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Diagnosis and Characterization of *DSM-5* Nonsuicidal Self-Injury Disorder Using the Clinician-Administered Nonsuicidal Self-Injury Disorder Index

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Abstract

Despite the inclusion of nonsuicidal self-injury disorder (NSSID) in the *DSM-5*, research on NSSID is limited and no studies have examined the full set of *DSM-5* NSSID diagnostic criteria. Thus, this study examined the reliability and validity of a new structured diagnostic interview for NSSID (the Clinician-Administered NSSI Disorder Index; CANDI) and provides information on the clinical characteristics and features of *DSM-5* NSSID. Data on the interrater reliability, internal consistency, and construct validity of the CANDI and associated characteristics of NSSID were collected in a community sample of young adults ($N = 107$) with recent recurrent NSSI (10 lifetime episodes of NSSI, at least one episode in the past year). Participants completed self-report measures of NSSI characteristics, psychopathology, and emotion dysregulation, as well as diagnostic interviews of borderline personality disorder (BPD) and lifetime mood, anxiety, and substance use disorders. The CANDI demonstrated good interrater reliability and adequate internal consistency. Thirty-seven percent of participants met criteria for NSSID. NSSID was associated with greater clinical and diagnostic severity, including greater NSSI versatility, greater emotion dysregulation and psychopathology, and higher rates of BPD, bipolar disorder, posttraumatic stress disorder, social anxiety disorder, and alcohol dependence. Findings provide support for the reliability, validity, and feasibility of the CANDI.

Keywords

deliberate self-harm; self-injury; diagnostic assessment; emotion regulation; borderline personality disorder; *DSM-5*

Until recently, nonsuicidal self-injury (NSSI), defined as the deliberate, direct, self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned

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Declaration of Conflicting Interests

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(Chapman, Gratz, & Brown, 2006; Gratz, 2001; International Society for the Study of Self-injury, 2007), was studied primarily in the context of borderline personality disorder (BPD; Shearer, 1994; Soloff, Lis, Kelly, Cornelius, & Ulrich, 1994). Although NSSI is a cardinal symptom of BPD (prevalent enough to be considered the “behavioral specialty” of patients with BPD; Gunderson & Ridolfi, 2006), a rapidly growing body of empirical research demonstrates that NSSI is not unique to BPD (Andover, Pepper, Ryabchenko, Orrico, & Gibb, 2005; Gratz, Breetz, & Tull, 2010; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Specifically, NSSI occurs in the context of numerous psychiatric disorders, including posttraumatic stress disorder (Dyer et al., 2009; Sacks, Flood, Dennis, Hertzberg, & Beckham, 2009; Zlotnick, Mattia, & Zimmerman, 1999), depression (Asarnow et al., 2011; Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2012), eating disorders (Paul, Schroeter, Dahme, & Nutzinger, 2002; Sansone & Levitt, 2002), and substance use disorders (Evren, Dalbudak, Evren, Cetin, & Durkaya, 2011; Gratz & Tull, 2010b). Furthermore, NSSI is associated with a variety of negative consequences and functional impairment in its own right (Klonsky, May, & Glenn, 2013; Klonsky & Olino, 2008; Turner, Chapman, & Layden, 2012).

With the increased recognition that NSSI represents an important clinical condition that is separable from other psychiatric diagnoses (e.g., BPD), the Child and Adolescent Work Group of the *DSM-5* recommended including NSSI as a separate diagnosis in the *DSM-5* (consistent with the recommendations of others; Muehlenkamp, 2005). The inclusion of NSSI Disorder (NSSID) in the *DSM-5* was intended to increase recognition of NSSI as a unique clinical entity, as well as to facilitate advancements in NSSI research and clinical practice (for a thorough discussion of the potential advantages of recognizing NSSI as a separate diagnosis in the *DSM-5*, see Shaffer & Jacobson, 2009; Wilkinson & Goodyer, 2011). Unfortunately, however, interrater reliability of NSSID was found to be very low in the *DSM-5* field trials; thus, this disorder was relegated to Section 3 (Disorders Requiring Further Research) of the *DSM-5* (Regier et al., 2013).

The diagnostic criteria for NSSID in the *DSM-5* (American Psychiatric Association, 2013) include the following: (1) engagement in NSSI on 5 or more days in the past year (Criterion A); (2) the expectation that NSSI will solve an interpersonal problem, provide relief from unpleasant thoughts and/or emotions, or induce a positive emotional state (Criterion B); (3) the experience of one or more of the following: (a) interpersonal problems or negative thoughts or emotions immediately prior to NSSI, (b) preoccupation with NSSI that is difficult to manage, or (c) frequent thoughts about NSSI (Criterion C); (4) the NSSI is not socially sanctioned or restricted to minor self-injurious behaviors (Criterion D); (5) the presence of NSSI-related clinically significant distress or interference across different domains of functioning (e.g., work, relationships; Criterion E); and (6) the NSSI does not occur only in the context of psychosis, delirium, or substance use/withdrawal and is not better accounted for by another psychiatric disorder or medical condition (Criterion F).

In order for research on NSSID to progress, valid and reliable measures of this disorder are needed. Indeed, extant research on this disorder has relied solely on self-report measures of symptoms of NSSID (many of which were not originally designed for this purpose; e.g., Glenn & Klonsky, 2013; Selby, Bender, Gordon, Nock, & Joiner, 2012; Ward et al., 2013;

Zetterqvist, Lundh, Dahlström, & Svedin, 2013). Moreover, no studies to date have assessed the full set of *DSM-5* diagnostic criteria for NSSID, due to the reliance on archival data collected prior to the publication of the proposed *DSM-5* criteria (Selby et al., 2012; Ward et al., 2013), the completion of the study prior to the finalization of the *DSM-5* criteria (Glenn & Klonsky, 2013; In-Albon, Ruf, & Schmid, 2013; Zetterqvist et al., 2013), or difficulties assessing all of the criteria through self-report measures (Andover, in press). Although the extant studies in this area provide preliminary data on the correlates and consequences of a probable NSSID, the absence of research examining the full set of *DSM-5* NSSID criteria and lack of a reliable and valid measure of this disorder limit our understanding of NSSID. To address these limitations and facilitate the advancement of research on this disorder, we developed a structured diagnostic interview to assess the full set of diagnostic criteria for NSSID in the *DSM-5*: the Clinician-Administered NSSI Disorder Index (CANDI).

Notably, although measures of various aspects of NSSID exist, no extant measures assess all of these criteria (especially Criterion E), and none focus exclusively on the specific set of criteria that constitute a *DSM-5* NSSID diagnosis. For example, whereas Linehan and colleagues' Suicide Attempt and Self-Injury Interview (SASII; Linehan, Comtois, Brown, Heard, & Wagner, 2006) evaluates characteristics relevant to NSSID, such as antecedents and functions of self-injury, this interview focuses on discrete episodes of NSSI rather than patterns of NSSI engagement over time. Likewise, although Nock and colleagues' Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007) includes questions that can inform the evaluation of some of the NSSID criteria and assesses patterns of NSSI engagement more broadly, it was not developed specifically to assess NSSID and focuses more on the topography and functions of NSSI. In contrast, the CANDI was developed specifically to assess the *DSM-5* NSSID criteria and evaluates key features of NSSID (e.g., preoccupation with NSSI that is difficult to control, clinically significant distress, and functional impairment associated with NSSI) that are not assessed by extant measures. Finally, by virtue of their broader focus on self-injury in general (vs. NSSI or NSSID in particular), measures such as the SITBI and SASII assess a number of characteristics and behaviors that are not directly relevant to NSSID, increasing the length and duration of these interviews and interfering with their portability and utility in most clinical settings.

Both the structure of the CANDI and our approach to developing this measure were based on the Clinician-Administered Posttraumatic Stress Disorder Scale (CAPS; Blake et al., 1995), a structured diagnostic interview considered the gold standard in the assessment of posttraumatic stress disorder (PTSD; Elhai, Gray, Kashdan, & Franklin, 2005; Weathers, Keane, & Davidson, 2001). Specifically, consistent with the CAPS (Blake et al., 1995), we based the development of the CANDI on guidelines outlined by Watson and colleagues (Watson, 1990; Watson, Juba, Manifold, Kucala, & Anderson, 1991) for evaluating a diagnostic assessment tool. In particular, we sought to develop a measure of NSSID that would: (1) correspond with current diagnostic criteria, (2) provide both dichotomous and dimensional data for each symptom and the overall disorder, (3) be accessible to and usable by paraprofessionals, and (4) exhibit adequate reliability and validity (Watson, 1990; Watson et al., 1991).

The primary aim of the present study was to examine the reliability, validity, and feasibility of the CANDI and provide information on the clinical characteristics and associated features of *DSM-5* NSSID. To this end, we examined the clinical and diagnostic correlates of NSSID as assessed with the CANDI, including the associations of NSSID with NSSI frequency, severity, versatility (i.e., use of multiple methods of NSSI; Dixon-Gordon, Tull, & Gratz, 2014; Turner, Layden, Butler, & Chapman, 2013), and motives; psychopathology and emotion dysregulation; and psychiatric disorders (including BPD and lifetime mood, anxiety, and substance use disorders). To ensure that the results of this study are relevant to NSSID per se (vs. engagement in NSSI in general), all participants in this study had a history of recent recurrent NSSI (defined as at least 10 lifetime episodes of NSSI, with at least one episode in the past year). We hypothesized that individuals with NSSID (compared to those with a history of recurrent NSSI but no NSSID) would report more frequent, severe, and versatile NSSI behavior, greater emotion dysregulation, more severe symptoms of BPD, depression, anxiety, and stress, and elevated rates of co-occurring psychiatric diagnoses (especially BPD).

Method

Participants

Participants were drawn from a large multisite study of emotion dysregulation and NSSI among young adults. The larger study includes a community sample of young adults with and without NSSI from two sites in Western Canada and the Southern United States. Participants were recruited through advertisements posted online and throughout the community. Inclusion criteria for the larger study included (1) being 18 to 35 years of age and (2) either reporting a history of recent (i.e., past-year) recurrent (i.e., 10 lifetime episodes) NSSI (NSSI group), or reporting no history of NSSI (non-NSSI group). Exclusion criteria for both groups focused on the presence of psychopathology that could influence responding to the study, including current (past 2 weeks) manic, hypomanic, or depressive mood episodes (but not lifetime history of mood disorders), current (past-month) substance dependence, and/or primary psychosis.

Participants in the current study ($N = 107$; 80% female) included only those reporting a history of recent, recurrent NSSI. Participants ranged in age from 18 to 35 years ($M = 23.86 \pm 4.87$) and were ethnically diverse (56% White; 16% Black/African American/Canadian; 11% Asian/Asian American/Canadian). Most participants (71%) were single and reported an annual household income of less than \$30,000. With regard to their highest educational attainment, 23% had completed high school or received a GED, 51% had attended some college or technical school, and 17% had graduated college. Despite being a community sample, 76% of participants reported a history of psychiatric treatment.

Measures

Clinician-Administered Nonsuicidal Self-injury Disorder Index—The format of the CANDI was based largely on the CAPS. Similar to the CAPS (which includes an initial screen for the experience of a potentially traumatic event), the CANDI includes a self-report screening measure of past-year NSSI. This screening measure was based on the Deliberate

Self-Harm Inventory (DSHI; Gratz, 2001) and assesses past-year history of various aspects of NSSI, including frequency and type of NSSI behavior, as well as the number of days on which NSSI occurred. These modifications to the DSHI enable the assessment of Criterion A of NSSID.

In addition to this screening questionnaire, the interview contains semistructured interview questions to verify Criteria A and D, and to assess Criteria B, C, E, and F. Each criterion is initially assessed with a yes/no question to determine the presence/absence of the symptom. Consistent with the recommendations of Watson et al. (1990, 1991), continuous data are also obtained through follow-up questions that assess: (1) how often different motives for NSSI were experienced during the past year (assessed using an 11-point Likert-type scale ranging from 0% to 100%; Criterion B); (2) how often different experiences (e.g., thoughts, emotions) preceded NSSI in the past year (assessed using an 11-point Likert-type scale ranging from 0% to 100%; Criterion C1); (3) the frequency, duration, and intensity (including difficulties resisting thoughts) of preoccupation with NSSI (assessed using 5-point Likert-type scales ranging from 0 to 4, with the exception of frequency, which was assessed continuously as the percentage of time preoccupation with NSSI preceded the behavior; Criterion C2); and (4) the frequency (i.e., number of times in the past day/week/month/year) and intensity of thoughts/urges to engage in NSSI (assessed using 5-point Likert-type scales ranging from 0 to 4; Criterion C3). Items assessing Criteria B and C1 were based on and/or drawn from extant empirically supported measures of the antecedents and functions of NSSI, including the Questionnaire for Non-suicidal Self-injury (QNSSI; Kleindienst et al., 2008) and SASII (Linehan et al., 2006).

Finally, to assess the level of interference and distress associated with NSSI (consistent with Criterion E), we included dimensional ratings of impairment modeled after the CAPS and in-line with suggestions that functional impairment is a multidimensional construct (Bird, 1999). These items assessed NSSI-related interference using 5-point Likert-type scales (0 = *no distress/no adverse impact*; 4 = *extreme, incapacitating distress/extreme impact, little or no functioning*). Also consistent with the CAPS, we included supplementary dimensional ratings (assessed using 5-point Likert-type scales) of global validity, global severity, and global improvement (for use with repeated assessments or to assess changes in the past 6 months).

In addition to providing an NSSID diagnosis, the CANDI provides a continuous score of NSSID severity, derived from the continuous ratings of Criteria B, C, and E.

Diagnostic Interviews—The Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID; First, Spitzer, Gibbon, & Williams, 1996) was used to assess for the exclusion criteria (i.e., current mood episodes, substance dependence, and primary psychosis), as well as lifetime *DSM-IV* Axis I disorders. The Diagnostic Interview for *DSM-IV* Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996) was used to assess for the presence of BPD. Both the SCID and DIPD-IV have demonstrated adequate interrater and test–retest reliability (First et al., 1996; Zanarini et al., 2000). Interviews were conducted by bachelors- or masters-level clinical assessors trained to reliability with study investigators (diagnostic agreement > 88%) and cross-site reliability was good (Landis & Koch, 1977;

Zanarini et al., 2000) for the DIPD-BPD module ($\kappa = 0.64$; diagnostic agreement = 90%) and the SCID ($\kappa = 0.64$, with a median of 0.84; diagnostic agreement = 87%). Specifically, a kappa coefficient of 0.61 to 0.80 is considered to represent “substantial” agreement in the good range (Landis & Koch, 1977; Zanarini et al., 2000).

Self-Report Measures—Characteristics of NSSI were assessed with the DSHI (Gratz, 2001). This 17-item self-report questionnaire assesses lifetime history of various aspects of NSSI, including frequency, duration, and type of NSSI behavior (e.g., cutting, burning, carving). The DSHI demonstrates adequate test–retest reliability and construct, discriminant, and convergent validity in undergraduate, community adult, and patient samples (Fliege et al., 2006; Gratz, 2001; Gratz et al., 2011; Gratz & Tull, 2012). Consistent with past research (Dixon-Gordon et al., 2014; Gratz & Tull, 2012; Turner et al., 2013), an NSSI frequency variable was computed by summing the total number of NSSI episodes reported, an NSSI versatility index was computed by summing the number of different types of NSSI behaviors (Turner et al., 2013), and a dichotomous NSSI medical severity variable was computed by assigning a “1” to participants who reported a history of medical treatment for NSSI and a “0” to participants who denied any history of medical treatment for NSSI.

Motivations for NSSI were assessed with an English translation (Turner et al., 2012) of the QNSSI (Kleindienst et al., 2008), supplemented with 13 items from the SASII (Linehan et al., 2006). Past factor analytic work using these items has found that the 22 QNSSI and SASII items assessing functions of NSSI yield five reliable subscales: emotion relief, feeling generation, interpersonal communication, interpersonal influence, and self-punishment (Turner et al., 2012). Cronbach’s α ranged from .64 to .88 in this sample.

BPD pathology was assessed using the Personality Assessment Inventory–Borderline Features Scale (PAI-BOR; Morey, 1991). This 24-item self-report questionnaire assesses four domains of BPD features (affective instability, identity problems, negative relationships, and self-harm) and yields both overall and subscale scores. The PAI-BOR is a widely used measure of BPD pathology (Trull, 2001) and has been found to demonstrate strong associations with SCID-II diagnoses of BPD (Jacobo, Blais, Baity, & Harley, 2007). In this study, Cronbach’s $\alpha = .88$ for the overall scale and .68 to .79 for the subscales.

Anxiety, stress, and depression symptom severity were assessed using the Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995), a 21-item self-report questionnaire designed to differentiate between core symptoms of depression, anxiety, and stress. The DASS-21 demonstrates adequate test–retest reliability and good construct and discriminant validity (Lovibond & Lovibond, 1995; Roemer, 2001). In this sample, Cronbach’s α ranged from .77 to .86 for the depression, anxiety, and stress subscales.

Self-reported emotion dysregulation was assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a 36-item self-report measure that assesses individuals’ typical levels of emotion dysregulation across six domains: nonacceptance of negative emotions, difficulties engaging in goal-directed behaviors when distressed, difficulties controlling impulsive behaviors when distressed, limited access to emotion regulation strategies perceived as effective, lack of emotional awareness, and lack

of emotional clarity. The DERS demonstrates good test–retest reliability and construct and predictive validity and is significantly associated with objective measures of emotion regulation (Gratz, Bornovalova, Delany-Brumsey, Nick, & Lejuez, 2007; Gratz & Roemer, 2004; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006; Gratz & Tull, 2010a; Vasilev, Crowell, Beauchaine, Mead, & Gatzke-Kopp, 2009). The overall DERS score was used in this study ($\alpha = .92$).

Procedure

All procedures received prior approval by the institutional review boards of participating institutions. Informed consent was obtained after study procedures had been fully explained to participants. After providing written informed consent, participants completed the diagnostic interviews. Following completion of the interviews, participants completed a series of self-report questionnaires. Participants were reimbursed \$30 for this session.

CANDI Training and Reliability Assessment

Consistent with our goal of developing a measure that is accessible to paraprofessionals and feasible to administer in a variety of clinical and research settings, the CANDI was administered by bachelors- or masters-level clinical assessors. All assessors underwent a brief (30–120 minutes) orientation and training in the use of the CANDI by the study authors, and reliability was assessed throughout the study on a subset of interviews at both sites. More than 10% of the interviews were rated by an independent trained rater to determine interrater reliability.

Data Analysis Plan

Between-site differences in demographic and NSSI characteristics (including rates of NSSID) were examined with a series of *t* tests and chi-square analyses. Interrater reliability of the CANDI was examined within the subset of interviews ($n = 12$) rated by an independent trained rater by calculating percentage of agreement and kappa coefficients for each criterion and the overall diagnosis. Internal consistency of the CANDI was examined by calculating Cronbach's alpha for all items. Differences between individuals with and without NSSID in relevant demographic, clinical, and diagnostic characteristics were examined with a series of *t* tests and chi-square analyses (with follow-up analyses of covariance and logistic regression analyses conducted to examine if the observed differences remain significant when controlling for BPD). Finally, a series of stepwise regression analyses with the NSSID criteria serving as the independent variables and the clinical characteristics serving as the dependent variables were conducted to identify the specific NSSID criteria most strongly associated with the clinical characteristics of interest.

Results

Preliminary Analyses

All continuous variables fell within the acceptable range of normality (i.e., skew < 2.0; Tabachnick & Fidell, 2001), with the exception of lifetime NSSI frequency. Following $\log_{10}$ transformation, the NSSI frequency variable approximated a normal distribution.

Between-Site Differences

Results revealed no significant between-site differences in sample age, $t(103) = 1.33$, $p = .19$, $d = 0.26$, or gender, $\chi^2(1) = 2.74$, $p = .10$, $\phi = -.16$. However, there were site differences in the racial/ethnic composition of the samples, $\chi^2(3) = 39.03$, $p < .001$, $\phi = .61$, with a greater proportion of participants at the Southern United States site identifying as Black/African American and a greater proportion of participants at the Western Canadian site identifying as Asian/Asian Canadian. Furthermore, although results revealed no significant between-site differences in NSSI versatility, $t(104) = 0.77$, $p = .15$, $d = 0.26$, or medical severity, $\chi^2(1) = 0.86$, $p = .35$, $\phi = .09$, there were significant site differences in NSSI frequency, $t(104) = 2.36$, $p = .02$, $d = 0.46$, with participants at the Canadian site reporting greater NSSI frequency than those at the United States site (nontransformed *means* = 445.90 ± 989.86 vs. 299.39 ± 718.25 , respectively). Notably, however, there were no significant differences in rates of NSSID across sites, $\chi^2(1) = 0.52$, $p = .47$, $\phi = -.07$, with 35% of participants at the Canadian site and 42% of participants at the United States site meeting criteria for NSSID. Furthermore, all findings remained the same when controlling for recruitment site in analyses.

CANDI Reliability and Feasibility

The CANDI demonstrated good interrater reliability, with an interrater kappa coefficient of 0.83 for all criteria and the overall diagnosis. Specifically, diagnostic agreement was 100% for Criteria A, B, C, D, and F, and 92% for criterion E ($\kappa = 0.83$). Overall diagnostic agreement was 92% ($\kappa = 0.85$). Internal consistency for the CANDI items was adequate ($\alpha = .71$). Providing support for the feasibility of this measure, the average administration time for the CANDI was 15.2 minutes ($SD = 7.7$), with the vast majority of interviews (i.e., 81%) taking less than 20 minutes to complete.

CANDI Descriptive and Demographic Data

Of the full sample of 107 self-injuring individuals who completed the CANDI, 37% ($n = 40$) met full criteria for NSSID, 77% ($n = 82$) met Criterion A, 79% ($n = 84$) met Criterion B, 81% ($n = 87$) met Criterion C, 91% ($n = 97$) met Criterion D, 41% ($n = 44$) met Criterion E, and 80% ($n = 86$) met Criterion F. There were no significant differences between participants with and without NSSID in demographic characteristics (Table 1).

Associations of NSSID With NSSI Characteristics

The most common NSSI behaviors were generally the same among those with and without NSSID, including cutting (88% and 76%), severe scratching (63% and 68%), carving words (58% and 38%), and needle-sticking (53% and 39%). However, burning was significantly more common among self-injuring adults with versus without NSSID (55% vs. 31%, respectively), $\chi^2(1) = 5.55$, $p = .02$, $\phi = 0.23$.

In terms of lifetime frequency, versatility, and medical severity of NSSI, participants with NSSID reported using a greater number of NSSI methods than those without NSSID (Table 1). Between-group differences in NSSI frequency and medical severity did not reach significance ($ps < .10$). In terms of NSSI-related interference, participants with (vs. without) NSSID received greater severity ratings in terms of overall interference associated with

NSSI, $t(88) = 6.61, p < .001, d = 1.41$, as well as greater impairment in terms of subjective distress, family, work, and social functioning as a result of NSSI, $t(87-88) = 6.06-8.60, ps < .001, ds = 1.29-1.84$.

With regard to self-reported motives for NSSI on the revised QNSSI, participants with NSSID reported significantly higher levels of both emotional relief and feeling generation motives than those without NSSID (see Table 1). There were no significant between-group differences with regard to interpersonal communication, interpersonal influence, or self-punishment motives for NSSI.

Comparable findings were obtained when examining associations with the continuous NSSID severity score (see Table 1), with NSSID severity evidencing significant positive associations with NSSI versatility (but not frequency or medical severity), and emotional relief and feeling generation motives for NSSI (in addition to interpersonal communication and self-punishment motives).

Associations of NSSID With Psychopathology and Emotion Dysregulation

As shown in Table 1, the presence of NSSID was associated with higher levels of emotion dysregulation and all psycho-pathology variables. Specifically, participants with (vs. without) NSSID reported significantly greater emotion dysregulation, depression, anxiety, and stress symptoms, and BPD pathology (both overall and across the specific BPD features of affective instability, identity disturbance, and self-harm). Likewise, the continuous score of NSSID severity evidenced significant positive associations with emotion dysregulation and all psychopathology variables (including all four BPD features; see Table 1).

Associations of NSSID With Psychiatric Diagnoses

Overall, rates of psychiatric disorders were high within this sample of recent recurrent self-injurers, with >79% of participants with and without NSSID reporting a mood disorder and >60% reporting an anxiety disorder (see Table 2 for details). The most common co-occurring diagnoses among those with NSSID were major depressive disorder and BPD. Among participants without NSSID, the most common diagnoses were major depressive disorder and drug dependence. Compared to self-injuring individuals without NSSID, those with NSSID were more likely to meet criteria for BPD, bipolar disorder, PTSD, social anxiety disorder, and alcohol dependence.

Unique Associations of NSSID With Clinical and Diagnostic Characteristics

To examine if the observed associations of NSSID with clinical and diagnostic characteristics remain significant when controlling for BPD, we conducted a series of analyses of covariance and logistic regressions examining the above associations with BPD included as a covariate. All findings reported above remained the same when controlling for BPD, with three exceptions. Specifically, the associations of NSSID with greater depression symptoms and higher rates of PTSD and social anxiety disorder failed to reach significance when BPD was included in the models as a covariate (for depression symptoms: $F(1, 92) = 3.72, p = .057, \eta_p^2 = 0.04$; for PTSD: $OR = 2.59, p = .09$; for social anxiety disorder: $OR = 2.12, p = .11$).

Associations of Specific NSSID Criteria With Clinical Characteristics

Results of the stepwise regression analyses suggest that it is Criterion E that is most strongly associated with the clinical characteristics of interest. Specifically, Criterion E was the only NSSID criterion to emerge as significantly associated with most of the clinical characteristics, with a few exceptions (see Table 3). Namely, only Criterion A was significantly associated with NSSI frequency, only Criterion B was significantly associated with interpersonal communication motives for NSSI, and both Criteria B and C were significantly associated with self-punishment motives for NSSI.

Discussion

Results of the present study provide support for the reliability, validity, and feasibility of the CANDI as a structured diagnostic interview for NSSID. Despite receiving limited training, paraprofessionals were able to reliably administer the CANDI, with excellent diagnostic agreement across independent raters. Given that the poor reliability of NSSID in the *DSM-5* field trials was one of the primary reasons NSSID was relegated to Section 3 of the *DSM-5* (Regier et al., 2013), findings that the CANDI has such high interrater reliability are particularly promising and provide further support for the utility of this diagnostic interview. Likewise, evidence that the CANDI can be reliably administered in approximately 15 to 20 minutes suggests that this measure may be feasible to administer in a variety of clinical and research settings. Although the use of valid and reliable structured diagnostic interviews in clinical practice is imperative for both assessment and treatment planning, these benefits must be balanced with the costs of administering such measures. Given the heavy caseloads and limited time and resources of community clinicians, structured diagnostic interviews are unlikely to be used unless they are relatively brief and can be easily incorporated into an initial intake assessment. Results of this study suggest that the CANDI may be one such measure.

Findings also provide support for the construct validity of the CANDI, as a diagnosis of NSSID on this interview was associated with greater clinical and diagnostic severity on a number of relevant measures as well as greater NSSI versatility (considered a marker of more severe NSSI; Turner et al., 2013). The results of this study also provide further information on (and support for) the NSSID diagnosis. Even with a rigorous comparison group of recent recurrent self-injurers, the presence of an NSSID diagnosis was associated with higher levels of emotion dysregulation and BPD pathology (overall and across the specific domains of affective instability, identity disturbance, and self-harm); greater severity of depression, anxiety, and stress symptoms; and higher rates of BPD, bipolar disorder, PTSD, social anxiety disorder; and alcohol dependence. Furthermore, the majority of these associations remained significant when controlling for BPD (providing evidence for the unique relations of an NSSID diagnosis to emotion dysregulation, psychopathology, and NSSI severity, above and beyond their shared associations with BPD).

With regard to the diagnostic correlates of NSSID, findings that the presence of NSSID was associated with higher rates of BPD, PTSD, and alcohol dependence, in particular, are consistent with past research highlighting the relevance of these disorders to NSSI (Chapman et al., 2006; Gratz & Tull, 2010b). Notably, although the recurrent self-injury

criterion of BPD could inflate the relation of NSSID and BPD in a sample with a range of NSSI (including individuals without NSSI), our use of a sample of recent recurrent self-injurers meant that this particular BPD criterion did not vary between the NSSID and non-NSSID groups. This suggests that the observed relation between BPD and NSSID is due to the non-overlapping criteria of BPD and NSSID rather than greater rates of NSSI in our NSSID versus non-NSSID group. Findings that NSSID is associated with higher rates of social anxiety disorder and bipolar disorder add to the literature on the diagnostic correlates of clinically significant NSSI and suggest the need for further research examining the co-occurrence of these disorders. Nevertheless, results of analyses examining the unique associations of NSSID with other psychiatric diagnoses when controlling for BPD suggest that the relations of NSSID to both PTSD and social anxiety disorder may be due to their shared associations with BPD rather than something unique to NSSID. Further research is needed to identify the diagnostic correlates unique to NSSID.

Findings also suggest that individuals with NSSID may have more serious NSSI histories than recurrently self-injuring individuals who do not meet criteria for NSSID. Specifically, the presence of NSSID was associated with several NSSI characteristics that have been linked to greater clinical severity (e.g., more severe NSSI, greater psychopathology and suicidality, and higher suicide risk), including the use of more NSSI methods and higher levels of intrapersonal (i.e., emotion regulation) motives (vs. interpersonal motives) for NSSI (Klonsky & Glenn, 2009; Nock & Prinstein, 2005; Turner et al., 2013). Moreover, findings that these associations remained significant when controlling for BPD suggest that an NSSID diagnosis may confer unique clinical information about NSSI severity that is not captured by a BPD diagnosis.

The results of this study also provide preliminary evidence for the discriminant validity of the CANDI, particularly with regard to diagnostic correlates. Specifically, NSSID was generally associated with disorders that have been found to be characterized by the combination of high negative emotionality and low constraint/inhibition (e.g., bipolar disorder, substance dependence; Krueger, 1999; Meyer, Johnson, & Winters, 2001) but not disorders associated with high constraint/inhibition (e.g., anxiety disorders; Krueger, 1999). In addition to this general pattern, results suggest the potential importance of examining relations between NSSID and subtypes of other disorders. For example, although social anxiety disorder is often characterized by high inhibition, research has shown that there may be a subtype of social anxiety disorder characterized by greater disinhibition, novelty-seeking, and risk-taking (Kashdan & Hofmann, 2008). Likewise, Miller, Kaloupek, Dillon, and Keane (2004) have provided evidence for both internalizing and externalizing subtypes of PTSD, with the latter characterized by high negative emotionality and low constraint/inhibition. Notably, individuals with an externalizing subtype of PTSD are more likely than those with an internalizing subtype to engage in more impulsive and self-destructive behaviors (see also Thomas et al., 2014). Thus, our observed associations of NSSID with both social anxiety disorder and PTSD may be capturing a shared vulnerability (high negative emotionality, low constraint/inhibition) underlying NSSID and the externalizing subtypes of these disorders.

Finally, this study provides preliminary data on the rate of NSSID among individuals who struggle with NSSI. Specifically, within this sample of recent recurrent self-injurers, 37% met criteria for NSSID. Notably, the NSSID criterion that appeared most useful in distinguishing recent recurrent self-injurers with NSSID from those without NSSID was Criterion E, which assesses the presence of clinically significant distress or impairment. Although most of the NSSID criteria appear to be applicable to the vast majority of individuals who struggle with NSSI (providing limited ability to distinguish among self-injurers), the presence of clinically significant distress or impairment related to NSSI appears to have particular diagnostic significance (consistent with the emphasis on functional impairment throughout the *DSM-5*). Moreover, with only a few exceptions, it was Criterion E (relative to the other NSSID criteria) that evidenced the strongest relations to both NSSI-specific and general clinical severity.

Importantly, although results suggest that the presence of an NSSID diagnosis may identify a subset of self-injurers characterized by greater psychopathology and clinical severity, it is likely that individuals who engage in NSSI experience varying degrees of dysfunction that may be better captured by a dimensional versus categorical approach. Indeed, findings that the continuous NSSID severity score was positively related to all of the clinical characteristics of interest are consistent with this interpretation and highlight the importance of examining the dysfunction and pathology associated with recurrent NSSI among individuals with and without a diagnosis of NSSID. Such research has the potential to further our understanding of NSSID-related pathology and the range of dysfunction associated with NSSI.

Several limitations warrant consideration. First, given the paucity of research on NSSID and its correlates, as well as our modest sample size (and related modest statistical power) and rigorous comparison group, we did not apply an alpha correction for cumulative Type I error in the present study (Tutzauer, 2003). As such, although our findings highlight potential clinical and diagnostic correlates of NSSID in need of further study, it will be important for future research to replicate these findings in larger samples. In addition, it is possible that the relatively higher reliability of the CANDI (vs. the BPD interview) in this study may have influenced findings of the incremental associations of NSSID with relevant constructs above and beyond BPD. Further research examining the unique clinical and diagnostic correlates of NSSID is needed.

Moreover, although our use of a sample of recent recurrent self-injurers allowed us to identify the factors associated with an NSSID diagnosis (vs. the presence of self-injury per se), it prohibits us from speaking to the rates of NSSID in the general community. Future research examining this disorder within general community samples with a range of NSSI is needed to speak to the prevalence of this disorder. Likewise, although most participants in this sample had a psychiatric diagnosis and history of psychiatric treatment, participants were not drawn specifically from a clinical setting. Thus, it is unclear to what extent results of this study are applicable to more severe clinical populations, especially inpatient populations. The extent to which these findings are applicable to other relevant nonclinical or community samples is also unclear. For example, by focusing on only individuals aged 18 to 35 years, no younger adolescents were included in our sample (despite evidence for high

rates of NSSI within this population; see, e.g., Gratz et al., 2012; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007). In addition, although we included a mixed-gender sample, the majority of participants were female, limiting the generalizability of the results to men. Future research examining the validity and reliability of the CANDI in relevant clinical (e.g., psychiatric inpatients, patients with BPD or PTSD) and nonclinical (e.g., community adolescents, young adult men) populations is needed. Research is also needed to examine the correlates and rates of NSSID across development, from adolescence through older adulthood. Such research may help elucidate the course of this disorder and identify the age groups at highest risk for NSSID.

Other limitations pertain to the scope of the validity and reliability data collected in this study. For example, due to the cross-sectional nature of our data, we were not able to examine the predictive validity of the CANDI over time. Given the importance of establishing this type of validity, future studies are needed to examine whether a CANDI NSSID diagnosis predicts later NSSI characteristics (e.g., frequency, versatility, and severity) and NSSI-related impairment. Likewise, evidence in support of the interrater reliability of the CANDI was based on a relatively small subset of the sample (i.e., just over 10%). Although findings of the high interrater reliability of this measure are promising in light of the poor reliability of NSSID in the *DSM-5* field trials (Regier et al., 2013), the reliability of the observed coefficients is unclear and further research examining the interrater reliability of the CANDI across a larger number of independent raters and cases is needed. Finally, although findings provide preliminary evidence that the CANDI is accessible to and can be reliably administered by paraprofessionals, it is important to note that all assessors were trained (albeit briefly) by the investigators and working in the investigators' research laboratories. Therefore, the extent to which this measure can be reliably administered by paraprofessionals in other settings or clinicians in the community remains to be determined.

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References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5. Arlington, VA: American Psychiatric Publishing; 2013.
- Andover MS. Non-suicidal self-injury disorder in a community sample of adults. *Psychiatry Research*. (in press).
- Andover MS, Pepper CM, Ryabchenko KA, Orrico EG, Gibb BE. Self-mutilation and symptoms of depression, anxiety, and borderline personality disorder. *Suicide and Life-Threatening Behavior*. 2005; 35:581–591. [PubMed: 16268774]

- Asarnow JR, Porta G, Spirito A, Emslie G, Clarke G, Wagner KD, Brent DA. Suicide attempts and nonsuicidal self-injury in the treatment of resistant depression in adolescents: Findings from the TORDIA study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2011; 50:772–781. [PubMed: 21784297]
- Bird, HR. The assessment of functional impairment. In: Shaffer, D., Lucas, CP., Richters, JE., editors. *Diagnostic assessment in child and adolescent psychopathology*. New York, NY: Guilford Press; 1999. p. 209–229.
- Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, Keane TM. The development of a clinician-administered PTSD scale. *Journal of Traumatic Stress*. 1995; 8:75–90. [PubMed: 7712061]
- Chapman AL, Gratz KL, Brown MZ. Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*. 2006; 44:371–394. [PubMed: 16446150]
- Dixon-Gordon KL, Tull MT, Gratz KL. Self-injurious behaviors in posttraumatic stress disorder: An examination of potential moderators. *Journal of Affective Disorders*. 2014; 166:359–367. [PubMed: 24981133]
- Dyer KFW, Dorahy MJ, Hamilton G, Corry M, Shannon M, Macsherry A, McElhill B. Anger, aggression, and self-harm in PTSD and complex PTSD. *Journal of Clinical Psychology*. 2009; 65:1099–1114. [PubMed: 19676110]
- Elhai JD, Gray MJ, Kashdan TB, Franklin CL. Which instruments are most commonly used to assess traumatic event exposure and posttraumatic effects? A survey of traumatic stress professionals. *Journal of Traumatic Stress*. 2005; 18:541–545. [PubMed: 16281252]
- Evren C, Dalbudak E, Evren B, Cetin R, Durkaya M. Self-mutilative behaviours in male alcohol-dependent inpatients and relationship with posttraumatic stress disorder. *Psychiatry Research*. 2011; 186:91–96. [PubMed: 20800903]
- First, MB., Spitzer, RL., Gibbon, M., Williams, JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders—Patient Edition (SCID-I/P, Version 2.0)*. New York, NY: New York State Psychiatric Institute; 1996.
- Fliege H, Kocalevent RD, Walter OB, Beck S, Gratz KL, Gutierrez PM, Klapp BF. Three assessment tools for deliberate self-harm and suicide behavior: Evaluation and psychopathological correlates. *Journal of Psychosomatic Research*. 2006; 61:113–121. [PubMed: 16813853]
- Glenn CR, Klonsky ED. Nonsuicidal self-injury disorder: An empirical investigation in adolescent psychiatric patients. *Journal of Clinical Child & Adolescent Psychology*. 2013; 42:496–507. [PubMed: 23682597]
- Gratz KL. Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*. 2001; 23:253–263.
- Gratz KL, Bornovalova MA, Delany-Brumsey A, Nick B, Lejuez CW. A laboratory-based study of the relationship between childhood abuse and experiential avoidance among inner-city substance users: The role of emotional non-acceptance. *Behavior Therapy*. 2007; 38:256–268. [PubMed: 17697851]
- Gratz KL, Breetz A, Tull MT. The moderating role of borderline personality in the relationships between deliberate self-harm and emotion-related factors. *Personality and Mental Health*. 2010; 107:96–107.
- Gratz KL, Hepworth C, Tull MT, Paulson A, Clarke S, Remington B, Lejuez CW. An experimental investigation of emotional willingness and physical pain tolerance in deliberate self-harm: The moderating role of interpersonal distress. *Comprehensive Psychiatry*. 2011; 52:63–74. [PubMed: 21220067]
- Gratz KL, Latzman RD, Young J, Heiden LJ, Damon JD, Hight TL, Tull MT. Deliberate self-harm among community adolescents in an underserved area: Exploring the moderating roles of gender, race, and school-level and association with borderline personality features. *Personality Disorders: Theory, Research, and Treatment*. 2012; 3:39–54.
- Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*. 2004; 26:41–54.

- Gratz KL, Rosenthal MZ, Tull MT, Lejuez CW, Gunderson JG. An experimental investigation of emotion dysregulation in borderline personality disorder. *Journal of Abnormal Psychology*. 2006; 115:850–855. [PubMed: 17100543]
- Gratz, KL., Tull, MT. Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. In: Baer, R., editor. *Assessing mindfulness and acceptance: Illuminating the process of change*. Oakland, CA: New Harbinger; 2010a. p. 105-133.
- Gratz KL, Tull MT. The relationship between emotion dysregulation and deliberate self-harm among inpatients with substance use disorders. *Cognitive Therapy and Research*. 2010b; 34:544–553. [PubMed: 21132101]
- Gratz KL, Tull MT. Exploring the relationship between posttraumatic stress disorder and deliberate self-harm: The moderating roles of borderline and avoidant personality disorders. *Psychiatry Research*. 2012; 199:19–23. [PubMed: 22521897]
- Gunderson JG, Ridolfi ME. Borderline personality disorder. *Annals of the New York Academy of Sciences*. 2006; 932:61–77.
- In-Albon T, Ruf C, Schmid M. Proposed diagnostic criteria for the DSM-5 of nonsuicidal self-injury in female adolescents: Diagnostic and clinical correlates. *Psychiatry*. 2013; 2013:1–12.
- International Society for the Study of Self-injury. Definitional issues surrounding our understanding of self-injury. Conference proceedings from the annual meeting; 2007.
- Jacobo MC, Blais MA, Baity MR, Harley R. Concurrent validity of the Personality Assessment Inventory Borderline scales in patients seeking dialectical behavior therapy. *Journal of Personality Assessment*. 2007; 88:74–80. [PubMed: 17266417]
- Kashdan TB, Hofmann SG. The high-novelty-seeking, impulsive subtype of generalized social anxiety disorder. *Depression and Anxiety*. 2008; 25:535–541. [PubMed: 17935217]
- Kleindienst N, Bohus M, Ludäscher P, Limberger MF, Kuenkele K, Ebner-Priemer UW, Schmahl C. Motives for nonsuicidal self-injury among women with borderline personality disorder. *Journal of Nervous and Mental Disease*. 2008; 196:230–236. [PubMed: 18340259]
- Klonsky ED, Glenn CR. Assessing the functions of non-suicidal self-injury: Psychometric properties of the Inventory of Statements About Self-injury (ISAS). *Journal of Psychopathology and Behavioral Assessment*. 2009; 31:215–219. [PubMed: 29269992]
- Klonsky ED, May AM, Glenn CR. The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology*. 2013; 122:231–237. [PubMed: 23067259]
- Klonsky ED, Olino TM. Identifying clinically distinct subgroups of self-injurers among young adults: A latent class analysis. *Journal of Consulting and Clinical Psychology*. 2008; 76:22–27. [PubMed: 18229979]
- Krueger RF. Personality traits in late adolescence predict mental disorders in early adulthood: A perspective-epidemiological study. *Journal of Personality*. 1999; 67:39–65. [PubMed: 10030020]
- Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977; 33:159–174. [PubMed: 843571]
- Linehan MM, Comtois KA, Brown MZ, Heard HL, Wagner A. Suicide Attempt Self-Injury Interview (SASII): Development, reliability, and validity of a scale to assess suicide attempts and intentional self-injury. *Psychological Assessment*. 2006; 18:303–312. [PubMed: 16953733]
- Lloyd-Richardson EE, Perrine N, Dierker L, Kelley ML. Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine*. 2007; 37:1183–1192. [PubMed: 17349105]
- Lovibond, SH., Lovibond, PF. *Manual for the Depression Anxiety Stress Scales*. 2. Sydney, Australia: Psychology Foundation; 1995.
- Meyer B, Johnson SL, Winters R. Responsiveness to threat and incentive in bipolar disorder: Relations of the BIS/BAS scales with symptoms. *Journal of Psychopathology and Behavioral Assessment*. 2001; 23:133–143. [PubMed: 21765592]
- Miller MW, Kaloupek DG, Dillon AL, Keane TM. Externalizing and internalizing subtypes of combat-related PTSD: A replication and extension using the PSY-5 scales. *Journal of Abnormal Psychology*. 2004; 113:636–645. [PubMed: 15535795]

- Morey, LC. Personality Assessment Inventory: Professional manual. Odessa, FL: Psychological Assessment Resources; 1991.
- Muehlenkamp JJ. Self-injurious behavior as a separate clinical syndrome. *American Journal of Orthopsychiatry*. 2005; 75:324–333. [PubMed: 15839768]
- Nock MK, Holmberg EB, Photos VI, Michel BD. Self-Injurious Thoughts and Behaviors Interview: Development, reliability, and validity in an adolescent sample. *Psychological Assessment*. 2007; 19:309–317. [PubMed: 17845122]
- Nock MK, Joiner TE, Gordon KH, Lloyd-Richardson E, Prinstein MJ. Non-suicidal self-injury among adolescents: diagnostic correlates and relation to suicide attempts. *Psychiatry Research*. 2006; 144:65–72. [PubMed: 16887199]
- Nock MK, Prinstein MJ. Contextual features and behavioral functions of self-mutilation among adolescents. *Journal of Abnormal Psychology*. 2005; 114:140–146. [PubMed: 15709820]
- Paul T, Schroeter K, Dahme B, Nutzinger DO. Self-injurious behavior in women with eating disorders. *American Journal of Psychiatry*. 2002; 159:408–411. [PubMed: 11870004]
- Regier DA, Narrow WE, Clarke DE, Kraemer HC, Kuramoto SJ, Kuhl EA, Kupfer DJ. DSM-5 field trials in the United States and Canada, Part II: Test-retest reliability of selected categorical diagnoses. *American Journal of Psychiatry*. 2013; 170:59–70. [PubMed: 23114666]
- Roemer, L. Measures of anxiety and related constructs. In: Antony, MM, Orsillo, SM., Roemer, L., editors. *Practitioner's guide to empirically based measures of anxiety*. New York, NY: Kluwer Academic/Plenum; 2001. p. 49-83.
- Sacks MB, Flood AM, Dennis MF, Hertzberg MA, Beckham JC. Self-mutilative behaviors in male veterans with posttraumatic stress disorder. *Journal of Psychiatric Research*. 2009; 42:487–494.
- Sansone RA, Levitt JL. Self-harm behaviors among those with eating disorders: An overview. *Eating Disorders*. 2002; 10:205–213. [PubMed: 16864264]
- Selby EA, Bender TW, Gordon KH, Nock MK, Joiner TE. Non-suicidal self-injury (NSSI) disorder: A preliminary study. *Personality Disorders: Theory, Research, and Treatment*. 2012; 3:167–175.
- Shaffer, D., Jacobson, C. Proposal to the DSM-V Childhood Disorder and Mood Disorder Work Groups to include non-suicidal self-injury (NSSI) as a DSM-V disorder. 2009. Retrieved from <http://www.dsm5.org/ProposedRevisionAttachments/APADSM-5NSSIProposal.pdf>
- Shearer SL. Phenomenology of self-injury among inpatient women with borderline personality disorder. *Journal of Nervous and Mental Disease*. 1994; 182:524–526. [PubMed: 8083682]
- Soloff PH, Lis JA, Kelly T, Cornelius J, Ulrich R. Self-mutilation and suicidal behavior in borderline personality disorder. *Journal of Personality Disorders*. 1994; 8:257–267.
- Tabachnick, B., Fidell, L. *Using multivariate statistics*. 5. Boston, MA: Pearson Education/Allyn & Bacon; 2001.
- Thomas KM, Hopwood CJ, Donnellan MB, Wright AG, Sanislow CA, McDevitt-Murphy ME, Morey LC. Personality heterogeneity in PTSD: Distinct temperament and interpersonal typologies. *Psychological Assessment*. 2014; 26:23–34. [PubMed: 24015858]
- Trull TJ. Structural relations between borderline personality disorder features and putative etiological correlates. *Journal of Abnormal Psychology*. 2001; 110:471–481. [PubMed: 11502090]
- Turner BJ, Chapman AL, Layden BK. Intrapersonal and interpersonal functions of non-suicidal self-injury: Associations with emotional and social functioning. *Suicide and Life-Threatening Behaviors*. 2012; 42:36–55.
- Turner BJ, Layden BK, Butler SM, Chapman AL. How often, or how many ways: Clarifying the relationship between non-suicidal self-injury and suicidality. *Archives of Suicide Research*. 2013; 17:397–415. [PubMed: 24224673]
- Tutzauer F. On the sensible application of familywise alpha adjustment. *Human Communication Research*. 2003; 29:455–463.
- Vasilev CA, Crowell SE, Beauchaine TP, Mead HK, Gatzke-Kopp LM. Correspondence between physiological and self-report measures of emotion dysregulation: A longitudinal investigation of youth with and without psychopathology. *Journal of Child Psychology and Psychiatry*. 2009; 50:1357–1364. [PubMed: 19811585]

- Ward A, Bender TW, Gordon KH, Nock MK, Joiner TE, Selby EA. Post-therapy functional impairment as a treatment outcome measure in non-suicidal self-injury disorder using archival data. *Personality and Mental Health*. 2013; 7:69–79. [PubMed: 24343926]
- Watson CG. Psychometric posttraumatic stress disorder measurement techniques: A review. *Psychological Assessment*. 1990; 2:460–469.
- Watson CG, Juba MP, Manifold V, Kucala T, Anderson PED. The PTSD interview: Rationale, description, reliability, and concurrent validity of a DSM-III-based technique. *Journal of Clinical Psychology*. 1991; 47:179–188. [PubMed: 2030122]
- Weathers FW, Keane TM, Davidson JR. Clinician-administered PTSD scale: A review of the first ten years of research. *Depression and Anxiety*. 2001; 13:132–156. [PubMed: 11387733]
- Wilkinson PO, Goodyer I. Non-suicidal self-injury. *European Child & Adolescent Psychiatry*. 2011; 20:103–108. [PubMed: 21222215]
- Wilkinson P, Kelvin R, Roberts C, Dubicka B, Goodyer IM. Clinical and psychosocial predictors of suicide attempts and non-suicidal self-injury in the Adolescent Depression Antidepressants and Psychotherapy Trial (ADAPT). *American Journal of Psychiatry*. 2012; 168:495–501.
- Zanarini, MC., Frankenburg, FR., Sickel, AE., Yong, L. The Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV). Boston, MA: McLean Hospital; 1996.
- Zanarini MC, Skodol AE, Bender D, Dolan R, Sanislow C, Schaefer E, Gunderson JG. The Collaborative Longitudinal Personality Disorders Study: II. Reliability of Axis I and II diagnoses. *Journal of Personality Disorders*. 2000; 14:291–299. [PubMed: 11213787]
- Zetterqvist M, Lundh LG, Dahlström O, Svedin CG. Prevalence and function of non-suicidal self-injury (NSSI) in a community sample of adolescents, using suggested DSM-5 criteria for a potential NSSI disorder. *Journal of Abnormal Child Psychology*. 2013; 41:759–773. [PubMed: 23344701]
- Zlotnick C, Mattia JJ, Zimmerman M. Clinical correlates of self-mutilation in a sample of general psychiatric patients. *Journal of Nervous and Mental Disease*. 1999; 187:296–301. [PubMed: 10348084]

Table 1

Demographic and Clinical Characteristics of Participants With and Without Nonsuicidal Self-Injury Disorder (NSSID) and Correlations of Clinical Characteristics With NSSID Severity.

	<u>NSSID (<i>n</i> = 40)</u>	<u>No NSSID (<i>n</i> = 67)</u>	<u>NSSID vs. No NSSID</u>	<u>Severity</u>
	<i>M</i> (<i>SD</i>) or % (<i>n</i>)	<i>M</i> (<i>SD</i>) or % (<i>n</i>)	Test statistic (effect size)	<i>r</i>
<i>Demographic characteristics</i>				
Age	23.77 (5.37)	23.91 (4.59)	$t(103) = 0.14$ ($d = 0.03$)	
Gender: Female	85.0% (<i>n</i> = 34)	77.6% (<i>n</i> = 52)	$\chi^2(1) = 1.17$ ($\phi = 0.11$)	
Race/ethnicity			$\chi^2(3) = 3.44$ ($\phi_v = 0.18$)	
White	55.0% (<i>n</i> = 22)	56.7% (<i>n</i> = 38)		
Black/African American/Canadian	20.0% (<i>n</i> = 8)	13.4% (<i>n</i> = 9)		
Asian/Asian American/Canadian	25.0% (<i>n</i> = 10)	14.9% (<i>n</i> = 10)		
Other	17.5% (<i>n</i> = 7)	11.9% (<i>n</i> = 8)		
Marital status			$\chi^2(2) = 0.95$ ($\phi_v = 0.10$)	
Single	90.0% (<i>n</i> = 36)	85.1% (<i>n</i> = 57)		
Married	5.0% (<i>n</i> = 2)	7.5% (<i>n</i> = 5)		
Separated/Divorced	2.5% (<i>n</i> = 1)	6.0% (<i>n</i> = 4)		
Highest educational attainment			$\chi^2(3) = 7.20$ ($\phi_v = 0.26$)	
Less than high school	5.0% (<i>n</i> = 2)	3.0% (<i>n</i> = 2)		
High school graduate	35.0% (<i>n</i> = 14)	16.4% (<i>n</i> = 11)		
Some college/technical school	47.5% (<i>n</i> = 19)	53.7% (<i>n</i> = 36)		
College graduate	7.5% (<i>n</i> = 3)	22.4% (<i>n</i> = 15)		
Income			$\chi^2(2) = 4.48$ ($\phi_v = 0.21$)	
< \$20,000	40.0% (<i>n</i> = 16)	52.2% (<i>n</i> = 35)		
\$20,000–\$59,999	25.0% (<i>n</i> = 10)	31.3% (<i>n</i> = 21)		
> \$60,000	25.0% (<i>n</i> = 10)	10.4% (<i>n</i> = 7)		
<i>Clinical characteristics</i>				
NSSI frequency ^a	645.71 (1374.25)	251.55 (392.60)	$t(104) = 1.67$ ($d = 0.33$)	0.14
NSSI versatility	6.45 (2.78)	5.14 (2.69)	$t(104) = 2.41^*$ ($d = 0.47$)	0.38***
Medical attention for NSSI	37.5% (<i>n</i> = 15)	21.2% (<i>n</i> = 14)	$\chi^2(1) = 3.33$ ($\phi = 0.18$)	0.12
NSSI Motives				
Emotional Relief	3.37 (0.96)	2.73 (0.93)	$t(102) = 3.37^{**}$ ($d = 0.67$)	0.37***
Feeling Generation	3.02 (1.20)	2.24 (1.12)	$t(102) = 3.35^{**}$ ($d = 0.66$)	0.39***
Interpersonal Communication	1.98 (1.16)	1.76 (0.94)	$t(102) = 1.10$ ($d = 0.22$)	0.37***
Interpersonal Influence	1.53 (0.81)	1.52 (0.82)	$t(102) = 0.11$ ($d = 0.02$)	0.17
Self-punishment	3.58 (1.02)	3.27 (1.12)	$t(102) = 1.42$ ($d = 0.28$)	0.42***
Emotion dysregulation	109.42 (21.79)	94.26 (23.07)	$t(93) = 3.13^{**}$ ($d = 0.65$)	0.43***
BPD pathology ^b	$T = 76.71$ (13.20)	$T = 67.89$ (11.63)	$t(93) = 3.38^{**}$ ($d = 0.70$)	0.47***
Affective instability	$T = 71.44$ (11.50)	$T = 66.13$ (12.82)	$t(93) = 2.01^*$ ($d = 0.42$)	0.48***
Identity problems	$T = 72.24$ (11.82)	$T = 64.61$ (12.39)	$t(93) = 2.92^{**}$ ($d = 0.61$)	0.35***

	NSSID (<i>n</i> = 40)	No NSSID (<i>n</i> = 67)	NSSID vs. No NSSID	Severity
	<i>M</i> (<i>SD</i>) or % (<i>n</i>)	<i>M</i> (<i>SD</i>) or % (<i>n</i>)	Test statistic (effect size)	<i>r</i>
Negative relationships	<i>T</i> = 70.59 (11.86)	<i>T</i> = 65.67 (11.82)	<i>t</i> (93) = 1.96 (<i>d</i> = 0.41)	0.34**
Self-harm	<i>T</i> = 71.50 (18.42)	<i>T</i> = 59.98 (13.77)	<i>t</i> (93) = 3.16** (<i>d</i> = 0.71)	0.31**
Depression symptoms ^c	18.68 (11.28)	13.99 (9.86)	<i>t</i> (93) = 2.11* (<i>d</i> = 0.44)	0.42***
Anxiety symptoms ^d	15.12 (9.81)	9.31 (7.23)	<i>t</i> (93) = 3.29** (<i>d</i> = 0.68)	0.36**
Stress symptoms ^e	20.65 (10.00)	14.20 (8.04)	<i>t</i> (93) = 6.45** (<i>d</i> = 0.71)	0.42***

Note. Severity = overall NSSID severity; NSSI = nonsuicidal self-injury; BPD = borderline personality disorder.

^aNon-transformed means are presented, but analyses used log-transformed data.

^b*T* scores are presented, but analyses used raw scores.

^cNormal symptoms range from 0–9, mild symptoms from 10 to 13, moderate symptoms from 14 to 20, and severe symptoms from 21 to 27 (Roemer, 2001).

^dNormal symptoms range from 0 to 7, mild symptoms from 8 to 9, moderate symptoms from 10 to 14, and severe symptoms from 15 to 19 (Roemer, 2001).

^eNormal symptoms range from 0 to 14, mild symptoms from 15 to 18, moderate symptoms from 19 to 25, and severe symptoms from 26 to 33 (Roemer, 2001).

**p* < .05.

***p* < .01.

****p* < .001.

Table 2

Psychiatric Diagnoses of Participants With and Without Nonsuicidal Self-injury Disorder (NSSID).

	NSSID (<i>n</i> = 40), % threshold	No NSSID (<i>n</i> = 67), % threshold	$\chi^2(1)$	Effect size (ϕ)
Lifetime mood disorder	87.5%	79.1%	2.42	0.15
Bipolar disorder	20.0%	6.0%	4.95 [*]	0.22
Major depressive disorder	72.5%	71.6%	0.01	0.01
Lifetime anxiety disorder	72.5%	59.7%	1.82	0.13
Panic disorder	27.5%	14.9%	2.51	0.15
Social anxiety disorder	37.5%	19.4%	4.25 [*]	0.20
Obsessive compulsive disorder	25.0%	11.9%	3.05	0.17
Posttraumatic stress disorder	25.0%	10.4%	3.97 [*]	0.19
Generalized anxiety disorder	17.5%	14.9%	0.12	0.03
Lifetime substance use disorder	65.0%	37.0%	7.70 ^{**}	0.27
Alcohol abuse	35.0%	19.4%	3.23	0.17
Alcohol dependence	40.0%	17.9%	6.33 [*]	0.24
Drug abuse	22.5%	17.9%	2.10	0.14
Drug dependence	32.5%	20.9%	2.79	0.16
Borderline personality disorder	45.0%	19.4%	7.98 ^{**}	0.27

^{*}
 $p < .05$.

^{**}
 $p < .01$.

Table 3

Results of Stepwise Regression Analyses Examining Nonsuicidal Self-injury Disorder (NSSID) Criteria in Relation to Clinical Characteristics.

	NSSI characteristics			NSSI motives						Emotion dysregulation and psychopathology					
	Intrapersonal			Interpersonal			Emotion dysreg.			Depression symptoms			Anxiety symptoms		
	Frequency ^a	Versatility	Relief	Generate	Punishment	Communicate	Influence	Emotion dysreg.	BPD pathology	Depression symptoms	Depression symptoms	Depression symptoms	Anxiety symptoms	Anxiety symptoms	Stress symptoms
Model R^2 (Adj R^2)	.14 (.13)	.07 (.06)	.06 (.05)	.07 (.06)	.13 (.11)	.05 (.03)	—	.12 (.10)	.13 (.11)	.05 (.04)	.05 (.04)	.05 (.04)	.12 (.11)	.12 (.11)	.10 (.09)
F	13.73 ***	6.06 *	5.39 *	6.84 *	6.18 **	4.01 *	—	10.00 **	10.98 **	4.41 *	4.41 *	4.41 *	10.90 **	10.90 **	8.98 **
df	(1, 86)	(1, 86)	(1, 86)	(1, 86)	(2, 85)	(1, 86)	(1, 86)	(1, 77)	(1, 77)	(1, 77)	(1, 77)	(1, 77)	(1, 77)	(1, 77)	(1, 77)
NSSID	β	t	β	t	β	t	β	t	β	t	β	t	β	t	t
Criterion A	0.37	3.71 ***	—	—	—	—	—	—	—	—	—	—	—	—	—
Criterion B	—	—	—	—	0.28	2.77 **	0.21	2.00 *	—	—	—	—	—	—	—
Criterion C	—	—	—	—	0.23	2.27 *	—	—	—	—	—	—	—	—	—
Criterion D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Criterion E	—	0.26	2.46 *	0.24	2.32 *	0.27	2.62 *	0.34	3.16 **	0.23	2.03 *	0.35	3.30 **	0.32	3.00 **
Criterion F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Note. NSSI = nonsuicidal self-injury; Relief = Emotional relief motives; Generate = Feeling generation motives; Punishment = Self-punishment motives; Communicate = Interpersonal communication motives; Influence = Interpersonal influence motives; Dysreg. = Dysregulation; BPD = borderline personality disorder.

^aNon-transformed means are presented, but analyses used log-transformed data.

* $p < .05$.

** $p < .01$.

*** $p < .001$.