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Direct and indirect forms of non-suicidal self-injury: Evidence for a distinction

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**Abstract**

Non-suicidal self-injury (NSSI) involves deliberate acts (such as cutting) that directly damage the body but occur without suicidal intent. However, other non-suicidal behaviors that involve people mistreating or abusing themselves but that do not deliberately and directly damage bodily tissue may have much in common with NSSI. Such 'indirect' methods of self-injury might include involvement in abusive relationships, substance abuse, risky or reckless behavior, or eating disordered behavior. Using a community sample ( $N=156$ ) we compared individuals engaging in NSSI ( $n=50$ ), indirect (non-suicidal) self-injurers ( $n=38$ ), and healthy controls ( $n=68$ ) on a range of clinical and personality characteristics. As predicted, non-suicidal self-injurers and indirect self-injurers showed more pathology than healthy controls on all measures. Comparisons of the NSSI and the Indirect self-injury groups revealed no significant differences on measures of dissociation, aggression, impulsivity, self-esteem, negative temperament, depressive symptoms, and borderline personality disorder. However, compared to people who engaged only in indirect forms of self-injury, those who engaged in NSSI were more self-critical, had higher scores on a measure of suicide proneness, and had a history of more suicide attempts. The findings suggest that NSSI and indirect self-injury are best viewed as separate and distinct clinical phenomena.

Key Words = DSM-5, non-suicidal self-injury (NSSI), deliberate self-harm, suicide, borderline personality disorder, self-criticism.

## 1. Introduction

Non-suicidal self-injury (NSSI) involves the direct and deliberate destruction of one's own body tissue in the absence of suicidal intent (Favazza, 1998; Nock et al., 2006). Although still little understood, this form of self-inflicted injurious behavior is now attracting a great deal of theoretical and empirical attention (Hooley, 2008; Prinstein, 2008; Nock, 2009).

Non-suicidal self-injury is estimated to occur in 4 percent of the general adult population, and in approximately 20 percent of adult clinical inpatients (Briere and Gil, 1998; Favazza, 1998; Nock and Prinstein, 2005). Rates of NSSI appear to be even higher in adolescents and young adults, affecting anywhere from 14-21 percent of the general population (Ross and Heath, 2002; Klonsky et al., 2003; Whitlock et al., 2006). Moreover, in samples of adolescent inpatients, rates as high as 40 percent have been reported (Darche, 1990; Hurry, 2000). There is also evidence that the prevalence of NSSI may be increasing (Jacobson and Gould, 2007). Understanding more about the nature and origins of NSSI is thus a priority for researchers and clinicians.

In the current literature 'non-suicidal self-injury' generally refers to highly visible forms of direct self-injury such as cutting or burning. However, from its earliest beginnings, the term 'self-defeating behaviors' has been used to describe a broad spectrum of acts ranging from nail biting to purposive accidents (see Menninger, 1938). Baumeister and Scher (1988) have also defined self-destructive behavior as "any deliberate or intentional behavior that has clear, definitely or probably negative effects on the self or on the self's projects" (p. 3). Recently, some clinicians have expressed concern that the prevailing definition of self-injurious behavior may be too narrow (see Turp, 2002). Certainly, it is not uncommon for clinicians and researchers to use terms such as 'health risk behaviors' or 'self-defeating behaviors' to refer to eating disordered behaviors, substance use, or sexual risk taking. This raises the question of

whether behaviors that involve people mistreating or abusing themselves (but not intentionally altering body tissue) should also be considered as forms of self-injury. An examination of this issue was the focus of the current study.

Indirect self-injurious behavior can be conceptualized as behavior that is clearly damaging to the self but does not involve immediate and deliberate damage to body tissue. Hooley and St. Germain (in press) have further suggested that indirect self-injurious behavior should be clinically significant, repetitive or persistent, represent a source of serious concern for clinicians or family members, and have the potential to lead to marked physical damage over time. The exact limits of indirect self-injury remain a subject for debate. However, substance abuse, eating disordered behavior, continuous engagement in abusive relationships, and engagement in risky or reckless behaviors all clearly fall within this general definition.

Although our current understanding of the relationship between direct and indirect forms of non-suicidal self-injury is limited, the available literature suggests that people who engage in NSSI are also likely to engage in indirect forms of self-injurious behaviors. For example, high rates of co-morbidity between NSSI and substance use are commonly reported (Putnins, 1995; Beutrais et al., 1996; Kessler et al., 1999; Hilt et al., 2008), although not invariably found (Dulit et al., 1994; Soloff et al., 1994). There is also a well-documented link between NSSI and eating disorders (Favazza et al., 1989; Favaro and Santonastaso, 2000; Wonderlich, 2001; Dohm, 2002; Paul, 2002; Sansone and Levitt, 2002; Stein et al., 2004; but see also Zlotnick et al., 1999). Rates of self-injury are also elevated six-fold in people who have been exposed to physical acts of violence or threats to their lives (Berenson et al., 2001). There is also evidence linking risky sexual practices in adolescents with self-injurious behaviors such as cutting (DiClemente et al., 1991; Brown et al., 2005; Brown et al., 2008).

Although indirect self-injurious behaviors may be accepted under a very broad definition of self-injurious behavior, we do not know to what extent those who engage in indirect forms of self-injury have characteristics in common with those who engage in NSSI. To date there has been no specific empirical investigation of this issue. However, several researchers have recommended that NSSI be considered as a distinct clinical syndrome (Favazza and Rosenthal, 1993; Muehlenkamp, 2005; Oquendo et al., 2008). Now NSSI is being considered for inclusion into the DSM-5 (Shaffer & Jacobson, 2009) it is especially important to know to what extent those who engage in NSSI are similar or different from those who engage in indirect self-injury

In the current study we explored this issue using measures of constructs that have previously been found to distinguish people who engage in NSSI from non-self-injuring controls. For example, research has shown that, compared to controls, direct self-injurers report higher levels of trait negative mood, more depression, high levels of impulsivity, and more dissociation (Darche, 1990; Simeon et al., 1992; Guertin et al., 2001; Klonsky et al., 2003). They also have decreased self-esteem (Boudewyn and Liem, 1995; Hawton et al., 2002; Lundh et al., 2007; Claes et al., 2010) and higher levels of aggression (Simeon and Favazza, 2001; Brown and Williams, 2007; Brunner et al., 2007). Increased disinhibition is also found in people with borderline personality disorder (BPD) (see Nigg et al., 2005; Coffey et al., 2010). Because NSSI is a symptom of BPD, we expected that individuals who engage in NSSI would score significantly higher on all of these measures compared to non-self injuring controls.

Problems with self-regulation and self-control occur in individuals who engage in any form of self-injurious behavior. We did not therefore predict significant differences between the NSSI and Indirect groups on measures of impulsivity, disinhibition, and aggression. Moreover, because symptoms of BPD within the DSM include both NSSI and impulsivity in at least two

areas that are potentially self-damaging (with reckless driving, substance use, and binge eating listed as possible examples) we anticipated that both these groups would score higher than controls on our measure of BPD pathology. We also did not predict any differences between the NSSI and Indirect groups on this measure. Additionally, negative temperament, depression and low self-esteem, while common in those who engage in NSSI, are also characteristic of those involved in abusive relationships (Grant et al., 2004; Matud, 2005; Zlotnick et al., 2006; Pineles et al., 2008), those with disordered eating (Joiner et al., 1997; Thompson et al., 1999; Polivy and Herman, 2002), and those who engage in substance use (Mertens et al., 2003). Accordingly we did not anticipate significant differences between the NSSI and Indirect groups for measures of negative temperament and self-esteem.

We did, however, hypothesize that those in our NSSI group would report higher levels of dissociation than those who engaged only in indirect methods of self-injurious behavior. This prediction was based on literature suggesting a link between dissociation (and frequent pain analgesia) and acts of direct self-injury (Giolas and Sanders, 1992; Russ, 1992; Brodsky et al., 1995; Orbach et al., 1997). Moreover, because those who engage in NSSI have a significantly elevated risk for suicide attempts than those who do not (Nock et al., 2006; Wilkinson et al., 2011), we hypothesized that those in our NSSI group would score significantly higher than indirect self-injurers on a measure of suicide proneness and also report more lifetime suicide attempts. Finally, in light of current thinking about the links between self-criticism and NSSI (see Glassman et al., 2007; Hooley et al., 2010) we predicted that individuals in our NSSI group would score significantly higher than indirect self-injurers on our measure of negative self-construct. For all measures, however, we predicted that the scores of both self-injury groups would be significantly higher than those of the non self-injuring controls.

## 2. Method

### 2.1 Participants

Participants were 156 individuals (109 females; 47 males; mean age 25.2 years ( $SD=9.0$ )) recruited from the local community. The NSSI group consisted of 50 participants (43 females, 7 males; average age = 22.5 years ( $SD=5.6$ )) who reported currently engaging in NSSI, specifically cutting. The mean duration of self-injury in this group was 5.5 years ( $SD=6.0$ ). Additionally, participants in the NSSI group reported a mean age of onset of 16.8 years ( $SD=4.8$ ). A further 38 participants (19 females, 19 males; average age = 29.5 years, ( $SD=10.4$ )) who had never engaged in NSSI but who were currently engaging in indirect forms of self-injury (again without suicidal intent) comprised the Indirect self-injury group. The mean duration of self-injury for this group was 7.2 years ( $SD=6.7$ ). Additionally, participants in the Indirect group reported a mean age of onset of 19.9 years ( $SD=4.7$ ). Finally, 68 participants (47 females, 21 males; average age = 24.8 years ( $SD=9.4$ )) who had never engaged in any form of self-injurious behavior and who had no current Axis I disorder were assigned to the control group. All participants provided written informed consent to a research protocol approved by the Harvard University Committee on the Use of Human Subjects and received remuneration for their participation.

### 2.2 Procedures

Participants were recruited via electronic or printed advertisements. Two different advertisements were used. The NSSI/self-injury advertisement began with the question, “Do you habitually tend to do things or behave in ways that are NOT in your best interests?” This posting flier listed six examples – getting into or staying in abusive relationships, drinking large quantities of alcohol, using illegal drugs, engaging in eating disordered behavior, doing things aggressively or impulsively, and deliberately causing oneself physical harm (e.g., cutting). The



control advertisement began with the question, “Do you generally take good care of yourself?” The posting listed maintaining a healthy lifestyle and generally acting in one’s best interests as examples of this.

Participants who responded to either advertisement were contacted and asked to complete a telephone interview to determine eligibility and group assignment. In this telephone interview, participants were questioned about the specific type, frequency, and severity of the reported self-injurious behavior(s) during a standardized semi-structured interview (see Hooley et al., 2010). This covered content similar to that found in the Self-Injurious Thoughts and Behaviors Interview (SITB: Nock et al., 2007). Participants were also screened for the presence of current Axis I disorders using the SCID (First et al., 1996). To be considered for inclusion, potential self-injuring participants (in addition to having a lifetime history of engagement in NSSI or indirect self-injury) were required to have engaged in this behavior at least once in the past month. Control participants with current Axis I disorders were excluded.

Following the phone screening, eligible participants were scheduled to participate in a single two-hour experimental session. After obtaining informed consent, participants were asked to complete a variety of questionnaire assessments. Data were collected by research assistants blind to the group membership of participants.

### 2.3 Clinical measures

To confirm the information about self-injury that participants provided in the screening interview, we administered the Michigan Alcoholism Screening Test (MAST: Selzer, 1971), the Drug Abuse Screening Test (DAST: Skinner, 1982), the Eating Disorder Examination-Questionnaire (EDEQ: Fairburn and Beglin, 1994), and a modified version of the Self-Harm Inventory (SHI: Sansone et al., 1998).

*Michigan Alcoholism Screening Test (MAST).*

The MAST (Selzer, 1971) is a self-report measure that consists of 24 yes/no questions that relate to current and lifetime problems stemming from excessive alcohol use. The MAST was originally conceptualized as a screening tool, but is also used extensively as a severity index for alcohol abuse and dependence (Zung, 1979; Hotch et al., 1983; Mischke and Venneri, 1987; Harburg et al., 1988). A score of 6 or above on the measure indicates serious difficulties with alcohol use (“problem drinking”). The MAST has been found to have good reliability and concurrent validity (Zung and Charalampous, 1975; Zung, 1978). Additionally the MAST has internal consistency as evidenced by Cronbach’s alphas ranging from 0.83-0.93 (Gibbs, 1983).

*Drug Abuse Screen Test (DAST).*

The DAST (Skinner, 1982) consists of 20 yes/no questions that assess both current and lifetime problems with drug use. The DAST is scored analogously to the MAST, with each item getting a score of 0 (no) or 1 (yes). A score of 11 or above indicates a significant drug problem. The DAST has good internal consistency (0.74 - 0.95) and can discriminate those who abuse alcohol from those who abuse other drugs (Skinner and Goldberg, 1986; Gavin et al., 1989, Yudko et al., 2007).

*Eating Disorder Examination-Questionnaire (EDEQ).*

The EDE-Q (Fairburn and Beglin, 1994) was derived directly from the Eating Disorder Examination interview (Fairburn and Cooper, 1993), a well-validated measure of eating pathology. Respondants rate 22 items using a 7-point frequency (0 = never; 6 = daily) and severity (0 = not at all; 6 = markedly) scale. The internal reliability of the measure is high (Cronbach’s alpha = 0.90; see Peterson et al., 2007). The EDE-Q is widely with adults with

eating disorders and has demonstrated validity in the assessment of adolescents with eating disorders (Binford and LeGrange, 2005).

*Self-Harm Inventory (SHI).*

The SHI (Sansone et al., 1998) is a 22-item self-report measure that explores both current and past self-harm behaviors. Each item asks about a different form of self-injurious behavior (very broadly defined - e.g., scratching, burning, overdose, driving recklessly). We modified the SHI by adding three questions to better assess illegal drug use, abusive relationships, and risky sexual behaviors: “have you ever intentionally, or on purpose... 1) abused street drugs (e.g., marijuana), 2) engaged in sexual activity for material and/or social gain, and 3) engaged in physically abusive relationships”. Additionally, we added the phrase “without intending to kill yourself” to the instructions on the SHI to better delineate between suicidal and non-suicidal self-injury. The total score is generated by summing the item responses. Higher scores indicate a history of (or current involvement in) a greater range of self-harming behaviors. The SHI has demonstrated satisfactory convergent validity with self-report measures of borderline personality disorder, clinical depression, and history of child abuse (Sansone et al., 1996; Sansone, et al., 1998; Sansone et al., 1998).

Scores on the following measures served as dependent variables and were the basis from which conclusions about similarities between the two self-injuring groups were drawn.

*Dissociative Experiences Scale-2 (DES-2).*

The DES-2 (Frischholz and Braun, 1990) is a 28-item self-report instrument that measures the frequency of dissociative experiences such as disturbances in memory, cognition, or attention. Participants circle the percentage of time that the described event happens (e.g., “finding oneself in a place and having no idea how one got there”). Each item on the DES-2 is

followed by an analogue scale with numbers ranging from 0% to 100% in multiples of 10. The DES-2 has been shown to have good test-retest and split-half reliability (Bernstein and Putnam, 1986). Additionally, the measure demonstrates good internal consistency (alpha reliability = 0.95) and good construct validity (Frischholz and Braun, 1990; Carlson and Putnam, 1993).

*Self-Rating Scale (SRS).*

The SRS (see Hooley et al., 2010) is an eight item measure that assesses the presence of a ‘defective self’ cognitive schema as well as for beliefs that one deserves to suffer or be punished. The items in the scale describe feelings or situations that directly relate to masochistic ideation, self-directed anger, and feelings of worthlessness. Sample items include: “sometimes I feel completely worthless”, and “others are justified in criticizing me.” The alpha reliability of the SRS is in the range of 0.73 - 0.88 (Glassman et al., 2007; Hooley et al., 2010). The SRS has been shown to discriminate between self-injurers and healthy controls (Hooley et al., 2010). Glassman et al. (2007) have also reported that self-criticism (as measured by the SRS) mediates the relationship between emotional abuse and adolescent engagement in NSSI.

*Beck Depression Inventory-II (BDI-II).*

The BDI-II (Beck et al., 1996) is a 21-item questionnaire that assesses both the presence and severity of symptoms of clinical depression. The BDI-II has excellent internal reliability (alpha = 0.92) among both psychiatric and community samples (Beck et al., 1996; Steer and Clark, 1997; Steer et al., 2000). The BDI-II also has good convergent, discriminant and criterion validity (Beck et al., 1996; Arnau et al., 2001).

*Schedule for Non-adaptive and Adaptive Personality (SNAP).*

The SNAP (Clark, 1993) is a 375-item self-report personality inventory. Within this inventory are items that correspond to 15 different personality traits (the ‘trait and temperament

scales') and items that correspond to 13 personality disorders (the 'diagnostic scales') as defined by the DSM-III-R (APA, 1987). Each scale is comprised of between 15 and 36 true/false items. The SNAP has been shown to be effective in distinguishing between different personality disorders based on both the diagnostic scales and personality profiles incorporating the trait and temperament scales (Morey et al., 2003). The SNAP has also demonstrated adequate internal consistency (Cronbach's alphas for the scales range from 0.71 to 0.92 in both clinical and normal samples), test-retest reliability, and criterion validity (Clark et al., 1993; Melley et al., 2002). In this study, we restricted our focus to 7 subscales that measured constructs especially relevant to the study of self-injury. These were negative temperament, disinhibition, impulsivity, aggression, low self-esteem, suicide proneness, and borderline personality disorder. Details of these subscales are provided below.

*SNAP Temperament Subscale: Negative Temperament (SNAP: NT).* This 28-item subscale assesses a tendency to experience a variety of negative emotions including anxiety, irritability, and anger. Additionally, high scorers on this scale express an over reactivity to daily stresses.

*SNAP Temperament Subscale: Disinhibition (SNAP: DIS).* The 35-item DIS temperament subscale examines whether the respondent tends to behave in an "under controlled versus an over controlled manner (Clark, 1993, p.36)." An individual high in disinhibition tends to pursue stimulating experiences or act on immediate feelings with little thought of ramifications in terms of safety or social responsibility.

*SNAP: Impulsivity Subscale (SNAP: IMP).* The Impulsivity subscale is composed of 19 items that measure the degree to which a respondent feels he/she acts on a momentary basis versus acting only after deliberate thought. Individuals who score high on this subscale tend to respond to their immediate needs and engage in risky or reckless behaviors.

*SNAP: Aggression Subscale (SNAP: AGG).* The Aggression subscale is comprised of 20 items that assess the frequency and intensity of behavioral expressions of anger. Individuals who score high on this scale often have difficulty controlling their anger, are easily provoked, and have a tendency towards revenge and physical fights.

*SNAP Self-Harm Subscale: Low Self Esteem (SNAP: LSE).* The Low Self Esteem subscale of the SNAP contains 7 items. Items on this subscale assess self-loathing and strong self-dissatisfaction. High scorers often endorse not liking themselves.

*Modified SNAP Self-Harm Subscale: Suicide Proneness (SNAP: SUICIP).* Some of the items on the original scale concern NSSI rather than suicidality. We therefore modified the SNAP:SUICIP subscale by eliminating 3 of the 9 items that directly referenced NSSI. Those eliminated items were: “When I get very tense, hurting myself physically somehow calms me down”, “Sometimes I get so upset I feel like hurting myself”, and “I have hurt myself on purpose several times.”

*SNAP Diagnostic Subscale: Borderline Personality Disorder (SNAP: BPD).* The BPD diagnostic scale is comprised of 28 items that correspond to the DSM criteria for borderline personality disorder.

### 3. Results

Group differences were examined using multivariate analyses of covariance (MANCOVA), with gender as a covariate. Univariate analyses of covariance (ANCOVAs) on each dependent variable were conducted as follow-up tests to the MANCOVA. We conducted pair wise comparisons (using a Bonferonni procedure to adjust for multiple comparisons) as post-hoc analyses to the univariate ANCOVAs. Additionally, we used two-tailed tests for all analyses, even when we had a specific a priori hypothesis.

#### 3.1 Demographic characteristics

The groups differed significantly in age,  $F(2,153) = 7.07, P = 0.001$ . Specifically, participants in the Indirect group ( $M = 29.5, SD = 10.4$ ) were significantly older than control participants ( $M = 24.8, SD = 9.4; P = 0.03$ ) and participants in the NSSI group ( $M = 22.5, SD = 5.6; P = 0.001$ ). There were also significantly more females in the NSSI group (43/50; 86% female) compared to the Indirect group (19/38, 50% female), Pearson  $\chi^2(1, n=88) = 13.44, P < 0.001$ . We therefore used gender as a covariate in all of our subsequent analyses. Even though age was not correlated with any of our dependent measures ( $P > 0.1$  in all cases), we also ran all analyses with both age *and* gender as covariates to determine whether the pattern of significance remained the same as with gender as the only covariate.

### 3.2 NSSI and indirect forms of self-injury

Reflecting our recruitment strategy, all participants in the NSSI group were required to be engaging in current NSSI (cutting). By definition, no member of the indirect self-injury group engaged in this behavior. Apart from this difference, however, the two self-injury groups were remarkably similar. Notably, all participants who engaged in NSSI also engaged in at least one form of indirect self-injury (see Table 1). Chi-square analyses revealed that the percentage of non-suicidal self-injurers engaging in eating disordered behavior, abusive relationships, and risky/reckless behavior was not significantly different from the percentage of those engaging in these behaviors in the indirect self-injury group. Substance abuse, however, was more common in the Indirect group than it was in the NSSI group. Also, using only female participants<sup>1</sup>, chi-square analyses indicated that significantly more people in the Indirect group ( $n=9; 47.4\%$ ) engaged in abusive relationships compared to those in the NSSI group ( $n=9; 12.5\%$ ), Pearson  $\chi^2(1, n=62) = 4.470, P = 0.034$ .

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<sup>1</sup> Involvement in abusive relationships was only reported by females

The high rate of indirect self-injury in the NSSI group was also reflected in their score on the SHI (see Table 2 for means and group comparisons). Overall, participants in the NSSI group scored higher on the SHI than participants in the Indirect group did ( $P = 0.037$ ). They also scored significantly higher on the MAST ( $P < 0.001$ ) and the DAST ( $P < 0.005$ ). The NSSI and Indirect groups were comparable with regard to their scores on the EDEQ, however. As expected, mean scores for participants in the control group were significantly lower for all measures than they were for participants in either of the NSSI or Indirect groups (for all comparisons  $P < 0.001$  except EDE-Q, where controls scored significantly lower than indirect self-injurers,  $P = 0.02$ ).

### 3.3 Comparing non-suicidal self-injurers and indirect self-injurers

One-way analyses of covariance (ANCOVAs) revealed that the healthy controls scored significantly lower than both the NSSI and the Indirect groups on all of the clinical measures (see Table 3 for means,  $P < 0.001$  for all comparisons). However, the primary goal of our study was to compare people who engaged in NSSI vs. indirect self-injury. Post-hoc comparisons revealed no significant differences between these two groups for the majority of measures. This was the case for depressive symptoms, as well as for measures of trait negative temperament, depression, aggression, low self-esteem, impulsivity, disinhibition, and borderline personality disorder pathology assessed using the SNAP (all  $P$  values  $> 0.1$ ; see Table 3). Moreover, contrary to prediction, levels of dissociation were also comparable in the NSSI and Indirect groups.

There were, however, several important differences. Compared with participants in the Indirect group, those in the NSSI group were more self-critical (as measured by the Self Rating Scale). They also showed higher levels of suicide proneness and reported more past suicide



attempts. These statistical differences remained even after Bonferroni correction for multiple comparisons.

#### 4. Discussion

People who do things that are self-damaging -- be it cutting, drinking excessively or depriving themselves of food, appear to have much in common. Compared to non self-injuring controls, those who engaged in NSSI *or* indirect forms of self-injury were more impulsive, experienced more problems with negative emotions (negative temperament, depression), had more problems with aggression, tended to be more under-controlled in their behavior (disinhibition) and had lower self-esteem. They also had more dissociative experiences and reported more symptoms of borderline personality disorder than control participants did. However, despite being very different from the controls on all of these measures, there were no significant differences between the NSSI and indirect self-injurers on all of the measures just described.

People in the NSSI group and the Indirect group did differ, however, in two important domains. First, those who engaged in NSSI were much more harshly self-critical than were people who engaged in indirect self-injury. They also had a higher potential for suicide. This was apparent from their scores on the SNAP suicide proneness scale. It was further supported by the higher number of past suicide attempts (frequency count) that individuals in our NSSI group reported.

For all measures, scores of both the NSSI and indirect groups were significantly elevated relative to controls. Furthermore, on all measures, those in the NSSI group scored higher than those in the indirect group (although both groups generally scored in the clinical range). Nonetheless, individuals in the NSSI group consistently reported somewhat higher levels of

psychopathology and impairment than people in the indirect group did, and we were unable to identify any characteristic that was more elevated in people in the indirect group versus the NSSI group.

The clinical differences between members of the NSSI and Indirect groups can also inform our understanding of self-injurious behavior. The finding that those in our NSSI group were significantly more self-critical than indirect self-injurers is especially interesting in light of recent research findings. Hooley and colleagues (2010) have demonstrated that a highly self-critical cognitive style differentiated non-suicidal self-injurers from healthy controls. Moreover, highly negative beliefs about the self were the strongest predictor of how long people were willing to endure experimentally induced pain. The idea that individuals who engage in NSSI may regard suffering and pain as something that they deserve may help researchers understand more about the functions and possible origins of self-injury. People who hold core belief about being bad, flawed or defective may have less resistance to the idea of direct forms of self-injury than people who have self-schemas that are more benign. To the extent that this is true a cognitive style that involves self-hatred may be a risk factor for the development of NSSI because it allows the person to consider options for emotion regulation such as cutting and burning that other people would immediately reject.

Several limitations of this study warrant mention. First, by definition, the indirect self-injury group was heterogeneous in terms of the types of self-injurious behaviors they engaged in (e.g., substance use, eating disordered behavior, abusive relationships, and risky/reckless behavior). People who engage in some of these behaviors may be different from those who engage in others. It is also possible that some indirect methods of self-injury are more similar to NSSI than the findings of our study might suggest. Second, because the vast majority of those in

our NSSI group were female, our results may not generalize to males who engage in NSSI.

Third, the number of participants in the indirect self-injury group was relatively small. This limits the reliability of the data and also precludes meaningful subgroup analysis. Such subgroups may have limited clinical validity however because indirect forms of self-injury often occurred together rather than in isolation. Finally, (and related to this) despite our best efforts, we were unable to recruit a sample of individuals whose *only* form of self-injurious behavior was NSSI. This may reflect clinical reality. It also serves to illustrate the high comorbidity between direct and indirect forms of self-injury.

Overall, our data do not support the idea that NSSI and indirect forms of self-injury might simply reflect interchangeable behaviors. To the contrary, our preliminary findings support current recommendations to conceptualize NSSI as an independent syndrome (Muehlenkamp, 2005; Oquendo et al., 2008). The increased suicide risk that characterizes people who engage in NSSI provides an important reason for preserving a distinction between direct and indirect forms of self-injury. If the conceptualization of self-injurious behavior were to be expanded to include indirect forms of self-injury, researchers and clinicians might be in danger of failing to identify those high-risk individuals who are most self-critical and most at risk for suicide. Broadening the definition of self-injury to include indirect self-injury therefore does not appear to be warranted at the present time.

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Table 1: Prevalence of self-injurious behaviors in the NSSI and Indirect groups

	NSSI Group	Indirect Group	
NSSI	50 (100%)	0 (0%)	Pearson $\chi^2$ (1, $n=88$ ) = 88.00, $P<0.001$
Eating Disordered Behavior	21 (42%)	13 (34.2%)	Pearson $\chi^2$ (1, $n=88$ ) = 0.55, $P=0.46$
Substance Use	25 (50%)	33 (86.8%)	Pearson $\chi^2$ (1, $n=88$ ) = 13.04, $P<0.001$
Abusive Relationships	10 (20%)	9 (23.7%)	Pearson $\chi^2$ (1, $n=88$ ) = 0.17, $P=0.68$
Risky/Reckless Behavior	15 (30%)	18 (47.4%)	Pearson $\chi^2$ (1, $n=88$ ) = 2.78, $P=0.10$

Note. Figures are number of participants who scored above the clinical cutoff on the self-report measure assessing that specific form of self-injury, followed by this number as a percentage in parenthesis. No control participants engaged in any of the subtypes of self-injurious behavior.



Table 2: Types of self-injurious behaviors in the NSSI and Indirect self-injury groups

	Control Group Mean (SD) <i>n</i> =68	NSSI Group Mean (SD) <i>n</i> =50	Indirect Group Mean (SD) <i>n</i> =38	<i>F</i>	<i>df</i>	<i>P</i>
Modified SHI	0.7 (0.8) <sup>a</sup>	10.1 (3.7) <sup>b</sup>	8.6 (3.8) <sup>c</sup>	185.3	2, 153	<0.001
EDE-Q	1.0 (1.6) <sup>a</sup>	2.5(1.8) <sup>b</sup>	2.1 (1.6) <sup>b</sup>	8.21	2, 82	0.001
MAST	0.5 (0.8) <sup>a</sup>	4.0 (4.2) <sup>b</sup>	6.7 (5.2) <sup>c</sup>	40.4	2, 153	<0.001
DAST	0.4 (0.7) <sup>a</sup>	3.8 (4.5) <sup>b</sup>	6.5 (6.0) <sup>c</sup>	31.4	2, 153	<0.001

Note. SHI = Self Harm Inventory; EDE-Q = Eating Disorder Examination, Questionnaire version; MAST = Michigan Alcoholism Screening Test; DAST = Drug Abuse Screening Test.

Figures with different superscripts are significantly different from each other.

Table 3: Comparison of the NSSI, Indirect Self-Injury, and Control Groups

	Control Group Mean (SD) <i>n</i> =68	NSSI Group Mean (SD) <i>n</i> =50	Indirect SIB Group Mean (SD) <i>n</i> =38	<i>F</i>	<i>df</i>	<i>P</i>	<i>NSSI vs. Indirect T, P-value</i>
DES-2	6.90 (5.6) <i>n</i> =66	23.7 (14.6) <i>n</i> =50	18.38 (12.8) <i>n</i> =37	33.9	2, 149	<0.001	1.73, 0.15
BDI-II	3.6 (3.3)	24.7 (11.2)	18.7 (10.6)	97.5	2, 152	<0.001	2.52, 0.07
SNAP: Aggression	2.60 (2.6)	8.12(5.8)	7.50 (5.4)	26.2	2, 152	<0.001	0.51, > 0.9
SNAP: Impulsivity	4.29 (3.2)	9.92 (3.9)	9.74 (4.1)	46.6	2, 152	<0.001	0.21, 0.79
SNAP: Low Self-Esteem	0.31 (0.6)	3.94 (2.5)	3.50 (2.7)	59.3	2, 152	<0.001	0.80, 0.74
SNAP: Negative Temperament	8.35 (5.4)	20.12 (6.2)	17.76 (7.1)	63.3	2, 152	<0.001	1.66, > 0.9
SNAP: Disinhibition	8.60 (4.8)	17.18 (6.1)	17.74 (5.4)	59.6	2, 152	<0.001	0.45, > 0.9
SNAP: Borderline PD	4.30 (2.5)	15.32 (4.9)	13.50 (4.7)	120.0	2, 152	<0.001	1.76, 0.14
SRS	17.8 (6.7)	32.9(11.6)	25.0 (10.1)	36.3	2, 152	<0.001	3.35, 0.002
SNAP: Suicide Proneness (modified)	0.4 (0.6)	6.0 (2.3)	2.6 (2.5)	64.4	2, 152	<0.001	4.63, <0.001
Suicide Attempts*	0.0 (0.0)	0.7 (1.0)	0.2 (0.5)	15.6	2, 152	<0.001	2.68, 0.004

Note. DES-2 = Dissociative Experiences Scale-2; BDI-II = Beck Depression Inventory II; SNAP = Schedule for Non-adaptive and Adaptive Personality; SRS = Self-Rating Scale; SNAP = Schedule for Non-adaptive and Adaptive Personality.

\* = Assumption of homogeneity of variance was violated; Welch F ratio and Games-Howell post-hoc tests are reported. For all analyses, the control group mean is significantly different from both the NSSI group mean and the Indirect group mean ( $P<0.001$  in all cases). Statistic and *P*-values reflecting pair wise comparisons across self-injury groups are noted in the final column.