



Classifying nonsuicidal overdoses: Nonsuicidal self-injury, suicide attempts, or neither?



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ABSTRACT

Self-injurious behaviors (SIBs) are leading causes of death and injury. Unfortunately, disagreement regarding whether and how to classify suicidal and nonsuicidal SIBs has contributed to their misclassification, likely hindering clinical care and impeding scientific progress. The present study utilized a data-driven approach to facilitate classification and measurement of three forms of SIBs, with a particular focus on one with scant clinical and scientific attention: nonsuicidal overdoses (i.e. intentional overdoses where the person states that they had no intention of dying from the overdose). Results from this study demonstrated that nonsuicidal overdoses were similar to suicide attempts in terms of age of onset, and similar to nonsuicidal self-injury (NSSI) in terms of suicidal thoughts and desire to die when engaging in these behaviors. Nonsuicidal overdoses were unique from NSSI and suicide attempts in terms of the reported likelihood of dying from the behavior. The present study highlighted that current definitions for nonsuicidal behaviors (including requirements that the person has zero intent to die) may not accurately represent people's intent when engaging in these behaviors. Additionally, the present study highlighted that empirical analysis of SIBs can provide important insights for classification of SIBs.

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1. Introduction

Self-injurious behaviors (SIBs) are leading causes of death and injury. Worldwide, suicide results in more than 800,000 deaths each year (WHO, 2012), and non-fatal suicide attempts result in substantially more injuries and hospitalizations. Self-injury without suicidal intent (nonsuicidal self-injury, or NSSI, such as self-cutting) is even more common, with millions of people engaging in these behaviors each year (e.g., Klonsky, 2011; Lloyd-Richardson et al., 2007; Whitlock et al., 2013). There are many different forms of suicidal and nonsuicidal SIBs. On the surface, the development of a clear SIB taxonomy may seem straightforward because SIBs are observable behaviors (e.g., self-hanging, self-burning, self-cutting, self-poisoning). However, the non-observable aspects of these behaviors (e.g., suicidal intent) have prompted longstanding disagreement about how they are most accurately classified, likely contributing to misclassification in both clinical (Brown et al., 2015) and research settings (Millner et al., 2015; Hom et al., 2015). In particular, researchers often disagree about how to best distinguish between suicidal and nonsuicidal self-injury, with some researchers arguing that such a distinction might not even exist

(e.g., Kapur et al., 2013). Although these disagreements have existed for decades, surprisingly few empirical studies have directly evaluated the differing SIB classification approaches. The primary purpose of the present study was to take a step toward resolving these disagreements by providing direct empirical evidence for how to best classify a particularly controversial SIB: nonsuicidal overdoses.

Intentional self-poisoning, including ingestion of inedible plants and objects, as well as drug and/or alcohol overdose, is the third leading cause of death by suicide (Karch et al., 2010), and non-fatal self-poisoning causes hundreds of thousands of emergency room and hospital visits each year (Albert et al., 2015). Intentional overdosing, a particularly common type of self-poisoning, involves taking an excess (i.e., more than the acknowledged therapeutic dose) of a prescribed, over the counter, or recreational drug (e.g., Madge et al., 2008; Rodham et al., 2004; Schmidtke et al., 1996). People overdose to kill themselves, to lead people to believe they want to kill themselves, or to hurt themselves without any intention of dying. Yet, unlike most other forms of SIBs, nonsuicidal overdoses do not fit into existing SIB categories. They are not classified as suicide attempts, because suicide attempts are defined as potentially harmful behaviors enacted with some non-zero intent to die (e.g., Crosby et al., 2011; De Leo et al., 2006; Nock and Favazza, 2009; O'Carroll et al., 1996; Posner et al., 2007; Silverman et al., 2007). Clearly, this definition excludes overdoses

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enacted without the intent to die. Similarly, popular definitions of NSSI require that the behaviors result in direct tissue damage (e.g., American Psychological Association, 2013; Gratz, 2001; Nock and Favazza, 2009). As a result, non-suicidal overdoses cannot be classified as NSSI either (see Brown et al., 2002; Klonsky and Glenn, 2009 for exceptions). This leads to the questions: what are non-suicidal overdoses and where do they fit in?

To answer this question, it is important to consider that the classification of SIBs as suicidal or non-suicidal is complex. First, there is disagreement regarding whether self-reported intent for an SIB must be exactly zero to be considered non-suicidal, or whether “very minimal” intent should still be classified as non-suicidal (e.g., Brown et al., 2002). This distinction could present difficulties when choosing to classify non-suicidal overdoses as suicidal or non-suicidal, especially when reported intent is ambivalent. Second, relying on self-reported intent could lead SIBs that are clearly nonlethal (e.g., taking three ibuprofen) to be considered a suicide attempt if the person endorses non-zero intent to die from the behavior. This is especially problematic when another person engaging in the exact same behavior reports no intent to die from the small overdose. Third, some people will be motivated to conceal their suicidal intent due to stigma or other considerations (e.g., to avoid inpatient hospitalization; Busch et al., 2003). Given difficulties in self-report, other researchers have argued that intent should be determined implicitly, using objective information about whether a SIB was potentially lethal (e.g., Crosby et al., 2011; Posner et al., 2007). Unfortunately, in some cases this implicit information may contradict someone's self-report, which might have more accurately reflected their actual goal for the behavior. In summary, a variety of factors can influence and potentially distort determinations of intent to die from different SIBs.

Due in part to difficulties distinguishing among SIBs, several researchers (e.g., Kapur et al., 2013) choose to forgo the distinction between suicidal and non-suicidal self-injury and instead combine all SIBs regardless of intent. Using this model, it would be unnecessary to differentiate suicidal and non-suicidal overdoses. However, combining disparate behaviors can obscure important differences, adversely affecting both future research and treatment. Moreover, prior research suggests that suicidal and typical non-suicidal (e.g., cutting) forms of SIBs are distinguishable (e.g., Nock et al., 2009).

Perhaps related to these difficulties, few studies have examined overdoses enacted without suicidal intent. These studies are drawn from research on deliberate self-harm, an umbrella term for all non-lethal self-harm regardless of suicide intent (e.g., Morgan, 1979). Results from these studies show that up to 1/3 of people who engage in SIBs endorse intentionally overdosing without the intent to die (e.g., Bancroft et al., 1979; Madge et al., 2008; Rodham et al., 2004). As with other forms of non-suicidal self-injury, participants from these studies endorsed a variety of motivations for these overdoses including to get relief from pain (Bancroft et al., 1979) and to self-punish (Madge et al., 2008). These few studies highlight that overdosing without suicidal intent is relatively common among people who engage in SIBs, and that these behaviors warrant attention.

More information about non-suicidal overdoses is needed to determine whether these behaviors should be classified as suicide attempts, NSSI, or neither. The goal of the current paper was to test a data-driven approach to aid classification and measurement of non-suicidal overdoses. To accomplish this, we collected data on descriptive characteristics, course, frequency, and suicidal thoughts and intent reported across three different forms of SIBs: NSSI, suicide attempts, and non-suicidal overdoses. We hypothesized that non-suicidal overdoses would more closely resemble NSSI than suicide attempts given that both are reportedly enacted without the intent to die. Additionally, given popular definitions of

NSSI, we hypothesized that there would be minimal thoughts of suicide and intention to die when engaging in NSSI.

2. Methods

2.1. Subjects

Participants were 183 young adults recruited online from web forums related to self-harm and severe psychopathology. Inclusion criteria for this sample included being 18+ years of age and fluent in English. In addition, it included at least one of the following: 5+ episodes of NSSI in the past year; 1+ suicide attempt with at least some intent to die; or 1+ episode of intentional overdosing without wanting to die in the past year.

Participants were primarily young adults ($M=25.16$ years old, $SD=6.78$) who reported female sex (86.8%). Participants identified as Caucasian (81.6%), Asian (5.8%), Black/African American (2.6%), Hispanic/Latino (3.2%), and Other (9%; e.g., Native American, Pacific Islander). Additionally, 71.58% were born in the USA.

2.2. Procedures

We used an identical recruitment technique as in earlier work (e.g., Franklin et al., 2016). Briefly, we joined online forums and posted study advertisements within self-harm and psychopathology related Internet communities. Interested forum members completed a screening questionnaire assessing inclusion criteria and related questions to obscure inclusion criteria. Those who qualified and were interested in participating indicated consent by providing an electronic signature (i.e., typing their first name only) and answering four questions about the consent form to ensure risks and benefits were understood. After completing each of these steps, participants were emailed a link to the assessment described in more detail below. Finally, participants were paid \$10 in Amazon gift cards for their participation. We asked that participants use an email address that did not contain any identifying information (e.g., name, date of birth) to increase their anonymity. Of the 280 forum members who completed the screening questionnaire, 203 (72.5%) qualified for the study and 183 adults participated in the study (90.1%).

Importantly, by approximating anonymity, it was impossible to intervene if someone indicated recent history of some form of self-injurious behavior or a desire to self-injure again in the future. Instead, at several points throughout the study we provided all participants with links to online support and treatment resources, and tips to locate treatment providers near them. Additionally, when participants indicated a recent (i.e., past month) engagement in self-injury of some kind or a desire to self-harm again in the future, we emailed them directly. In this email we mentioned that it seemed like they were going through a hard time right now, and encouraged them to use resources provided (e.g., suicide prevention hotlines) at any point, especially if they did not feel safe. The university institutional review board approved of all study materials, measures, methods, and procedures.

2.3. Questionnaires

2.3.1. Eligibility questionnaire

We created a brief screening questionnaire assessing inclusion criteria (i.e., age, English fluency, and past year history of NSSI, non-suicidal overdoses, and suicide attempts). The survey also included additional questions, such as lifetime presence and frequency of various suicidal thoughts and behaviors.

2.3.2. Demographics

We assessed basic demographic information (e.g., sex, gender, age, ethnicity, sexual orientation).

2.3.3. Self-report suicidal thoughts and behaviors interview (SITBI; Nock et al., 2007)

The SITBI is typically administered as an interview-based measure of self-injurious (i.e., suicidal and nonsuicidal) thoughts and behaviors, assessing the presence, frequency, and characteristics of these thoughts and behaviors. This measure has demonstrated strong test-retest reliability (average $K=0.70$) and inter-rater reliability (average $K=0.99$). Similar to previous studies (e.g., Franklin et al., 2014), we used an online version of the SITBI in the present study. Online and in-person versions of the SITBI produce similar estimates of SITBI status and frequency (Franklin et al., 2014).

We used the SITBI to assess self-injurious thoughts and behaviors over one's lifetime, past year, past month, and past week. To better understand associations across different types of NSSI, we assessed the frequency of each NSSI method endorsed. We included additional questions to assess history and frequency of engaging in nonsuicidal overdoses over different time periods. To assess these behaviors, we asked participants: "Sometimes people take an overdose as a way to kill themselves. Other times, they take an overdose for other reasons, without wanting to die (e.g., to feel sick, to hurt themselves). Have you ever intentionally overdosed without wanting to die? "

We added questions to examine suicidal thoughts and intent during each type of SIB. We asked participants to rate (from 0, not at all, to 4, extremely) their thoughts of suicide during average SIB (i.e., suicide attempt, NSSI, nonsuicidal overdose) episodes. Intent to die was more difficult to assess, as this term is also difficult to define. We used the definition put forth by Silverman et al. (2007), in which suicidal intent requires a desire or wish to die, knowledge of the behavior's lethality, perception that the necessary tools are available, and knowledge of how to use these tools. Accordingly, we asked participants to rate (from 0, not at all, to 4, extremely) their desire to die from the episode and the likelihood that they would die from the average SIB (see Appendix A for specific questions asked).

2.3.4. Self-rating scale (SRS; Hooley et al., 2010)

The SRS is an eight-item measure examining self-critical thoughts. Participants responded to items on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The SRS demonstrates good reliability (Glassman et al., 2007; Hooley et al., 2010).

2.3.5. Brief symptom index (BSI-18; Derogatis, 2000)

The BSI-18 assesses symptoms of psychological status and distress experienced over the past week using a 5-point scale ranging from 1 (not at all) to 5 (extremely). This measure provides a global severity index (GSI) of distress, with higher scores indicating higher levels of psychological distress.

2.3.6. Acquired capability for suicide scale – fearlessness about death (ACSS-FAD; Ribeiro et al., 2014)

The ACSS-FAD assesses one component of capability toward suicide: fearlessness about death. Participants respond to this seven-item measure on a scale from 0 (not at all like me) to 4 (very much like me). Items include statements such as, "The pain involved in dying frightens me."

2.3.7. McLean screening instrument for borderline personality disorder (MSI-BPD; Zanarini et al., 2003)

The MSI is a 10-item scale assessing the Diagnostic and

Statistical Manual of mental disorders 4th edition (APA, 2000) defined symptoms of borderline personality disorder. All items are answered in a yes or no questions format. This measure has demonstrated adequate internal consistency (Zanarini et al., 2003).

2.4. Data analytic plan

We first explored characteristics (e.g., methods, frequencies) of NSSI, nonsuicidal overdoses, and suicide attempts. Next, we compared different aspects of these SIBs. To compare ages of onset across SIBs, we calculated the average (i.e., mean, median) ages of onset for these different SIBs. We then conducted dependent *t*-tests to determine if average onset ages were significantly different across these groups. We also examined relevant socio-demographic variables (i.e., race, sex, sexual orientation) across people engaging in these behaviors. Given the high overlap in participants reporting histories of multiple SIBs, we did not test whether sociodemographic variables were different between groups.

To directly compare patterns of engagement across these behaviors, we calculated the average number of reported episodes within the past week, month, year, and life for each SIB. Outliers (i.e., values 3 standard deviations [SDs] above the global mean) were replaced with the next highest value of any given behavior. Again, we conducted dependent *t*-tests to determine whether these frequencies were significantly different across behaviors. For exploratory purposes, we also examined characteristics of each of these behaviors, focusing on the different methods reportedly used for each type of SIB.

We next examined associations among SIBs and other relevant variables (i.e., general psychopathology, symptoms of borderline personality disorder, self-criticism, acquired capability for suicide). Specifically, we used Spearman rank order correlations to determine whether SIBs have similar associations with these relevant variables. Rather than using a composite NSSI variable, frequencies of specific NSSI types (i.e., cutting, burning, scraping skin to the point of drawing blood, inserting objects under the skin, hitting) were used to better understand similarities and differences across these different behaviors.

Finally, we conducted one-sample *t*-tests to assess whether mean scores on each of the following variables, assessed for each type of SIB, were significantly different than zero: (1) how much they thought the average episode could kill them (termed "likelihood of death"); (2) how much they wanted the average episode to kill them (termed "desire to die"); and (3) how much they were thinking about suicide when performing the average episode (termed "thoughts of suicide"). We examined the proportion of each response to these items and the means and confidence intervals of each of these values to determine whether scores on these variables were significantly different across average episodes of NSSI, nonsuicidal overdoses, and suicide attempts. We also explored whether responses to these items were associated with history of suicidal thoughts and behaviors.

3. Results

3.1. Prevalences within sample

Among the 183 participants, 45.3% reported a lifetime history of nonsuicidal overdosing, 88.9% reported a lifetime history of NSSI, and 49.5% reported a lifetime suicide attempt. Notably, numerous participants reported a history of engaging in multiple SIBs. In fact, among participants with a history of nonsuicidal overdoses, 96.51% ($n=83$) also reported an NSSI history and 79.07% ($n=68$) also reported a history of suicide attempt(s).

Conversely, 55.03% ($n=93$) of those participants reporting a history of NSSI reported a history of nonsuicidal overdoses and 58.58% ($n=99$) reported a history of suicide attempt(s).

3.2. Characteristics of NSSI

Among those with a history of NSSI, self-cutting was the most commonly endorsed method of NSSI (92.9%). Participants also reported burning (54.4%), hitting (76.9%), scraping skin to the point of drawing blood (69.2%), inserting objects under the skin (34.7%). Notably, “other” methods were endorsed by almost half the sample (46.3%). The majority of the “other” methods included different versions of those methods listed previously (e.g., punching a wall, punching self, burning skin using salt and ice, hitting one’s head). Some participants also reported self-suffocation (6.32%) and purging, sometimes indicating that the purge was to the point of blood or bile (7.32%). Notably, many of the “other” methods endorsed would be classified as “indirect” nonsuicidal self-harm, or self-harm that does not result in tissue damage (e.g., starvation, 7.37%). Additionally, some “other” methods included mild forms of self-injury that likely do not cause skin damage (e.g., scratching skin without drawing blood; hair-pulling) or socially sanctioned behaviors (e.g., piercing/tattooing). Given the heterogeneity across these methods, “other” behaviors were not included in composite NSSI frequency variables.

The sample contained participants with an extensive history of NSSI. On average, participants reported 558.82 total lifetime NSSI episodes ($Mdn=200$, $SD=923.25$), 45.44 past year NSSI episodes ($Mdn=20$, $SD=60.65$), 8.79 past month NSSI episodes ($Mdn=3$, $SD=13.61$), and 2.43 past week NSSI episodes. ($Mdn=1$, $SD=4.50$). Only 4 participants reported fewer than 5 lifetime NSSI episodes and only 34 participants reported fewer than 5 NSSI episodes in the past year. Accordingly, the majority of participants with an NSSI history in the present sample met some criteria for the proposed DSM-5 NSSI disorder, which requires NSSI engagement on 5+ days in the past year (American Psychological Association, 2013).

3.3. Characteristics of nonsuicidal overdoses

Among participants who reported a history of nonsuicidal overdoses, the majority reported overdosing on over the counter (OTC) medications (74.4%) and prescription drugs (76.7%), with remaining participants reporting use of illegal drugs (18.6%), other substances (8.1%), and alcohol (52.3%). Participants who reported overdosing using only alcohol ($n=2$) were not included in analyses.

On average, participants reported 38.11 lifetime nonsuicidal overdose episodes ($Mdn=9.00$, $SD=72.23$), 12.44 past year nonsuicidal overdose episodes ($Mdn=2.00$, $SD=25.77$), 1.48 past month nonsuicidal overdose episodes ($Mdn=0.00$, $SD=3.10$), and 0.38 past week nonsuicidal overdose episodes ($Mdn=0$, $SD=1.09$).

3.4. Characteristics of suicide attempts

On average, participants reported 9.65 lifetime suicide attempts

($Mdn=4.00$, $SD=18.23$), 1.60 past year attempts ($Mdn=1.00$, $SD=2.41$), 0.31 past month attempts ($Mdn=0.00$, $SD=0.94$), and 0.07 past week attempts. ($Mdn=0$, $SD=0.39$).

Regarding the method used for the most recent suicide attempt, 54.2% reported overdosing, 18.1% reported using a sharp object (e.g., cutting), 8.5% reported hanging, 5.3% reported using a train or car (e.g., getting hit by car), 4.3% reported suffocation, 2.1% reported jumping from a height, and 8.5% reported using another method (e.g., gas, poison). Of those who reported overdosing, the majority used prescription drugs (40.74%) and OTC medications (37.04%), with remaining participants overdosing on illegal drugs (1.85%), and a mix of prescription, OTC, alcohol, and/or illegal drugs (18.52%).

People who engaged in nonsuicidal overdoses were more likely to attempt suicide by overdosing (48.43%) than those without a nonsuicidal overdose history (29.17%), but the difference was not significant, $X^2(2, N=95)=2.64$, $p=0.104$. Given the small number of participants with no history of nonsuicidal overdoses who also reported a lifetime suicide attempt, ($n=24$) it is possible that there was insufficient power for this analysis. However, overdosing was also the most common method for the most recent suicide attempt among participants with a history of self-cutting without wanting to die (28.7%). The next most common method for these participants was using a sharp object (e.g., self-cutting; 10.2%).

3.5. Age of onset

We next tested whether the average ages of onset were significantly different across the SIBs. The mean age of onset was youngest for NSSI, then nonsuicidal overdoses, and then suicide attempts (see Table 1). To test whether these average ages of onset were significantly different, we conducted pairwise t -tests between NSSI and nonsuicidal overdoses, nonsuicidal overdoses and suicide attempts, and NSSI and suicide attempts. Importantly, these are within-participant variables, and to be included in these analyses participants must have engaged in both behaviors. Results suggested that average age of onset for nonsuicidal overdoses ($t(80)=7.89$, $p<0.001$, Cohen’s $d=0.89$) and suicide attempts ($t(90)=0.561$, $p<0.001$, Cohen’s $d=0.61$) were significantly older than for NSSI. Average age of onsets for nonsuicidal overdoses and suicide attempts were not significantly different ($t(63)=1.91$, $p=0.06$, Cohen’s $d=0.24$). These results suggest that nonsuicidal overdoses are more similar to suicide attempts than NSSI in terms of age of onset.

3.6. Sociodemographic variables across categories

We next sought to examine sociodemographic characteristics among people who engage in these different SIBs. As seen in Table 1, the majority of participants in all groups reported female sex and approximately half reported heterosexual orientation. Bisexual orientation was the next most commonly reported sexual orientation across each group. Given the high overlap in participants engaging in each of these behaviors, it was not appropriate to analyze differences across these groups.

Table 1
Ages of onset across SIBs.^a

	Mean (SD) Age Onset	Female	Heterosexual	Homosexual	Bisexual	Unsure	Preferred not to report
Nonsuicidal Overdose	16.76 (15)	84.4%	47.7%	5.8%	31.4%	9.3%	5.8%
NSSI	13.58 (13)	88.0%	50.3%	3.0%	34.3%	8.9%	3.6%
Suicide Attempt	15.73 (15)	88.3%	48.9%	2.1%	33.0%	10.6%	5.3%

^a Note: This table includes between-participants data to show ages of onset. To test differences in ages of onset, we used within subjects data.

3.7. Likelihood of death, desire to die, thoughts of suicide

To compare self-reported intent to die when engaging in these SIBs, we compared scores on items assessing the average likelihood of dying, desire to die, and thoughts of suicide during each SIB. Each of the one-sample *t*-tests revealed that the scores on the likelihood death, desire to die, and thoughts of suicide variables were significantly different from zero across all categories (see Table 2).

We next examined confidence intervals to determine whether these variables were significantly different across SIBs. Results demonstrated that average scores reported for likelihood death, desire to die, and thoughts of suicide were significantly higher for average suicide attempts compared to other categories (i.e., NSSI, nonsuicidal overdoses; see Fig. 1). Additionally, NSSI and nonsuicidal overdoses were not significantly different in terms of average ratings of desire to die or thoughts of suicide; however, they were significantly different in terms of the reported likelihood of dying from the event. Specifically, participants reported that, on average, episodes of nonsuicidal overdosing were more likely to result in death than episodes of NSSI.¹

Given definitions of suicidal intent require both the desire to die and likelihood of dying from the behavior, we created a variable assessing whether both of these tenants were present (i.e., a non-zero score on both desire to die and likelihood of dying from the average behavior) for average SIB. Scores of 1 indicate that some non-zero intent was present and scores of 0 indicate that no intent was present. Results demonstrated that 100% of suicide attempts were, on average, enacted with some non-zero intent to die. In contrast, 43% of NSSI episodes were, on average, enacted with some non-zero intent to die. Nonsuicidal overdoses fell in between these categories, with 74.3% enacted, on average, with non-zero intent to die.

3.8. Spearman rank order correlations

Finally, we examined associations among past year SIB frequencies and relevant clinical variables. Past year engagement in each SIB demonstrated similar associations with each other and relevant variables (i.e., general psychopathology, symptoms of borderline personality disorder, self-criticism, acquired capability for suicide), but there were some notable differences (see Table 3). For example, past year episodes of cutting, burning, and nonsuicidal overdosing were each significantly associated with past year suicide attempts, and the magnitudes of these associations were quite similar. However, past year episodes of inserting objects under the skin, hitting, and scraping the skin to the point of drawing blood were not significantly associated with past year suicide attempts. Additionally, past year episodes of cutting were not significantly associated with self-criticism, whereas past year episodes of burning, hitting, scraping the skin to the point of drawing blood, nonsuicidal overdoses, and suicide attempts were significantly associated. Follow-up Fisher *r*-to-*z* transformations indicated that none of these correlations were significantly different ($ps > 0.05$). All of these SIBs were significantly associated with past year suicide plans, and the majority (i.e., each SIB except past year episodes of inserting) were associated with past year ideation.

¹ These results were nearly identical when including only those suicide attempts by overdose.

4. Discussion

Inconsistent classification of SIBs limits our ability to understand, predict, treat, and prevent these dangerous behaviors. Identification and categorization of nonsuicidal overdoses have been particularly difficult, with many researchers and clinicians unaware of these behaviors (Brown et al., 2015). To our knowledge, the present study was the first to empirically examine similarities and differences among nonsuicidal overdoses, suicide attempts, and NSSI. Results suggest that people experience substantial suicidal thoughts while engaging in each of these behaviors. Moreover, SIBs have similar associations with each other, suicidal thoughts, and relevant traits of psychopathology. However, the present results highlight several important differences among these SIBs. Both similarities and differences are described in more detail below.

Nonsuicidal overdoses, suicide attempts, and NSSI demonstrated several important similarities. First, the majority of participants reported experiencing suicidal thoughts during their average nonsuicidal overdose, suicide attempt, and NSSI episode. These results demonstrate that the presence of at least some form of suicidal thoughts is common across both suicidal and nonsuicidal behaviors. Second, some amount of suicidal ambivalence or intent appears to exist among all three SIBs examined. Although questions assessing nonsuicidal overdoses and NSSI asked about behaviors enacted *without* wanting to die, approximately half of participants reported a non-zero likelihood of dying as a result of the average NSSI and nonsuicidal overdose episodes, and even more participants reported a non-zero desire to die from these behaviors. Although suicide intent is a complex phenomenon, it is often considered a combination of a desire to die and belief that a given behavior is lethal (Posner et al., 2007). According to this definition, some non-zero suicidal intent was reported during NSSI and nonsuicidal overdoses, calling into question definitions requiring that intent to die be non-existent for nonsuicidal behaviors, and highlighting similarities across suicidal and nonsuicidal SIBs. This may reflect that people engage in self-injurious behaviors without being sure whether they want to live or die (Linehan, 1986).

Third, frequency of past year engagement in each SIB demonstrated similar associations with each other and with relevant variables (i.e., general psychopathology, symptoms of borderline personality disorder, self-criticism, acquired capability for suicide). Although there were some differences across SIBs, these were not substantially different than those observed among NSSI behaviors. This highlights that SIBs are highly related to each other and to other symptoms of psychopathology.

Despite these similarities, results demonstrated notable differences among nonsuicidal overdoses, NSSI, and suicide attempts. Suicide attempts were the most unique. Self-reported thoughts of suicide, desire to die, and likelihood of dying from the average suicide attempt were each substantially higher than from the average NSSI or nonsuicidal overdose episode. Looking more directly at suicidal intent (i.e., a composite variable requiring a non-zero score on both desire to die and likelihood of dying from the average behavior), results demonstrated that, on average, more participants demonstrated some intent to die during suicide attempts than during NSSI or nonsuicidal overdoses. Comparing nonsuicidal overdoses and NSSI, reported desire to die was not significantly different between these behaviors. However, nonsuicidal overdoses were unique from NSSI in terms of perceived likelihood of death and suicidal intent.

Regarding age of onset, nonsuicidal overdoses were more similar to suicide attempts than to NSSI. Specifically, the average age of onset for nonsuicidal overdoses and suicide attempts (which had similar ages of onset) were significantly older than for NSSI.

Table 2
Thoughts of suicide, desire to die, and likelihood of dying during SIBs

	0 (not at all)	1 (a little bit)	2 (somewhat)	3 (very much)	4 (extremely)	M	SD	t(df)	p	95% CI
NSSI										
N (%) Thoughts of suicide	20 (10.5%)	33 (17.4%)	43 (22.6%)	49 (25.8%)	20 (10.5%)	0.76	1.00	9.72 (164)	0.00	[0.60, 0.91]
N (%) Desire to die	36 (18.9%)	42 (22.1%)	51 (26.8%)	30 (15.8%)	6 (3.2%)	1.56	1.13	17.81 (164)	0.00	[1.39, 1.74]
N (%) Likelihood death	88 (46.3%)	44 (23.2%)	22 (11.6%)	7 (3.7%)	4 (2.1%)	2.1	1.21	22.25 (164)	0.00	[1.91, 2.28]
Nonsuicidal overdose										
N (%) Thoughts of suicide	8 (4.2%)	21 (11.1%)	25 (13.2%)	23 (12.1%)	11 (5.8%)	1.51	0.95	14.77 (86)	0.00	[1.30, 1.71]
N (%) Desire to die	13 (6.8%)	32 (16.8%)	29 (15.3%)	10 (5.3%)	4 (2.1%)	1.55	1.03	14.11 (87)	0.00	[1.33, 1.76]
N (%) Likelihood of death	11 (5.8%)	36 (18.9%)	27 (14.2%)	11 (5.8%)	2 (1.1%)	2.09	1.17	16.75 (87)	0.00	[1.84, 2.34]
Suicide Attempts										
N (%) Thoughts of suicide	0 (0%)	5 (2.6%)	12 (6.3%)	25 (13.2%)	52 (27.4%)	2.61	0.86	29.46 (93)	0.00	[2.43, 2.78]
N (%) Desire to die	0 (0%)	3 (1.6%)	21 (11.1%)	34 (17.9%)	36 (18.9%)	3.1	0.86	35.07 (93)	0.00	[2.92, 3.27]
N (%) Likelihood death	0 (0%)	9 (4.7%)	33 (17.4%)	38 (20.0%)	14 (7.4%)	3.32	0.9	35.97 (93)	0.00	[3.14, 3.50]

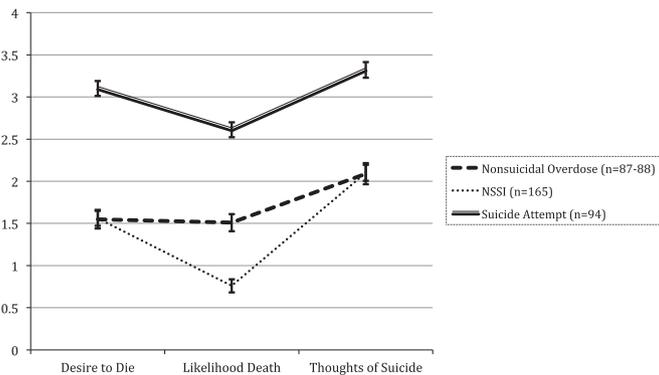


Fig. 1. Graph of suicidal thoughts, intent, and desire to die during each type of SIB. Note. Error bars represent standard error values. Overlapping values indicate that the scores are not significantly different.

We hypothesize that two important components to this age difference may be access and concealment. Teens may have an easier time concealing NSSI engagement behaviors from their parents or relatives. Whereas those tools (e.g., knives, razors) can be easily cleaned and returned, overdosing requires obtaining the drugs and, if possible, replacing them before others notice they are missing. This is particularly difficult for younger adolescents, who may not have the means (e.g., personal money, drivers license) to

replace these medications. It is important to note that overdoses were the most commonly reported suicide attempt method (~57%) in this sample. Similar ages of onset for these behaviors may highlight the importance of age in gaining access to drugs necessary for all types of overdosing. It is also interesting to consider that the younger age of NSSI onset may indicate that these behaviors serve to increase risk for later engagement in other SIBs. This is consistent with several theories, including that NSSI may provide a gateway for engaging in future SIBs (Whitlock et al., 2013) and that NSSI may be a painful and provocative experience that increases suicide capability (Van Orden et al., 2010).

Together, these results highlight numerous similarities between NSSI and nonsuicidal overdoses, but a few differences in terms of course and at least one important facet of suicidal intent: perceived likelihood of dying from the behavior. Nonsuicidal overdoses also share some similarities with suicide attempts, but the majority of these factors are also shared with NSSI (e.g., presence of suicidal thoughts during the episodes, desire to die during the episodes). In contrast to researchers who believe that all SIBs regardless of suicide intent should be lumped into a single category, we believe that these data suggest that nonsuicidal overdoses (i.e., overdoses enacted without the desire to die, regardless of apparent lethality) and NSSI are distinct from suicide attempts. Future research extending upon this work would be useful to conclude whether NSSI and nonsuicidal overdoses should

Table 3
Two-tailed Spearman Rank Correlations

	Year Cut ^a	Year Burn ^a	Year Insert ^a	Year Hit	Year Scrape ^a	Year Non-suicidal Overdose	Year Ideation ^b	Year Plans ^b	Year Attempts	BSI	MSI	SRS	ACSS
1	1.00	0.35**	0.31**	0.22**	0.36**	0.27**	0.42**	0.43**	0.33**	0.28**	0.08	0.03	0.16*
2		1.00	0.46**	0.34**	0.41**	0.24**	0.23**	0.31**	0.22**	0.32**	0.19*	0.07	0.24**
3			1.00	0.24**	0.40**	0.16*	0.10	0.20*	0.11	0.24**	0.11	0.11	0.00
4				1.00	0.39**	0.04	0.38**	0.22**	0.12	0.19*	0.22**	0.14	-0.04
5					1.00	0.14	0.26**	0.25**	0.11	0.26**	0.25**	0.09	0.09
6						1.00	0.25**	0.28**	0.38**	0.47**	0.16*	0.08	0.01
7							1.00	0.69**	0.29**	0.33**	0.20**	0.17*	0.06
8								1.00	0.38**	0.33**	0.20*	0.08	0.186*
9									1.00	0.33**	0.17*	0.10	0.13
10										1.00	0.44**	0.32**	0.22**
11											1.00	0.13	0.29**
12												1.00	-0.17*
13													1.00
Mean	17.99	1.9	2.08	13.74	9.83	4.41	0.71	36.96	4.93	42.48	16.47	94.3	36.72
SD	-35.53	-4.15	-5.13	-25.55	-21.78	-11.19	-1.62	-15.14	-3.7	-8.17	-7.16	432.36	75.65

^a Frequency of past year engagement in specific nonsuicidal self-injurious behaviors.

^b Frequency of past year suicide ideation.

^c Frequency of past year suicide plans.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

continue to be categorized separately.

The present study should be interpreted in light of its limitations. First, the present sample included young adults with a recent and frequent history of SIB, and few participants only engaged in one type of SIB. These participants likely represent a particularly severe part of the population, and it remains unclear how these different SIBs may be interrelated among people with less severe presentations. Second, the present study was not able to examine sociodemographic differences across participants who engage in these different SIBs. Future research should consider conducting large-scale studies comparing and contrasting these different behaviors and variables. It would be especially enlightening to compare population-level prevalence rates and sociodemographic characteristics across people who engage in NSSI, nonsuicidal overdoses, and suicide attempts.

Third, in the present study we asked about perceived lethality levels and desire to die across SIB types. Future studies should consider utilizing more detailed questions including those that directly assess suicidal intent across each specific episode of a given behavior. Such research may provide more nuanced information to better compare and contrast suicidal intent during different SIBs. Fourth, all participants reported on their SIB histories retrospectively. Self-reported perceived lethality and desire to die from these previous episodes could all be influenced by the outcome of these and other life events, thereby not reflecting how participants would have responded to these questions right before or right after engaging in these behaviors. Fifth, the large majority of suicide attempts reported involved overdosing on some type of drug. It is unclear whether our results would generalize if participants were reporting other, potentially more lethal, types of suicide attempts (e.g., hanging, firearms). Moreover, it is possible that the high similarity between suicidal and nonsuicidal overdoses inflated similarities observed between suicide attempts and nonsuicidal overdosing. Future research using participants with more diverse suicide attempt histories could help clarify this question. Finally, data from the present study were all cross-sectional. Future studies using longitudinal designs could be useful to determine whether and how suicidal intent affects engagement in future SIBs.

In summary, the present study highlighted important similarities and differences across NSSI, nonsuicidal overdoses, and suicide attempts. These SIBs demonstrated similar associations with each other and other traits of psychopathology, and thoughts of suicide were present during engagement in each of these behaviors. Despite these similarities, there were several differences regarding the course and suicidal intent behind these behaviors, with nonsuicidal overdoses approximating suicide attempts in terms of age of onset and NSSI in terms of suicidal thoughts and desire to die during the behaviors. Additionally, the present study highlighted that current definitions for nonsuicidal behaviors (including requirements that the behavior have zero intent to die) may not accurately represent people's intent when engaging in these behaviors. Most importantly, the present study emphasized that empirical analysis of these behaviors can provide important insights for classification of SIBs. Future research should consider extending this research to help create an empirically based taxonomy of SIBs, eventually helping to decrease misclassification of these behaviors.

Appendix A. Questions added to the SITBI

The following questions ask you to think across **all** of the times that you have intentionally overdosed **without** wanting to die.

Thinking of all the times that you have intentionally overdosed without wanting to die:

- On average, how much did you want these overdoses to kill you?
- On average, how much did you think these overdoses could kill you?
- On average, how much did you care if you died?
- On average, how much were you thinking about suicide?

Thinking of all the times (episodes) that you have purposely hurt yourself without wanting to die:

- On average, how much did you want it to kill you?
- On average, how much did you think that doing that could kill you?
- On average, how much did you care if you died?
- On average, how much were you thinking about suicide?

The following questions ask you to think across **all** of the times that you made an attempt to kill yourself **in which you had at least some intent to die** (not including times where someone else stopped you or you changed your mind).

Thinking of all the times that you made an attempt to kill yourself **in which you had at least some intent to die**:

- On average, how much did you want these attempts to kill you?
- On average, how much did you think these attempts could kill you?
- On average, how much did you care if you died?
- On average, how much were you thinking about suicide?

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