Journal of Affective Disorders 260 (2020) 314–322

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

# Investigating the DSM-5 criteria for non-suicidal self-injury disorder in a community sample of adolescents

Tinne Buelens[a,*], Koen Luyckx[a,b], Glenn Kiekens[c], Amarendra Gandhi[a], Jennifer J. Muehlenkamp[d], Laurence Claes[a,e]

[a] Faculty of Psychology and Educational Sciences, KU Leuven, Tiensestraat 102 – box 3720, 3000 Leuven, Belgium
[b] UNIBS, University of the Free State, Bloemfontein, South Africa
[c] Centre for Public Health Psychiatry, KU Leuven, Leuven, Belgium
[d] Department of Psychology, University of Wisconsin-Eau Claire, Eau Claire, WI, USA
[e] Faculty of Medicine and Health Sciences, University Antwerp, Antwerp, Belgium

ARTICLE INFO

*Keywords:*
Non-suicidal self-injury
DSM-5
Adolescence
NSSI disorder

ABSTRACT

*Background:* Non-suicidal self-injury (NSSI) is a serious public health concern in adolescents. In 2013, DSM-5 recognized NSSI as a distinct clinical phenomenon and made a call for more systematic research by including Non-Suicidal Self-Injury-Disorder (NSSI-D) as a condition requiring further research. Yet, few studies have examined the prevalence of NSSI-D in adolescents using the exact DSM-5 criteria. Additionally, the few studies available criticised several of the proposed diagnostic criteria and pointed out that more research is needed.

*Methods:* Therefore, we examined prevalence rates of NSSI-D and investigated the four most controversial criteria (i.e., criteria A, B/C, and E) in a large community sample of adolescents ($N$ = 2,130; 54% female; $M_{age}$ = 15, $SD$ = 1.81).

*Results:* Our results show an overall NSSI-D prevalence rate of 7.6%, with significantly more girls (11.7%) than boys (2.9%) meeting the diagnosis. The prevalence of NSSI-D dropped to 5.5% when an alternative *criterion A* (i.e., ≥10 days of NSSI in the past year) was implemented. In our sample, 87% and 99% of adolescents with lifetime NSSI met *criteria B* and *C,* which clearly questions the clinical utility of these criteria for the DSM-5 diagnosis of NSSI-D. Importantly, however, although *criterion E* received relatively low endorsement, it significantly distinguished adolescents with and without NSSI-D from one another.

*Limitations and conclusion:* Although our conclusions are restricted by the cross-sectional nature of our study, these findings show that NSSI-D is common in community adolescents and offer new insights in the endorsement and clinical utility of specific NSSI-D criteria.

## 1. Introduction

Non-Suicidal Self-Injury (NSSI) involves deliberate injury to one's body tissue without suicidal intent and for purposes not socially sanctioned (Nock and Favazza, 2009). Common methods of NSSI include cutting, burning, hitting or carving oneself (Nock, 2009). Epidemiological research consistently indicates that approximately 17% of community adolescents engage in NSSI at least once (Muehlenkamp et al., 2012; Swannell et al., 2014). This high prevalence rate of NSSI in community samples is concerning, given that NSSI is strongly associated with internal distress, rejection by peers, academic difficulties, and increased risk for developing mental disorders and attempting suicide (Crouch and Wright, 2004; Kiekens et al., 2018a; Wilkinson et al., 2018).

As such, the field is in need of a clear and consistent definition that allows systematic identification and classification of individuals engaging in NSSI. Addressing this important need, NSSI-disorder (NSSI-D) has been included in the most recent revision of the *Diagnostic and Statistical Manual of Mental* as a "condition requiring further study" (*DSM-5*; American Psychiatric Association, 2013). A separate diagnostic category for NSSI-D has been long advocated (e.g., Ross and Heath, 2002) and would come with certain advantages. For instance, NSSI-D would be acknowledged as a diagnosis separate from other disorders such as borderline personality disorder, a claim supported by previous research (In-Albon et al., 2013; Muehlenkamp and Brausch, 2016; Selby et al., 2015). Furthermore, advances could be made in research on prevention and intervention of NSSI-D when using a unified definition of a separate clinical

* Corresponding author.
*E-mail address:* tinne.buelens@kuleuven.be (T. Buelens).

https://doi.org/10.1016/j.jad.2019.09.009
Received 23 April 2019; Received in revised form 11 July 2019; Accepted 1 September 2019
Available online 03 September 2019
0165-0327/ 

disorder (Muehlenkamp, 2005; Wilkinson and Goodyer, 2011).

Currently, the DSM-5 includes six diagnostic criteria for NSSI-D (APA, 2013). The first criterion, criterion A, specifies that NSSI has to occur for at least 5 days in the past year. Second, criterion B covers the expectations or reasons an individual should have concerning their behaviour. Namely, an individual must engage in NSSI for one or more of these reasons: B1) to relieve negative thoughts or feelings, B2) to resolve interpersonal difficulties, or B3) to induce a positive state. Third, criterion C specifies that NSSI must be preceded by either negative thoughts or feelings (C1a), conflicts with others (C1b), preoccupation with the behaviour that is difficult to resist (C2) or there should be recurrent thoughts about the behaviour (C3). Finally, behaviours that are *not* socially sanctioned are excluded (Criterion D), the behaviour must cause clinical interference/distress (Criterion E) and should not occur solely in the context of another mental disorder (Criterion F).

It has been estimated that 5.6% to 6.7% of adolescents and 0.2 to 3% of (young) adults in community samples are eligible for a NSSI-D diagnosis (Albores-Gallo et al., 2014; Benjet et al., 2017; Kiekens et al., 2018b; Plener et al., 2016; Zetterqvist et al., 2013). In most studies, NSSI-D was more common in girls compared to boys (for a review, see Zetterqvist, 2015). Previous research supports that NSSI-D is associated with, but distinct from other diagnoses (e.g., Andover, 2014; Washburn et al., 2015). Furthermore, both clinicians and NSSI experts regarded the proposed criteria as prototypic of a self-injuring patient in a survey by Lengel and Mullins-Sweat (2013). However, NSSI-D as a diagnostic entity showed poor test-retest reliability and inconsistent validity (Muehlenkamp et al., 2017; Washburn et al., 2015). The first NSSI-D field trials failed, with two out of three trials being unsuccessful, possibly due to small sample sizes. The third trial was successful, although sample size was still very limited with only seven pre-post patients being recruited, and resulted in an unacceptable Kappa estimate (Regier et al., 2013). Some specific diagnostic criteria for NSSI-D have been under scrutiny ever since their release (Zetterqvist, 2015).

Namely, studies that evaluated ***criterion A*** found mixed evidence as to whether engaging in NSSI for *five* days in the past year is a clinically meaningful and valid benchmark (Ammerman et al., 2019; Muehlenkamp et al., 2017). It has been suggested that the current five-days-specifier is too lenient and possibly over-diagnoses those who experiment with NSSI or intermittently engage in the behaviour (Muehlenkamp and Brausch, 2016). A recent study indicated that, to ensure clinical validity and utility, the NSSI-D frequency cut-off should be raised to at least 10 days in the past year (Ammerman et al., 2017; Muehlenkamp and Brausch, 2016). Second, Washburn et al. (2015) reported ***criterion B*** (expectations of NSSI) to be subordinate and therefore dependent on criterion C (precipitants of NSSI), leaving it unclear if criterion B adds anything of value to NSSI-D. Confirming the limited clinical utility of criterion B, previous research found that almost all (87.8% to 99%) of those engaging in NSSI reported at least one function of their behaviour, and therefore met criterion B (Brausch et al., 2016; Washburn et al., 2015). Perhaps an overarching criterion that combines criteria B and C could be an improvement to the parsimony of the DSM-5 list of NSSI-D criteria. Third and finally, the wording of ***criterion E*** (NSSI causing interference in daily life) has been scrutinised because some patients tend to report NSSI as being *helpful* in regulating negative emotions, rather than as being impairing or distressing (Zetterqvist, 2015). And yet, in one study, criterion E best distinguished adolescents with NSSI-D from those without NSSI-D (Gratz et al., 2015). This would imply that criterion E is important for the validity of NSSI-D and, as such, "potentially functions appropriately by screening out those without distressing or impairing NSSI" (Zetterqvist, 2015, p. 11).

## 2. Rationale and hypotheses

To further investigate these diagnostic criteria, more extensive research is necessary. Most research so far used earlier versions of the DSM-5 criteria and/or did not assess all criteria, which limits the generalisability of findings regarding NSSI-D (Zetterqvist, 2015). Moreover, 87% of all available data on NSSI currently comes from university students (Swannell et al., 2014). Additional research on adolescents, the age group with the highest prevalence rates of NSSI, is necessary to provide a representative overview of the full range of NSSI severity in the entire population (Benjet et al., 2017).

Therefore, we included all six diagnostic criteria exactly as they are worded by the DSM-5 and studied these criteria using a self-report questionnaire in a large sample of community adolescents. The purpose of the current study was to (1) assess all DSM-5 criteria to determine prevalence rates and descriptive statistics of NSSI-D; and (2) investigate the threshold of criterion A, the overlap of criteria B/C, and the endorsement of criterion E in a large community sample of adolescents. First, we expected a prevalence rate of NSSI-D in the 5–7% range, with higher rates for girls than boys (Albores-Gallo et al., 2014; Zetterqvist et al., 2013). Second, regarding criterion A, we examined the extent to which the prevalence of NSSI-D would decrease if we increased the frequency threshold from 5 to 10 days in the past year (Muehlenkamp and Brausch, 2016). Additionally, we explored the number of days one engaged in NSSI in a subsample with lifetime NSSI who did not meet NSSI-D criteria compared to a subsample with an NSSI-D diagnosis. Regarding criterion B/C, we expected high endorsement of and a considerable overlap between criterion B and C (Brausch et al., 2016). Both criterion B and C are composed of three sub-criteria (B1, B2, B3, and C1, C2, C3). Due to their similar content and wording, we hypothesised criterion B2 (*I injure myself to resolve interpersonal difficulties*) to overlap substantially with criterion C1b (*In the period immediately prior to self-injuring, I get into conflicts with others*). Similarly, we expected criterion B1 (*I injure myself to relieve negative thoughts or feelings*) to overlap with criterion C1a (*In the period immediately prior to self-injuring, I experience negative feelings or thoughts*). Finally, we expected criterion E to distinguish adolescents with NSSI-D from those without NSSI-D (based on Gratz et al., 2015).

## 3. Method

### 3.1. Participants

The current study is part of a research project in which eight secondary schools participated, all located in Flanders, Belgium. Convenience sampling technique was used to collect the data. In all eight schools, we contacted the parents of 3483 students and distributed informed consent forms among them. A total of 2313 (66.4%) students received active parental consent[1] and were subsequently invited to partake in the current study. The 2162 (93.5%) participants who eventually participated (54% female, 0.2% undisclosed) ranged between the ages of 10 and 21 years old ($M$ = 14.68; $SD$ = 1.88). Because this study focuses on adolescents, we excluded students younger than 12 and older than 18, resulting in a final sample size of 2130 ($M_{age}$ = 15; $SD_{age}$ = 1.81). In the first and second year of secondary school, all students were enrolled in the same general education programme[2] ($n$ = 738, 34.6%). From the third year on, students were

[1] Students over 18 years old were not required to obtain parental consent in order to participate in the study.

[2] Children enter the first year of secondary school in Belgium at age 11-12. From the third year on, students can choose between general education (focusing on theoretical knowledge), technical education (focusing on maths and science in their more practical application), or art education (providing music, ballet, or performing arts classes next to a general education programme). All three programmes allow students to start any later higher education. The fourth and final option in Belgian secondary schools is a vocational programme, which is available from the first grade and does not prepare students for later higher education. Due to differences in the school trajectory as well as the relative difficulty of the questionnaires, students from the vocational programme were not included in the current study.

distributed among general education ($n$ = 432, 20.3%), technical education ($n$ = 554, 26.0%) and art education ($n$ = 406, 19.1%). The vast majority of the sample had Belgian nationality (at T1; $n$ = 1901, 89.2%), and the remaining students had Dutch ($n$ = 108, 5.1%) or another nationality ($n$ = 114, 5.4%). Of the total sample, 68.5% lived with both parents, 20.2% had divorced parents, 6.7% lived in a reconstituted family, and 4.4% indicated they lived in another home environment. Sample characteristics were similar to the Belgian school population regarding location (i.e., both rural and urban schools spread across Flanders), nationality, and family environment. However, there was an overrepresentation of art education students (i.e., 19.1% of our sample versus 2.25% of the Belgian school population).

### 3.2. Procedure

The data collection took place during school hours, with the researchers present at all time. Each student received an assent form, a questionnaire booklet, and an envelope. After signing the assent form and filling out all questionnaires, the students returned these documents in a sealed envelope to the researchers. Each student received a movie ticket as compensation. Students who were absent on the day were contacted by e-mail to complete an online version of the study. Every participant received a letter with contact details of the school counsellor and several professionals and mental health services they could contact if needed. The study was approved by the Ethics Committee at the University of Leuven.

### 3.3. Measures

Lifetime NSSI was assessed using a single-item screening measure 'Have you ever engaged in self-injury without an intent to die?'. Those who marked *yes*, responded to follow-up questions regarding the DSM-5 criteria. We used questions that explicitly assessed all NSSI-D criteria, with the wording of these items matching the DSM-5 criteria as closely as possible (see Table 1). Furthermore, since previous research indicated a close overlap between criterion B and C, we additionally split criterion C1 into C1*a* (negative feelings or thoughts) and C1*b* (conflicts with others). For all DSM-5 NSSI-D criteria together, a KR-20 reliability coefficient of .689 was found, which is close to the .7 cut-off for acceptable internal consistency (Cortina, 1993).

Consistent with previous research (Kiekens et al., 2018a), we classified participants in one of the following four groups: (1) no NSSI (i.e., respondents without prior NSSI), (2) past NSSI (i.e., NSSI history, but not in past 12 months), (3) subthreshold NSSI (i.e., NSSI in past 12 months without meeting all DSM-5 criteria[3]), and (4) NSSI-D (i.e., those meeting all DSM-5 criteria). Finally, additional questions assessed NSSI behaviours (e.g., cutting, burning), age of onset, treatment history for NSSI, and the extent to which participants sought information online about NSSI or had online conversations about NSSI.

### 3.4. Statistical analyses

Associations between categorical variables were analysed using cross-tabulations and the Pearson chi-square statistic. Differences between groups on continuous variables were analysed using (M)ANOVA or Welch $F$-statistic with (partial) eta-squared ($\eta^2$) as a measure of effect size. According to Cohen's rule of thumb (1988), the $\eta^2$ effect size is considered small, medium, or large starting from an eta-squared value of .01, .06, and .14 respectively. Tukey or Games–Howell post-hoc tests were performed as appropriate.

## 4. Results

**Missingness.** The average percentage of missing responses across all study variables was 2.16%. Since this is below the 5% item-missingness rule of thumb, the potential impact of the missing data can be considered negligible (Jakobsen et al., 2017). For each analysis, we opted for listwise deletion to handle the missing data.

**Objective 1: Prevalence rates and descriptive analyses.** The overall lifetime prevalence of NSSI was 21.8% in our sample, with girls reporting significantly more lifetime NSSI than boys ($\chi^2_1 = 99.9$ $p < .001$; see Fig. 1 for more details). Overall, 78.1% of the full sample classified for the no NSSI group ($n$ = 1664), 6.2% for the past NSSI group ($n$ = 132), 7.2% for the subthreshold group ($n$ = 153) and 7.6% met the NSSI-D diagnosis ($n$ = 162). Due to missing data, 19 students (0.9%) could not be classified in any of the four groups.[4] Table 2 presents an overview of NSSI-D criteria endorsed across each group. The prevalence rate of NSSI-D was significantly higher in girls (11.7%) than boys (2.9%; $\chi^2 1 = 57.4$ $p < .001$), and was significantly higher in art education (16.2%), than general education (6.8%) or technical education programmes (4.6%; $\chi^2 3 = 52.4$, $p < .001$). This is not due to a higher number of girls in the art program, since the interaction term (gender * educational program) we included in a logistic regression to predict NSSI-D presence, was non-significant ($B$ = .006; $SE$ = .171; Wald(1) = .001, $p$ = .973).

Age of NSSI onset ($M$ = 12.8, $SD$ = 2.22) was not significantly different across the NSSI groups ($F$ (2431) = .08, $p$ = .93). Individuals with NSSI-D reported more versatility in NSSI methods ($M$ = 3.04; $SD$ = 1.84, $F_{welch}$ (2287) = 20.35, $p < .001$) than those with past NSSI ($M$ = 1.86, $SD$ = 1.40, $p < .001$) or subthreshold NSSI ($M$ = 2.13, $SD$ = 1.35, $p < .001$). Additionally, individuals with NSSI-D had a greater tendency to search online for information on NSSI ($F_{welch}$ (3249) = 58.18, $p < .001$) and to engage in online conversations about NSSI ($F_{welch}$ (3253) = 22.95, $p < .001$) compared to all other groups.

**Objective 2: Investigating DSM-5 criteria in a community sample of adolescents. Criterion A.** Of the 323 adolescents reporting NSSI in the past year, 69.0% ($n$ = 223) indicated they engaged in the behaviour more than five days (Table 3). Hence, these adolescents fulfilled the existing DSM-5 threshold for criterion A (≥ 5 days). When the alternative criterion A (≥ 10 days in the past year) was used, only 49.8% ($n$ = 161) of those with past year NSSI would meet this criterion. If this alternative frequency criterion would be implemented while retaining all other original DSM-5 criteria, 3 out of 10 adolescents with DSM-5 NSSI-D (27.8%) would no longer meet the frequency threshold and the prevalence rate of NSSI-D would drop from 7.6% to 5.5% in our sample.

**Criterion B/C.** In our sample, 89% of adolescents with a lifetime history of NSSI reported at least one function of their NSSI behaviour and therefore met criterion B (see Table 4). This high endorsement of the overall criterion was largely due to subcriterion B1; 86% of adolescents reported to injure themselves to relieve negative thoughts or feelings. Almost all adolescents with a lifetime history of NSSI reported at least one precipitant of their behaviour; 99% of this sample met criterion C.

Furthermore, a considerable overlap was found between criterion B and C: 99.8% of participants who met criterion B also met criterion C,

[3] Supplementary Table 2 provides the percentages of endorsement for each (sub)criterion for the subthreshold group. Moreover, adolescents in the subthreshold group who were missing *exactly one* criterion (i.e., those who meet five out of all six NSSI-D criteria) are grouped together. The endorsement percentages for the criteria show that criterion A most often holds an individual who already meets five criteria back from meeting all six criteria. Criterion E is the second most frequently missing criterion in this group.

[4] Of these 19 students, 17 students did not complete the question of lifetime NSSI. However, two students did report lifetime NSSI but did not complete the other questions. Therefore, these two students are included in the total NSSI prevalence rate ($n$ = 464; 21.8% of the 2130 included students), but are not assigned to any of the abovementioned groups.

**Table 1**
Assessed survey questions that map onto each criterion of DSM-5 Non-Suicidal Self-Injury Disorder.

| Criteria | | Survey question | Variable type | Criteria present |
|---|---|---|---|---|
| Criterion A | | In the past year, how many days have you engaged in this behavior [injuring yourself without an intent to die]? | Ordinal variable with the following categories: not at all, 1–4 days, 5–9 days, 10–14 days, 15–19 days, 20–24 days, 25 days or more | 5–9 days or more |
| Criterion B | | I injure myself… | 5-point Likert scale ranging from 1 (not at all) to 5 (very much so) | At least one of the contingent responses is present to some extent (≥ 2) |
| | B1 | …to relieve negative thoughts or feelings | | |
| | B2 | …to resolve interpersonal difficulties | | |
| | B3 | …to induce a positive state | | |
| Criterion C | C1 | (a) In the period immediately prior to self-injuring, I experience negative feelings or thoughts (such as sadness, anxiety, tension, anger, stress, or self-blame)<br>(b) In the period immediately prior to self-injuring, I get into conflicts with others | 5-point Likert scale ranging from 1 (not at all) to 5 (very much so) | At least one psychological precipitant is present to some extent (≥ 2) |
| | C2 | Prior to engaging in self-injury, I experience a period of preoccupation with the behavior that I can't control. | | |
| | C3 | I often think about self-injury, even when I'm not acting upon it. | | |
| Criterion D | | (a) From the list below, which behavior(s) have you ever engaged in?<br>(b) I injure myself for another reason. | (a) A list of 8 behaviors, the 9th option is an open-ended "other" category[a]<br>(b) Open ended question | (a) Not restricted to picking a scab or nail biting<br>(b) Not a part of a religious ritual |
| Criterion E | | Deliberately injuring myself… | 5-point Likert scale ranging from 1 (not at all) to 5 (very much so) | At least one of the contingent responses is present to some extent (≥ 2) |
| | E1 | … causes stress to myself | | |
| | E2 | … negatively influences my relationships with others | | |
| | E3 | … negatively influences my performance (school/work/…) | | |
| | E4 | … negatively influences other important areas. If yes, describe which ones. | | |
| Criterion F | | (a) Do you only injury yourself when you have used drugs or alcohol? | (a) Dichotomous variable (1 yes; 0 no) | (a) Not exclusively with substance intoxication (0) and |
| | | (b) From the list below, which behavior(s) have you ever engaged in? | (b) A list of 8 behaviors, the 9th option is an open-ended "other" category | (b) not restricted to hair pulling and skin picking |

[a] The list contained the following behaviors: (1) scratching my skin to the point of drawing blood, (2) carving my own skin, (3) cutting my own skin, (4) hitting/bruising myself, (5) burning my skin, (6) stabbing or pricking myself with a sharp object, (7) banging my head, (8) rubbing my skin extensively, (9) other behavior, namely.

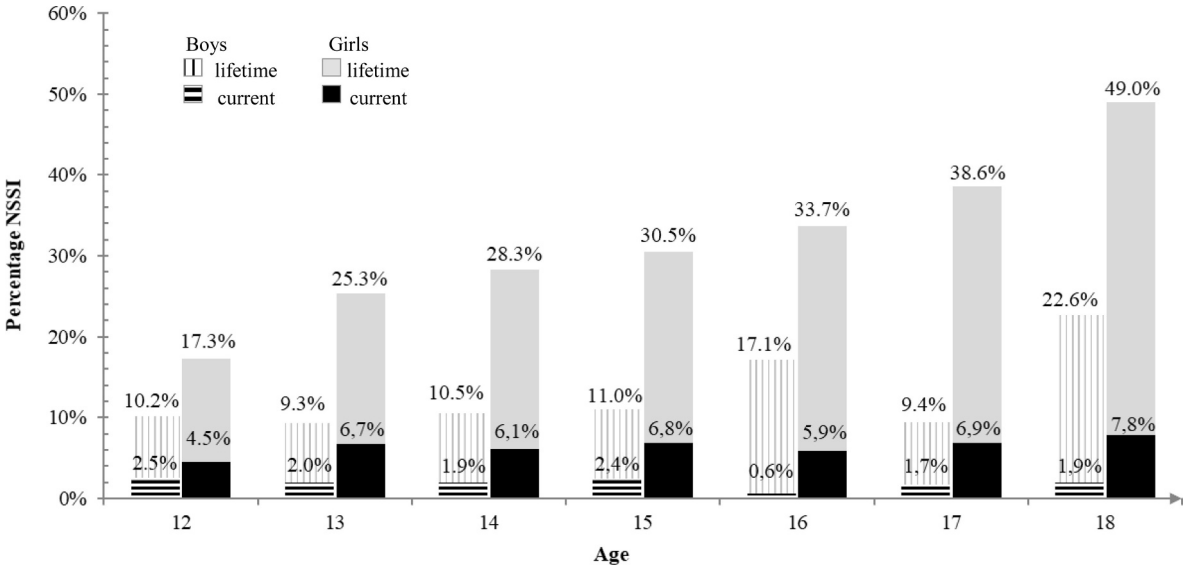


**Fig. 1.** Lifetime and current NSSI percentages by gender and age.
*Note.* Current NSSI; no significant gender difference ($M_{boys}$ = 1.9%, $M_{girls}$ = 6.2%, $\chi^2(1) = 1.563$, $p = .211$), no significant age difference for boys ($F(1, 111) = 2.77$, $p = .099$) or girls ($F(1335) = 2.677$, $p = .103$). Lifetime NSSI; significant gender difference ($M_{boys}$ = 12%, $M_{girls}$ = 29.9%, $\chi^2(1) = 99.919$, $p < .001$), significant age difference for boys ($F(1, 966) = 4.44$, $p = .035$) and girls ($F(1, 1153) = 31.45$, $p < .001$). The prevalence rate of NSSI was significantly higher in art education (37.4%) than general education (16.9%) or technical education (20.2%, $\chi^2(3) = 74.046$, $p < .001$). There was no significant gender * educational program interaction effect in the prediction of NSSI presence ($B = -.173$; $SE = .152$; Wald(1) = 91.90, $p = .073$).

**Table 2**
DSM-5 criteria of non-suicidal self-injury disorder.

| | | Past NSSI $n$ = 132 | Subthreshold $n$ = 153 | NSSI-D $n$ = 162 | Lifet.NSSI $n$ = 464 |
|---|---|---|---|---|---|
| **A** | In the last year, the individual has, on 5 or more days, engaged in intentional self-inflicted damage to the surface of his or her body of a sort likely to induce bleeding, bruising, or pain (e.g., cutting, burning, stabbing, hitting, excessive rubbing), with the expectation that the injury will lead to only minor or moderate physical harm (i.e., there is no suicidal intent)[a] | 0 | 34.6 | 100 | 49.0 |
| **B** | The individual engages in the self-injurious behavior with one or more of the following expectations:[b] | 84.0 | 80.3 | 100 | 88.7 |
| | **B1)** To obtain relief from a negative feeling or cognitive state | 80.8 | 76 | 98.1 | 85.7 |
| | **B2)** To resolve an interpersonal difficulty | 17.6 | 21.1 | 28.4 | 22.7 |
| | **B3)** To induce a positive feeling state | 16.8 | 21.9 | 34.6 | 25.4 |
| **C** | The intentional self-injury is associated with at least one of the following: | 96.9 | 98.0 | 100 | 98.5 |
| | **C1)** Interpersonal difficulties or negative feelings or thoughts, such as depression, anxiety, tension, anger, generalized distress, or self-criticism, occurring in the period immediately prior to the self-injurious act | 95.2 | 96.0 | 100 | 97.1 |
| | **C2)** Prior to engaging in the act, a period of preoccupation with the intended behavior that is difficult to control | 74.0 | 76.4 | 88.8 | 80.3 |
| | **C3)** Thinking about self-injury that occurs frequently, even when it is not acted upon | 22.4 | 48.3 | 79.0 | 52.6 |
| **D** | The behavior is not socially sanctioned (e.g., body piercing, tattooing, part of a religious or cultural ritual) and is not restricted to picking a scab or nail biting | 100 | 100 | 100 | |
| **E** | The behavior or its consequences cause: | 71.1 | 57.6 | 100 | 77.6 |
| | **E1)** Clinically significant distress | 53.7 | 40.7 | 76.3 | 57.4 |
| | **E2)** Interference in interpersonal functioning | 49.6 | 35.3 | 63.7 | 50.2 |
| | **E3)** Interference in academic functioning | 40.5 | 25.2 | 64.0 | 44.0 |
| | **E4)** Interference in other important areas of functioning | 19.8 | 11.8 | 32.5 | 21.8 |
| **F** | The behavior does not occur exclusively during psychotic episodes, delirium, substance intoxication, or substance withdrawal. In individuals with a neurodevelopmental disorder, the behavior is not part of a pattern of repetitive stereotypies. The behavior is not better explained by another mental disorder or medical condition (e.g., psychotic disorder, autism spectrum disorder, intellectual disability, Lesch–Nyhan syndrome, stereotypic movement disorder with self-injury, trichotillomania, excoriation disorder) | 100 | 96.7 | 100 | 98.9 |
| Criteria met | One or more | 100 | 100 | 100 | 100 |
| | Two or more | 100 | 100 | 100 | 100 |
| | Three or more | 98.3 | 99.4 | 100 | 99.3 |
| | Four or more | 91.6 | 95.3 | 100 | 96.0 |
| | Five | 60.8 | 73.0 | 100 | 79.8 |
| | Six | 0 | 0 | 100 | 37.7 |

*Note*. Lifet. NSSI, lifetime NSSI. Reprinted with permission from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (Copyright © 2013). American Psychiatric Association.

[a] Note. The absence of suicidal intent has either been stated by the individual or can be inferred by the individual's repeated engagement in a behavior that the individual knows, or has learned, is not likely to result in death.

[b] Note. The desired relief or response is experienced during or shortly after the self-injury, and the individual may display patterns of behavior suggesting a dependence on repeatedly engaging in it.

**Table 3**
Representation of criterion A.

| | Number of days engaged in NSSI in the last year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1-4 | 5-9 | 10-14 | 15-19 | 20-24 | ≥ 25 | Total |
| 12-month NSSI | 100<br>31.0% | 62<br>19.2% | 42<br>13.0% | 32<br>9.9% | 44<br>13.6% | 43<br>13.3% | 323<br>100% |
| | | | *n* = 223 (69.0%) | | | | |
| | | | | *n* = 161 (49.8%) | | | |
| Subthreshold | 100<br>65.4% | 13<br>8.5% | 14<br>9.2% | 9<br>5.9% | 5<br>3.3% | 12<br>7.8% | 153<br>100% |
| NSSI-D | 0<br>0% | 45<br>27.8% | 27<br>16.7% | 21<br>13.0% | 38<br>23.5% | 31<br>19.1% | 162<br>100% |

*Note.* 12-month NSSI: participants who indicated engaging in self-injury at least once in the past year; NSSI-D: participants fulfilling all six DSM-5 criteria; Subthreshold: participants engaging in self-injury in the last 12 months but not fulfilling all NSSI-D criteria.

**Table 4**
Endorsement of criterion B and C in lifetime NSSI (*n* = 464) or current NSSI (*n* = 90).

| DSM-5 Criteria B and C | | Life-time | Current |
|---|---|---|---|
| B1 | In injure myself to relieve negative thoughts or feelings | 85.7% | 87.2% |
| B2 | I injure myself to resolve interpersonal difficulties | 22.7% | 21.6% |
| B3 | I injure myself to induce a positive state | 25.4% | 33.3% |
| **B** | *At least one subcriterion (B1/B2/B3) is present* | *88.7%* | *89.8%* |
| C1a | In the period immediately prior to self-injuring, I experience negative feelings or thoughts | 95.8% | 98.9% |
| C1b | In the period immediately prior to self-injuring, I get into conflicts with others | 84.7% | 84.3% |
| C2 | Prior to engaging in self-injury, I experience a period of preoccupation with the behavior that I can't control | 80.3% | 91.0% |
| C3 | I often think about self-injury, even when I'm not acting upon it. | 52.6% | 85.4% |
| **C** | *At least one subcriterion (C1/C2/C3) is present* | *98.5%* | *98.9%* |

Note. Lifetime = adolescents who indicated having ever engaged in NSSI; Current = adolescents who indicated to be currently engaging in NSSI.

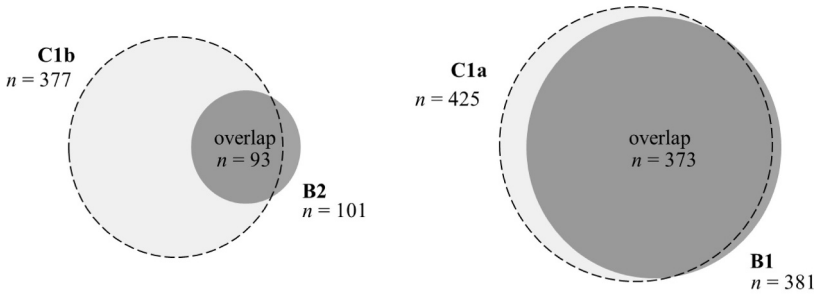


**Fig. 2.** Visual representation of the proportional overlap between criteria B and C of DSM-5 non-suicidal self-injury disorder. The diameter of the venn diagrams represents the sample size.

and 90.6% of those who met criterion C also met criterion B (Fig. 2) .[5]

We hypothesised (1) overlap between B2 and C1b, and (2) overlap between B1 and C1a.Our results partially confirmed the first hypothesis (see Fig. 2): out of the 101 participants who confirmed criterion B2, 93 participants (92%) also confirmed criterion C1b. This indicates that almost all of those who self-injure to resolve interpersonal conflicts (B2), also reported conflicts with others before their self-injurious act (C1b). Less straightforward, however, was the opposite association. Namely, out of the 377 participants who report having interpersonal conflict before engaging in NSSI (C1b), only a minority (25%) engages in NSSI to *resolve* this conflict (B2); most (87%) engage in NSSI to relieve negative thoughts or feelings (B1).

The second hypothesis, regarding the overlap of criteria B1 and C1a, was confirmed (see Fig. 2). Out of the 381 participants who met criterion B1, 373 (98%) also met C1a. Conversely, out of the 425 participants who met criterion C1a, 373 (88%) also met B1. This shows that

[5] See also Supplementary Table 1 for the overview of endorsement per (sub) criterion.

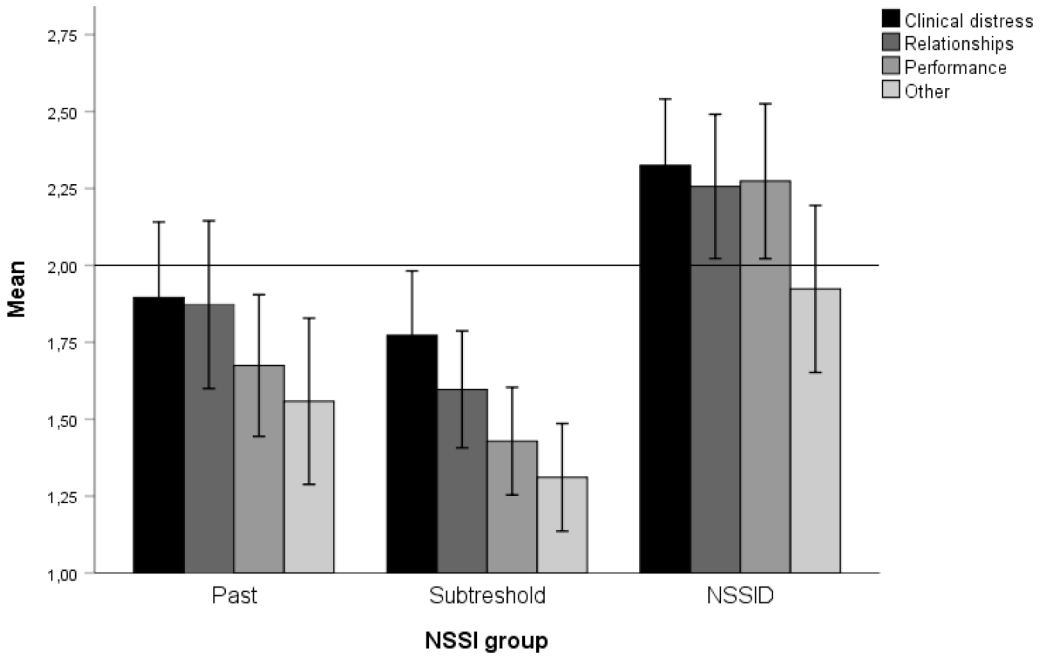


**Fig. 3.** Comparing criterion E questions in NSSI subgroups.
Note. Mean = mean score on criterion E items (Likert scale ranging from 1 to 5); Error bars represent ± 2 SE.

those who self-injure to reduce negative thoughts or feelings (B1), almost all experience negative thoughts or feelings immediately prior to their NSSI (C1a). Similarly, adolescents who experience negative thoughts or feelings prior to their NSSI (C1a), also tend to indicate reducing these feelings as a function of NSSI (B1).

**Criterion E.** Criterion E consists of four questions assessing the extent to which NSSI causes clinical distress (E1, $M = 2.03$, $SD = 1.15$), interference in interpersonal functioning (E2, $M = 2.03$, $SD = 1.26$), interference in academic functioning (E3, $M = 1.88$, $SD = 1.22$), and interference in other important areas (E4, $M = 1.61$, $SD = 1.28$). These mean values (ranging from 1.61 to 2.03) indicate that, across the entire group of adolescents with a history of NSSI in our sample, scores on the Criterion E distress items were on the lower end of the scale (ranging from 1 to 5). However, as displayed in Fig. 3, significant differences exist between those adolescents meeting all NSSI-D criteria and the other NSSI groups. Specifically, adolescents meeting all NSSI-D criteria ($M_{critE} = 8.77$, $SD_{critE} = 3.27$) reported significantly higher criterion E values ($F_{welch}$ (2, 197) $= 21.41$, $p < .001$) compared to adolescents in the past NSSI group ($M_{critE} = 7.00$, $SD_{critE} = 3.60$; $M_{\Delta} = 1.78$**) and subthreshold group ($M_{critE} = 6.11$, $SD_{critE} = 3.03$; $M_{\Delta} = 2.67$***). Thus, although criterion E received relatively low endorsement overall in our sample, it still significantly distinguished adolescents with and without NSSI-D from one another.

## 5. Discussion

The purpose of this study was to investigate NSSI Disorder (NSSI-D; a condition requiring further research included in DSM-5; American Psychiatric Association, 2013). We aimed to investigate (1) NSSI-D prevalence rates and (2) the NSSI-D criteria in DSM-5 that were most often criticised (i.e., criterion A, B/C, and E). In obtaining these objectives, we used the final DSM-5 criteria in a large community sample of adolescents.

### 5.1. NSSI-D prevalence rates in a community sample of adolescents

In our sample, 7.6% of adolescents met all NSSI-D criteria, a percentage that is slightly higher but similar to previous studies in adolescents. Zetterqvist et al. (2013) reported 6.7% of 3060 adolescents (15–17 years) to be eligible for an NSSI-D diagnosis and Albores-Gallo et al. (2014) found a prevalence rate of 5.6% in a sample of 533 adolescents between 11 and 17 years old. Consistent with previous work (Kiekens et al., 2018b; Plener et al., 2016), NSSI-D prevalence was higher in girls than boys.

### 5.2. Investigating DSM-5 NSSI-D criteria (A, B/C, E)

We investigated three criteria that were often criticised by both researchers and clinicians. First, clinicians raised concerns regarding the cut-off of five instances in the past year (***Criterion A***) as adolescents in psychiatry practices often presented with far more than five episodes of NSSI (Zetterqvist, 2015). Additionally, one empirical study in a community sample of adolescents suggested increasing the Criterion A benchmark to 10 or more instances in the past year based on their data (Zetterqvist et al., 2013). Similar to Muehlenkamp and Brausch (2016), our results showed that increasing the criterion from *5 or more* to *10 or more* acts of NSSI in the past year, made the prevalence rates of NSSI-D drop from 7.6% to 5.5% in the full community sample of adolescents. There seems to be growing empirical evidence suggesting the field should reconsider the frequency threshold for Criterion A given that a number of studies indicate a cut-off of 5 days in the past year may be too low to be clinically meaningful.

Second, regarding ***criterion B/C***, our results were in line with the high endorsement of criterion B described by previous research (Brausch et al., 2016; Washburn et al., 2015). Having 89% and 99% meeting respectively criterion B and C in a community sample clearly questions the clinical utility of these criteria for the DSM-5 diagnosis of NSSI-D. It implies that it is unlikely that any specificity or sensitivity would have been added by including the criterion in the set. Moreover, our results showed a substantial overlap between criterion B and C. We chose to split criteria B and C in different meaningful components to investigate this overlap in a precise and detailed manner. As Fig. 2 shows, adolescents who reported negative feelings prior to engaging in NSSI (C1a), mainly reported engaging in NSSI to resolve negative feelings or thoughts (B1). However, adolescents who reported interpersonal conflict prior to engaging in NSSI (C1b), were not so likely to report engaging in NSSI to resolve interpersonal conflict (B2), rather, they too reported resolving negative feelings or thoughts as their reason

to engage in NSSI. In conclusion, the relation between criterion B and C is not merely a case of complete overlap, nor is one full criterion simply subordinate to the other.

We suggest two possible reasons for this finding. First, research has reached consensus that interpersonal functions of NSSI are rarely reported (Muehlenkamp et al., 2013; Taylor et al., 2017). This aligns with the low endorsement we found in our study for "engaging in NSSI to resolve conflict with others (B2)". Criterion C1b, on the other hand, was commonly reported; 84% of adolescents reported to experience interpersonal conflict right before they engaged in NSSI. Consequently, simply because there were so many adolescents confirming criterion C1b, overlap with something as uncommon as injuring oneself to resolve conflicts (B2) was bound to be small. Second, criterion B2 could be affected by self-report bias and social stigma. Namely, in the current study we were fully dependent on the reflective functioning and honesty of our young participants, who are likely to experience (implicit or explicit) social stigma regarding their NSSI (Jacobson and Gould, 2007). However, as stated above, research has long agreed that social functions are uncommon motivations for NSSI and our results align with this consensus. Our study adds to the literature by showing that even those who experience social conflict prior to NSSI, are unlikely to then engage in NSSI to resolve this social conflict, but rather do so to resolve emotional distress (possibly caused by the social conflict). Even though it could be so that individuals originally started self-injuring to get attention or to elicit social reinforcement (Caicedo and Whitlock, 2009; Jacobson and Gould, 2007; Muehlenkamp et al., 2013), our results show that regulating negative affect (possibly evoked by the social conflict) remains their main motivation.

Finally, regarding ***criterion E***, adolescents in our sample reported relatively low interference in their daily lives due to their NSSI. This lack of impairment has been reported by previous studies as well (e.g., In-Albon et al., 2013; Zetterqvist et al., 2013). Zetterqvist (2015) suggested that the specific phrasing of criterion E would not resonate well with those engaging in NSSI, since some patients regard NSSI as helpful, rather than distressing or impairing their personal daily life. Importantly however, and in line with Gratz et al. (2015), criterion E significantly distinguished adolescents with and without NSSI-D from one another in our sample, thereby seemingly functioning as a meaningful screening criterion for NSSI-D. Thus, perceiving and reporting negative consequences of NSSI is relatively uncommon in those engaging in NSSI, but when one *does* report impairment due to NSSI, it may be indicative that NSSI for those adolescents is better conceptualized as a mental disorder than a symptomatic behaviour. Over time, these individuals might start to experience little volitional control over NSSI (i.e., leading to significant distress about the behaviour) or might experience that the negative consequences (e.g., scars, interpersonal conflict) outweigh the benefits (e.g., temporality relief) of NSSI. Given the findings, and the fact that only 35% of clinicians and researchers previously considered criterion E as prototypic of those engaging in NSSI (Lengel and Mullins-Sweatt, 2013), the clinical utility of this criterion deserves more empirical scrutiny in future research.

Finally, an additional interesting demographic finding was that, in our study, adolescents who met all the NSSI-D criteria indicated they spent more time online seeking information and speaking with others about NSSI, a concerning finding for at least two reasons. First, NSSI-related posts on popular social media platforms such as Instagram[6] or Tumblr were found to be saturated with graphic content; almost 75% of the examined online posts included blood, cut/scars, or other injuries (Miguel et al., 2017). Second, Instagram posts with depictions of more severe wounds (e.g., gaping cuts or larger amounts of blood) tend to generate more comments from other users of the social platform (Brown et al., 2018). These comments can function as a social positive reinforcement for NSSI, resulting in the adolescent performing and posting more severe self-injurious acts (Brown et al., 2018; Nock and Prinstein, 2004). The present study encourages mental health professionals to assess the influences of social media, especially when working with adolescents who engage in more severe self-injury, such as those meeting NSSI-D criteria (Lewis et al., 2019).

### 5.3. Limitations and future research directions

Although the present study contributes to the understanding of NSSI-D as proposed in DSM-5, our research is not without limitations. First, our findings are based solely on adolescent self-report questionnaires. Collecting self-report data from a single informant could result in reporting bias (Podsakoff et al., 2003) and may have limited our ability to adequately assess certain features, such as criterion E. Although most adolescents with NSSI did not indicate interference or distress due to NSSI (Criterion E) in our questionnaire, future studies using clinical interviews could address more specific consequences such as impact of visible scars and wounds (e.g., avoiding clothing changes in public). In that way, the interference referred to in Criterion E could be assessed in a comprehensive manner. While we could have questioned peers, parents, or teachers about NSSI and its consequences, research has shown that people do not always observe internalizing behaviours accurately in others (e.g., Achenbach et al., 1987), making the NSSI-D criteria difficult to assess by other informants. Additionally, NSSI is often secretive (Baetens et al., 2011), and people close to the adolescent who engages in NSSI, such as parents, are often unaware of the presence of the NSSI (Baetens et al., 2015). Future research could embrace a multi-method approach and include structured or semi-structured interviews with the adolescents and/or use behavioural measures. Relatedly, criterion F (the exclusion of other disorders as a better explanation of the self-injurious behaviour) was measured by self-report questionnaires in the current study. In our questionnaires, we only assessed substance use, trichotillomania, and excoriation disorder, even though criterion F lists multiple possible mental disorders and medical conditions that could explain the self-injurious behaviour (see Table 2). Thus, future research could use diagnostic interviews to exclude all other possible alternative diagnoses. Another limitation is that our results may not be generalizable to clinical samples and our conclusions are restricted by the cross-sectional nature of our study. Therefore, as the field moves forward, longitudinal studies in both community and clinical populations will be necessary to examine the clinical utility and validity of this newly proposed disorder, its developmental course, differentiation from other disorders, and the short- and long-term antecedents and consequents of NSSI-D.

## CRediT authorship contribution statement

**Tinne Buelens:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. **Koen Luyckx:** Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Writing - review & editing. **Glenn Kiekens:** Methodology, Writing - review & editing. **Amarendra Gandhi:** Methodology, Writing - review & editing. **Jennifer J. Muehlenkamp:** Writing - review & editing. **Laurence Claes:** Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Writing - review & editing.

## Declaration of Competing Interest

The authors declare that they have no conflict of interest.

[6] In February 2019, Instagram released a statement introducing a ban on all graphic images of self-injury and improvements in the algorithm to track down and suppress non-graphic content (Mosseri, 2019). Importantly, however, content that shows reflection upon self-injury will still be allowed, as it can help people get the support they need (Mosseri, 2019).

## Acknowledgements

We would like to thank Ine Triangl, Lotte Verboven, and Kaat Buelens for their help with the data-collection.

## Role of the funding source

This study was funded by Fonds Wetenschappelijk Onderzoek (FWO, Belgium; grant number G062117N).

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2019.09.009.

## References

Achenbach, T.M., McConaughy, S.H., Howell, C.T., 1987. Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. Psychol. Bull. 101 (2), 213–232. https://doi.org/10.1037/0033-2909.101.2.213.

Albores-Gallo, L., Méndez-Santos, J.L., Xóchitl-García Luna, A., Delgadillo-González, Y., Chávez-Flores, C.I., Martínez, O.L., ... Martinez, O.L., 2014. Nonsuicidal self-injury in a community sample of older children and adolescents of Mexico city. Actas Esp. Psiquiatr. 42 (4), 159–168.

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders (DSM-5). American Psychiatric Press, Washington DC, US.

Ammerman, B.A., Jacobucci, R., Kleiman, E.M., Muehlenkamp, J.J., McCloskey, M.S., 2017. Development and validation of empirically derived frequency criteria for NSSI disorder using exploratory data mining. Psychol. Assess. 29 (2), 221–231. https://doi.org/10.1037/pas0000334.

Ammerman, B.A., Jacobucci, R., McCloskey, M.S., 2019. Reconsidering important outcomes of the nonsuicidal self-injury disorder diagnostic criterion a. J. Clin. Psychol. https://doi.org/10.1002/jclp.22754.

Andover, M.S., 2014. Non-suicidal self-injury disorder in a community sample of adults. Psychiatry Res. 219 (2), 305–310. https://doi.org/10.1016/j.psychres.2014.06.001.

Baetens, I., Claes, L., Muehlenkamp, J., Grietens, H., Onghena, P., 2011. Non-suicidal and suicidal self-injurious behavior among flemish adolescents: a web-survey. Arch. Suicide Res. 15 (1), 56–67. https://doi.org/10.1080/13811118.2011.540467.

Baetens, I., Claes, L., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., ... Griffith, J.W., 2015. The effects of nonsuicidal self-injury on parenting behaviors: a longitudinal analyses of the perspective of the parent. Child Adolesc. Psychiatry Ment. Health 9 (1). https://doi.org/10.1186/s13034-015-0059-2.

Benjet, C., González-Herrera, I., Castro-Silva, E., Méndez, E., Borges, G., Casanova, L., Medina-Mora, M.E., 2017. Non-suicidal self-injury in Mexican young adults: prevalence, associations with suicidal behavior and psychiatric disorders, and DSM-5 proposed diagnostic criteria. J. Affect. Disord. 215, 1–8. https://doi.org/10.1016/j.jad.2017.03.025.

Brausch, A.M., Muehlenkamp, J.J., Washburn, J.J., 2016. Nonsuicidal self-injury disorder: does criterion B add diagnostic utility. Psychiatry Res. 244, 179–184. https://doi.org/10.1016/j.psychres.2016.07.025.

Brown, R.C., Fischer, T., Goldwich, A.D., Keller, F., Young, R., Plener, P.L., 2018. #cutting: non-suicidal self-injury (NSSI) on Instagram. Psychol. Med. 48 (2), 337–346. https://doi.org/10.1017/S0033291717001751.

Caicedo, S., Whitlock, J.L., 2009. Top misconceptions about self-injury. The Fact Sheet series, Cornell Research Program on Self-Injury and Recovery. Cornell University, Ithaca, NY.

Cohen, J., 1988. Statistical Power Analysis For the Behavioral Sciences (2nd Edition). Lawrence Erlbaum Associates, Hillsdale, New Jersey.

Cortina, J.M., 1993. What is coefficient alpha? An examination of theory and applications. J. Appl. Psychol. 78 (1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98.

Crouch, W., Wright, J., 2004. Deliberate self-harm at an adolescent unit: a qualitative investigation. Clin. Child Psychol. Psychiatry 9 (2), 185–204. https://doi.org/10.1177/1359104504041918.

Gratz, K.L., Dixon-Gordon, K.L., Chapman, A.L., Tull, M.T., 2015. Diagnosis and characterization of DSM-5 nonsuicidal self-injury disorder using the clinician-administered nonsuicidal self-injury disorder index. Assessment 22 (5), 527–539. https://doi.org/10.1177/1073191114565878.

In-Albon, T., Ruf, C., Schmid, M., 2013. Proposed diagnositic criteria for the DSM-5 of nonsuicidal self-injury in female adolescents: diagnostic and clinical correlates. Psychiatry J. 2013, 159208. https://doi.org/10.1155/2013/159208.

Jacobson, C.M., Gould, M., 2007. The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: a critical review of the literature. Arch. Suicide Res. 11 (2), 129–147. https://doi.org/10.1080/13811110701247602.

Jakobsen, J.C., Gluud, C., Wetterslev, J., Winkel, P., 2017. When and how should multiple imputation be used for handling missing data in randomised clinical trials—A practical guide with flowcharts. BMC Med. Res. Methodol. 17 (1), 1–10. https://doi.org/10.1186/s12874-017-0442-1.

Kiekens, G., Hasking, P., Boyes, M., Claes, L., Mortier, P., Auerbach, R.P., ... Bruffaerts, R., 2018a. The associations between non-suicidal self-injury and first onset suicidal thoughts and behaviors. J. Affect. Disord. 239, 171–179. https://doi.org/10.1016/j.jad.2018.06.033.

Kiekens, Glenn, Hasking, P., Claes, L., Mortier, P., Auerbach, R.P., Boyes, M., ... Bruffaerts, R., 2018b. The DSM-5 nonsuicidal self-injury disorder among incoming college students: prevalence and associations with 12-month mental disorders and suicidal thoughts and behaviors. Depress. Anxiety 35 (7), 629–637. https://doi.org/10.1002/da.22754.

Lengel, G.J., Mullins-Sweatt, S.N., 2013. Nonsuicidal self-injury disorder: clinician and expert ratings. Psychiatry Res. 210 (3), 940–944. https://doi.org/10.1016/j.psychres.2013.08.047.

Lewis, S.P., Kenny, T.E., Pritchard, T.R., 2019. Toward an understanding of online self-injury activity. Nonsuicidal Self-Injury. pp. 195–214. https://doi.org/10.4324/9781315164182-12.

Miguel, E.M., Chou, T., Golik, A., Cornacchio, D., Sanchez, A.L., DeSerisy, M., Comer, J.S., 2017. Examining the scope and patterns of deliberate self-injurious cutting content in popular social media. Depress. Anxiety 34 (9), 786–793. https://doi.org/10.1002/da.22668.

Mosseri, A. (2019). Changes we're making to do more to support and protect the most vulnerable people who use Instagram. Retrieved June 4, 2019, from https://instagram-press.com/blog/2019/02/07/changes-were-making-to-do-more-to-support-and-protect-the-most-vulnerable-people-who-use-instagram/.

Muehlenkamp, J., Brausch, A., Quigley, K., Whitlock, J., 2013. Interpersonal features and functions of nonsuicidal self-injury. Suicide Life-Threat. Behav. 43 (1), 67–80. https://doi.org/10.1111/j.1943-278X.2012.00128.x.

Muehlenkamp, J.J., 2005. Self-Injurious behavior as a separate clinical syndrome. Am. J. Orthopsychiatr. 75 (2), 324–333. https://doi.org/10.1037/0002-9432.75.2.324.

Muehlenkamp, J.J., Brausch, A.M., 2016. Reconsidering criterion a for the diagnosis of non-suicidal self-injury disorder. J. Psychopathol. Behav. Assess. 38 (4), 547–558. https://doi.org/10.1007/s10862-016-9543-0.

Muehlenkamp, J.J., Brausch, A.M., Washburn, J.J., 2017. How much is enough? Examining frequency criteria for NSSI disorder in adolescent inpatients. J. Consult. Clin. Psychol. 85 (6), 611–619. https://doi.org/10.1037/ccp0000209.

Muehlenkamp, J.J., Claes, L., Havertape, L., Plener, P.L., 2012. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. Child Adolesc. Psychiatry Ment. Health 6 (1), 10. https://doi.org/10.1186/1753-2000-6-10.

Nock, M.K., 2009. Why do people hurt themselves? Curr. Dir. Psychol. Sci. 18 (2), 78–83. https://doi.org/10.1111/j.1467-8721.2009.01613.x.

Nock, M.K., Favazza, A.R., 2009. Nonsuicidal self-injury: definition and classification. Understanding Nonsuicidal Self-Injury: Origins, Assessment, and Treatment. pp. 9–18. https://doi.org/10.1037/11875-001.

Nock, M.K., Prinstein, M.J., 2004. A functional approach to the assessment of self-mutilative behavior. J. Consult. Clin. Psychol. 72 (5), 885–890. https://doi.org/10.1037/0022-006X.72.5.885.

Plener, P.L., Allroggen, M., Kapusta, N.D., Brähler, E., Fegert, J.M., Groschwitz, R.C., 2016. The prevalence of Nonsuicidal Self-Injury (NSSI) in a representative sample of the German population. BMC Psychiatry 16 (1), 1–7. https://doi.org/10.1186/s12888-016-1060-x.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J. Appl. Psychol. 88 (5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879.

Regier, D.A., Narrow, W.E., Clarke, D.E., Kraemer, H.C., Kuramoto, S.J., Kuhl, E.A., Kupfer, D.J., 2013. DSM-5 field trials in the United States and Canada, part II: test-Retest reliability of selected categorical diagnoses. Am. J. Psychiatry 170 (1), 59–70. https://doi.org/10.1176/appi.ajp.2012.12070999.

Ross, S., Heath, N., 2002. A study of the frequency of self-mutilation in a community sample of adolescents. J. Youth Adolesc. 31 (1), 67–77. https://doi.org/10.1023/A:1014089117419.

Selby, E.A., Kranzler, A., Fehling, K.B., Panza, E., 2015. Nonsuicidal self-injury disorder: the path to diagnostic validity and final obstacles. Clin. Psychol. Rev. 38, 79–91. https://doi.org/10.1016/j.cpr.2015.03.003.

Swannell, S.V., Martin, G.E., Page, A., Hasking, P., St John, N.J., 2014. Prevalence of nonsuicidal self-injury in nonclinical samples: systematic review, meta-analysis and meta-regression. Suicide Life-Threat. Behav. 44 (3), 273–303. https://doi.org/10.1111/sltb.12070.

Taylor, P.J., Jomar, K., Dhingra, K., Forrester, R., Shahmalak, U., Dickson, J.M., 2017. A meta-analysis of the prevalence of different functions of non-suicidal self-injury. J. Affect. Disord. 227, 759–769. https://doi.org/10.1016/j.jad.2017.11.073.

Washburn, J.J., Potthoff, L.M., Juzwin, K.R., Styer, D.M., 2015. Assessing DSM-5 nonsuicidal self-injury disorder in a clinical sample. Psychol. Assess. 27 (1), 31–41. https://doi.org/10.1037/pas0000021.

Wilkinson, P., Goodyer, I., 2011. Non-suicidal self-injury. Eur. Child Adolesc. Psychiatry 20 (2), 103–108. https://doi.org/10.1007/s00787-010-0156-y.

Wilkinson, P.O., Qiu, T., Neufeld, S., Jones, P.B., Goodyer, I.M., 2018. Sporadic and recurrent non-suicidal self-injury before age 14 and incident onset of psychiatric disorders by 17 years: prospective cohort study. Br. J. Psychiatry 212 (4), 222–226. https://doi.org/10.1192/bjp.2017.45.

Zetterqvist, M., 2015. The DSM-5 diagnosis of nonsuicidal self-injury disorder: a review of the empirical literature. Child Adolesc. Psychiatry Ment. Health 9 (1), 31. https://doi.org/10.1186/s13034-015-0062-7.

Zetterqvist, M., Lundh, L.-G., Dahlström, Ö., Svedin, C.G., 2013. Prevalence and function of Non-Suicidal Self-Injury (NSSI) in a community sample of adolescents, using suggested DSM-5 criteria for a potential NSSI disorder. J. Abnorm. Child Psychol. 41 (5), 759–773. https://doi.org/10.1007/s10802-013-9712-5.