The DSM-5 Non-suicidal self-injury disorder among incoming college students: Prevalence and associations with 12-month mental disorders and suicidal thoughts and behaviors

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Conflict of interest

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ABSTRACT

Background: Approximately one in five college students report a history of non-suicidal self-injury. However, it is unclear how many students meet criteria for the recently proposed DSM-5 Non-Suicidal Self-Injury-Disorder (NSSI-D). In this study, we used full NSSI-D criteria to identify those students most in need of clinical care.

Methods: Using data from the Leuven College Surveys (n=4,565), we examined the 12-month prevalence of DSM-5 NSSI-D in a large and representative sample of incoming college students. We also explored the optimal frequency threshold as a function of interference in functioning due to NSSI, and examined comorbidity patterns with other 12-month mental disorders (i.e., MDD, Hypomania, GAD, PD and Alcohol dependence) and suicidal thoughts and behaviors (STB).

Results: Twelve-month NSSI-D prevalence was 0.8% and more common among females (1.1%) than males (0.4%). The proposed 5+ diagnostic threshold was confirmed as yielding highest discrimination between threshold and subthreshold cases in terms of distress or disability due to NSSI. A dose-response relationship was observed for NSSI recency-severity (i.e., 12-month NSSI-D, subthreshold 12-month NSSI-D, past NSSI, no history of NSSI) with number of 12-month mental disorders and STB. NSSI-D occurred without comorbid disorders for one in five individuals, and remained associated with severe role impairment when controlling for the number of comorbid disorders.

Conclusions: These findings offer preliminary evidence that DSM-5 NSSI-D is uncommon among incoming college students, but may help improve the deployment of targeted resource allocation to those most in need of services. More work examining the validity of NSSI-D is required.

INTRODUCTION

College entrance often marks the transition between adolescence and young adulthood (Arnett, 2015), a crucial developmental period for the occurrence of mental health problems (Auerbach et al., 2017; Hunt & Eisenberg, 2010; Zivin et al., 2009). Non-suicidal self-injury (NSSI), the intentional destruction of one's body tissue with no intent to die (Nock & Favazza, 2009), including behaviors such as skin cutting, burning and self-battery, is eliciting increased concern on college campuses worldwide. International pooled prevalence estimates indicate ~20% of college students report engaging in any self-injury in their lifetime (Swannell et al., 2014), and 12-month rates range between 2-14% (Serras et al., 2010; Wilcox et al., 2012). NSSI is most often used to escape emotional turmoil (Bentley, Nock & Barlow, 2014), and has been associated with greater risk of subsequent suicidal thoughts and behaviors (STB; Mortier et al., 2017; Hamza &Willoughby, 2016; Whitlock et al., 2013), low levels of help-seeking (Gollust et al., 2008; Whitlock et al., 2011), and poorer academic performance (Kiekens et al., 2016). This has led researchers, clinicians, and policy-makers to argue that clinical services should be offered to college students with a history of NSSI.

However, in a resource-limited environment, addressing NSSI effectively necessitates accurate identification of those students most in need of services. Indeed, there are likely important differences in clinical severity among students who have ever engaged in NSSI. For instance, college students who engage in more frequent and ongoing NSSI may be at greater risk of adverse outcomes than those who have ceased their self-injury, or have only experimented with NSSI once or twice (Hamza & Willoughby, 2014; Kiekens et al., 2017; Whitlock et al., 2008). To better understand NSSI severity and need for services among people who self-injure, the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition* (*DSM-5*) includes Non-Suicidal Self-Injury-Disorder (NSSI-D) as a 'condition requiring further study' (APA, 2013). This newly proposed disorder identifies those with more frequent NSSI (i.e., at least five days in the past year) who experience significant distress or interference in one or more areas of life due to their self-injury. Other diagnostic criteria include presence of a psychological precipitant (e.g., negative feelings), urge that is difficult to control prior to NSSI or frequent thoughts about NSSI, and the expectation that self-injury will provide emotional or cognitive relief, resolve interpersonal difficulties, or lead to positive feelings (APA, 2013).

To date, studies that have examined NSSI-D using full DSM-5 criteria are scarce (see Zetterqvist, 2015), but emerging evidence from epidemiological studies suggests that the prevalence of NSSI-D may be quite low in community samples (less than 1%; Benjet et al., 2017; Plener et al., 2016). However, as no prior study has assessed the full DSM-5 criteria in a representative sample of college students, it remains unclear whether rates are also low in college students, or whether the high rate of NSSI engagement translates to an elevated rate of NSSI-D. The proposed study was designed to address this gap. In addition, more work is needed regarding the diagnostic correlates of NSSI-D. Prior research has shown that NSSI commonly co-occurs with other mental health problems (especially emotional disorders and suicidal thoughts and behaviors [STB]; Benjet et al., 2017; Bentley et al., 2015; Taliaferro & Muehlenkamp, 2015), yet is not pathognomonic of any particular

condition (see Selby et al., 2015). Initial studies among clinical samples confirm the diagnostic heterogeneity of NSSI-D, but also observed that individuals who meet disorder criteria present with a more clinical profile than those not meeting criteria (Glenn & Klonsky, 2013; In-Albon, Ruf, & Schmid, 2013; Washburn, Potthoff, Juzwin, & Styer, 2015). Building upon these findings, we considered comorbidity patterns with other 12-month mental disorders and STB, and explored differences compared to those who engage in NSSI but do not meet criteria (i.e., subthreshold NSSI-D) and those who may once have engaged in, but have subsequently ceased, their self-injury (i.e., past NSSI). This will provide meaningful information about how NSSI-D corresponds to other mental health problems and inform discussions regarding the potential clinical relevance of DSM-5 NSSI-D.

Here, we report data from the Leuven College Surveys (LCS) - part of the World Mental Health International College Student Project (WMH-ICS) - which includes representative samples of college students, surveyed to assess a wide range of mental health outcomes. Our main objectives were to: (1) estimate the 12-month prevalence of *DSM-5* NSSI-D, (2) and examine associations with other 12-month mental disorders (i.e., MDD, Hypomania, GAD, PD and Alcohol dependence) and 12-month STB (i.e., suicide ideation, plan, and attempt). Given debate regarding the clinically meaningful number of NSSI occurrences for diagnosis (Ammerman et al., 2017; Muehlenkamp et al., 2017), we will also explore the association between number of NSSI occurrences in the past year and experience of distress or disability due to NSSI. Finally, to inform discussions about the validity of NSSI-D as a unique mental disorder (Selby et al., 2015), we will test whether NSSI-D is associated with severe role impairment in daily life when controlling comorbid disorders.

METHOD

Procedures and sample

KU Leuven is Belgium's largest university with an enrollment of over 40,000 students. Between 2014 and 2016, all 8,530 freshmen were eligible for inclusion in the study (i.e. *census sampling*). Detailed recruitment strategies of the LCS are described elsewhere (Kiekens et al., 2016). In brief, all eligible students were invited to participate, with non-respondents sent up to seven reminder emails. In total, 4,565 freshmen (56.8% female, M_{age} = 18.3, *SD* = 1.1) completed all relevant sections (Response Rate = 53.5%). All procedures were in accordance with the 1964 Helsinki declaration and its later amendments. The study was approved by the university hospital and by the Belgian commission for the protection of privacy.

Measures
Non-suicidal self-injury. NSSI history was assessed using items from the self-report version of the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007). The original SITBI has strong psychometric properties including good construct validity for NSSI (κ=0.74-1.0) and excellent test-retest reliability for the presence of NSSI (κ=1.0; Nock et al., 2007). The self-report version used in the current study also showed excellent test-retest reliability (κ = 1.0) and external validity (κ = 1.0) in a study designed to compare self-report measures of self-harm (Latimer, Meade, & Tennant,

2013). Respondents were presented with a behavior checklist, including 13 non-suicidal self-injurious behaviors (e.g., cutting or carving skin) and an 'other' category.

Using the SITBI and additional questions that map onto each of the *DSM-5* criteria (see Suppl. Table 1), students were classified as belonging to one of the four following groups: (1) NSSI-D (i.e., those meeting all *DSM-5* criteria), (2) subthreshold NSSI-D (i.e., NSSI in past 12-months without meeting all *DSM-5* criteria required for diagnosis), (3) past NSSI (i.e., NSSI history, but not in past 12-months), or (4) controls (i.e. respondents without prior NSSI). Additional questions assessed age of onset, and medical treatment history for NSSI.

Twelve-month suicidal thoughts and behaviors. STB within the preceding 12 months also were assessed with the self-report version of the SITBI (Nock et al., 2007). STB was conceptualized as a continuum, and included suicide ideation (i.e., having thoughts of killing yourself), suicide plan (i.e., thinking about how you might kill yourself or working out a plan of how to kill yourself), and a suicide attempt (i.e., purposefully hurt yourself with at least some intent to die). Construct validity of the SITBI ranged from substantial to good for STB (κ = 0.48-0.65), with test-retest reliability ranging from good to excellent for the presence of STB (κ = 0.70-1.00; Nock et al., 2007).

Twelve-month mental disorders. The Screening Scales of the Composite International Diagnostic Interview (CIDI-SC; Kessler & Ustün, 2004) were used to assess two 12-month mood disorders (i.e., Major Depressive Disorder, and [Hypo]mania), and two anxiety disorders (Generalized Anxiety Disorder, and Panic Disorder). The CIDI-SC was developed by the WHO to deliver reliable estimates of DSM-IV mental disorder diagnosis, with previous research indicating good concordance for the assessed disorders (AUC = .70-.78) between CIDI-SC and independent clinical diagnoses based on blinded structured clinical interviews (Kessler et al., 2013b). Using the well-validated Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993; DeMartini & Carey, 2012), students with 12-month risk for alcohol dependence were also identified.

Severe role impairment. Role impairment in daily life was assessed with a revised version of the Sheehan Disability Scale from the CIDI (Kessler & Ustün, 2004). This measure asks respondents the extent to which problems with physical or mental health in the past year interfered with home management, quality of work, social life, and close personal relationships. Severe role impairment was defined as a 7 to 10 rating in 1 or more domains (cf. Kessler et al., 2014).

Statistical analyses

To assess the representativeness of our data, a representativeness indicator (R-indicator) was calculated on a broad range of socio-demographic characteristics available for all students in the population: gender, age, nationality, parental financial situation, parental educational level, family composition, secondary school type, and current field of study (Kiekens et al., 2016). R-indicator values range between 0 and 1, with the latter indicating sample data are fully representative with respect to the population characteristics considered (Schouten et al., 2009). Potential residual non-response bias was taken into account using non-response propensity weighting techniques (Lee,

2006). This approach enables us to obtain estimates representative for the full population of incoming students. Prevalence estimates are reported as weighted proportions with associated standard errors. Associations between categorical variables were analyzed using cross-tabulations and the Rao-Scott chi square statistic. Differences between groups on continuous variables were analyzed using ANOVA or Welch F statistic, and Bonferroni or Games-Howell post-hoc tests were performed, as appropriate. Using penalized maximum likelihood estimation (Heinze, 2006), Odds Ratio's (OR) with 95% confidence intervals were estimated to: (1) examine whether NSSI-D captures individuals at increased risk for 12-month mental disorders and STB, (2) assess the optimal threshold for diagnosis (criterion A) as a function of experience of distress or disability due to NSSI (criterion E) using dummy variables for number of NSSI occurrences in the past year, and (3) examine the residual association between NSSI-D and severe role impairment when controlling for the number of comorbid disorders. Analyses were performed with SAS (v9.4) and SPSS (v23).

RESULTS

Sample representativeness
Table 1 shows the characteristics of the sample. An R-indicator of 0.87 was observed, indicating good representativeness of the respondent data based on these characteristics relative to the entire population of college freshmen.

[Table 1 about here]

Prevalence rates and descriptive analyses
Across the sample, 17.7% (SE = 0.6) reported engaging in NSSI at some point in their lifetime and 9.5% (SE = 0.4) reported that they did so in the past 12-months. The three most common forms of self-injury included 'smashing hands or feet against the wall or other objects' (8.7%, SE = 0.4), 'cutting or carving the skin' (6.1%, SE = 0.4), and 'scraping the skin' (5.0%, SE = 0.3). Twelve-month prevalence of past NSSI, subthreshold NSSI-D and NSSI-D were estimated at 8.2% (SE = 0.4), 8.8% (SE = 0.4) and 0.8% (SE = 0.1), respectively. Table 2 presents an overview of NSSI-D criteria endorsed across each group. Prevalence rates of NSSI-D were significantly higher in females (1.1% SE = 0.2) than males (0.4% SE = 0.1, χ^2_{1df} = 6.7, p = .010).

[Table 2 about here]

Individuals with NSSI-D (M = 5.4, SD = 2.6, F_{welch} 2,87 = 31.9 p < .001) utilized more NSSI methods than those with past NSSI (M = 1.9, SD = 1.4, p < .001), or subthreshold NSSI-D (M = 2.3, SD = 1.7, p <.001). Age-of-onset of NSSI (M = 13.8, SD = 3.4) was not significantly different across groups (F_{welch} 2,96 = 0.6 p = .558). Students meeting NSSI-D criteria more often required medical treatment for injuries (22.9%, SE = 7.1), than past or subthreshold cases (5.1-5.6% range, χ^2_{2df} = 17.2, p < .001).

The optimal frequency threshold (Criterion A) as a function of interference (Criterion E)

The currently proposed diagnostic threshold of 5 or more NSSI occurrences in the past year was most strongly associated with NSSI specific interference (OR = 3.1, 95%CI = 1.2-8.1, p = .010; Figure 1). Increasing the diagnostic threshold did not result in higher proportions reporting interference above and beyond the *DSM-5* proposed criteria.

[Figure 1 about here]

Associations with other 12-month mental disorders and suicidal thoughts and behaviors

Table 3 summarizes the associations with other 12-month mental disorders and STB across NSSI categories. Of those with NSSI-D, 80.7% (SE = 6.6) also met criteria for at least one mental disorder in the last 12 months, with more than half having two or more comorbid disorders. Conversely, of those with at least one mental disorder, only 3.3% (SE = 0.6) met criteria for NSSI-D. NSSI-D co-occurred most frequently with 12-month MDD (63.8%, SE = 8.1), but was associated with higher odds of all examined 12-month disorders relative to controls (ORs in the 5.7-46.5 range), past NSSI (ORs in the 3.1-12.8 range), and subthreshold NSSI-D (ORs in the 3.4-6.0 range). Further, more than half of college students with NSSI-D reported 12-month suicide ideation (61.8%, SE = 8.3) and suicide plans (51.6%, SE = 8.5). One in ten students with NSSI-D also reported a suicide attempt in the past 12 months. Meeting NSSI-D criteria was associated with higher odds of STB when compared to controls (ORs in the 36.3-331.9 range), students with past NSSI (ORs in the 12.9-97.8 range), and with subthreshold NSSI-D (ORs in the 4.9-8.5 range).

[Table 3 about here]

Severe role impairment in daily life

Severe role impairment in daily life, as assessed with the Sheehan Disability Scale, was reported by 10.3% (SE = 0.5) of the sample, and was substantially more common among students with (58.9%, SE = 8.3) than without NSSI-D (10.0%, SE = 0.5; χ^2_{1df} = 89.5, p < .001). When controlling for the number of comorbid disorders[1], NSSI-D remained significantly associated with severe role impairment (Table 4).

[Table 4 about here]

DISCUSSION

To the best of our knowledge, this is the first study that uses the full *DSM-5* criteria to provide information about the prevalence and diagnostic correlates of NSSI-D among college students.

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[1] Post-hoc analyses revealed that NSSI-D was also associated with severe role impairment in daily life in the subsample without 12-month mental disorders (OR = 8.6, 95%CI = 1.7-43.5). However, due to low number of cases with NSSI-D in this subsample (n = 7), caution is needed in interpreting these findings.

Several important findings warrant brief comment. First, consistent with recent work among young adults in the general population (Benjet et al., 2017), the proposed *DSM-5* criteria lead to more conservative prevalence estimates when considering severe NSSI. Although approximately one in six reported a history of self-injury, and one in ten reported past year NSSI, only 0.8% met criteria for NSSI-D. Given that most studies focus on lifetime or 12-month NSSI, which does not capture NSSI severity and need for clinical services, this is an important epidemiological finding. This shows that assessment of NSSI-D might help identify realistic proportions – i.e., an estimated 32 individuals out of more than 4,000 incoming students each year in our university - needing specialized care for NSSI. In line with previous studies (Plener et al., 2016; Zetterqvist, 2015), NSSI-D was more common among females.

Second, the proposed 5+ threshold was confirmed as yielding highest discrimination between threshold and subthreshold cases in terms of distress or disability due to NSSI. While this is in line with other work in college students (Ammerman et al., 2017), derived thresholds were higher in clinical samples (Muehlenkamp et al., 2017). However, given the characteristics of such data, empirically derived thresholds can always be assumed to yield higher cutoffs in clinical samples. Arguably, establishing accurate thresholds requires representative population data capturing the full range of NSSI severity. It will be important for future prospective studies to evaluate whether the currently proposed diagnostic accurately predict a more severe course of self-injury.

Third, in line with emerging evidence (Glenn & Klonsky, 2013; In-Albon, et al., 2013; Washburn, et al., 2015), students who meet diagnostic criteria for NSSI-D had a more clinical profile than those not meeting criteria. While this confirms a high level of clinical severity and need for services (Merikangas & Kalaydjian, 2007), it also raises questions regarding the reasons for these high rates of comorbid 12-month mental disorders and STB. One potential explanation may be shared risk factors and etiological pathways (e.g., childhood adversities, internalizing coping strategies, difficulties in emotion-regulation; Bentley et al., 2015; Kiekens et al., 2015; Nock et al., 2009). Such findings would support a unified approach to prevention and treatment. A second possibility is that the presence of one condition increases risk of another. For example, people with mental disorders may use NSSI to regulate strong aversive internal and social experiences (Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Nock & Prinstein, 2004). However, over time, NSSI itself may also lead to significant distress (e.g., feelings of shame; Mahtani, Melvin, & Hasking, 2017) and disability (e.g., social isolation; Stänicke, Haavind, & Gullestad, 2018). Relatedly, theoretical accounts suggest that frequent NSSI may gradually prepare an individual to make a suicide attempt, by building-up an acquired capability for suicide through simultaneously lowering fear of death and heightening pain tolerance (Joiner, 2005; Van Orden et al., 2010; Willoughby, Heffer, & Hamza, 2015). That said, we also found that NSSI-D is not simply a marker of any particular disorder (Selby et al., 2015). Only 3% of people with mental disorders meet diagnostic criteria for NSSI-D, and for a small, but significant, group of young people (approximately 20%), NSSI-D occurred outside the context of a comorbid 12-month mental disorder. Further, our analyses indicated that NSSI-D is related to severe role impairment in daily life, over and above the presence of other debilitating mental disorders. Building upon these findings, future work should consider whether NSSI-D is prospectively associated with

greater risk for adverse outcomes (e.g., college dropout, lower quality of life, higher risk for a suicide attempt) throughout the academic career.

Finally, while findings show that incoming college students with NSSI-D are most in need of clinical interventions, students with ongoing NSSI who do not meet *DSM-5* criteria, and even some with past NSSI behavior, remain at elevated risk for other 12-month mental disorders and STB. This shows that students with infrequent or less severe NSSI should not be overlooked when planning mental health promotion programs. Future research is warranted considering a stepped care approach to responding to self-injury on college campuses. Perhaps, less intensive forms of care (e.g., e-mental health) might be more appropriate to target less severe NSSI; addressing such questions in future research will ultimately inform appropriate resource allocation among the millions of college students who self-injure each year.

Limitations and future directions

Several limitations of the study should be noted. First, the response rate was relatively low (i.e., 53.5%), yielding the possibility of non-response bias that may limit the external validity of our findings. The observed R-indicator suggested a good sociodemographic representativeness of the respondent data and all analyses were non-response propensity weighted; however, this remains a concern. Second, although we used full DSM-5 criteria, it should be noted that we assessed the number of NSSI occurrences in the past year as opposed to the number of days (as stated in Criterion A). Future studies would benefit from using a measure specifically developed to assess NSSI-D (see Victor et al., 2017). Further, we used screeners rather than full diagnostic interviews to assess comorbid 12-month mental disorders. Although these screeners have shown good concordance in clinical reappraisal studies (Kessler et al., 2013a, 2013b), they are not a substitute for in-depth clinical interviews. Therefore, it will be important for future research to examine the consistency of the findings obtained here with those in studies using clinical interviews.

Third, due to the low prevalence of NSSI-D, our analyses of psychiatric comorbidity were restricted to bivariate models. It is therefore likely that some associations are actually effects of other comorbid disorders. Relatedly, we controlled the number of comorbid disorders when examining the association between NSSI-D and severe role impairment in daily life. This assumes that the effect of comorbid mental disorders is additive and independent of disorder type. Future studies with larger sample sizes should relax these constraints in more complex models that also include disorder type and allow for interactions. Fourth, some comorbid mental disorders (e.g., eating disorders, post-traumatic stress disorder and borderline personality disorder) were not included and warrant more research. Borderline personality disorder (BPD) is relevant in this context, as NSSI is included in DSM-5 as a symptom of BPD (APA, 2013). More work is warranted that specifically investigates variation in etiological mechanisms, as well as prognosis and treatment response, of persons with different disorder profiles (e.g., NSSI-D with vs. without comorbid BPD). Studies that conceptualize personality disorders from a dimensional approach, as currently listed in section III of DSM-5 (APA, 2013), will be particularly useful in providing a thorough understanding of

personality traits that may underlie NSSI-D for some individuals, irrespective of whether an actual personality disorder is present. Despite these limitations, the present study adds valuable information to the emerging literature about NSSI-D.

CONCLUSIONS

NSSI prevalence rates are prohibitively high to feasibly offer specialized clinical care to all incoming college students who have engaged in this behavior. Our data suggest that the proposed DSM-5 criteria could help improve the deployment of targeted resource allocation for a small group of incoming college students who engage in frequent, and clinically severe, NSSI that causes distress or disability. These students will often present with a more clinical profile which emphasizes the need for a thorough clinical assessment. We found evidence that the proposed 5+ diagnostic threshold meaningfully distinguishes students who experience distress or disability due to their self-injury, and observed that NSSI-D is associated with severe role impairment in daily life above and beyond number of comorbid mental disorders. While these findings provide preliminary support for the validity and utility of NSSI-D, future studies should advance our understanding of the risk factors, course and potential burden of this newly proposed disorder in order to determine its relative merit for college mental health.

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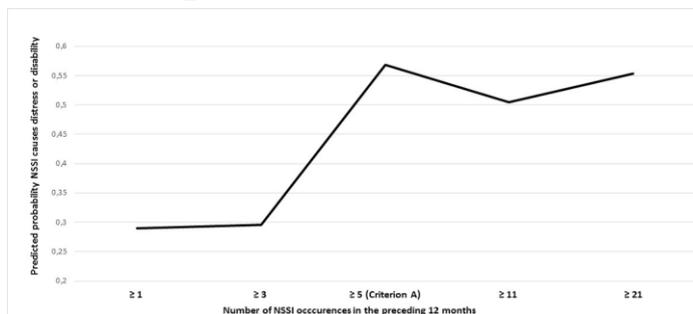
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Figure 1 Associations between number of NSSI occurrences in the preceding 12 months (criterion A) and reported interference due to NSSI (criterion E) among students who self-injured in the past year and meet all other DSM-5 criteria (B, C, D, and F).

TABLES

Table 1.

	% (*w*)	SE
Female Sex	56.8	0.7
Age:		
17 or younger	5.5	0.3
18 years	71.1	0.7
19 years	18.1	0.6
20 years or more	5.3	0.4
Belgian Nationality	95.3	0.3
Parents' Financial Situation Difficult	17.3	0.6
Parental Education:		
Both parents high	62.1	0.7
Only one parent high	22.6	0.6
None of parents high	15.3	0.5
Non-intact Familial Composition	23.3	0.6
University Group Membership:		
Biomedical Sciences	19.3	0.6
Human Sciences	54.6	0.7
Science & Technology	26.1	0.6
General Secondary Education	94.5	0.3

Characteristics of the sample (n = 4,565)

Note: % (*w*) = Weighted percetage, SE = Standard Error

Table 2.

DSM-5 criteria of non-suicidal self-injury disorder among college sample.

		Past NSSI *n(w) = 373* % (SE)	Subthreshold NSSI-D *n(w) = 401* % (SE)	NSSI-D *n(w) = 34* % (SE)
Criterion A:	In the last year, the individual has on 5 or more days in the 12-months engaged in intentional self-inflicted damage to the surface of his or her body without suicidal intent.	0	16.9 (1.9)	100
Criterion B:	The individual engages in the self-injurious behavior with one or more of the following expectations: B1) To relieve negative thoughts or feelings	83.6 (1.9)	74.7 (2.2)	100

	B2) To resolve an interpersonal difficulty		70.2 (2.3)	96.8 (3.2)
	B3) To induce a positive state	74.4 (2.3)	21.1 (2.1)	38.3 (8.3)
		27.3 (2.3)	34.5 (2.4)	66.3 (8.0)
		35.3 (2.5)		
Criterion C:	The intentional self-injury is associated with at least one of the following:	83.5 (1.9)	79.9 (2.0)	100
	C1) Negative thoughts or feelings or interpersonal problems occurring in the period immediately prior to the self-injurious act.	82.3 (2.0)	76.0 (2.2)	100 (0.0)
	C2) Prior to engaging in NSSI, there is a period of preoccupation with NSSI that is difficult to control.		17.5 (1.9)	64.3 (8.2)
	C3) Thinking about self-injury that occurs frequently, even when it is not acted upon.	14.2 (1.8)	15.7 (1.8)	80.7 (7.0)
		2.6 (0.8)		
Criterion D:	The behavior is not socially sanctioned (e.g., part of religious ritual) and is not restricted to picking a scab or nail biting.	98.9 (0.5)	97.5 (0.8)	100%
Criterion E:	The behavior or its consequences cause: clinically significant distress (E1), and/or interference in interpersonal (E2), academic (E3), or other important areas of functioning (E4).	25.3 (2.3)	19.7 (2.0)	100
		13.1 (1.7)	9.7 (1.5)	39.9 (8.3)
		14.9 (1.9)	9.9 (1.5)	65.3 (8.1)
		9.8 (1.6)	7.4 (1.3)	42.3 (8.4)
		13.9 (1.8)	9.8 (1.5)	37.6 (8.3)
Criterion F:	The behavior does not occur exclusively in the context of another syndrome (e.g., substance intoxication) and cannot be explained better by another medical syndrome (e.g., trichotillomania or excoriation disorder).	97.8 (0.8)	96.4 (0.9)	100%

Criteria Met:				
1 or more	100 (0.0)	100 (0.0)	100
2 or more	98.8 (0.6)	98.4 (0.6)	100
3 or more	92.1 (1.4)	90.6 (1.5)	100
4 or more	75.6 (2.2)	71.8 (2.3)	100
5	22.7 (2.2)	24.3 (2.2)	

Note: NSSI = Non-suicidal self-injury NSSI-D = Non-suicidal self-injury disorder.

Table 3. Prevalence rates of other 12-month mental disorders and suicidal thoughts and behaviors and comparisons with non-suicidal self-injury disorder.

	Prevalence rates				Comparisons		
	Controls	Past NSSI	Subthreshold NSSI-D	NSSI-D	Controls vs. NSSI-D	Past NSSI vs. NSSI-D	Subthreshold vs. NSSI-D
	%(*w*) (SE)	%(*w*) (SE)	%(*w*) (SE)	%(*w*) (SE)	OR (95%CI)	OR (95%CI)	OR (95%CI)
12-Month Mental Disorders:							
Major Depressive Disorder	7.1 (0.4)	21.1 (2.1)	33.8 (2.4)	63.8 (8.1)	**22.7** (11.3-45.5)	**6.4** (3.1-13.4)	**3.4** (1.7-6.9)
Broad mania	0.6 (0.1)	1.9 (0.7)	4.2 (1.0)	20.4 (6.9)	**46.5** (18.5-117.1)	**12.8** (4.2-38.9)	**6.0** (2.3-15.6)
Generalized Anxiety Disorder	5.0 (0.4)	17.6 (2.0)	19.5 (2.0)	54.1 (8.5)	**22.1** (11.2-43.6)	**5.5** (2.7-11.1)	**4.8** (2.4-9.8)
Panic Disorder	1.2 (0.2)	5.6 (1.2)	5.8 (1.2)	22.2 (7.0)	**25.0** (10.8-58.2)	**4.9** (2.0-12.2)	**4.8** (1.9-11.7)
Alcohol Dependence	3.4 (0.3)	6.1 (1.3)	5.5 (1.2)	16.1 (6.6)	**5.7** (2.3-14.1)	**3.1** (1.2-8.3)	**3.4** (1.3-9.2)
Any positive screen	13.4 (0.6)	35.5 (2.5)	44.4 (2.5)	80.7 (6.6)	**25.6** (11.2-58.6)	**7.9** (3.1-16.8)	**5.0** (2.1-11.6)
Number of Mental Disorders:							
None	86.6 (0.6)	64.5 (2.5)	55.6 (2.5)	19.3 (6.6)	Ref	Ref	Ref
Exactly 1	10.1 (0.5)	21.9 (2.2)	25.5 (2.2)	19.6 (6.7)	**8.7** (3.1-24.7)	**3.0** (1.0-8.7)	2.2 (0.8-6.4)
Exactly 2	2.8 (0.3)	10.3 (1.6)	15.0 (1.8)	34.4 (8.1)	**53. 2** (20.6-136.8)	**10.7** (4.0-28.7)	**6.4** (2.4-16.8)
3 or more	0.5 (0.1)	3.3 (0.9)	4.0 (1.0)	26.7 (7.6)	**224.8** (76.7-658.4)	**25.6** (8.2-79.7)	**18.6** (6.2-56.1)
χ^2 (*p*-value)					462.6	60.1	45.7 (*p*<.001)

		(*p*<.001)	(*p*<.001)				
12-Month Suicidal Thoughts and Behaviors:							
Suicide Ideation	4.2 (0.3)	10.9 (1.6)	24.3 (2.2)	61.8 (8.3)	**36.3** (18.1-72.9)	**12.9** (6.1-27.4)	**4.9** (2.4-10.1)
Suicide Plan	0.9 (0.2)	3.1 (0.9)	11.0 (1.6)	51.6 (8.5)	**115.9** (55.0-244.1)	**31.6** (13.0-76.3)	**8.5** (4.1-17.7)
Suicide Attempt	0.0 (0.0)	0.0 (0.0)	1.7 (0.7)	10.5 (5.0)	**331.9** (40.5-2719.6)	**97.8** (3.5-2759.2)	**6.9** (1.9-25.8)

Note: Associations shown in bold are significant (*p* < .05). NSSI = Non-suicidal self-injury NSSI-D = Non-suicidal self-injury disorder.

Table 4.

	OR (95%CI)	*p*
NSSI Disorder[a]	2.9 (1.3-6.6)	.010
Number of Comorbid Disorders:		
None	Ref	
Exactly 1	4.9 (3.9-6.3)	.002
Exactly 2	12.4 (9.1-16.8)	<.001
3 or more	40.6 (21.9-75.1)	<.001

Associations with severe role impairment in daily life.

Note: [a] Odds of impairment associated with NSSI disorder after controlling for number of comorbid disorders.