obtained scores varied from 0 to 7, indicating that some participants did experience significant childhood difficulties. Average ACE score was significantly higher among those with a history of recent NSSI, $t(27) = -3.16$, $p = .004$, Cohen’s $d = .93$. Group means and standard deviations for the ACE can be found in Table 3.

**Difficulties with emotion regulation.**

Two scales were used to assess emotion regulation: the Difficulties in Emotion Regulation scale (DERS) and the Emotion Regulation Questionnaire (ERQ). The mean score on the DERS was 85.57 ($SD = 24.94$) on a scale from 36 to 180. On the ERQ, the mean reappraisal score (on a scale from 6 to 42) was 29.07 ($SD = 5.97$), while the mean suppression score (on a scale from 4 to 28) was 14.00 ($SD = 5.29$). While overall DERS score was significantly higher
among the group with recent NSSI than those without, \( t(97) = -4.41, p < .001 \), Cohen’s \( d = .85 \), no significant differences were found between the groups on either ERQ subscale (\( ps > .2 \)).

Group means and standard deviations for the DERS and ERQ can be found in Table 3.

**Borderline personality disorder.**

The MSI-BPD is a self-report measure of BPD symptoms scored from 0 to 10; it is typical in studies investigating NSSI to eliminate the item assessing NSSI from the scale, resulting in a range of 0 to 9. In this sample, the MSI-BPD mean without the NSSI item was 3.07 (\( SD = 2.65 \)), indicating a moderate level of BPD symptoms. The SIDP-IV, a structured interview assessment of BPD symptoms, yields a score from 0 to 27; the mean score on the SIDP-IV in this sample was 3.55 (\( SD=3.87 \)). Both measures indicated significantly more BPD symptoms in the group with recent NSSI, MSI-BPD: \( t(93) = -6.28, p < .001 \), Cohen’s \( d = 1.21 \), SIDP-IV: \( t(74) = -5.74, p < .001 \), Cohen’s \( d = 1.16 \). Group means and standard deviations for the MSI-BPD and ERQ can be found in Table 3.

**Psychopathology and Axis I Diagnoses.**

The DASS includes three scales, anxiety, depression, and stress, which range in value from 0 to 21. In this sample, the highest scores were found for the stress subscale (\( M = 11.47, SD = 7.97 \)), then the depression subscale (\( M = 10.04, SD = 9.93 \)), and finally the anxiety scale (\( M = 7.40, SD = 7.26 \)). Scores on each subscale differed significantly between those with and without recent NSSI, with the recent NSSI group exhibiting greater negative emotion: stress, \( t(88) = -6.36 \), Cohen’s \( d = 1.23 \), depression, \( t(85) = -5.74 \), Cohen’s \( d = 1.11 \), anxiety, \( t(73) = -5.23 \), Cohen’s \( d = 1.02 \), all \( ps < .001 \). Group means and standard deviations for DASS scales can be found in Table 3.
Participants endorsed a variety of psychopathological symptoms on the SCID-I/P, resulting in an average of less than one diagnosis per person ($M = .92, SD = 1.38$). The rate of SCID-I/P diagnoses was significantly higher among those with a history of NSSI compared to those without, $t(75) = -4.84, p < .001$, Cohen’s $d = .94$ (group means can be found in Table 3). The most frequent disorders were anxiety disorders, with 35 (31.8%) participants meeting criteria for at least one anxiety disorder diagnosis, followed by mood disorders, with 28 (25.5%) participants meeting criteria for at least one mood disorder. For both of these categories, those with a recent history of NSSI were significantly more likely to have a diagnosis, anxiety, $X^2(1) = 13.59, p < .001$, Cohen’s $d = .75$, depression, $X^2(1) = 21.19$, Cohen’s $d = 1.18, p < .001$. Less common were substance use disorders, $n = 15$ (13.6%), and eating disorders, $n = 8$ (7.3%); while eating disorders were more prevalent among those with recent NSSI ($X^2(1) = 5.34, p = .028$, Cohen’s $d = .47$), this difference did not reach the threshold established for this study regarding statistical significance. In addition, no significant group differences were found with regard to substance use disorders ($p > .6$). Group information regarding Axis I psychopathology prevalence can be found in Table 3.

**Diary descriptive data.**

The most highly endorsed emotional states during the diary portion of the study were happy ($M = 9.12, SD = 1.59$), relaxed ($M = 8.24, SD = 2.04$), and cheerful ($M = 8.07, SD = 8.36$); the least endorsed emotional states were angry ($M = 4.99, SD = 1.46$), afraid ($M = 4.63, SD = 1.55$), and disgusted ($M = 4.54, SD = 1.74$). Similar to the baseline measurement, the frequency, intensity, and duration subscales were all significantly greater for the positive emotions than the negative emotions across the whole sample (all $ps < .001$). More descriptive data regarding the MEQ analyses from the diary portion of the study can be found in Table 4.
Of the 67 participants who completed the diary portion of the study, 25 engaged in at least one instance of NSSI over the course of the diary; all of these participants were in the recent NSSI group (69.4% of the recent NSSI group). The most frequent method of NSSI during the diary was interference with wound healing (19.4%), followed by “other” (8.96%), severe pinching (5.97%), and biting (5.97%). Also consistent with the laboratory assessment, the most frequently endorsed function of NSSI that occurred during the diary was affect regulation. Because of the skewed nature of NSSI frequency measures, frequency of NSSI during the diary was assessed by counting the number of days on which at least one act of NSSI occurred and dividing that by the number of days the diary was completed, resulting in a percentage of days on which the individual engaged in NSSI. Of those participants who engaged in NSSI, the mean percentage of days on which NSSI occurred was 38.02% (SD = 28.98%); the median percentage was 28.57%. Additional information regarding NSSI behaviors over the course of the diary can be found in Table 5.

**Baseline Emotion and NSSI Status**

**Specific emotions and NSSI status.**

Of the twenty measured specific emotions, significant differences between those with and without a history of NSSI were found for three positive emotions (happy, proud, and relaxed), as well as seven negative emotions (sad, afraid, angry, ashamed, disgusted, anxious, and dissatisfied with self), all $p < .01$. The largest effect was found for differences in the level of dissatisfaction with self, with higher reported values in the recent NSSI group, $t(108) = -5.20, p < .001$, Cohen’s $d = .48$. Additional information on between-group differences in specific emotions can be found in Table 2.
Reactivity scales and NSSI status.

The positive and negative reactivity scales (intensity, duration, and frequency averaged separately across emotions) indicated significant differences on all scales with the exception of positive emotional intensity (all \(ps < .007\), positive intensity \(p = .50\)). Each scale result was in the expected direction, with negative intensity, negative frequency, and negative duration elevated among those with a recent history of NSSI (Cohen’s \(d\)s of .72, .73, and 1.02, respectively), and positive frequency and positive duration elevated among those with no history of NSSI (Cohen’s \(d\) of .54 and .59, respectively). The largest effect was found for differences in duration of negative emotion, \(t(108) = -5.37, p < .001\), Cohen’s \(d = 1.02\). Additional information on between group differences in overall emotional reactivity can be found in Table 2.

Specific emotional states and NSSI status including covariates.

To determine whether between group differences in specific emotions were uniquely related to NSSI status or better accounted for by other variables of interest, such as depression, anxiety, BPD features, or history of abuse, partial correlations were used to assess the relationship between NSSI status and the ten specific emotions that differed significantly between NSSI status groups, controlling for a variety of covariates.

After controlling for history of childhood abuse, two emotions differed significantly between groups: happy \((r_{ab.c} = -.46, p = .003\), Cohen’s \(d = 1.05\)) and dissatisfied with self \((r_{ab.c} = .57, p < .001\), Cohen’s \(d = 1.39\)), with happiness higher among those without a history of NSSI and dissatisfaction with self higher among those with recent NSSI. After controlling for emotion regulation difficulties and strategies, as measured by the DERS and ERQ (both entered simultaneously), dissatisfaction with self remained significantly related to NSSI history, \(r_{ab.c} = .43, p = .002\), Cohen’s \(d = .96\). Controlling for the presence of four types of Axis I psychopathology
(eating, anxiety, mood, and substance use disorders) as assessed by the SCID-I/P, dissatisfied with self, $r_{ab,c} = .31, p = .001$, Cohen’s $d = .65$, and happy, $r_{ab,c} = -.26, p = .007$, Cohen’s $d = .55$, remained significantly related to NSSI group status.

We subsequently controlled for BPD symptoms by including both the MSI-BPD (without the NSSI item) and SIDP-IV scores into a partial correlation between the emotional states and NSSI status. While no correlations remained significant after controlling for these covariates, there were several emotions for which a substantial relationship with NSSI status continued to exist; for example, pride was higher in the no NSSI group with a $r_{ab,c}$ of -.22, $p = .026$, Cohen’s $d = .26$, and self-dissatisfaction was higher in the recent NSSI group with a $r_{ab,c}$ of .19, $p = .053$, Cohen’s $d = .41$. This pattern also emerged after controlling for the three DASS scores; no correlations reached the threshold for statistical significance, but there were emotional states with sizeable remaining relationships, such as disgusted, $r_{ab,c} = .21, p = .03$, Cohen’s $d = .33$, and dissatisfied with self, $r_{ab,c} = .18, p = .07$, Cohen’s $d = .35$. These results indicate that dissatisfaction with self evidences perhaps the most robust difference between those with and without NSSI, but that this finding is at least in part accounted for by symptoms of psychiatric disorders such as depression, anxiety, and BPD.

**Diary Emotions and NSSI Status**

**Specific emotional states and NSSI status.**

Because of the potential reporting biases evident using self-report laboratory-based measures, comparisons were made between average levels of specific emotions recorded during the diary portion of the study for those who did and did not report a history of NSSI at the laboratory session. While differences in positive and negative emotions were found when comparing overall reports of specific emotions using the laboratory data, only negative emotions...
were significantly different across groups when looking at the data from the diary period; these emotions were sad, $t(63) = -3.10, p = .003$, Cohen’s $d = .74$, ashamed, $t(57) = -3.47, p = .001$, Cohen’s $d = .82$, and dissatisfied with self, $t(59) = -3.72, p < .001$, Cohen’s $d = .88$; in each case, the group with recent NSSI reported higher levels of the negative emotional experiences.

Additional information on group differences in diary specific emotions can be found in Table 3.

**Reactivity scales and NSSI status.**

Similar in pattern to the specific emotions reported during the diary period, only negative reactivity scales were significantly different between NSSI groups when evaluating diary data. The largest difference was found in the frequency of negative emotion, $t(58) = -3.22, p = .002$, Cohen’s $d = .76$, but significant differences were also found with regards to negative emotional intensity, $t(59) = -2.96, p = .004$, Cohen’s $d = .70$, and negative emotional duration, $t(59) = -2.97, p = .004$, Cohen’s $d = .70$. Additional information on group differences in diary reactivity scales can be found in Table 3.

**Specific emotional states and NSSI status including covariates.**

Because of the potential influence of current psychopathology on the specific emotional states reported in the diary, partial correlations were computed between NSSI group and the three specific emotions that differed significantly by group (sad, ashamed, dissatisfied with self) while controlling for measures that captured current psychopathology (DASS scales, MSI-BPD, SIDP-IV). After controlling for these measures, there were no significant relationships between NSSI group status and specific emotions as reported in the diary. It should be noted, however, that the MEQ emotion scales were highly correlated with these covariates; each covariate was significantly correlated (all $ps < .001$) each of the specific emotion scales assessed.
Baseline Emotion Predicting Subsequent NSSI Behavior

The nature of this study provided a unique opportunity to investigate prospective predictors of engagement in NSSI over the two-week diary period. To avoid artificially biasing the scores for the “no NSSI during diary” group lower due to inclusion of individuals with no lifetime history of NSSI, these analyses were conducted only using participants who completed the diary and who, prior to the diary, had a recent history of NSSI (n = 36). Because of the small sample size, these analyses are exploratory.

Participants who engaged in NSSI during the diary portion of the study reported significantly higher levels of anger, $t(34) = -2.86, p = .007$, Cohen’s $d = 1.03$, at baseline than participants with a recent history of NSSI who did not engage in NSSI during the diary. No other specific emotional experiences predicted subsequent engagement in NSSI among those with a lifetime history of NSSI. Of the reactivity scales, only negative emotional duration at baseline was significantly different between those with and without NSSI in the diary, $t(34) = -2.99, p = .005$, Cohen’s $d = 1.08$, with higher negative emotional duration among those who subsequently engaged in NSSI.
Discussion

A large body of research indicates that individuals who engage in NSSI experience elevated levels of negative emotions compared to individuals with no history of NSSI (e.g., Andover & Gibb, 2010; Briere & Gil, 1998; Klonsky et al., 2003). Additionally, the literature on the functions of NSSI suggests that the primary reason individuals choose to engage in NSSI is to regulate negative emotions (see Klonsky, 2007 for review). Given these findings, a better understanding of the nature of emotional experiences among individuals with a history of NSSI has both theoretical relevance and potential clinical utility. In this study, we sought to investigate three main research directions: specific emotions in individuals with and without a history of NSSI; dimensions of emotional reactivity (frequency, intensity, and duration) in individuals with and without a history of NSSI; and emotional experiences and emotional reactivity as prospective predictors of engagement in NSSI in those with a preexisting history of NSSI.

Specific Emotional Experiences and NSSI

First, we investigated whether specific emotions are particularly salient for individuals who engage in NSSI. To investigate this question, we used a laboratory-based self-report measure of daily specific emotions to compare overall levels of twenty emotions between individuals with a history of recent NSSI and without any history of NSSI.

In this avenue of research, we focused on specific emotions (as opposed to broader measures of negative and positive emotion) for several reasons. Most existing literature investigating emotional experience in NSSI has focused on these broader constructs; while this research has succeeded in demonstrating the link between NSSI and elevated levels of negative emotion, the range of experiences and emotional states captured by measures of negative emotion (e.g., depression measures, anxiety measures) is too broad to come to specific
conclusions about the nature of emotional experience in NSSI. Second, existing research is conflicting regarding the most salient aspects of negative emotion; in those studies where comparisons between types of negative emotion are made (e.g., depression versus anxiety), the data are inconclusive regarding the most salient emotional state in NSSI. Some research indicates that emotional states associated with depression and low mood are the most elevated in individuals with NSSI; other works suggest that NSSI is primarily associated with high arousal negative emotions, such as anxiety; even further research indicates that the primary emotional experience in NSSI is one of self-derogation and self-criticism. Because of this current lack of clarity in the literature, we sought to investigate which types of specific emotional states are the most relevant for engagement in NSSI using a measure that clearly delineates between a variety of emotions and that includes an assessment of the frequency, duration, and intensity of those states.

The most robust finding regarding differences in specific emotions between individuals with and without a history of NSSI was elevated levels of self-dissatisfaction among participants with a recent history of NSSI. Self-dissatisfaction evidenced the greatest between-group difference when comparing those with and without NSSI, and this result remained significant when controlling for a history of childhood abuse, Axis I psychopathology, as well as two measures of emotion (dys)regulation. Additionally, the partial correlations in which self-dissatisfaction did not reach statistical significance (controlling for DASS scores and BPD symptoms) were still relatively large; controlling for MSI-BPD and SID-P scores, NSSI group and self-dissatisfaction were correlated $r_{ab.c} = .19, p = .05$, Cohen’s $d = .41$, while controlling for the three DASS subscales, NSSI group and self-dissatisfaction were correlated $r_{ab.c} = .18, p = .07$, Cohen’s $d = .35$. These results suggest that, above and beyond a variety of covariates related to
psychopathology, self-dissatisfaction had significant predictive value when comparing those with and without a history of NSSI, but that this relationship may be at least partially mediated by psychopathological symptoms. It will be important for future researchers to determine whether self-dissatisfaction raises the risk of both psychopathology and NSSI, whether psychopathology raises the risk of both self-dissatisfaction and NSSI, or whether some third, as yet unmeasured, variable accounts for this relationship.

Because individuals who engage in NSSI often experience a variety of types of negative emotions, it can be difficult for providers of psychological services to determine the primary treatment target or goal in this population. By determining the specific and particularly salient role of self-dissatisfaction, this research may provide valuable information to clinicians when presented with a client who self-injures, as well as to researchers investigating mechanisms of change in treatment outcome studies of NSSI.

**Emotional Reactivity and NSSI**

Our second research goal was to investigate the relationship between specific aspects of emotional reactivity (intensity, frequency, and duration) and NSSI. Not only has most research in NSSI used broad measures that encompass a variety of negative emotional experiences, but also these measures typically only measure one aspect of emotional experience (e.g., frequency, or intensity, or duration). These methods of quantifying emotion treat emotions as if their intensity, duration, and frequency are indistinguishable or not important to distinguish. However, this approach is not supported by the literature indicating that individuals with NSSI may report elevated levels of negative emotion in general, but not elevated levels of emotional intensity, nor with the basic emotions literature which suggests that frequency, intensity, and duration are distinguishable aspects of emotional reactivity (Davidson, 1998).
To determine how aspects of emotional reactivity may differ between individuals, we investigated how emotional intensity, duration, and frequency for positive and negative emotions might be related to engagement in NSSI, and if so, which aspects of emotional experience were particularly important. The goals of this research area were two-fold: first, to determine what parts of emotional experience are salient for NSSI (frequency, intensity, duration), and second, to see if these relationships were consistent when comparing between positive and negative emotions.

Our results indicated that individuals who engage in NSSI have a variety of emotional experiences that differ from individuals without NSSI, namely, more intense, frequent, and longer negative emotions, and less frequent and shorter positive emotions. Of these findings, the most robust reactivity difference between groups was the duration of negative emotion; this pattern of results was consistent in both cross-sectional and longitudinal analyses. These results are valuable to the field for several reasons.

First, these findings suggest that deficits in both negative and positive emotional experiences play a role in engagement in NSSI; to this point, most researchers have focused explicitly on negative emotions, without acknowledging that deficits in positive emotions may also play a role in NSSI. Second, knowing that positive emotional intensity did not vary significantly between the groups may be useful for future investigations of treatment targets for NSSI. Third, the largest difference between those with and without a history of NSSI was in negative emotional duration, which suggests that NSSI may become an attractive coping strategy when negative emotion persists for an extended period of time. These results suggest that perhaps intense negative emotion, while aversive, may not lead to NSSI when these emotions are experienced only briefly; when the emotional experience is perceived as persistent and unending,
however, NSSI may become a more attractive option for coping with negative emotional experiences.

While the MEQ was structured in such a way that frequency, duration, and intensity could be measured for each individual emotion, we chose not to investigate that question here due to the potential reliability and validity issues with using single-item measures. These data may prove useful in the future, though, as exploratory analyses that could suggest specific aspects of certain emotions that might be especially salient.

These two research questions – how specific emotions and how aspects of emotional experience differ between those with a history of NSSI and those without – provide us with valuable information regarding the emotions in the daily lives of people engaging in NSSI. It is possible that these emotional experiences may be risk factors for development of NSSI; however, it is also possible that these experiences actually result from NSSI engagement. Future prospective research is needed to determine the causal relationship between NSSI, self-dissatisfaction, and negative emotional duration.

**Diary Measures of Emotion and NSSI**

In addition to the findings that establish the relationship between overall emotional experience and a history of NSSI, our third avenue of research investigated how the experience of specific emotions during the diary portion of the study was related to NSSI group status. Given the literature on recall biases in emotional reporting, the opportunity to use daily reports of emotional experience was valuable to confirm or refute the evidence obtained based on the laboratory data.

In this case, the results indicated that several negative emotions were more common during the diary among people with a history of NSSI; the difference that was greatest between
those with and without an NSSI history was again in the rating of self-dissatisfaction. Additionally, no differences in positive emotion were noted, suggesting that, while individuals who engage in NSSI might perceive and report that they feel fewer positive emotions when completing baseline measures in a laboratory setting, their actual positive emotional experiences as reported during the daily diary may differ from those reported retrospectively.

**Prospective Predictors of NSSI Behaviors**

Finally, our design also allowed us to examine prospective relationships between baseline reports of emotions and subsequent NSSI reported during the two-week daily diary portion of the study. To examine this question, we compared laboratory MEQ ratings between individuals who were in the recent NSSI group and who did not engage in NSSI during the diary with individuals in the recent NSSI group who did engage in NSSI during the diary. This area of research, while promising, was an exploratory avenue, given the relatively small sample size ($n = 36$).

Certain baseline measures of emotional experience prospectively predicted NSSI in the subsequent diary period. In this sample, anger was significantly more highly endorsed among those who subsequently engaged in NSSI during the diary than those without. Additionally, the duration of negative emotions experienced by the individuals who engaged in NSSI during the diary was significantly longer than that of individuals who did not engage in NSSI during the diary. These findings suggest that the duration of negative emotions may be not only a factor in the decision to begin NSSI, but also in continuing to engage in NSSI as a coping strategy.

The results presented here, both cross-sectional and prospective, indicate that NSSI appears to be related much more strongly to elevated negative emotion than to deficits in positive emotion. These findings are consistent with existing models of NSSI that suggest NSSI is a primarily, but not exclusively, negatively reinforcing behavior (Chapman, Gratz, & Brown,
2006; Klonsky, 2009; Victor & Klonsky, 2012, in press), and are also consistent with the relatively infrequent endorsement of positive reinforcement reasons for NSSI compared to negative reinforcement (Klonsky, 2007; Nock & Prinstein, 2004). These findings are not only theoretically relevant to our understanding of NSSI as a clinical phenomenon, but also potentially clinically relevant in the determination of the most effective treatment targets for individuals engaging in NSSI.

Limitations and Future Directions

Our research findings provide valuable information regarding the emotional experience of individuals who engage in NSSI and how those experiences might a) differ from individuals without a history of NSSI and b) be related to prospective engagement in NSSI. However, there are several limitations of the study that should be noted. While the overall sample size for the laboratory portion of the study was reasonable (N = 110), only a subset of participants completed the diary portion of the study, making our belief in our conclusions regarding prospective prediction more cautious. Additionally, participants were primarily undergraduate students; it is unclear to what extent the emotional experience of university students engaging in NSSI may be similar or different from other individuals in the community or in psychiatric care engaging in NSSI. Finally, the diary portion of the study involved assessing daily emotions once a day; while this method may decrease recall bias evident in the baseline measure, there is still likely some retrospective recall bias that may influence the results.

Future studies can expand upon these findings in a variety of ways. First, prospective studies are needed; by investigating the emotional experiences of individuals both before and after they begin NSSI, the causal relationships between emotional experience, psychopathology, and NSSI can be more clearly determined. In this sample, for example, we cannot rule out the
possibility that engaging in NSSI influences emotional experience (e.g., increasing self-dissatisfaction), and so our hypotheses regarding the role of emotional experience in NSSI are tentative.

Second, future research should attempt to investigate members of populations outside of undergraduate students; while these samples are convenient and frequently have a prevalence high rate of NSSI, it is unclear to what extent the reasons for NSSI and the emotional experiences that go along with NSSI are similar or different between undergraduates and members of the community, incarcerated individuals, or individuals receiving psychiatric care.

Finally, additional work should be conducted using more frequent diary sampling methods, perhaps through ecological momentary assessment (EMA) technology that would capture not only daily emotional experience, but also the affective states immediately preceding and following a specific NSSI episode. These avenues of research would permit us to more clearly understand the relationship between emotional experience, onset of NSSI, continuation of NSSI, and in-vivo versus retrospective reports of emotional experience.
Table 1

Descriptive Data on NSSI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chronology</strong></td>
<td></td>
</tr>
<tr>
<td>Age of onset</td>
<td>12.40 (5.36)</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td></td>
</tr>
<tr>
<td>Number of methods</td>
<td>5.38 (2.75)</td>
</tr>
<tr>
<td>Interfering with wound</td>
<td>39 (73.6)</td>
</tr>
<tr>
<td>Severe pinching</td>
<td>35 (66)</td>
</tr>
<tr>
<td>Banging</td>
<td>34 (64.2)</td>
</tr>
<tr>
<td>Hairpulling</td>
<td>29 (54.7)</td>
</tr>
<tr>
<td>Biting</td>
<td>28 (52.8)</td>
</tr>
<tr>
<td>Severe scratching</td>
<td>26 (49.1)</td>
</tr>
<tr>
<td>Cutting</td>
<td>23 (43.4)</td>
</tr>
<tr>
<td>Other</td>
<td>16 (30.2)</td>
</tr>
<tr>
<td>Rubbing with rough</td>
<td>15 (28.3)</td>
</tr>
<tr>
<td>Surfaces</td>
<td>12 (22.6)</td>
</tr>
<tr>
<td>Burning</td>
<td>10 (18.9)</td>
</tr>
<tr>
<td>Carving</td>
<td>9 (17)</td>
</tr>
<tr>
<td>Needles</td>
<td>9 (17)</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td></td>
</tr>
<tr>
<td>Affect regulation</td>
<td>3.38 (1.94)</td>
</tr>
<tr>
<td>Self-punishment</td>
<td>2.87 (2.11)</td>
</tr>
<tr>
<td>Marking distress</td>
<td>2.06 (2.01)</td>
</tr>
<tr>
<td>Anti-dissociation</td>
<td>1.57 (1.79)</td>
</tr>
<tr>
<td>Self-care</td>
<td>1.34 (1.56)</td>
</tr>
<tr>
<td>Interpersonal influence</td>
<td>1.08 (1.49)</td>
</tr>
<tr>
<td>Toughness</td>
<td>1.02 (1.18)</td>
</tr>
<tr>
<td>Anti-suicide</td>
<td>.96 (1.43)</td>
</tr>
<tr>
<td>Interpersonal boundaries</td>
<td>.96 (1.34)</td>
</tr>
<tr>
<td>Revenge</td>
<td>.68 (1.31)</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.68 (1.25)</td>
</tr>
<tr>
<td>Sensation-seeking</td>
<td>.62 (.77)</td>
</tr>
<tr>
<td>Peer bonding</td>
<td>.25 (.83)</td>
</tr>
</tbody>
</table>

*Note.* Specific methods are listed with *n* (%); all other values are listed with *M (SD).* Function scores range from 0 to 6.
Table 2

MEQ Descriptive Data in Full Sample and Comparisons between NSSI and non-NSSI Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive emotion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interested</td>
<td>10.25</td>
<td>2.17</td>
<td>.74</td>
</tr>
<tr>
<td>Happy</td>
<td>10.23</td>
<td>1.47</td>
<td>3.41**</td>
</tr>
<tr>
<td>Cheerful</td>
<td>9.51</td>
<td>1.95</td>
<td>2.08</td>
</tr>
<tr>
<td>Enthusiastic</td>
<td>9.40</td>
<td>2.07</td>
<td>1.60</td>
</tr>
<tr>
<td>Inspired</td>
<td>9.34</td>
<td>2.12</td>
<td>-.55</td>
</tr>
<tr>
<td>Excited</td>
<td>9.33</td>
<td>2.03</td>
<td>-.06</td>
</tr>
<tr>
<td>Confident</td>
<td>9.24</td>
<td>2.64</td>
<td>2.02</td>
</tr>
<tr>
<td>Joyful</td>
<td>9.15</td>
<td>2.02</td>
<td>2.23</td>
</tr>
<tr>
<td>Relaxed</td>
<td>8.95</td>
<td>1.94</td>
<td>3.03**</td>
</tr>
<tr>
<td>Proud</td>
<td>8.40</td>
<td>2.10</td>
<td>2.70*</td>
</tr>
<tr>
<td><strong>Negative emotion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissatisfied with self</td>
<td>9.38</td>
<td>3.18</td>
<td>-5.20***</td>
</tr>
<tr>
<td>Nervous</td>
<td>9.37</td>
<td>2.48</td>
<td>-2.55</td>
</tr>
<tr>
<td>Anxious</td>
<td>9.01</td>
<td>2.77</td>
<td>-2.88*</td>
</tr>
<tr>
<td>Sad</td>
<td>8.97</td>
<td>1.92</td>
<td>-4.86***</td>
</tr>
<tr>
<td>Lonely</td>
<td>8.72</td>
<td>3.16</td>
<td>-1.62</td>
</tr>
<tr>
<td>Angry</td>
<td>8.32</td>
<td>1.96</td>
<td>-2.83*</td>
</tr>
<tr>
<td>Irritable</td>
<td>8.30</td>
<td>2.26</td>
<td>-2.43</td>
</tr>
<tr>
<td>Afraid</td>
<td>7.32</td>
<td>2.36</td>
<td>-2.76*</td>
</tr>
<tr>
<td>Ashamed</td>
<td>7.12</td>
<td>2.90</td>
<td>-3.05**</td>
</tr>
<tr>
<td>Disgusted</td>
<td>6.32</td>
<td>2.17</td>
<td>-2.92**</td>
</tr>
<tr>
<td><strong>Reactivity Scales – Positive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive duration</td>
<td>28.39</td>
<td>5.02</td>
<td>3.11**</td>
</tr>
<tr>
<td>Positive frequency</td>
<td>33.02</td>
<td>5.56</td>
<td>2.81*</td>
</tr>
<tr>
<td>Positive intensity</td>
<td>32.38</td>
<td>4.60</td>
<td>.67</td>
</tr>
<tr>
<td><strong>Reactivity Scales – Negative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative duration</td>
<td>25.13</td>
<td>6.02</td>
<td>-5.37***</td>
</tr>
<tr>
<td>Negative frequency</td>
<td>27.60</td>
<td>6.24</td>
<td>-3.84***</td>
</tr>
<tr>
<td>Negative intensity</td>
<td>30.10</td>
<td>6.24</td>
<td>-3.78***</td>
</tr>
</tbody>
</table>

*Note.* Specific emotion scores could range from 5 to 15. Reactivity scale scores could range from 10 to 50. * = p < .01, ** = p < .005, *** = p < .001
### Table 3
Comparing NSSI and non-NSSI Groups on Clinical and Emotion Regulation Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score Range</th>
<th>Recent NSSI ($n = 53$)</th>
<th>Never NSSI ($n = 57$)</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE</td>
<td>0-10</td>
<td>1.95(2.01)</td>
<td>.50(.71)</td>
<td>-3.16**</td>
</tr>
<tr>
<td>DASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>0-21</td>
<td>10.83(8.39)</td>
<td>4.21(3.98)</td>
<td>-5.23***</td>
</tr>
<tr>
<td>Depression</td>
<td>0-21</td>
<td>15.06(10.58)</td>
<td>5.37(6.48)</td>
<td>-5.74***</td>
</tr>
<tr>
<td>Stress</td>
<td>0-21</td>
<td>15.81(8.12)</td>
<td>7.44(5.29)</td>
<td>-6.36***</td>
</tr>
<tr>
<td>BPD Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SID-P</td>
<td>0-27</td>
<td>5.63(4.20)</td>
<td>1.73(2.39)</td>
<td>-5.74***</td>
</tr>
<tr>
<td>McLean (no NSSI item)</td>
<td>0-9</td>
<td>4.49(2.63)</td>
<td>1.75(1.84)</td>
<td>-6.28***</td>
</tr>
<tr>
<td>SCID-I/P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Lifetime Diagnoses</td>
<td>0-30</td>
<td>1.53(1.60)</td>
<td>.35(.79)</td>
<td>-4.84***</td>
</tr>
<tr>
<td>Mood Diagnosis</td>
<td>0-1</td>
<td>24(45.28%)</td>
<td>4(7.02%)</td>
<td>21.19***</td>
</tr>
<tr>
<td>Anxiety Diagnosis</td>
<td>0-1</td>
<td>26(49.06%)</td>
<td>9(16.07%)</td>
<td>13.59***</td>
</tr>
<tr>
<td>Eating Diagnosis</td>
<td>0-1</td>
<td>7(13.21%)</td>
<td>1(1.75%)</td>
<td>5.34</td>
</tr>
<tr>
<td>Substance Diagnosis</td>
<td>0-1</td>
<td>8(15.09%)</td>
<td>7(12.28%)</td>
<td>.19</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DERS</td>
<td>36-180</td>
<td>95.72(26.10)</td>
<td>76.14(19.76)</td>
<td>-4.45***</td>
</tr>
<tr>
<td>ERQ Reappraisal</td>
<td>6-42</td>
<td>28.04(6.92)</td>
<td>30.04(4.87)</td>
<td>1.23</td>
</tr>
<tr>
<td>ERQ Suppression</td>
<td>4-28</td>
<td>13.19(5.78)</td>
<td>14.75(4.77)</td>
<td>1.08</td>
</tr>
</tbody>
</table>

*Note.* Score range is all possible values for the measure described. All values reported for recent NSSI or never NSSI groups are $M$ ($SD$) except for Axis I diagnoses, which are reported as $n$ (%) having that diagnosis. All statistical tests are $t$-test values except for Axis I diagnoses, which are $X^2$ tests. * = $p < .01$, ** = $p < .005$, *** = $p < .001$.
Table 4

MEQ Descriptive Data in Diary Sample and Comparisons between NSSI and non-NSSI Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive emotion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>9.12</td>
<td>1.59</td>
<td>2.03</td>
</tr>
<tr>
<td>Relaxed</td>
<td>8.24</td>
<td>2.04</td>
<td>.81</td>
</tr>
<tr>
<td>Cheerful</td>
<td>8.07</td>
<td>2.09</td>
<td>2.04</td>
</tr>
<tr>
<td>Interested</td>
<td>7.85</td>
<td>2.06</td>
<td>.22</td>
</tr>
<tr>
<td>Joyful</td>
<td>7.59</td>
<td>2.00</td>
<td>2.51</td>
</tr>
<tr>
<td>Confident</td>
<td>7.54</td>
<td>2.76</td>
<td>1.60</td>
</tr>
<tr>
<td>Enthusiastic</td>
<td>7.28</td>
<td>1.99</td>
<td>.84</td>
</tr>
<tr>
<td>Excited</td>
<td>7.25</td>
<td>1.75</td>
<td>.58</td>
</tr>
<tr>
<td>Inspired</td>
<td>6.29</td>
<td>2.20</td>
<td>--.96</td>
</tr>
<tr>
<td>Proud</td>
<td>6.22</td>
<td>2.18</td>
<td>1.75</td>
</tr>
<tr>
<td><strong>Negative emotion</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dissatisfied with self</td>
<td>6.51</td>
<td>2.76</td>
<td>--3.72***</td>
</tr>
<tr>
<td>Sad</td>
<td>6.16</td>
<td>2.09</td>
<td>--3.10**</td>
</tr>
<tr>
<td>Anxious</td>
<td>6.07</td>
<td>2.16</td>
<td>--2.29</td>
</tr>
<tr>
<td>Nervous</td>
<td>6.02</td>
<td>2.02</td>
<td>--2.07</td>
</tr>
<tr>
<td>Irritable</td>
<td>5.70</td>
<td>1.75</td>
<td>--1.32</td>
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<tr>
<td>Lonely</td>
<td>5.65</td>
<td>2.43</td>
<td>--2.21</td>
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<tr>
<td>Ashamed</td>
<td>5.25</td>
<td>1.97</td>
<td>--3.47**</td>
</tr>
<tr>
<td>Angry</td>
<td>4.99</td>
<td>1.46</td>
<td>--.36</td>
</tr>
<tr>
<td>Afraid</td>
<td>4.63</td>
<td>1.55</td>
<td>--2.35</td>
</tr>
<tr>
<td>Disgusted</td>
<td>4.54</td>
<td>1.74</td>
<td>--2.64</td>
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<tr>
<td><strong>Reactivity Scales – Positive</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Positive duration</td>
<td>23.66</td>
<td>5.08</td>
<td>1.43</td>
</tr>
<tr>
<td>Positive frequency</td>
<td>26.58</td>
<td>5.92</td>
<td>1.84</td>
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<tr>
<td>Positive intensity</td>
<td>25.20</td>
<td>5.77</td>
<td>.78</td>
</tr>
<tr>
<td><strong>Reactivity Scales – Negative</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Negative duration</td>
<td>17.30</td>
<td>4.85</td>
<td>--2.97**</td>
</tr>
<tr>
<td>Negative frequency</td>
<td>19.03</td>
<td>5.48</td>
<td>--3.22**</td>
</tr>
<tr>
<td>Negative intensity</td>
<td>19.20</td>
<td>5.97</td>
<td>--2.96**</td>
</tr>
</tbody>
</table>

*Note.* Specific emotion scores could range from 5 to 15. Reactivity scale scores could range from 10 to 50. * = *p* < .01, ** = *p* < .005, *** = *p* < .001
Table 5

Descriptive Data on NSSI during Diary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Days Reporting NSSI/ Days Completed Diary</td>
<td>.27 (.29)</td>
</tr>
<tr>
<td>Methods</td>
<td></td>
</tr>
<tr>
<td>Number of methods</td>
<td>2.16 (1.46)</td>
</tr>
<tr>
<td>Interfering with wound healing</td>
<td>13 (36.1)</td>
</tr>
<tr>
<td>Hairpulling</td>
<td>12 (33.3)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (16.7)</td>
</tr>
<tr>
<td>Biting</td>
<td>4 (11.1)</td>
</tr>
<tr>
<td>Severe pinching</td>
<td>4 (11.1)</td>
</tr>
<tr>
<td>Cutting</td>
<td>3 (8.3)</td>
</tr>
<tr>
<td>Rubbing with rough surfaces</td>
<td>3 (8.3)</td>
</tr>
<tr>
<td>Burning</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Severe scratching</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Banging</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Substances</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Needles</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Carving</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Functions</td>
<td></td>
</tr>
<tr>
<td>Affect regulation</td>
<td>3.13 (2.10)</td>
</tr>
<tr>
<td>Self-punishment</td>
<td>1.81 (1.92)</td>
</tr>
<tr>
<td>Marking distress</td>
<td>1.55 (1.68)</td>
</tr>
<tr>
<td>Anti-dissociation</td>
<td>.95 (1.46)</td>
</tr>
<tr>
<td>Self-care</td>
<td>.75 (1.17)</td>
</tr>
<tr>
<td>Toughness</td>
<td>.59 (.89)</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.45 (.97)</td>
</tr>
<tr>
<td>Sensation-seeking</td>
<td>.32 (.69)</td>
</tr>
<tr>
<td>Interpersonal influence</td>
<td>.30 (.63)</td>
</tr>
<tr>
<td>Anti-suicide</td>
<td>.26 (.80)</td>
</tr>
<tr>
<td>Revenge</td>
<td>.21 (.59)</td>
</tr>
<tr>
<td>Interpersonal boundaries</td>
<td>.15 (.43)</td>
</tr>
<tr>
<td>Peer bonding</td>
<td>.05 (.20)</td>
</tr>
</tbody>
</table>

*Note.* Specific methods are listed with n (%); all other values are listed with M (SD). Function scores range from 0 to 6.
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