



Non-suicidal self-injury in Portuguese college students: relationship with emotion regulation, resilience and self-compassion

Sónia Gonçalves¹ · Ana Isabel Vieira² · Bárbara Cesar Machado³ · Catarina Bessa¹

Accepted: 10 July 2023 / Published online: 20 July 2023
© The Author(s) 2023

Abstract

Non-Suicidal Self-Injury (NSSI) are behaviors relatively frequent among college students and seem to be associated to difficulties in emotion regulation. Less is known, however, about the relationship of NSSI with protective factors such as resilience and self-compassion. The aims of this study are to compare three groups of Portuguese college students (without NSSI, past NSSI, and current NSSI) regarding difficulties in emotion regulation, resilience, and self-compassion and to evaluate the predictors of NSSI considering demographics and those risk and protective factors. Three hundred and eighty-five college students were evaluated through self-report measures. Ninety participants (23.4%) reported lifetime NSSI. These participants reported higher difficulties in emotion regulation and lower resilience and self-compassion than the group without NSSI. The group with current NSSI presented the lowest levels of resilience and self-compassion. Lifetime NSSI was significantly associated with past suicide attempts. Past psychopathology and lower self-compassion were predictors of NSSI. Interventions for decrease NSSI in college students should promote adaptive emotion regulation strategies, resilience, and self-compassion.

Keywords Non-suicidal self-injury · College students · Emotion regulation · Resilience · Self-compassion

Introduction

Non-Suicidal Self-Injury (NSSI) is defined as deliberate act, typically repetitive and socially unacceptable, that cause damage on the body tissue, don't revealing suicidal intentions by the individual (Claes & Vandereycken, 2007; Messer & Fremouw, 2008). Besides, NSSI is considered a high-risk marker for the development and persistence of mental health problems, encompassing high rates of morbidity and mortality, and causing substantial costs for the health system (Buerger et al., 2022). NSSI are more common in adolescence, being the first occurrence typically between 12 and 14 years old, with prevalence of 17–60% throughout life (Cipriano et al., 2017). In college students, prevalence varies

between 11.68% (Heath et al., 2008) and 39.5% (Hamza et al., 2013). Regarding sex, it seems to exist some inconsistencies - some studies report that women involve themselves more in NSSI than men (e.g., Liao et al., 2022; Rotolone and Martin, 2012), and others don't report significant differences between women and men (e.g., Swannell et al., 2014). Moreover, NSSI can take countless forms (Cipriano et al., 2017; Claes & Vandereycken, 2007), being the most common cutting (Cipriano et al., 2017; Swannell et al., 2014). The majority of individuals uses more than one method (Cipriano et al., 2017) and their involvement can vary in frequency. A higher frequency, severity and number of NSSI methods, seem to function as predictors of suicidal behaviors, which suggests that NSSI can be a risk factor for suicide (Buerger et al., 2022; Hamza et al., 2012). NSSI can even be considered as a critical risk factor for suicide attempts and several studies identified clear associations between NSSI and suicidal behavior and, in some of them, NSSI appear to be even a stronger predictor of suicide attempts than past suicidal behavior (cf. Wolff et al., 2019). This relation of risk between the two phenomena can result from a habituation to fear and to physical pain provoked by NSSI, which seems to facilitate the acquisition of capacity to commit suicidal acts (Nock et al., 2006). NSSI can also perform various functions such

✉ Sónia Gonçalves
sgoncalves@psi.uminho.pt

¹ Centre of Research in Psychology of University of Minho (CiPsi) School of Psychology, University of Minho, Campus de Gualtar, Braga, Portugal

² Faculty of Education and Psychology, University of Porto, Porto, Portugal

³ CEDH - Research Centre for Human Development, Universidade Católica Portuguesa, Porto, Portugal

as to show the interpersonal influence (e.g., to seek others help), to punish the self, to induce and finish states of dissociation and depersonalization, among others, being the most common, to regulate the emotional state (cf. Edmondson et al., for a systematic review). Deficits in emotion regulation, specifically in terms of managing with uncomfortable feelings and relief from emotional stress/pressure, are the most frequent reasons for NSSI (Muehlenkamp et al., 2013). Accordingly, studies suggest that there are characteristic emotional states present before and after the occurrence of NSSI. The first involve emotions with a more negative connotation (e.g., anger, anxiety and depression), in turn, the second involve more positive emotions and a decrease of the previous negative emotionality (Braga & Gonçalves, 2014; Cipriano et al., 2017). According to the Emotion Regulation Model of Messer and Fremouw (2008), people seem to engage in NSSI to relieve the prior negative emotionality, consequently increasing the positive emotions.

In turn, emotional dysregulation can be characterized by deficits: in consciousness, comprehension and acceptance of emotions; in the ability of involvement in goal-directed behaviors and in the ability of controlling impulses when experiencing negative emotions; by the use of inadequate strategies to modulate emotions; and not being willing to experience negative emotions as part of the search for significant activities in life (Gratz & Roemer, 2004). In that sense, emotional dysregulation can constitute a vulnerability for NSSI on college students, given that the ones who report NSSI tend to present higher difficulties in emotion regulation as opposed to the ones who don't (Emery et al., 2016). In fact, in a recent systematic review and meta-analysis, Wolff et al. (2019) findings supported the notion that greater emotion dysregulation is associated with higher likelihood of NSSI among individuals across settings, regardless of age or sex. Furthermore, findings revealed that different emotion dysregulation types, such as limited access to emotion regulation strategies, may have unique implications for NSSI risk (Wolff et al., 2019). On the other hand, self-compassion, seems to be associated to lower NSSI in college students (Hasking et al., 2019; Kaniuka et al., 2020; Nagy et al., 2021). Self-compassion can be defined as involving (a) a kind and comprehensive attitude towards the self in moments of pain or failure, (b) a perception that the experiences of the self are part of the larger human experience and (c) a balanced awareness of painful thoughts, possibly functioning as a protective factor against NSSI (Neff, 2003a). According to Suh and Jeong (2021), intense negative feelings and attitudes about the self often coexist with NSSI, hypothesizing that self-compassion may reduce this negative emotional state. Briefly, and regarding to the role of self-compassion, psychopathology, and NSSI, Kaniuka et al. (2020), found that self-compassion seems to decrease the depression-NSSI

and anxiety-NSSI relationships. In a recent meta-analysis, it was concluded that self-compassion was negatively associated with suicidal thoughts and behaviors and NSSI (cf. Suh & Jeong, 2021). The authors claim for more evidence to reflect about the potential protective role of self-compassion vs. NSSI. Another factor that appears to decrease NSSI (Rotolone & Martin, 2012) is the capacity of the individual to adapt successfully to adverse conditions that constitute risk for the well-being, which is called resilience (Masten, 2014). According to Rotolone and Martin's study (2012), individuals with past NSSI and individuals with current NSSI presented lower levels of resilience, comparatively to the ones who never engaged in NSSI, being the recent engagement in NSSI associated to the lowest levels of resilience. Moreover, a low level of resilience was the only significant predictor of current NSSI behaviors. In another study, conducted with Korean young adults, the authors found significant associations between NSSI and suicidal ideation and decreased resilience, and also concluded that participants who exhibited more suicidal ideation and less resilience, reported more functions NSSI (cf. Kim et al., 2019).

The present study aims to contribute to a deepening of the knowledge of NSSI and factors that seems to be associated to them, enhancing, or protecting from NSSI, namely difficulties in emotion regulation, resilience, and self-compassion, in a community sample of Portuguese college students. As far as it's known, in Portugal there are no studies that have approached the role of resilience and self-compassion in NSSI. The pertinence of this study resides in the fact that, if these variables work as protective factors against the development and maintenance of NSSI, intervention and prevention programs for the use of NSSI as a maladaptive emotion regulation behavior can profit from the promotion of adaptative strategies of emotion regulation, and the development of resilience and self-compassion skills among college students.

Accordingly, this study will follow two research questions: (1) are difficulties in emotion regulation enhancing NSSI behaviors and acting as a maintenance factor for NSSI involvement? and (2) can resilience and self-compassion be associated with the absence and/or lower levels of NSSI involvement, acting as protective factors for NSSI development and maintenance? (Fig. 1). Therefore, the specific aims are: (1) assess the frequency of NSSI; (2) characterize the types of NSSI and the underlying motivations; (3) compare three groups of individuals (without NSSI; past NSSI; current NSSI) regarding difficulties in emotion regulation, resilience and self-compassion; (4) assess the predicting role of sociodemographic and clinical variables such as age, sex and past psychopathology, and of psychological variables such as difficulties in emotion regulation, resilience and self-compassion in NSSI lifetime. Understanding the mechanisms that underlie NSSI behaviors is an important

Fig. 1 NSSI development and maintenance

step toward for, not only developing NSSI prevention programs that work, but also outline more effective clinical interventions for NSSI.

Method

Participants

In this study 385 college students participated, with ages between 18 and 35 ($M = 20.71$, $SD = 2.80$), being the majority women (85.2%), of Portuguese nationality (94.3%).

Regarding the socioeconomic level, 145 (37.7%) participants were from high class, 194 (50.4%) from middle class and 43 (11.2%) from low middle class. It was not possible to assess the economic level of 3 participants.

Measures

Sociodemographic and clinical questionnaire

Questionnaire built to gather sociodemographic and clinical information about participants, namely sex, age, nationality, native language, educational institution, course, grade, marital status, parents' academic level, past psychopathology and respective psychological or psychiatric support and existence of suicidal ideation and suicide attempts.

Self-Injury Questionnaire - Treatment Related – Short Form (SIQ-TR-SF – Claes and Vandereycken, 2007; translated by Gonçalves, 2007) Self-report measure developed from the original version with 12 items, that evaluates the presence of non-suicidal self-injury. Being this behavior present, its methods and duration are questioned, as well as the most frequent injured parts, frequency in the last month and frequency and intensity of pain during the behavior. Then, four questions are made in Likert scales of four points (1 = never to 4 = always) and five points (1 = nothing to 5 = a lot), in which the participant reports what he did when the behavior occurred (e.g., take care of the wounds), how he felt before and right after the behavior (e.g., nervous, relieved) and why he did it (e.g., to feel some pleasure).

Difficulties in Emotion Regulation Scale – Short Form (DERS-SF – Kaufman et al., 2016; adapted by Moreira et al., 2020) Self-report scale constituted by 18 items, answered on a five-point

Likert scale (1 = almost never to 5 = almost always) and distributed by six subscales: Limited Access to Emotion Regulation Strategies ($\alpha = 0.82$); Nonacceptance of Emotional Responses ($\alpha = 0.88$); Difficulties Engaging in Goal-Directed Behavior ($\alpha = 0.91$); Impulse Control Difficulties ($\alpha = 0.92$); Lack of Emotional Awareness ($\alpha = 0.70$) and Lack of Emotional Clarity ($\alpha = 0.81$). In the present sample, it reveals a good internal consistency ($\alpha = 0.92$).

Self-Compassion Scale (SCS - Neff, 2003b; adapted by Castilho & Gouveia, 2011) Self-report instrument that evaluates self-compassion, more specifically, its three basic components: self-kindness (i.e., the ability to be kind and understanding versus being harshly self-critical); common humanity (i.e., perceiving one's experiences as part of the larger human experience versus perceiving them as separate or isolated) and mindfulness (i.e., holding painful thoughts and feelings in balanced awareness versus overidentifying with them). Its 26 items, answered in a five-point Likert scale (1 = almost never to 5 = almost always), are distributed by six subscales: Self-Kindness ($\alpha = 0.89$); Self-Judgement ($\alpha = 0.87$); Common Humanity ($\alpha = 0.80$); Isolation ($\alpha = 0.83$); Mindfulness ($\alpha = 0.79$) and Over-identification ($\alpha = 0.83$). In the present sample, it reveals an excellent internal consistency ($\alpha = 0.95$).

Resilience Scale for College Students (RS - Wagnild & Young, 1993; adapted by Oliveira & Machado, 2011) Scale constituted by 25 items, answered in a seven-point Likert scale (1 = totally disagree to 7 = totally agree) and distributed by five subscales: Personal Competence (belief that the subject has on himself as positive perception) ($\alpha = 0.89$); Self-discipline (subject's perception of his capacity of organization on solving tasks) ($\alpha = 0.82$); Autonomy (most autonomous dimension of the individual, translated in his ability to solve things on his own) ($\alpha = 0.73$); Solving Problems (ability of solving problems, focusing on the way the subject will face the situations) ($\alpha = 0.56$) and Optimism (a more positive perception of life, without excess of preoccupations) ($\alpha = 0.54$). In the present sample, it reveals a good internal consistency ($\alpha = 0.92$).

Procedure

The present study was authorized and approved by the Ethics Commission of the University. After approval, the random

recruitment of participants took place, through online dissemination (i.e., on social media and on the platform for crediting experiences of the School of Psychology at University of Minho), of a form created with Google Forms, that contained the informed consent (i.e., goals, study procedure, information about anonymity, data confidentiality and willingness to participate) and the self-report questionnaires. Since the study follows a cross-sectional design, the filling of the questionnaires occurred only on one timeframe. The inclusion criteria were the participant having an age between 18 and 35 years old and the native language being Portuguese.

Statistical analyses

The statistical analyses were made through the *IBM® SPSS® Statistics statistical program*, 27th version. First, descriptive analyses of the data were conducted, through Wilcoxon's Test (Z), to test the differences between the emotional states that precede and succeed NSSI. Associations between sociodemographic/clinical variables and the presence of NSSI, were also conducted. For sex, suicidal ideation, suicide attempts and past psychopathology, Chi-Square Test (χ^2) was used, and for age, the Point-Biserial Correlation Coefficient (r_{pb}). Then, the sample was divided in three groups: without NSSI (i.e., participants who reported the absence of NSSI throughout life), past NSSI (i.e., participants who reported the last occurrence of NSSI over a year ago) and current NSSI (i.e., participants who reported the occurrence of NSSI during last year). To understand the differences between these groups regarding difficulties in emotion regulation and resilience, and regarding the subscales scores of all scales, for which the Kruskal Wallis Tests (χ^2) and the Mann-Whitney Tests (U) with Bonferroni correction were used, since the data did not meet the assumptions for the use of parametric tests. As for the total score of self-compassion, One-way Analysis of Variance (F) was used, once the data met the assumptions for the use of parametric tests, and consequently, Hochberg's GT2 Post-Hoc Test was used, since is advised for when the groups dimension is very discrepant. A binary logistic regression analysis (*Enter* method) was conducted to verify if sex, age, past psychopathology, difficulties in emotion regulation, resilience and self-compassion predicted lifetime NSSI.

Results

Frequency of NSSI

Ninety (23.4%) participants reported lifetime NSSI. Of these, 63 participants (16.4%) reported NSSI over a year ago (Past NSSI) and 27 (7%) reported NSSI during the last year (Current NSSI). Regarding the frequency of NSSI on the last month, the majority (84.5%) reported NSSI one to

five days. No significant association was found between sex and NSSI, $\chi^2(1) = 1.27$, $p = 0.26$, and age and NSSI, $r_{pb} = 0.05$, $p = 0.317$.

Characterization of NSSI

Of the participants who reported NSSI, the majority reported to use more than one method (77.8%), being the most frequent ones, cutting (74.4%) and scratching (60%). The most injured parts were the arms, hands, fingers and nails (76.6%). Additionally, 68 (75.5%) reported feeling pain occasionally, 16 (17.8%) always feeling pain and 6 (6.7%) never feeling pain. Regarding the pain intensity, the majority (87.8%) reported little or mild pain, 7 (7.8%) feeling strong pain or very strong pain and 4 (4.4%) not feeling pain at all. The majority (88.9%) reported to have as primary reason "To avoid or suppress negative feelings". In contrast, the less referred reasons were "To show others how strong I am" and "To avoid going to school, work or other activity".

Statistically significant differences were found between positive emotions felt before and after NSSI, $Z = -6.70$, $p < 0.001$, and between negative emotions felt before and after NSSI, $Z = -5.85$, $p < 0.001$. Thus, college students reported having more positive emotions and less negative emotions after NSSI. A significant association was found between suicidal ideation and lifetime NSSI, $\chi^2(1) = 109.77$, $p < 0.001$, suicide attempts and lifetime NSSI, $\chi^2(1) = 65.30$, $p < 0.001$. About 77% of the participants in the lifetime NSSI group reported having already thought about ending their life (versus 18% in the group without NSSI), 28% having already tried to end their life (versus 2% in the group without NSSI) and 74% reported past psychological problems/disorders (versus 34% in the group without NSSI).

Difficulties in emotion regulation and NSSI

The results of the Kruskal Wallis Tests showed statistically significant differences in terms of emotion regulation difficulties except at the level of the Awareness subscale of the DERS-SF ($p = .130$) (Table 1). Mann-Whitney tests showed differences between the groups "without NSSI" and "past NSSI" at the DERS-SF subscales Clarity, $U = 7277$, $p = 0.007$, Impulses, $U = 7347.5$, $p = 0.008$, Strategies, $U = 6595.5$, $p < 0.001$, and DERS-SF total score, $U = 6883$, $p < 0.001$, with participants with past NSSI presenting the highest levels (Table 2). Between the groups "without NSSI" and "current NSSI" statistically significant differences were found at the DERS-SF subscales Clarity, $U = 2060.5$, $p < 0.001$, Goals, $U = 2183$, $p < 0.001$, Strategies, $U = 1882.5$, $p < 0.001$, Non-Acceptance, $U = 2324.5$, $p < 0.001$, and DERS-SF total score,

Table 1 Differences regarding difficulties in emotion regulation, resilience and self-compassion

	Without <i>NSSI</i> (<i>n</i> = 295)	Past <i>NSSI</i> (<i>n</i> = 63)	Current <i>NSSI</i> (<i>n</i> = 27)	χ^2
	Medium Post	Medium Post	Medium Post	
DERS-SF Clarity	179.65	221.96	271.26	22.107***
DERS-SF Goals	181.49	214.78	267.93	17.998***
DERS-SF Impulses	183.73	224.30	221.28	9.023*
DERS-SF Strategies	176.74	232.50	278.50	30.544***
DERS-SF Non-Acceptance	182.08	214.49	262.13	15.786***
DERS-SF Awareness	188.30	198.25	232.09	4.074
DERS-SF Total	177.75	228.32	277.17	27.345***
RS Personal Competence	211.49	154.14	81.59	42.940***
RS Self-discipline	206.13	166.72	110.89	22.384***
RS Autonomy	198.79	191.29	133.69	8.541*
RS Problem Solving	197.86	192.11	142.02	6.317*
RS Optimism	201.74	175.79	137.70	10.060**
RS Total	208.69	160.91	96.41	31.456***
SCS Self-kindness	211.55	144.01	104.63	37.605***
SCS Self-critical	172.05	248.73	291.81	47.700***
SCS Common Humanity	207.78	162.76	102.06	28.082***
SCS Isolation	173.97	241.33	288.15	40.428***
SCS Mindfulness	206.51	164.35	112.24	22.921***
SCS Overidentification	176.12	239.86	268.13	30.417***

DERS-SF Clarity, DERS-SF Goals, DERS-SF Impulses, DERS-SF Strategies, DERS-SF Non-Acceptance, DERS-SF Awareness = subscales of Difficulties in Emotion Regulation Scale – Shot Form; DERS-SF Total = total score of Difficulties in Emotion Regulation Scale – Shot Form; RS Personal Competence, RS Self-discipline, RS Autonomy, RS Problem Solving, RS Optimism = subscales of Resilience Scale; RS Total = total score of Resilience Scale; SCS Self-kindness, SCS Self-critical, SCS Common Humanity, SCS Isolation, SCS Mindfulness, SCS Overidentification = subscales of Self-Compassion Scale

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

$U = 1894.5$, $p < 0.001$, with participants with current *NSSI* presenting the highest levels. No differences were found between the groups “Past *NSSI*” and “Current *NSSI*”.

Resilience and *NSSI*

The results of the Kruskal Wallis Tests showed statistically significant differences in terms of resilience (Table 1). Mann-Whitney tests showed differences between the groups “Without *NSSI*” and “Past *NSSI*” at the RS subscales Personal Competence, $U = 6501$, $p < 0.001$, Self-discipline, $U = 7335.5$, $p = 0.009$ and RS total score, $U = 6951.5$, $p = 0.002$, with participants without *NSSI* presenting the highest levels (Table 2).

Between the groups “Without *NSSI*” and “Current *NSSI*” statistically significant differences were found at the RS subscales Personal Competence, $U = 1318$, $p < 0.001$, Self-discipline, $U = 2067$, $p < 0.001$, Autonomy, $U = 2631$, $p = 0.003$, Solving Problems, $U = 2814$, $p = 0.011$, Optimism, $U = 2674$, $p = 0.005$, and RS total score, $U = 1694$, $p < 0.001$, with the group without *NSSI* presenting the

highest levels. Between the groups “Past *NSSI*” and “Current *NSSI*”, statistically significant differences were found at the RS subscales Personal Competence, $U = 507$, $p = 0.002$, Self-discipline, $U = 549$, $p = 0.008$ and RS total score, $U = 531$, $p = 0.005$, with participants with Past *NSSI* presenting the highest levels.

Self-Compassion and *NSSI*

The results of the Kruskal Wallis Test (Table 1) and of the One-way ANOVA Test, the latter performed for the total score of the Self-Compassion Scale, $F(2, 382) = 30.739$, $p < 0.001$, showed that there are statistically significant differences at the level of self-compassion. Mann-Whitney tests showed differences between the groups “without *NSSI*” and “Past *NSSI*” at the SCS subscales Self-critical, $U = 5573.5$, $p < 0.001$, Isolation, $U = 6016.5$, $p < 0.001$ and Overidentification, $U = 6235.5$, $p < 0.001$, with participants with past *NSSI* presenting the highest levels. For the SCS subscales Self-kindness, $U = 6036$, $p < 0.001$, Common Humanity, $U = 7118$, $p = 0.003$ and Mindfulness, $U = 7293$, $p = 0.007$, participants without

Table 2 Difficulties in emotion regulation, resilience and self-compassion by group, in two-by-two comparisons

	Without NSSI vs. Past NSSI		Without NSSI vs. Current NSSI		Past NSSI vs. Current NSSI	
	<i>Mdn</i>		<i>Mdn</i>		<i>Mdn</i>	
	1	2	1	3	2	3
DERS-SF Clarity	6	8	6	9	8	9
DERS-SF Goals	10	11	10	12	11	12
DERS-SF Impulses	6	7	6	6	7	6
DERS-SF Strategies	6	8	6	10	8	10
DERS-SF Non-Acceptance	7	8	7	10	8	10
DERS-SF Total	34	41	34	45	41	45
RS Personal Competence	49	42	49	36	42	36
RS Self-discipline	33	31	33	26	31	26
RS Autonomy	22	23	22	18	23	18
RS Problem Solving	18	18	18	14	18	14
RS Optimism	10	9	10	7	9	7
RS Total	132	121	132	101	121	101
SCS Self-kindness	3.20	2.40	3.20	2.20	2.40	2.20
SCS Self-critical	2.60	3.40	2.60	4	3.40	4
SCS Common Humanity	3.50	3	3.50	2.50	3	2.50
SCS Isolation	2.75	3.50	2.75	4	3.50	4
SCS Mindfulness	3.25	2.75	3.25	2.50	2.75	2.50
SCS Overidentification	3	3.50	3	3.50	3.50	3.50

DERS-SF Clarity, DERS-SF Goals, DERS-SF Impulses, DERS-SF Strategies, DERS-SF Non-Acceptance = subscales of Difficulties in Emotion Regulation Scale – Shot Form; DERS-SF Total = total score of Difficulties in Emotion Regulation Scale – Shot Form; RS Personal Competence, RS Self-discipline, RS Autonomy, RS Problem Solving, RS Optimism = subscales of Resilience Scale; RS Total = total score of Resilience Scale; SCS Self-kindness, SCS Self-critical, SCS Common Humanity, SCS Isolation, SCS Mindfulness, SCS Overidentification = subscales of Self-Compassion Scale

1 = Without NSSI; 2 = Past NSSI; 3 = Current NSSI

NSSI presented the highest levels (Table 2). According to the Hochberg's GT2 Post-Hoc Test, the same happens for SCS total score ($p < 0.001$), with the group without NSSI presenting higher levels of self-compassion ($M = 3.22$, $SD = 0.75$) than the group with past NSSI ($M = 2.67$, $SD = 0.81$). Between the groups "without NSSI" and "current NSSI" statistically significant differences were found at the SCS subscales Self-critical, $U = 1522.5$, $p < 0.001$, Isolation, $U = 1645$, $p < 0.001$ and Overidentification, $U = 2059$, $p < 0.001$, with participants with current NSSI presenting the highest levels. For the SCS subscales Self-kindness, $U = 1766.5$, $p < 0.001$, Common Humanity, $U = 1796.5$, $p < 0.001$ and Mindfulness, $U = 1996.5$, $p < 0.001$, participants without NSSI presented the highest levels. Regarding SCS total score, Hochberg's GT2 Post-Hoc Test showed statistically significant differences ($p < 0.001$) with participants without NSSI presenting higher levels of self-compassion ($M = 3.22$, $DP = 0.75$) than participants with current NSSI ($M = 2.25$, $DP = 0.67$). Between the groups "Past NSSI" and "Current

NSSI", the Hochberg's GT2 Post-Hoc Test indicated statistically significant differences at the SCS total score ($p = .047$), with the group with Past NSSI presenting higher levels of self-compassion ($M = 2.67$, $DP = 0.81$) than the group with current NSSI ($M = 2.25$, $DP = 0.67$).

Predictive variables for lifetime NSSI

To determine the effects of sex, age, past psychopathology, difficulties in emotion regulation, resilience, and self-compassion on the likelihood of NSSI, a binary logistic regression was performed. The model present in block 1, which includes age and sex, was not statistically significant, $\chi^2(2) = 2.06$, $p = 0.36$, indicating that age and sex do not predict NSSI. On the other hand, the model present in block 2, proved to be statistically significant, $\chi^2(6) = 74.34$, $p < 0.001$, explaining 27% of the variance (Nagelkerke R^2). Given that all variables are included in this model, it appears that past psychopathology ($p < 0.001$) is associated with greater likelihood of

lifetime NSSI and self-compassion ($p = 0.006$) is associated with lower likelihood. The remaining variables did not show significant effects (Table 3).

Discussion

This study aimed to assess NSSI frequency and characterize NSSI in a sample of college students regarding the presence of difficulties in emotion regulation, resilience, and self-compassion.

NSSI estimated frequency (23.4%) was consistent with the one found in other studies, whose prevalence vary between 11.68% (Heath et al., 2008) and 39.5% (Hamza et al., 2013). However, in the present study, NSSI frequency was higher than the one reported by Braga and Gonçalves (2014), also conducted with a sample of Portuguese college students (16.2%). One explanation may lie in the fact that the data in the present study was collected during COVID-19 pandemic, which could be translated into higher levels of mental health difficulties (e.g., anxiety) (Son et al., 2020), usually associated with a greater likelihood for the NSSI (Buerger et al., 2022; Kaniuka et al., 2020).

The results found also revealed that there were no differences between sexes regarding NSSI frequency, which is in line with previous studies (Rotolone & Martin, 2012; Hamza et al., 2013).

Our results also supported that college students seem to use NSSI mostly as a strategy to regulate emotions, given that the majority reported as the main reason “to avoid or

suppress negative feelings”. In the same line, participants with past or current NSSI reported an increase in positive emotions after NSSI. These results support the Emotion Regulation Model of Messer and Fremouw (2008), which postulates that NSSI may arise as a way to reduce antecedent negative emotionality, consequently increasing positive emotions. Additionally, suicidal ideation and suicide attempts were associated with NSSI, being that a very significant percentage of college students with NSSI reported having already thought about ending their life or even having already tried to put an end to it. As it was already discussed, NSSI in college students can represent a risk for developing suicidal ideation and committing suicide attempts, concurrently or later (e.g., Kiekens et al., 2018; Whitlock et al., 2013), once this relationship usually has an underlying habituation to fear and physical pain, increased by NSSI (Nock et al., 2006). It should also be noted that most participants in this study reported only feeling little or moderate pain, and occasionally, which may also be a risk factor for the development of more harmful behaviors in college students. Also in line with the existing literature (e.g., Fox et al., 2015), our results also showed that past psychopathology was associated with NSSI.

College students with NSSI lifetime reported higher levels of difficulties in emotion regulation compared to the ones without NSSI, which is in accordance with other studies (e.g., Emery et al., 2016). However, it is important to point out one exception in the Lack of Emotional Awareness subscale, where no differences were found between the three groups: without NSSI, past NSSI, and current NSSI. This pattern of results was already evidenced by previous

Table 3 Binary logistic regression to estimate the likelihood of college students with lifetime NSSI, based on gender, age, past psychopathology, difficulties in emotion regulation, resilience and self-compassion

Variable	B (SE)	Wald	Odds Ratio	95% for Odds Ratio	
				Lower	Upper
Block 1^a					
Constant	-0.69 (1.08)	0.41			
Age	-0.04 (0.05)	0.68	0.96	0.88	1.06
Sex ^b	0.37 (0.38)	0.95	1.44	0.69	3.01
Block 2^c					
Constant	1.84 (1.75)	1.11			
Age	-0.04 (0.06)	0.57	0.96	0.86	1.07
Sex	0.11 (0.41)	0.07	1.11	0.50	2.50
Past Psychopathology ^d	1.33*** (0.29)	20.48	3.78	2.12	6.71
DERS-SF Total	0.002 (0.01)	0.03	1.00	0.98	1.03
RS Total	-0.01 (0.01)	1.05	0.99	0.98	1.01
SCS Total	-0.72** (0.26)	7.44	0.49	0.29	0.82

DERS-SF Total = total score of Difficulties in Emotion Regulation Scale – Short Form; RS Total = total score of Resilience Scale; SCS Total = total score of Self-Compassion Scale

^a.01 (Cox & Snell), 0.01 (Nagelkerke). Model $\chi^2(2) = 2.06, p = .36$. ^b0 = Man e 1 = Woman. ^c.18 (Cox & Snell), 0.27 (Nagelkerke). Model $\chi^2(6) = 74.34, p < 0.001$. ^d0 = No e 1 = Yes

** $p < 0.01$. *** $p < 0.001$

studies (e.g., Heath et al., 2008). However, we found differences in the access to the other emotion regulation strategies in college students who reported past and current NSSI, exhibiting a more limited access to an array of strategies to regulate their emotions like acceptance of emotional responses, engaging in goal directed behaviors, impulse control, and emotional clarity. Anderson and Crowther (2012) already discussed that emotional regulation difficulties are located more at these levels than at the level of the emotional awareness. In a recent systematic review and meta-analysis, the authors concluded that emotion dysregulation subscales most strongly associated with NSSI included limited access to regulation strategies, non-acceptance of emotional responses, impulse control difficulties, and difficulties engaging goal-directed behavior, and that lack of emotional awareness/clarity and cognitive aspects of emotional dysregulation had a weaker association with NSSI (cf. Wolff et al., 2019). In line with previous evidence, the group without NSSI also reported higher levels of resilience (Rotolone & Martin, 2012) and self-compassion (e.g., Nagy et al., 2021; Suh Jeong, 2021) compared to the other two groups assessed with past/current NSSI. Moreover, college students with past and current NSSI differed in terms of resilience between them, as supported by previous studies (e.g., Rotolone and Martin, 2012). The same for self-compassion, which is in line with the study conducted by Hasking et al. (2019), in which low levels of self-compassion particularly predicted recent NSSI. However, we can discuss about the role of NSSI behaviors cessation on the promotion of greater resilience and self-compassion skills since the group with past NSSI had higher levels of resilience and self-compassion than the group with current NSSI. Prospective longitudinal studies should be carried out considering this hypothesis.

The results of the binary logistic regression showed that college students with past psychopathology were more likely to present NSSI, whereas the opposite was true for the ones with higher levels of self-compassion, whose probability of presenting NSSI behaviors was lower. Past psychopathology seem to predispose college students to NSSI (e.g., Fox et al., 2015), contrary to the self-compassion skills, that seems to function as protective factors (e.g., Jiang et al., 2016). Whereas higher levels of self-compassion are associated with greater emotion regulation capacity (Barlow et al., 2017), and since NSSI seem to function primarily as a way to regulate emotions, higher levels of self-compassion may boycott individuals' need to incur in maladaptive forms of emotion regulation strategies, such as the NSSI, and thus decreasing the likelihood of these behaviors to occur.

The results should be considered taking into account some limitations, namely: (1) the cross-sectional nature of the study, which makes it impossible to infer causal relationships between the variables; (2) the fact that the measures are self-report measures, thus allowing for some bias in the responses due to

social desirability (even after being ensured the anonymity and data confidentiality); (3) the sample being mostly constituted by women, thus limiting the generalization of the data; and (4) the Problem Solving and Optimism subscales of the Resilience Scale, showing low internal consistency.

In future studies, it would be pertinent to follow a longitudinal design to understand the onset, course, and maintenance of NSSI, by identifying which factors predict their onset or reduce the probability of their occurrence. Additionally, it would be important to use other approaches to assess the variables in question (e.g., researcher based semi-structured interviews).

Despite the acknowledged limitations, this study contributed significantly to the existing literature since it provided a deepening of knowledge about NSSI and associated factors that may be relevant in the development and maintenance of these behaviors, in a community sample of college students. As far as it is known, it is the first study evaluating and comparing participants without NSSI, with past NSSI and current NSSI, not only regarding towards difficulties in emotion regulation, but also assessing resilience and self-compassion skills.

From a clinical point of view, the results of this study allowed to identify relevant factors that can be considered in prevention and clinical interventions with young people with NSSI, namely the individuals' competences related to resilience and self-compassion. As Wolff et al. (2019) stressed out, NSSI may pose unique challenges since the function of this behavior may be to regulate emotions which, in turn, require successful treatments to not only facilitate the use of adaptive emotion regulation strategies, but also to provide alternate behaviors in which individuals may engage under circumstances of heightened emotion or reactivity. Thus, preventive, and remedial interventions should consider deficits that sustain emotion regulation difficulties, but also focus on resilience and self-compassion skills', which seem to function as protective and dampening factors in the development and maintenance of NSSI in college students.

This study concluded for similar NSSI lifetime frequency among college students when compared with other studies. We also concluded that students with NSSI lifetime showed higher difficulties in emotion regulation and lower levels of resilience and self-compassion and that those with current NSSI presented the lowest levels of resilience and self-compassion. Past psychopathology and lower self-compassion were predictors of NSSI and NSSI lifetime was associated with past suicide attempts. Concluding, interventions that focus NSSI prevention and/or reduction in college students should promote adaptive emotion regulation strategies, but also work in resilience and self-compassion skills.

Funding Open access funding provided by FCTIFCCN (b-on). This study was conducted at the Psychology Research Centre (CIPsi),

School of Psychology, University of Minho, supported by the Foundation for Science and Technology (FCT) through the Portuguese State Budget (Ref.: UIDB/PSI/01662/2020).

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval This study was approved by the Ethic Committee of the University CEICSH 104/2020 at 28.10.2020.

Consent to participate Informed consent was obtained from all individual participants in the study.

Competing interests All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Anderson, N. L., & Crowther, J. H. (2012). Using the experiential avoidance model of non-suicidal self-injury: Understanding who stops and who continues. *Archives of Suicide Research, 16*(2), 124–134. <https://doi.org/10.1080/13811118.2012.667329>
- Barlow, M. R., Goldsmith Turow, R. E., & Gerhart, J. (2017). Trauma appraisals, emotion regulation difficulties, and self-compassion predict posttraumatic stress symptoms following childhood abuse. *Child Abuse and Neglect, 65*, 37–47. <https://doi.org/10.1016/j.chiabu.2017.01.006>
- Braga, C., & Gonçalves, S. (2014). Non-suicidal self injury, psychopathology and attachment: A study with university students. *Spanish Journal of Psychology, 17*(2), 1–7. <https://doi.org/10.1017/sjp.2014.66>
- Buerger, A., Emsler, T., Seidel, A., et al. (2022). DUDE - a universal prevention program for non-suicidal self-injurious behavior in adolescence based on effective emotion regulation: Study protocol of a cluster-randomized controlled trial. *Trials, 23*, 97. <https://doi.org/10.1186/s13063-021-05973-4>
- Castilho, P., & Gouveia, J. P. (2011). Auto-compaixão: Estudo da validação da versão portuguesa da escala da auto-compaixão e da sua relação com as experiências adversas na infância, a comparação social e a psicopatologia. *Psychologica, 54*, 203–230. https://doi.org/10.14195/1647-8606_54_8
- Cipriano, A., Cella, S., & Cotrufo, P. (2017). Nonsuicidal self-injury: A systematic review. *Frontiers in Psychology, 8*, 1946. <https://doi.org/10.3389/fpsyg.2017.01946>
- Claes, L., & Vandereycken, W. (2007). The Self-Injury Questionnaire—Treatment Related (SIQ-TR): Construction, reliability, and validity in a sample of female eating disorder patients. In P. M. Goldfarb (Ed.), *Psychological tests and testing research trends* (1st ed., pp. 111–139). Nova Science Publishers.
- Emery, A. A., Heath, N. L., & Mills, D. J. (2016). Basic psychological need satisfaction, emotion dysregulation, and non-suicidal self-injury engagement in young adults: An application of self-determination theory. *Journal of Youth and Adolescence, 45*(3), 612–623. <https://doi.org/10.1007/s10964-015-0405-y>
- Fox, K. R., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Bentley, K. H., & Nock, M. K. (2015). Meta-analysis of risk factors for nonsuicidal self-injury. *Clinical Psychology Review, 42*, 156–167. <https://doi.org/10.1016/j.cpr.2015.09.002>
- Gonçalves, S. (2007). *Escala de avaliação de ferimentos autoinfligidos [The self-injury questionnaire-treatment related (SIQ-TR)]*. Centro de Investigação em Psicologia. Braga: Universidade do Minho.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41–54. <https://doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*(6), 482–495. <https://doi.org/10.1016/j.cpr.2012.05.003>
- Hamza, C. A., Willoughby, T., & Good, M. (2013). A preliminary examination of the specificity of the functions of nonsuicidal self-injury among a sample of university students. *Psychiatry Research, 205*(1–2), 172–175. <https://doi.org/10.1016/j.psychres.2012.08.036>
- Hasking, P., Boyes, M. E., Finlay-Jones, A., McEvoy, P. M., & Rees, C. S. (2019). Common pathways to NSSI and suicide ideation: The roles of rumination and self-compassion. *Archives of Suicide Research, 23*(2), 247–260. <https://doi.org/10.1080/13811118.2018.1468836>
- Heath, N., Toste, J., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137–156. <https://doi.org/10.17744/mehc.30.2.8p879p3443514678>
- Jiang, Y., You, J., Hou, Y., Du, C., Lin, M. P., Zheng, X., & Ma, C. (2016). Buffering the effects of peer victimization on adolescent non-suicidal self-injury: The role of self-compassion and family cohesion. *Journal of Adolescence, 53*, 107–115. <https://doi.org/10.1016/j.adolescence.2016.09.005>
- Kaniuka, A. R., Kelliher-Rabon, J., Chang, E. C., Sirois, F. M., & Hirsch, J. K. (2020). Symptoms of anxiety and depression and suicidal behavior in college students: Conditional indirect effects of non-suicidal self-injury and self-compassion. *Journal of College Student Psychotherapy, 34*(4), 316–338. <https://doi.org/10.1080/87568225.2019.1601048>
- Kaufman, E. A., Xia, M., Fosco, G., Yaptangco, M., Skidmore, C. R., & Crowell, S. E. (2016). The difficulties in emotion regulation scale short form (DERS-SF): Validation and replication in adolescent and adult samples. *Journal of Psychopathology and Behavioral Assessment, 38*(3), 443–455. <https://doi.org/10.1007/s10862-015-9529-3>
- Kiekens, G., Hasking, P., Boyes, M., Claes, L., Mortier, P., Auerbach, R. P., Cuijpers, P., Demyttenaere, K., Green, J. G., Kessler, R. C., Myin-Germeys, I., Nock, M. K., & Bruffaerts, R. (2018). The associations between non-suicidal self-injury and first onset suicidal thoughts and behaviors. *Journal of Affective Disorders, 239*(January), 171–179. <https://doi.org/10.1016/j.jad.2018.06.033>
- Kim, S., Kim, Y., & Hur, J. W. (2019). Nonsuicidal self-injury among Korean young adults: A validation of the Korean version of the

- inventory of statements about self-injury. *Psychiatry Investigation*, 16(4), 270.
- Liao, C., Gu, X., Wang, J., Li, K., Wang, X., Zhao, M., & Feng, Z. (2022). The relation between neuroticism and non-suicidal self-injury behavior among college students: Multiple mediating effects of emotion regulation and depression. *International Journal of Environmental Research and Public Health*, 19, 2885. <https://doi.org/10.3390/ijerph19052885>
- Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development*, 85(1), 6–20. <https://doi.org/10.1111/cdev.12205>
- Messer, J. M., & Fremouw, W. J. (2008). A critical review of explanatory models for self-mutilating behaviors in adolescents. *Clinical Psychology Review*, 28(1), 162–178. <https://doi.org/10.1016/j.cpr.2007.04.006>
- Moreira, H., Gouveia, M. J., & Canavarro, M. C. (2020). A bifactor analysis of the difficulties in emotion regulation scale - short form (DERS-SF) in a sample of adolescents and adults. *Current Psychology*. <https://doi.org/10.1007/s12144-019>
- Muehlenkamp, J., Brausch, A., Quigley, K., & Whitlock, J. (2013). Interpersonal features and functions of nonsuicidal self-injury. *Suicide and Life-threatening Behavior*, 43(1), 67–80. <https://doi.org/10.1111/j.1943-278X.2012.00128.x>
- Nagy, L. M., Shanahan, M. L., & Baer, R. A. (2021). An experimental investigation of the effects of self-criticism and self-compassion on implicit associations with non-suicidal self-injury. *Behaviour Research and Therapy*, 139(February), 103819. <https://doi.org/10.1016/j.brat.2021.103819>
- Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2(2), 85–101. <https://doi.org/10.1080/15298860309032>
- Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223–250. <https://doi.org/10.1080/15298860309027>
- Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, 144(1), 65–72. <https://doi.org/10.1016/j.psychres.2006.05.010>
- Oliveira, M. F., & Machado, T. S. (2011). Tradução e validação da escala de resiliência para estudantes do ensino superior. *Análise Psicológica*, 29(4), 579–591. <https://doi.org/10.14417/ap.105>
- Rotolone, C., & Martin, G. (2012). Giving up self-injury: A comparison of everyday social and personal resources in past versus current self-injurers. *Archives of Suicide Research*, 16(2), 147–158. <https://doi.org/10.1080/13811118.2012.667333>
- Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, 22(9), 1–14. <https://doi.org/10.2196/21279>
- Suh, H., & Jeong, J. (2021). Association of self-compassion with suicidal thoughts and behaviors and non-suicidal self injury: A meta-analysis. *Frontiers In Psychology*, 12, 633482. <https://doi.org/10.3389/fpsyg.2021.633482>
- 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 and Life-threatening Behavior*, 44(3), 273–303. <https://doi.org/10.1111/sltb.12070>
- Wagnild, G., & Young, H. (1993). Development and psychometric evaluation of a resilience scale. *Journal of Nursing Measurement*, 1(2), 165–178.
- Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Baral Abrams, G., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health*, 52(4), 486–492. <https://doi.org/10.1016/j.jadohealth.2012.09.010>
- Wolff, J. C., Thompson, E., Thomas, S. A., Nesi, J., Bettis, A. H., Ransford, B., et al. (2019). Emotion dysregulation and non-suicidal self-injury: A systematic review and meta-analysis. *European Psychiatry*, 59, 25–36. <https://doi.org/10.1016/j.eurpsy.2019.03.004>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.