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Emotion dysregulation and mindfulness in non-suicidal self-injury

Esther Calvete [a,*], Estibaliz Royuela-Colomer [a], Claudio Maruottolo [b]

[a] University of Deusto, Spain
[b] Avances Médicos, Spain

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ABSTRACT

This study examined the association between mindfulness and engagement in non-suicidal self-injury (ENSSI) and whether emotion dysregulation explains this association. A secondary objective was to explore the difference between participants who engaged in a suicide attempt and those who only engaged in non-suicidal self-injury. A sample of 201 psychiatric patients (62.7% female; age range: 18–71 years old) participated in the study. The path analysis indicated that trait mindfulness was negatively associated with all emotion dysregulation dimensions and that one of these dimensions, impulse control difficulty, was associated with higher ENSSI. Moreover, impulse control difficulty was associated with increased odds of having attempted suicide. These findings suggest that mindfulness is a relevant construct to ENSSI with and without a suicide attempt. Future studies should investigate mindfulness-based interventions for ENSSI and the role played by the capacity to control impulses when experiencing negative emotions.

1. Introduction

Non-suicidal self-injury (NSSI) consists of the deliberate, self-inflicted destruction of body tissue without the intent to die, and for non-socially sanctioned purposes (Nock, 2010). NSSI is considered a significant public health problem (Wolff et al., 2019). NSSI disorder is listed as a condition for further study in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013). NSSI happens in many ways, such as cutting, scratching the skin, burning, hitting, and interfering with wound healing (Klonsky, 2011). There is high variability in prevalence rates depending on the sample and methodology used to assess engagement in NSSI (ENSSI). One meta-analysis reported a high prevalence of ENSSI throughout life, with a higher prevalence in samples of psychiatric patients (Jacobson et al., 2008) and young people (Swannell et al., 2014).

ENSSI is currently considered a transdiagnostic problem related to several mental problems (Bentley et al., 2014). Moreover, although there are some discrepancies in the literature (Andrewes et al., 2019), overall, ENSSI has been associated with an increased risk of suicidal behaviors (Hamza et al., 2012; Ribeiro et al., 2016). Several models and studies have addressed this association. Some research suggests that both problems share some risk factors, such as having a psychiatric disorder (Nock et al., 2006). Other models emphasize that both problems exist along a continuum of self-harm behaviors, with ENSSI at one extreme and suicide at the other (Stanley et al., 1992). Finally, the interpersonal theory of suicide proposes that ENSSI may habituate an individual to the fear and pain associated with suicidal behaviors and thus increase his or her suicide capability (Joiner, 2005).

Many theoretical models propose that ENSSI can fulfill a dysfunctional affective regulation function derived from a poor capacity to regulate emotions (i.e., dysregulation of emotions) (Klonsky, 2011). The multidimensional concept of emotion regulation processes includes several dimensions: (a) awareness of one's emotions, (b) acceptance of emotions, (c) control of impulsive behaviors and actions to achieve desired goals when experiencing negative emotions, and (d) the ability to use appropriate emotion regulation strategies to meet individual goals and contextual demands (Gratz and Roemer, 2004).

Grounded in this framework, a recent meta-analysis found that greater emotion dysregulation was associated with a higher risk of ENSSI. The emotion dysregulation dimensions most strongly associated with ENSSI included denial of emotional responses, impulse control difficulty, limited access to regulation strategies, and difficulties engaging in goal-directed behavior (Wolff et al., 2019). Several studies have found that emotion dysregulation is also associated with suicide (Hatkevich et al., 2019; Neacsiu et al., 2018). However, the differences in emotion dysregulation between individuals with only ENSSI and those with suicidal behaviors are unclear.

In a study of adolescents, those with a history of only ENSSI reported

* Corresponding author at: Department of Psychology, Faculty of Health Sciences, University of Deusto, Bilbao, Spain.
E-mail address: esther.calvete@deusto.es (E. Calvete).

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greater emotion dysregulation than those with a history of only suicidal attempts (Kim et al., 2020). In a sample of patients with eating disorders, there were no differences in any emotion dysregulation dimension between those with and without ENSSI and those with and without at least one attempted suicide in their lifetime (Pisetsky et al., 2017). In a longitudinal study, emotion dysregulation was associated with higher suicidal desire (Heffer and Willoughby, 2018). However, in the same research, emotion dysregulation displayed a varied role in the acquired capability for suicide. On the one hand, it was associated with a higher capacity for suicide through ENSSI. On the other hand, effective emotion regulation was directly associated with a higher potential for suicide.

Most studies on ENSSI have focused on risk factors. However, it is essential to identify protective factors against ENSSI. One potential protective factor is trait mindfulness. Mindfulness has been defined as the awareness that emerges through paying attention, in the present moment, purposely and non-judgmentally (Kabat-Zinn, 2003). Although trait mindfulness consists of several dimensions (Baer et al., 2006), attention and awareness of the present are foundational dimensions (Brown and Ryan, 2003). Research in the last decade has revealed that trait mindfulness is beneficial to help prevent the development of several mental health problems (Tomlinson et al., 2018). However, previous research on the association between trait mindfulness and ENSSI is scarce and mainly based on non-clinical samples (for an exception, see Kok et al., 2011). Both cross-sectional (Caltabiano and Martin, 2017; Heath et al., 2016) and longitudinal (Calvete et al., 2017; Garisch and Wilson, 2015) studies have provided evidence that trait mindfulness is associated with reduced ENSSI. Mindfulness has also been associated with lower suicidal ideation in non-clinical samples (Anastasiades et al., 2017; Tucker et al., 2014) and psychiatric patients (Cheng et al., 2018). Moreover, mindfulness-based interventions have shown promising effects on suicidal behavior (Raj et al., 2020).

One of the mechanisms through which mindfulness could prevent the development of ENSSI is adequate emotional regulation. In fact, mindfulness is associated with emotional awareness and regulation (Guendelman et al., 2017). Although some studies have examined the role of emotion dysregulation in the association between mindfulness and other mental health problems (Pepping et al., 2016), research on this mechanism in the case of ENSSI is scarce. Using a non-clinical sample, Per et al. (2021) compared participants with lifetime ENSSI to those without ENSSI. They found that two mindfulness facets, non-judging and acting with awareness, were negatively associated with NSSI engagement and that a general measure of emotion dysregulation fully explained this association. Similarly, Yusainy and Lawrence (2014) found that the association between mindfulness and ENSSI was explained by self-control, including emotional control.

Therefore, previous research indicates that ENSSI is associated with emotion dysregulation and an increased risk of suicide. However, the role of protective factors, such as trait mindfulness, which can be developed through training, has been relatively neglected. Moreover, except for a study on a small sample of adolescents in a psychiatric setting (Kok et al., 2011), most research on trait mindfulness and ENSSI has been limited to non-clinical samples. Therefore, this study attempted to fill this gap in current research and examined whether trait mindfulness was associated with lower ENSSI in a sample of psychiatric patients and whether emotion dysregulation explained this association. The study's secondary objective was to examine whether mindfulness and emotion dysregulation differentiate individuals who have attempted suicide and those with only ENSSI.

Previous research yielded mixed findings (Heffer and Willoughby, 2018; Pisetsky et al., 2017). The objectives of this study are of great clinical relevance. If trait mindfulness is associated with lower ENSSI, the results can guide treatments to prevent or reduce ENSSI because mindfulness can be developed and improved through interventions. Identifying possible mechanisms of the associations between variables is also relevant for technical interventions seeking to develop the most important components of emotion regulation. From a conceptual perspective, this would help us to understand better the psychological mechanisms involved.

2. Methods

2.1. Subjects

The study sample consisted of 201 psychiatric patients (62.7% female) between 18 and 71 years of age ($M = 41.50$, $SD = 13.85$) from five treatment units at a day hospital in the Basque Country. The vast majority of participants (97.5%) identified as Spanish. The psychiatric diagnosis was made by the psychologists and psychiatrists from the day hospital. Table 1 shows the participants' clinical characteristics according to the DSM-5 (American Psychiatric Association, 2013). Personality disorder was the most frequent diagnosis (57.2%), and, within this group, 46.1% of the participants had a borderline personality disorder.

2.2. Measures

The Mindful Attention Awareness Scale (MAAS; Brown and Ryan, 2003; Spanish version by Soler et al., 2012) consists of 15 items that measure trait mindfulness. It assesses the frequency of open and receptive attention to events and experiences. The responses range from 1 (*almost never*) to 6 (*almost always*), so the total score range is between 15 and 90. The item scores were reverse scored so that higher scores represented a greater degree of mindfulness. The items are worded to reflect a lack of mindfulness and are recoded before summing. Some examples of items are "I tend to walk quickly to get where I am going without paying attention to what I experience along the way" and "I do jobs or tasks automatically, without realizing what I am doing." The alpha coefficient was 0.87.

The Functional Assessment of Self-Mutilation scale (FASM; Lloyd et al., 1997; Spanish version by Calvete et al., 2015) was used to assess the frequency of ENSSI during the last 12 months. The first part of the FASM determines the occurrence and frequency of 10 self-harm behaviors (e.g., cutting, picking a wound, biting, hitting, and hair-pulling) in the last year with the following response options: *never, one time, 2–5 times, 6–10 times*, and *11 or more times*. In order to obtain a frequency measure of NSSI, the items were recoded: "*Never*" = 0, "*one time*" = 1, "*2–5 times*" = 3.5, "*6–10 times*" = 8, and "*11 or more times*" = 12. In the second part of the FASM, respondents who have reported any self-harm behavior are asked "if medical treatment was obtained" as an indicator of the severity of the injury. They are also asked if the ENSSI was performed under the influence of drugs or alcohol (0 = *No*, 1 = *Yes*) and if any of these behaviors was a suicide attempt (0 = *No*, 1 = *Yes*).

The Spanish version of the Difficulties in Emotion Regulation Scale

Table 1
Clinical Characteristics of Participants According to DSM-5.

Diagnosis *n* (%)		Treatment Unit *n* (%)	
Personality Disorders	115 (57.2)	Personality Disorders and Vital Crisis	111 (55.2)
Substance-Related and Addictive Disorders	76 (37.8)	Dual Pathology	71 (35.3)
Trauma- and Stressor-Related Disorders	68 (33.8)	Eating Disorders	12 (6)
Anxiety Disorders	58 (28.9)	Psychotic Disorders	4 (2)
Depressive Disorders	51 (25.4)	Outpatient Visits	3 (1.5)
Feeding and Eating Disorders	15 (7.5)		
Obsessive-Compulsive and Related Disorders	9 (4.5)		
Bipolar and Related Disorders	4 (2)		
Schizophrenia Spectrum and Other Psychotic Disorders	4 (2)		

(DERS) (Gratz and Roemer, 2004) uses only 28 of the original 36 items in the DERS (Hervás and Jódar, 2008). In this study, the following subscales were used: lack of emotional awareness (4 items), lack of emotional clarity (4 items), difficulties engaging in goal-directed behavior (4 items), impulse control difficulties (6 items), non-acceptance of emotional responses (7 items), and limited access to emotion regulation strategies (3 items). The alpha coefficients for these subscales ranged between 0.81 and 0.92.

2.3. Procedure

Patients who met the inclusion criteria (18 years of age or older, ability to understand Spanish, and ability to decide to participate in the study) were invited by their psychiatrist, who explained the purpose and conditions of participation in the study. Particular emphasis was placed on the confidentiality of the information, the participants' freedom to leave the study, and the fact that their participation would not affect the treatment they received. The participants signed the informed consent forms and completed the questionnaires through *Qualtrics* with the supervision of their psychiatrists. This allowed the psychiatrists to clarify doubts about the meaning of specific items if necessary. Questionnaires were completed in the initial treatment session. To protect the participants' privacy, they did not include any private information. Instead, we used a unique code, only known to the patient and psychiatrist, to link the questionnaire responses to the patient histories and diagnostic data. Thus, the database only includes anonymous data, and the identity of the participants is completely protected. The ethical committee of the [Masked Information] approved the study. Data were collected between 2018 and 2021.

2.4. Statistical approach

The participants completed all of the questionnaires, and the percentage of missing values at the item level was insignificant (0.33%). The pattern of missingness of items was examined. Little's MCAR test was not statistically significant ($\chi^2(1302) = 968.42$, p = 1), which suggests that the data were missing completely at random (Little, 1988). Thus, the EM (expectation–maximization) algorithm, which is an iterative procedure that produces maximum likelihood unbiased estimates and can be used when missing data are at least missing at random (Graham, 2009), was utilized to impute missing values at the item level using IBM Statistical Package for the Social Sciences (SPSS-28). To evaluate whether emotion dysregulation explained the association between trait mindfulness and frequency of ENSSI, we used path analysis with MPLUS-8 following the robust maximum likelihood (MLR) estimation method. The model included paths from trait mindfulness to ENSSI and each of the six emotion dysregulation dimensions and from emotion dysregulation dimensions to ENSSI. Age was included in the model because ENSSI is much more frequent among younger people (Swannell et al., 2014). The goodness of model fit was evaluated using the comparative fit index (CFI), the Tucker–Lewis index (TLI), the standardized root-mean-square residual (SRMR), and the root-mean-square error of approximation (RMSEA). CFI and TLI values of 0.95 or higher indicate an excellent fit. SRMR and RMSEA values lower than 0.08 indicate a good fit for longitudinal research (Little, 2013). Bootstrapping ($n = 5000$ samples) was used to test the significance of the indirect effects.

To assess whether trait mindfulness and emotion dysregulation differentiated between participants a) without ENSSI, b) only with ENSSI, and c) with ENSSI and a suicide attempt, we conducted an analysis of variance (ANOVA) with post hoc comparisons using SPSS-28. Moreover, we conducted a multinomial regression analysis to identify which variables were associated with these groups when overlapping between variables was controlled. Bootstrapping ($n = 5000$) was used to estimate confidence intervals for the regressive coefficients. Multiple testing correction was conducted in all the analyses using the Benjamini–Hochberg false discovery rate method (Benjamini and Hochberg, 1995).

3. Results

Table 2 shows the correlation coefficients between variables. Mindfulness was significantly and negatively associated with ENSSI and emotion dysregulation. Age was negatively associated with ENSSI and several emotion dysregulation dimensions. A total of 67.7% of the participants displayed at least one NSSI behavior during the last year, and 46.4% engaged in at least five NSSI behaviors. Of those who reported ENSSI, 16.1% indicated engaging in suicide attempts during the previous year, 23.4% reported alcohol or drug use during ENSSI, and 16.1% required medical treatment after ENSSI. Regarding physical pain, 38% of those with ENSSI reported no pain, 34.3% a small amount of pain, 19% moderate pain, and 8.8% severe pain.

The model explaining the frequency of ENSSI displayed adequate fit indices (χ^2 (9, $N = 201$) = 16.47; RMSEA = 0.064 (90% CI [.001, 0.113]), $p = .280$; TLI = 0.957; CFI = 0.989; SRMR =0.044). Trait mindfulness was significantly associated with lower scores on all emotion dysregulation dimensions and ENSSI. Of all the emotion dysregulation dimensions, only impulse control difficulty was significantly associated with ENSSI. Age was negatively associated with ENSSI and clarity. Fig. 1 displays the statistically significant coefficients. The bootstrapping results indicated that the indirect association between mindfulness and ENSSI via impulse control difficulties was significant, as the 95% CI did not include zero [−0.10; −0.38].

We compared participants a) without ENSSI, b) only with ENSSI, and c) with ENSSI plus suicide attempts (ENSSI+SA). One participant did not respond to the suicidal intent question and was not included in the group comparison analyses. Table 3 displays the mean differences for all the variables, which were statistically significant except for lack of emotional awareness. Post hoc analyses indicated that, in trait mindfulness, participants with ENSSI+SA scored lower than participants with only ENSSI, and those with only ENSSI scored lower than participants without ENSSI. For impulse control difficulties, participants with ENSSI+SA scored higher than those with only ENSSI, and those with only ENSSI scored higher than those without ENSSI. Participants with ENSSI+SA scored higher than the other two groups on lack of emotional clarity, non-acceptance of emotional responses, and limited access to emotion regulation strategies. Both groups involved in NSSI scored higher than participants without ENSSI on difficulties in goal-directed behavior. Participants without ENSSI were older than the participants in the other two groups.

The results of the multinomial logistic regression analysis (Table 4), which controlled the overlapping between variables, indicated that the impulse control difficulties dimension was significantly associated with a higher risk of ENSSI+SA versus non-ENSSI ($B = -0.29$, SE = 0.08, $p < .001$, OR = 0.75 [95%CI: 0.64; 0.88]) and marginally significantly associated with a higher risk of ENSSI+SA versus only ENSSI ($B = -0.20$, SE = 0.07, $p = .059$, OR = 0.92 [95%CI: 0.83; 1.02]). According to the bootstrapping results ($n = 5000$), both regressive coefficients were statistically significant.

4. Discussion

The main objective of this study was to examine whether trait mindfulness was associated with a lower frequency of NSSI in a sample of psychiatric patients and whether this association was explained by lower emotion dysregulation. The results revealed a high prevalence of ENSSI during the last year. Namely, 46.4% of the participants engaged in at least five NSSI behaviors, close to one of the NSSI disorder criteria (American Psychiatric Association, 2013).

Mindfulness was negatively associated with all emotion dysregulation dimensions. All emotion dysregulation dimensions, except for emotional awareness, were positively associated with ENSSI. These

Table 2
Descriptive Statistics and Correlations of Study Variables.

Variables	*M*	*SD*	Score range	1	2	3	4	5	6	7	8
1. Mindfulness	55.07	14.49	15–90	1							
2. Lack of emotional awareness	11.62	4.18	4–20	−0.32**	1						
3. Lack of emotional clarity	10.64	4.01	4–20	−0.50**	0.47**	1					
4. Difficulties in goal-directed behavior	13.86	4.72	4–20	−0.55**	0.08	0.48**	1				
5. Impulse control difficulties	16.98	6.70	6–30	−0.56**	0.14	0.51**	0.71**	1			
6. Non-acceptance of emotional responses	22.04	8.14	7–35	−0.41**	0.17*	0.52**	0.62**	0.57**	1		
7. Limited access to emotion regulation strategies	9.05	3.68	3–15	−0.50**	0.14	0.51**	0.60**	0.67**	0.64**	1	
8. Non-suicidal self-injury (NSSI)	11.66	16.77	0–120	−0.38**	0.13	0.23**	0.32**	0.45**	0.19*	0.31**	1
9. Age	41.50	13.85		.04	0.01	−0.19*	−0.18*	−0.21*	−0.03	−0.10	−0.27**

Note. Pearson correlations are presented for all variables except the NSSI variable, which follows a non-normal distribution. Therefore, Spearman correlations are presented for NSSI. *p*-values were adjusted using Benjamini-Hochberg's correction. * $p < .05$, ** $p < .001$.

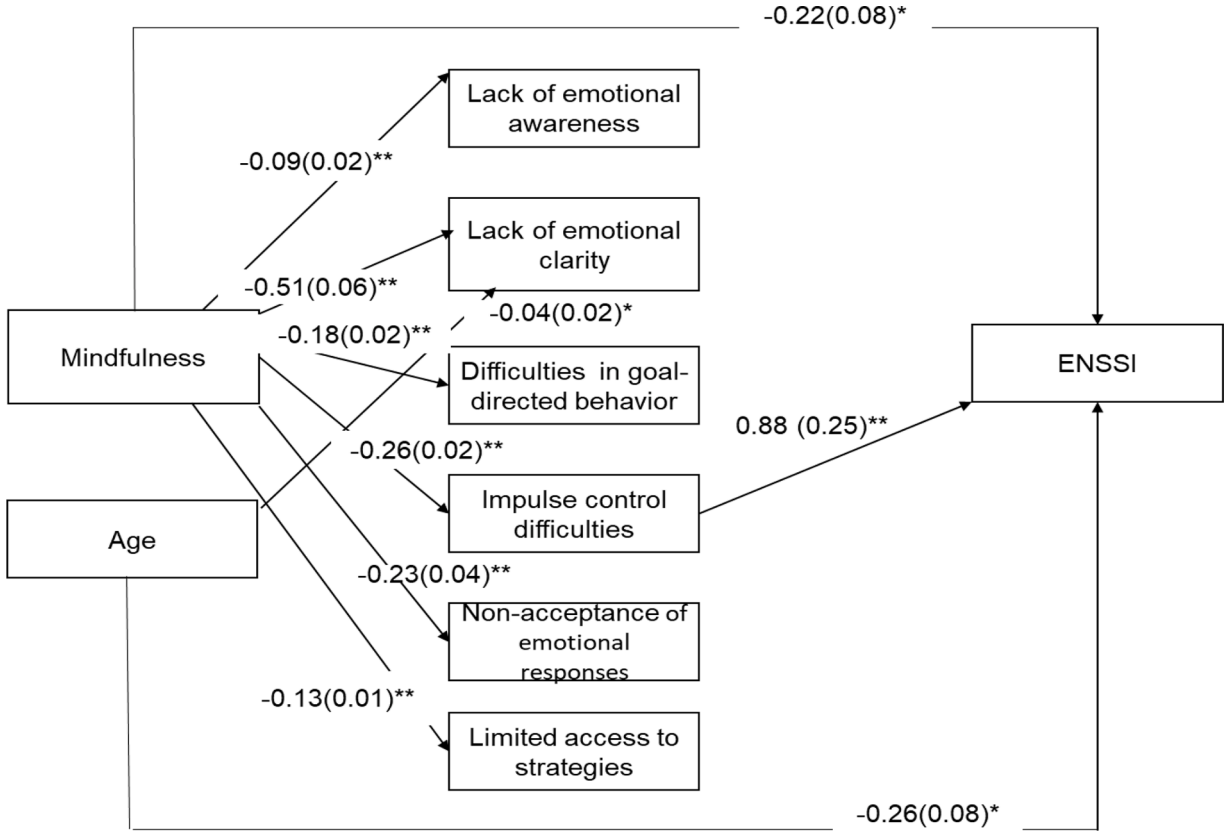

Fig. 1. Model linking trait mindfulness and non-suicidal self-injury through emotion dysregulation.
Note. Unstandardized coefficients are displayed. SE are indicated within brackets. *$p < .05$, **$p < .001$. *p*-values were adjusted using Benjamini–Hochberg's correction. ENSSI = engagement in non-suicidal self-injury.

Table 3
Mean Differences in the Study Variables for Engagement in NSSI and Suicide Status.

	Non-ENSSI (a)*N* = 64		ENSSI(b)*N* = 114		ENSSI + SA(c)*N* = 22		*F(2197)*	*p**	PartialEta Squared	Post hocComparisons*
	M	*SD*	*M*	*SD*	*M*	*SD*				
Mindfulness	60.43	13.06	54.18	14.07	44.19	14.34	11.92	<.001	0.11	*a* > *b* > *c*
Lack of emotional awareness	11.00	4.07	11.63	4.26	13.32	3.85	2.545	.081	0.03	
Lack of emotional clarity	9.74	3.69	10.69	4.01	12.91	4.24	5.35	.005	0.05	*c* > a, b
Difficulties in goal-directed behavior	12.24	5.00	14.23	4.48	16.52	3.53	8.12	<.001	0.08	*a* < b, c
Impulse control difficulties	13.80	5.82	17.43	6.33	23.81	5.47	22.95	<.001	0.19	*a* < *b* < *c*
Non-acceptance of emotional responses	20.83	8.54	21.52	7.66	27.82	7.12	6.89	.001	0.07	*c* > a, b
Limited access to emotion regulation strategies	7.99	3.58	9.16	3.64	11.65	2.95	8.80	<.001	0.08	*c* > a, b
Age	46.74	14.71	39.05	12.18	38.55	15.87	7.27	.001	0.07	*a* > b, c

Note. *p*-values were adjusted using Benjamini–Hochberg's correction. Post hoc comparisons indicate group differences at $p < .05$ after applying Benjamini–Hochberg's correction. ENSSI = engagement in non-suicidal self-injury.

Table 4
Multinomial logistic regression for engagement in NSSI and suicide attempt status.

				*Bootstrapping*95% Confidence Interval			*95% CI for Odds Ratio*		
	B	SE	*p**	Lower	Upper	*P*	Lower	Odds ratio	Upper
Non-ENSSI vs. ENSSI + suicide attempt									
Mindfulness	0.05	0.03	.210	−0.01	0.14	.083	1.00	1.05	1.11
Lack of emotional awareness	−0.11	0.08	.320	−0.31	0.05	.129	0.76	0.89	1.04
Lack of emotional clarity	0.11	0.10	.419	−0.16	0.44	.373	0.92	1.12	1.37
Difficulties in goal-directed behavior	0.16	0.12	.405	−0.02	0.46	.116	0.93	1.17	1.48
Impulse control difficulties	−0.29	0.08	<0.001	−0.54	−0.18	<.001	0.64	0.75	0.88
Non-acceptance of emotional responses	−0.04	0.06	.630	−0.22	0.10	.563	0.86	0.96	1.08
Limited access to emotion regulation strategies	−0.03	0.12	.881	−0.34	0.28	.826	0.77	0.97	1.24
Age	0.05	0.02	.208	−0.01	0.12	.098	1.00	1.05	1.09
Only ENSSI vs. ENSSI + suicide attempt									
Mindfulness	0.03	0.02	.362	−0.026	0.113	.269	0.98	1.03	1.08
Lack of emotional awareness	−0.07	0.07	.483	−0.242	0.079	.310	0.82	0.94	1.07
Lack of emotional clarity	0.06	0.09	.630	−0.213	0.346	.618	0.89	1.06	1.26
Difficulties in goal-directed behavior	0.19	0.11	.230	0.031	0.473	.049	0.97	1.20	1.49
Impulse control difficulties	−0.20	0.07	.059	−0.436	−0.102	<.001	0.71	0.82	0.95
Non-acceptance of emotional responses	−0.09	0.05	.231	−0.265	0.029	.133	0.83	0.92	1.02
Limited access to emotion regulation strategies	0.00	0.11	.999	−0.293	0.291	.998	0.80	1.00	1.25
Age	0.00	0.02	.208	−0.048	0.068	.855	0.97	1.00	1.05

Note: $R^2 = 0.28$ (Cox & Snell), 0.33 (Nagelkerke). Model $\chi 2(16) = 65.19$, $p < .001$. * Adjusted using Benjamini–Hochberg's correction. ENSSI = engagement in non-suicidal self-injury.

findings are consistent with previous studies indicating that mindfulness involves managing one's emotions better (Guendelman et al., 2017) and that emotion dysregulation is a risk factor for ENSSI (Wolff et al., 2019). More importantly, the path analysis model, which controlled the overlapping of variables, indicated that only reduced difficulties in controlling impulses explained the negative association between mindfulness and ENSSI. This variable was one of the primary emotion dysregulation dimensions identified as a risk factor for ENSSI in the meta-analysis by Wolff et al. (2019). This finding is also consistent with the results of another meta-analysis, which found that, among impulse control problems, negative urgency was particularly associated with NSSI engagement (Hamza et al., 2015). This study extends the research of Per et al. (2021), which was conducted with a non-clinical sample using a general measure of emotion dysregulation.

Thus, the results highlight the relevance of impulse control difficulties when experiencing negative emotions. Feeling out of control in response to a negative affect is a salient trait linked to ENSSI (Baer et al., 2018). Therefore, consistent with previous research, this finding contributes to the understanding of the functions of ENSSI. The presence of a negative affect would act as an antecedent to the performance of NSSI behavior such that ENSSI would reduce emotional distress in the short term (Klonsky and Glenn, 2009; Nock and Prinstein, 2005). Individuals with reduced impulse control would be more likely to engage in NSSI behavior, seeking immediate emotional relief at the expense of the medium- and long-term costs of their behavior (Cyders and Smith, 2008). Notably, qualitative research on the experiences of people who engaged in NSSI has shown that they often report feeling distressed and out of control in the moments before self-injury (Kakhnovets et al., 2010; Polk and Liss, 2009) and that self-injurious behavior provided them with some sense of control over some aspect of their lives (Polk and Liss, 2009).

Interestingly, younger age was associated with higher ENSSI frequency, consistent with several studies indicating that ENSSI is more prevalent in youths (Swannell et al., 2014). Greater difficulties with impulse control in younger people could explain the role of age in ENSSI, as several components of impulsivity tend to decrease with age (Herman et al., 2018).

A secondary aim of this study was to examine differences in mindfulness and emotion dysregulation between participants with only ENSSI and those who indicated engaging in suicide attempts. The latter presented lower scores for mindfulness and higher scores for lack of emotional clarity, impulse control difficulties, non-acceptance of emotional responses, and limited access to emotion regulation strategies, indicating that patients who have attempted suicide have worse emotion regulation. The results of the multinomial regression analysis, which controlled the covariance between variables, suggested that the dimension of impulse control difficulties was the most relevant for suicide attempts. Namely, impulse control difficulties when experiencing distress were associated with a higher risk of exhibiting only ENSSI in contrast to not presenting any ENSSI behavior and marginally associated with a higher risk of presenting ENSSI with a suicide attempt in contrast to presenting only ENSSI. This finding points to the relevance of emotional dysregulation in both suicidal self-injury and NSSI.

These results can be interpreted in light of some of the proposed theories on NSSI and suicidal behavior. For instance, according to the continuum of self-harm behaviors model (Stanley et al., 1992), there is a transition from mild forms of self-injury at one extreme to completed suicide at the other extreme. The differences between subgroups (non-ENSSI, ENSSI, and ENSSI with suicide attempts) in difficulties in impulse control and other dimensions of emotion dysregulation suggest that poor emotion regulation when experiencing negative emotions may be a parallel variable that worsens along the continuum.

The role played by difficulties in impulse control, as a potential explanatory mechanism for the association between mindfulness and ENSSI, suggests that mindfulness-based interventions could benefit individuals engaging in NSSI. Moreover, it has been proposed that impulse control strategies should be part of top-down mindfulness-based emotion regulation strategies (Guendelman et al., 2017).

This study has some limitations that should be addressed in future studies. First, the mindfulness measure focused on acting with awareness, and measures of other facets of mindfulness, such as not judging, describing, or not reacting, were not included, although they are also relevant to psychological problems such as ENSSI (Caltabiano and Martin, 2017). The second limitation is related to the study's cross-sectional nature, which did not allow determining directionality in the relationship between the variables. The underlying conceptual model of this study proposes that trait mindfulness acts as a protective factor that is associated with a lower frequency of NSSI through better emotional regulation. However, this implies a mediational mechanism, which can only be tested through a proper longitudinal design (Lee et al., 2021; O'Laughlin et al., 2018). Given the cross-sectional design of this study, it is possible that the mechanisms of association are different between variables. Thus, for example, worse emotion regulation could negatively affect mindfulness capacity and/or ENSSI could contribute to worsening emotional regulation. Moreover, there are other potential sources of bias interpretation for this type of design (Lee et al., 2021).

For example, other variables could explain the associations between the study variables, such as having a psychiatric disorder and personality traits like neuroticism, which have been associated with trait mindfulness (Tomlinson et al., 2018), emotion regulation (Cludius et al., 2020), and ENSSI (Lin et al., 2017; Patel et al., 2021). Both ENSSI and emotion dysregulation are considered transdiagnostic processes, and as such they could be manifestations of numerous psychiatric disorders (Bentley et al., 2014; Cludius et al., 2020). Future research should longitudinally evaluate this study's hypotheses and thus utilize a more substantial methodology for examining potential mediational relationships between variables.

Despite these limitations, this study concluded that ENSSI is highly frequent in psychiatric patients and that further evaluation is necessary to address this problem adequately. It should be noted that several of the participants had a personality disorder, and, in particular, borderline personality disorder has been identified as one of the psychopathological problems most associated with ENSSI (Selby and Joiner, 2009). Moreover, impulse control is also impaired in borderline personality disorder (Hamza et al., 2015). Finally, the role played by mindfulness and emotion dysregulation suggests that mindfulness-based strategies could be helpful in this context.

Author contributions

EC: designed the study, conducted the data analyses, and wrote the manuscript. ERC: collected data, and collaborated with the writing of the study. CM: collected data and collaborated with the writing of the manuscript. All author approved the final version of the manuscript for submission.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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