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Non-suicidal self-injury, attempted suicide, and suicidal intent among psychiatric inpatients☆

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ABSTRACT

Although attempted suicide and non-suicidal self-injury (NSSI) differ in several important ways, a significant number of individuals report histories of both behaviors. The current study further examined the relations between NSSI and attempted suicide among psychiatric inpatients. Self-report questionnaires were administered to 117 psychiatric inpatients at a general hospital ($M = 39.45$ years old, S.D. = 12.84 years, range = 17–73 years). We found that presence and number of NSSI episodes were significantly related to presence and number of suicide attempts. Supporting the importance of NSSI assessment, patients' history of NSSI (presence and frequency) was more strongly associated with history of suicide attempts than were patients' depressive symptoms, hopelessness, and symptoms of borderline personality disorder, and as strongly associated with suicide attempt history as current levels of suicidal ideation. Finally, among patients with a history of suicide attempts, those with an NSSI history reported significantly greater lethal intent for their most severe attempt, and patients' number of prior NSSI episodes was positively correlated with the level of lethal intent associated with their most severe suicide attempt.

1. Introduction

Although both suicide attempts and non-suicidal self-injury (NSSI) fall along a continuum of self-harm behaviors (Walsh, 2006), the behaviors differ from each other in several important ways. By definition, both NSSI and suicide attempts involve intentional harm to oneself but, unlike suicide attempts, NSSI does not involve intent to die. Suicide attempts, therefore, differ from NSSI in suicidal intent and function of the behavior (Muehlenkamp, 2005; Suyemoto, 1998), although the functions of the behaviors may overlap in some instances, such as in escape from distressing feelings (Boergers et al., 1998; Brown et al., 2002; Nock and Prinstein, 2005).

Despite differences between NSSI and attempted suicide (Muehlenkamp, 2005; Suyemoto, 1998), a significant number of individuals with a history of NSSI report past suicide attempts (Jacobson et al., 2008; Langbehn and Pfohl, 1993; Nock et al., 2006), and a history of NSSI has been found to statistically predict history of attempted suicide (Whitlock and Knox, 2007). Research also suggests that individuals with a history of both suicide attempts and NSSI may present a more severe clinical picture than those with suicide attempts alone. For example, individuals with a history of NSSI and suicide attempts exhibit more severe psychopathology (e.g., Guertin et al., 2001; Muehlenkamp and Gutierrez, 2007; Stanley et al., 2001), and greater suicidal ideation (Muehlenkamp and Gutierrez, 2007; Stanley et al., 2001) than those with a history of a suicide attempt alone, and longer history of NSSI and more methods of NSSI are associated with increased rates of suicide attempts among adolescents (Nock et al., 2006).

To the best of our knowledge, there has only been one study investigating the lethality of suicide attempts among individuals with and without NSSI histories. In their study of psychiatric inpatients with cluster B personality disorder diagnoses, Stanley et al. (2001) found that although the medical lethality of the injury sustained during the suicide attempt was similar among individuals with and without a history of NSSI, those with a history of NSSI subjectively rated the lethality of their attempts as lower. Therefore, although the actual lethality of the suicide attempt did not differ between groups, those with a history of NSSI believed their attempts to be less lethal. The authors interpreted these findings as suggesting that a history of NSSI may be associated with an increased risk of death by suicide among inpatients with a cluster B personality disorder, as those with an NSSI history may underestimate the lethality of their attempts (Stanley et al., 2001).

The relationship between suicide attempts and NSSI may be explained in part by Joiner's (2005) theory of attempted and completed suicide. Joiner and colleagues (Joiner, 2005; Van Orden et al., 2005) theorize that serious suicidal behavior requires both the desire and the ability to complete suicide. Although they theorize that the desire for suicide is influenced by perceptions of belongingness and burdensomeness, the

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ability to engage in serious self-injury is hypothesized to be acquired through habituation to physical pain, fear, and emotional pain (Van Orden et al., 2005). This habituation can occur through activities such as repeated suicide attempts, risk-taking behaviors, and vicarious exposure to such behaviors. Consistent with this hypothesis, a history of suicide attempts is a significant risk factor for future suicidal behavior, even when statistically controlling for depressive symptoms, hopelessness, suicidal ideation, and other known predictors of suicide risk (Joiner et al., 2005). Joiner and colleagues hypothesized that NSSI may also serve to habituate an individual to physical and emotional pain and the act of self-injury itself, thereby increasing future risk for death by suicide (Joiner et al., 2005; Van Orden et al., 2005). This theory also suggests that the number of NSSI episodes may be more important for suicide prediction than simply the presence of NSSI, as greater numbers of NSSI episodes would allow more opportunity for habituation and the acquisition of self-injury ability and therefore place the individual at a greater risk for suicide. However, the implications of this theory for the relationship between NSSI and attempted suicide have been little studied beyond the co-occurrence of the behaviors.

Given the implications of Joiner's theory for the relation between NSSI and attempted suicide, the need for continued research in the area is evident. As noted above, only one study has investigated the relations among these co-occurring behaviors and suicide attempt lethality (Stanley et al., 2001), and studies investigating the relation between number of NSSI episodes and suicide attempts have yielded mixed results (Nock et al., 2006; Whitlock and Knox, 2007). Whitlock et al. (2008) found support for three distinct typologies of NSSI, which indicated that individuals classified as high severity NSSI endorsed greater suicidality and frequency of NSSI than those classified as superficial or moderate severity NSSI. Research has not yet investigated the association of NSSI and suicide attempts in relation to established predictors of suicide, such as depressive symptoms, hopelessness, suicidal ideation (Brown et al., 2000), and borderline characteristics (Yen et al., 2003). Although borderline characteristics are important to consider in NSSI research because self-injurious behaviors are a criterion for the disorder, investigators must account for this in their research in order to avoid artificially inflating the relation.

The current study sought to fill these gaps in the literature, as well as to further investigate the relations between NSSI and suicide attempt lethality. First, we examined the concurrence of suicide attempts and NSSI among psychiatric inpatients. Second, we investigated NSSI as a statistical predictor of suicide attempts, including the relative strength of this prediction when compared to other established predictors of suicide attempts. Finally, we investigated the relations among suicidal intent and NSSI among psychiatric inpatients with a history of suicide attempts. In examining these relations, we focused on the presence vs. absence of NSSI and attempted suicide, as well as the frequency of these behaviors. Although the majority of research has focused on the presence vs. absence of NSSI (e.g., Guertin et al., 2001; Jacobson et al., 2008; Muehlenkamp and Gutierrez, 2007), doing so likely results in a heterogeneous group in which individuals with two and two hundred NSSI episodes would be classified together. Our strategy of focusing on both the presence and frequency of NSSI will facilitate comparisons between the current findings and previous research, as well as provide a more detailed examination of the likely heterogeneity in NSSI and suicide attempt frequency among psychiatric inpatients.

2. Methods

2.1. Participants

Participants in this study were recruited from an adult psychiatry unit at a not-for-profit hospital in the Northeastern United States. Patients were excluded from the study if they were cognitively incapable of completing questionnaires (e.g., because of dementia or acute psychotic symptoms) as determined by unit staff. The average length of stay at the time of the assessment was 9.24 days (S.D. = 11.57). One hundred fifty-seven patients were approached to participate in the study; 117 agreed to participate and gave informed consent (75% consent rate). Participants completed questionnaires on the unit and returned them later that day to the researcher. Charts were only reviewed for study participants, and data were not collected for patients who were excluded from the study or did not give consent. The sample ($n = 117$) was 61.5% female and 74.4% Caucasian. Participants ranged in age from 17 to 73 years ($M = 39.45$, S.D. = 12.84). Chart diagnoses were made by the patient's attending psychiatrist on the unit and were as follows: Bipolar Disorder (27.4%); Major Depression (18.0%); Depressive Disorder NOS (8.5%); Schizoaffective Disorder (7.7%); Schizophrenia (6.0%); Psychosis NOS (6.0%); Mood Disorder NOS (4.3%); Adjustment Disorder, Depressive Type (2.6%); Delusional Disorder (1.7%); and Post-Traumatic Stress Disorder (0.9%). Diagnoses were unavailable for 17 (14.5%) patients. Axis II diagnoses were not recorded, but based on the cutoff suggested by Zanarini et al. (2003) for the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; score > 7) to yield the greatest sensitivity and specificity for a diagnosis of BPD, 61.3% of participants were likely to meet criteria for BPD. This sample was representative of the larger psychiatric unit.

2.2. Measures

The Suicidal Behaviors Questionnaire (SBQ; Linehan, 1981) was used to assess suicidal ideation and participants' histories of self-injurious behaviors (suicide attempts and NSSI). Individuals were asked to indicate the number of times they have performed any of 17 self-injurious behaviors, as well as an "other" category, and their level of intent to die at that time. NSSI was operationalized as the number of times the participant has engaged in self-injurious behaviors without intent to die. Number of suicide attempts was defined as number of times the participant engaged in self-injurious behaviors with intent to die. For the purposes of this study, the SBQ was modified by including more options for self-injurious behaviors that are typically included in NSSI research (i.e., Favazza, 1998; Prinstein, 2008), such as scratching, carving, and interfering with wound healing, and by assessing the intent to die for each episode of self-injury. A 23-item suicidal ideation score was also calculated from the SBQ. Studies have shown the SBQ suicidal ideation scale to have high internal reliability and good concurrent validity (for a review, see Brown, 1999). Internal consistency for the suicidal ideation scale was excellent in the current study ($\alpha = 0.97$).

Suicidal intent of participants' previous suicide attempts was assessed using the Suicide Intent Questionnaire (SIQ; Linehan, 1982), a self-report version of the Suicide Intent Scale (Beck et al., 1974). In this study, we focused on the suicidal intent of participants' most severe suicide attempt given evidence that this may be a stronger predictor of future death by suicide than are the characteristics of other attempts (e.g., the most recent; Joiner et al., 2003). For individuals with only one prior attempt, that attempt was considered the most severe. The SIQ consists of two subscales, Planning and Lethal Intent (Mieczkowski et al., 1993). The planning subscale assesses the objective circumstances surrounding the attempt, such as measures taken to avoid discovery and if a suicide note was written. The lethal intent subscale assesses subjective lethality of the attempt, such as attitude towards death at the time and perception of the lethality of the attempt. A number of studies have supported the psychometric characteristics of the SIQ (for a review, see Brown, 1999). Among individuals reporting a history of suicide attempts in the current study, the internal consistency for the planning subscale was moderate ($\alpha = 0.60$) and for the lethal intent subscale good ($\alpha = 0.88$).

The McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003) consists of ten true or false statements that reflect the criteria of borderline personality disorder (Zanarini et al., 1996). The MSI-BPD has shown good sensitivity and specificity (Zanarini et al., 2003). To reduce construct overlap with our assessment of NSSI and suicide attempts, ratings for the self-injury question were not included in calculations of MSI-BPD scores. The internal consistency for the measure in this study was good ($\alpha = 0.80$).

Depressive symptoms were assessed using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996), a 21-item self-report measure. Instructions were modified to assess for depressive symptoms during the week preceding admission to the hospital to account for the symptom fluctuation that often occurs once inpatient treatment begins. Symptoms are rated on a four-point Likert-type scale, with higher scores indicating greater symptom severity. Studies have supported the reliability and validity of the BDI-II in clinical samples (e.g., Beck et al., 1996). In this study, the BDI-II exhibited excellent internal consistency ($\alpha = 0.94$).

Hopelessness was assessed using the Beck Hopelessness Scale (BHS; Beck and Steer, 1993), a self-report questionnaire consisting of twenty true or false statements reflecting positive and negative beliefs about the future. Research has demonstrated the utility of the BHS in the prediction of suicide (Beck et al., 1985) Researchers have reported excellent psychometric properties for the measure (Beck and Steer, 1993). The BHS demonstrated excellent internal consistency in this study ($\alpha = 0.95$).

2.3. Procedure

All patients other than those meeting exclusion criteria were approached by the first author, a researcher outside the unit, and invited to participate in the study. Patients were invited to participate regardless of NSSI or suicide attempt history. Individuals were informed that their responses would be kept confidential, and limits to confidentiality were explained. All participants provided written informed consent

to participate in this study. The participants then completed a series of questionnaires. Participants received no remuneration for their involvement. Procedures were approved by the relevant university and hospital Human Subjects Review Boards.

2.4. Statistical analyses

Chi-square analyses were used to determine the relations between NSSI and suicide attempt histories. Correlations were used to determine the relations between the frequencies of the behaviors. Logistic and linear regressions were used to determine the predictive strength of NSSI for presence and number of suicide attempts. Lastly, *t*-tests and correlations were conducted to determine the relations between NSSI and suicidal intent. NSSI and attempted suicide were analyzed as both dichotomous and continuous variables in order to ascertain the roles of both frequency and history of the behavior, as well as to address some of the consequences associated with the dichotomization of continuous variables, such the loss of information about individual differences (MacCallum et al., 2002). All analyses were performed using SPSS version 17.

3. Results

Nearly two-thirds of the sample (63.2%, $n=74$) reported a history of suicide attempts. The number of lifetime suicide attempts ranged from 0 to 25. Three outliers were excluded from subsequent analyses of number of episodes; the mean number of suicide attempts for the remaining participants was 2.14 (S.D. = 2.76). Nearly half (45.3%, $n=53$) of the sample reported a history of NSSI. The lifetime frequency of NSSI ranged from 0 to over 1000 episodes. Two outliers were excluded from subsequent analyses of frequency; the mean NSSI frequency for the remaining participants was 156.92 (S.D. = 680.81). The most commonly reported method of attempted suicide was overdosing ($n=32$, 45.1%), followed by cutting ($n=13$, 18.3%) and hanging/strangulation ($n=13$, 18.3%). The most commonly reported method of NSSI was cutting ($n=23$, 48.9%), followed by self-hitting ($n=18$, 38.3%) and skin picking ($n=17$, 36.2%).

Because of the skew of the suicide attempt, NSSI, and SBQ Suicidal Ideation variables ($zs=10.25$, 30.05, and 2.11, respectively), inverse and square root transformations were performed on these variables to achieve a normal distribution. The amount of missing data on each variable (%) was as follows: NSSI status (12.8%), suicide attempt status (4.3%), NSSI frequency (18.8%), number of suicide attempts (8.5%), BDI (12.8%), BHS (29.9%), SBQ Suicidal Ideation (35.0%), and MSI-BPD (27.4%). The SIQ was only completed by individuals reporting a history of at least one suicide attempt; the amount of missing data on the SIQ was as follows: SIQ—Planning (29.6%), and SIQ—Lethal Intent (29.6%). We examined whether the data were missing at random in order to justify the use of data imputation methods for estimating missing values (cf. Schafer and Graham, 2002). Specifically, we conducted Little's missing completely at random (MCAR) test (Little and Rubin, 1987), which was non-significant, $\chi^2(73)=68.72$, $P=0.62$. Therefore, maximum likelihood estimates of missing data were computed and used in analyses (see Schafer and Graham, 2002). We note, however, that the pattern of significant findings was virtually identical whether we used estimated data or only focused on patients with complete data.

Our first goal was to examine the co-occurrence of suicide attempts and NSSI in our sample of adult psychiatric inpatients. Patients who reported a history of NSSI were significantly more likely to report a history of attempted suicide than those without an NSSI history (86.8% and 43.8%, respectively), χ^2 (1, $N=117$) = 23.11, $P<0.001$, $\phi=0.44$. Further, patients' reported NSSI frequency was positively correlated with number of suicide attempts, $r=0.41$, $P<0.001$. Correlations among number of self-injury episodes and depressive and BPD symptoms, hopelessness, and current suicidal ideation are included in Table 1.

Our second goal was to determine whether the relation between NSSI history and suicide attempts would be maintained after accounting for the influence of other known correlates of suicide attempt history. NSSI status (yes vs. no) remained significantly related to presence or absence of suicide attempts, $B=2.21$, SE = 0.60, $P<0.001$, OR = 9.13, even after statistically controlling for the influence of depressive symptoms, hopelessness, current suicidal ideation, and symptoms of BPD. The only other significant predictor in the model was participants' current suicidal ideation, $B=0.65$, SE = 0.17, $P<0.001$, OR = 1.91. As presented in Table 2, NSSI status (yes vs. no) also remained statistically related to number of suicide attempts, $t(114)=4.21$, $P<0.001$, $\beta=0.31$, after statistically controlling for the influence of depressive symptoms, hopelessness, current suicidal ideation, and symptoms of BPD. NSSI status accounted for an additional 8.7% of the variance in this model. Again, the only other significant predictor in the model was participants' current suicidal ideation, $t(114)=5.01$, $P<0.001$, $\beta=0.53$. As seen in the table, there was evidence of suppressor effects driven by the high correlations among the depression, borderline, and hopelessness variables. To address this issue, supplemental analyses were conducted in which we examined the association between NSSI and attempted suicide, including each additional variable as covariates in separate analyses. In each of these analyses, regardless of the covariates included, NSSI remained significantly related to attempted suicide.

These results were maintained when frequency of NSSI—rather than presence vs. absence of NSSI—was entered as a predictor, whether attempted suicide was considered as a categorical (presence vs. absence), $B=2.24$, SE = 0.66, $P=0.001$, OR = 9.39, or continuous (number of attempts), $t(114)=3.91$, $P<0.001$, $\beta=0.29$, dependent variable.

Our final goal was to examine the relation between patients' histories of NSSI and the lethal intent and planning of their most severe suicide attempt. Only participants who had reported a previous suicide attempt ($n=74$) were included in these analyses (See Table 3). Among

Table 1
Correlations among history of self-injury and relevant variables.

	1	2	3	4	5	6	7	8
1. SA history	–							
2. NSSI history	0.44***	–						
3. Number of SA	0.86***	0.43***	–					
4. NSSI frequency	0.41***	0.97***	0.41***	–				
5. BDI-II	0.43***	0.28**	0.49***	0.27**	–			
6. BHS	0.28**	0.19*	0.34***	0.17	0.59***	–		
7. SBQ-SI	0.52***	0.23**	0.58***	0.23*	0.64***	0.68***	–	
8. MSI-BPD	0.22*	0.13	0.23**	0.13	0.51***	0.36***	0.37***	–
Mean			2.14	156.92	30.79	9.41	27.33	5.88
S.D.			2.76	680.81	13.63	6.14	23.14	2.28

SA = suicide attempt. NSSI = non-suicidal self-injury. BDI-II = Beck Depression Inventory-II. BHS = Beck Hopelessness Scale. SBQ-SI = Suicidal Behaviors Questionnaire-suicidal ideation scale. MSI-BPD = McLean Screening Inventory for Borderline Personality Disorder.
* $P<0.05$.
** $P<0.01$.
*** $P<0.001$.

Table 2
Summary of hierarchical regression analyses predicting number of suicide attempts.

	B	SE *B*	*β*	*pr*
BDI-II	0.01	0.007	0.20	0.49
BHS	−0.03	0.02	−0.18	0.34
MSI-BPD	−0.02	0.04	−0.05	0.23
SBQ-SI	0.22	0.04	0.53***	0.58
NSSI History	0.60	0.14	0.31***	0.44

NSSI = non-suicidal self-injury. BDI-II = Beck Depression Inventory-II. BHS = Beck Hopelessness Scale. SBQ-SI = Suicidal Behaviors Questionnaire-suicidal ideation scale. MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder. To prevent overlap of constructs, the self-injury item was removed for analysis. Overall model: $F(5, 114)=19.18$, $P<0.001$, $R^2=0.47$. Pattern of significant results was consistent after substituting NSSI frequency for NSSI history, and when analyzing variables in a logistic regression predicting history of suicide attempts.
*** $P<0.001$.

Table 3
Group means among patients with a suicide attempt history.

	No NSSI ($n=26$)	NSSI ($n=48$)	df	χ^2/t	Effect size (r_{es})
Sex (% women)	50.0	69.8	1	1.08	0.12
Age (years)	44.00 (12.77)	35.59 (11.59)	72	2.87**	0.32
BDI-II	34.64 (14.06)	35.45 (10.45)	72	0.28	0.03
BHS	10.27 (6.51)	11.10 (5.62)	72	0.58	0.07
SBQ-SI	34.76 (24.66)	37.44 (19.60)	72	0.51	0.06
MSI-BPD	5.96 (2.48)	6.52 (1.93)	72	1.07	0.13
SIQ—planning	14.41 (3.08)	16.42 (3.32)	39	1.96	0.30
SIQ—lethal intent	12.94 (3.33)	15.55 (3.32)	45	2.61**	0.36

Unless otherwise specified, values in cells represent means, and values in parentheses represent standard deviations. Chi-square tests were used for tests involving sex and ethnicity; all other analyses were conducted using *t-tests*. BDI-II = Beck Depression Inventory-II. BHS = Beck Hopelessness Scale. SBQ-SI = Suicidal Behaviors Questionnaire-suicidal ideation scale. MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder. To prevent overlap of constructs, the self-injury item was removed for analysis. SIQ—planning = Suicidal Intent Questionnaire, Planning Subscale. SIQ—lethal intent = Suicidal Intent Questionnaire, Lethal Intent Subscale.
** $P<0.01$.

suicide attempters, those with an NSSI history, compared to those without an NSSI history, reported significantly higher scores on the lethal intent subscale of the SIQ, $t(45)=2.61$, $P=0.01$, $r_{es}=0.36$, but not the planning subscale, $t(39)=1.96$, $P=0.06$, $r_{es}=0.30$. We then examined the relations between NSSI frequency and scores on the planning and lethal intent subscales. Significant positive correlations were found between NSSI frequency and the lethal intent subscale, $r=0.39$, $P=0.009$, suggesting that as NSSI frequency increases, lethal intent for suicide attempts also increases. The correlation between NSSI frequency and the planning subscale was non-significant, $r=0.27$, $P=0.09$.

4. Discussion

Despite the significant overlap of NSSI and attempted suicide, few studies have investigated the association between NSSI and nonfatal suicide attempts beyond co-occurrence or the influence of an NSSI history on perceived lethality of suicide attempts. Therefore, this study investigated the relations among NSSI and attempted suicide, including the associations among NSSI history and perceptions of lethal intent and planning for suicide attempts. In our sample of adult psychiatric inpatients, we found that those with an NSSI history were more likely to report a history of suicide attempts than those without an NSSI history, supporting previous findings on the concurrence of self-injurious behaviors (Jacobson et al., 2008; Langbehn and Pfohl, 1993; Nock et al., 2006). Further, as reported by Whitlock and Knox (2007), as patients' reported NSSI frequency increased, the number of suicide attempts increased. It is important to note that Nock et al. (2006) did not find a relationship between NSSI frequency and number of suicide attempts among adolescent inpatients. This may be due to differences between an adolescent and an adult sample or differences in assessment (i.e., number of NSSI injuries vs. number of NSSI episodes, which may consist of multiple injuries per episode), but the conflicting findings warrant further inquiry.

We then investigated the relations between NSSI and attempted suicide considered both categorically (presence vs. absence of history) and continuously (number of injuries). History of NSSI and NSSI frequency were associated with both the presence of attempted suicide and the number of suicide attempts. When compared with established risk factors for attempted suicide (Brown et al., 2000; Yen et al., 2003), NSSI history and frequency predicted attempted suicide as well as current suicidal ideation and more strongly than depression, hopelessness, and borderline personality disorder characteristics. It is important to note that attempted suicide was significantly predicted by the presence of NSSI history independent of NSSI frequency.

Finally, we investigated the relations among NSSI and patients' perceptions of the planning and lethal intent of their suicide attempts. Patients with a history of NSSI reported significantly higher levels of lethal intent for their most severe suicide attempt than those without an NSSI history, suggesting that patients with an NSSI history were more certain that their attempt would lead to death than those without an NSSI history. It is important to note that groups did not differ in depressive symptoms, hopelessness, suicidal ideation, or borderline symptoms. Further, as NSSI frequency increased, scores on the lethal intent subscale also increased, and a non-significant trend for the planning subscale was noted. This is inconsistent with Stanley et al.'s (2001) finding that psychiatric inpatients with a history of NSSI perceived their suicide attempts to be less lethal than those without an NSSI history. However, these findings are consistent with Joiner's (2005) theory, as history of NSSI was associated with greater levels of lethal intent and non-significantly greater levels of planning for the attempt, and increased NSSI frequency was associated with greater levels of lethal intent and non-significantly greater levels of planning. Despite these promising findings, they should be interpreted with caution pending replication given the relatively low number of patients who completed the lethality measure, combined with the scale's relatively low internal consistency in this sample.

Findings from this study add to the growing body of research supporting the co-occurrence of suicide attempts and NSSI in both clinical and nonclinical samples (Jacobson et al., 2008; Langbehn and Pfohl, 1993; Nock et al., 2006). Results also suggest that NSSI is an important factor to consider in suicide risk assessment and is associated with the frequency, lethal intent, and planning of suicidal behavior. High rates of NSSI are reported among adolescent and young adult community samples. Although we do not yet know the extent of generalizability from clinical to nonclinical self-injuring samples, a similar pattern of co-occurrence between NSSI and attempted suicide in nonclinical samples may indicate a strong need for school and community-based prevention programs and assessments that address both attempted suicide and NSSI. These findings support Joiner's (2005) hypothesis that the habituation necessary to die by suicide may be acquired through experience with NSSI. Further research is necessary to continue to investigate the role of NSSI in the habituation process, as well as a study of whether more self-injury episodes is associated with more severe medical lethality in attempted suicide.

This represents one of the first studies examining relations among history and frequency of NSSI and attempted suicide, as well as suicide attempt lethality, and adds to the growing literature on the concurrence of—and relations between—suicide attempts and NSSI in adult psychiatric inpatients. This study also extends previous research on suicidal intent, planning, and lethal intent by utilizing a sample of general psychiatric inpatients and by incorporating frequency of self-injurious behaviors. NSSI frequency was positively correlated with the level of lethal intent reported for patients' most severe suicide attempt, highlighting the potential importance of investigating frequency of self-injury in research. Finally, this study provides preliminary support for Joiner's (Joiner, 2005; Van Orden et al., 2005) hypothesis that NSSI may provide the habituation to self-injury necessary to die by suicide.

NSSI is operationally distinguished from attempted suicide by intent to die (i.e., Silverman et al., 2007). However, some researchers focus instead on the concept of deliberate self-harm (DSH), which includes any intentional self-poisoning or self-injury, regardless of suicidal intent (i.e., Hawton et al., 2007; Madge et al., 2008). Research has demonstrated a high co-occurrence between NSSI and attempted suicide and overlap in certain functions of the behaviors, such as escape from distressing feelings (Boergers et al., 1998; Brown et al., 2002; Nock and Prinstein, 2005). While these similarities may suggest that the concept of DSH is more accurate than the concept of NSSI, research has consistently demonstrated differences between NSSI and attempted suicide that are obscured in the categorization of DSH, such as differences in suicidal intent, perception, function, and chronicity (Muehlenkamp, 2005;

Suyemoto, 1998). Overlap in behaviors, such as the high rate of co-occurrence reported in this study, indicates the need for continued research to clarify the associations between these distinct—yet related—behaviors. Researchers may choose to specifically investigate individuals who engage in NSSI but have not attempted suicide, a group that accounted for approximately 10% of the present sample.

Limitations to the study must be noted. The current study was limited by the lack of a measure of medical lethality for the most severe suicide attempt, although we did assess self-reported lethal intent and planning. Brown et al. (2004) reported that although there is an association between suicidal intent and medical lethality, lethal suicide attempts were more likely to be performed by individuals who had greater suicidal intent and an accurate expectation of attempt lethality. As we did not assess the medical lethality of the attempt, we are limited in our ability to draw conclusions regarding the actual lethality of the attempt or potential differences in findings between the current study and that of Stanley et al. (2001). Future research including medical lethality of the attempt is necessary before any definitive conclusions can be drawn. Other potential limitations of the study include the reliance on patients' retrospective self-reports and the amount of missing data. Although the data was found to be missing completely at random, indicating that there was no pattern to the missing data (i.e., individuals with a history of attempted suicide were not more likely to have missing data), it is important to consider this limitation in the interpretation of these results. Further, the planning subscale of the SIQ had low internal reliability, which may have influenced the findings concerning this subscale. The small effect sizes for analyses of suicidal intent may be a result of this low internal reliability or may be related to the sample size.

The results of this study may hold important implications for the assessment and treatment of individuals with self-injuring behaviors. It is important to recognize that NSSI and attempted suicide commonly co-occur, and increased frequency of one behavior was associated with increased frequency of the other in this sample. Further, increased episodes of NSSI were associated with greater subjective perceptions of lethal intent for a suicide attempt. The current results reinforce the need for clinicians to directly target any form of self-injurious behavior, even when no suicidal intent is present. NSSI is generally a low-lethality, repetitive behavior (Muehlenkamp, 2005), but the current findings suggest that NSSI, particularly when frequent, may increase the risk for suicide attempts. Future longitudinal studies are necessary to investigate the presence and frequency of NSSI as a risk factor for suicide attempts, as well as to provide conclusive support for Joiner's hypothesis (Joiner et al., 2005; Van Orden et al., 2005) that NSSI may provide the habituation to emotional and physical pain necessary to die by suicide. It is imperative that clinicians assess for both suicidal and non-suicidal self-injury, as well as frequency of self-injury, in their patients and address the behaviors that do exist.

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