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ORIGINAL ARTICLE

Invalidating Caregiving Environments, Specific Emotion Regulation Deficits, and Non-suicidal Self-injury

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Abstract
This study examined the indirect effects of distinct aspects of invalidating caregiving environments (i.e., paternal maltreatment, maternal maltreatment, and perceived alienation) on non-suicidal self-injury (NSSI) via six specific emotion regulation difficulties. We hypothesized that specific emotion regulation deficits would mediate associations between invalidating environments and NSSI. Participants included 114 young adults (57 self-injurers; 57 age- and sex-matched comparison participants) aged 17–25 years. Three parallel mediation models tested hypotheses. Results showed that maternal maltreatment, paternal maltreatment, and perceived alienation indirectly predicted NSSI through poor emotional clarity. Maternal maltreatment uniquely predicted NSSI through limited access to regulation strategies. Lastly, maternal maltreatment and perceived alienation were both linked to greater difficulties engaging in goal-directed behavior during emotional upsets; however, contrary to hypotheses, this particular deficit was associated with decreased odds of engaging in NSSI. Findings illustrate how different aspects of invalidating environments and specific emotion regulation deficits may be implicated in NSSI engagement.

Keywords Non-suicidal self-injury · Parent–child relationships · Maltreatment · Alienation · Emotion regulation

Introduction

Non-suicidal self-injury (NSSI) is defined as purposeful, self-inflicted injury (e.g., self-cutting, burning the skin, head-banging) that is performed without suicidal intent using socially unsanctioned methods [1]. In non-clinical samples of youth and young adults, the estimated lifetime rates of NSSI amount to 13–17% [2], thus highlighting its commonplace nature. Beyond the various physical and psychological health risks associated with the behavior, which can lead to considerable costs to health care systems and communities [3, 4], engagement in NSSI is increasingly understood as a reflection of young people's emotional distress [5, 6]. It is therefore imperative to investigate the risk factors of NSSI in order to help prevent youth's engagement in the behavior and address its underlying causative agents.

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In light of growing evidence suggesting that self-injurious behaviors are etiologically linked to the emotional climate of parent–child relationships [7–9], and underpinned by emotion regulation (ER) difficulties [6], the current study sought to examine the indirect effects of particular caregiving contexts (i.e., paternal and maternal maltreatment, and perceived alienation) on NSSI via a range of specific ER deficits.

Maltreatment, Emotion Regulation, and NSSI

Substantial research supports the notion that a young person's experience of maltreatment in childhood, particularly at the hands of primary caregivers, increases their likelihood of engaging in NSSI. A recent meta-analysis of 18 independent samples ($n = 19{,}537$) drawn from this research found a medium-to-large effect for the positive univariate relationship between childhood maltreatment (e.g., sexual, physical, emotional) and NSSI; this relationship was robust to the addition of covariates in multivariate analyses, as well as tests of publication bias [10]. The mechanism by which

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childhood maltreatment confers risk for NSSI is understood primarily in the context of youth's emotional development. Specifically, Linehan's biosocial theory [11] posits that emotionally invalidating family experiences, such as maltreatment and abuse, impede the development of adaptive ER skills (i.e., the various competencies required to monitor, evaluate, and manage distressing emotions [12]), thereby increasing the risk of relying on maladaptive strategies, such as NSSI, to cope with negative emotion. Research exploring the functions of NSSI corroborates this theory by demonstrating that the behavior is frequently motivated by a desire to escape or release intense emotional pain [13, 14].

In an effort to empirically explore this developmental trajectory, researchers have begun to examine indirect links between parental maltreatment and NSSI through ER difficulties, with a particular focus on deficits in the understanding of emotions. Paivio and McCulloch [15] and Swannell et al. [8] found support for the mediating role of alexithymia—a personality construct reflective of difficulties with identifying and labeling emotions—in associations between maltreatment and NSSI using community-based samples of female college students ($n = 100$) and Australian adults ($n = 11{,}423$), respectively (although results were only significant for females in Swannell et al.'s study). Two additional studies explored similar models in clinical populations of youth. In their sample of 131 psychiatrically hospitalized adolescents, Sim et al. [7] found that difficulties with the expression and awareness/understanding of emotions explained significant variance in the association between maltreatment (i.e., emotional abuse and neglect) and the frequency of NSSI. Likewise, using an inpatient sample of 95 adolescents, Thomassin et al. [16] explored indirect pathways from childhood emotional, physical, and sexual abuse to NSSI through two ER deficits, namely poor emotion coping (i.e., difficulties tolerating and coping with negative emotions) and poor emotion expressivity (i.e., difficulties with the expression and awareness/understanding of emotions). These authors found that only poor emotion expressivity mediated the relationship between emotional abuse and NSSI. Taken together, these studies lend support to the suggestion that maltreatment confers risk for NSSI by interfering with the development of adaptive ER skills, particularly youth's understanding of, and insight into, their emotional experiences.

Despite these important findings, given that a narrow range of ER difficulties have been explored as potential mediators of the link between maltreatment and NSSI, our understanding of these risk pathways remains far from exhaustive. Indeed, given that one's ER ability relies on multiple and incremental processes, including the effective monitoring of emotions in the self, the adaptive and realistic evaluation of these emotional experiences, and the effective modulation of expressed emotions based on environmental demands [12, 17], it is possible that distinct ER skills may be differentially affected by childhood maltreatment, and thus have discrete implications for NSSI engagement. To our knowledge, only one study of 249 female undergraduates [18] explored a broad range of ER deficits (i.e., lack of emotional awareness, lack of emotional clarity, non-acceptance of emotions, limited access to ER strategies, difficulties with goal-directed behavior, impulse control difficulties) as mediators of the link between maltreatment and NSSI. The researchers found that the association between maltreatment and NSSI was only partially explained by a limited access to ER strategies, thus reflecting few mediational pathways through specific ER deficits. A few factors frequently encountered in NSSI research could potentially serve to explain these results, including an over-inclusive assessment of NSSI behavior (e.g., picking at wounds, nail biting; see [19]), or low rates of maltreatment in the college sample (see [20]). However, as neither full rates of NSSI methods or maltreatment are reported in the study, these potential explanations remain strictly speculative.

Another factor that may serve to explain additional variance in these links, but that remains unexamined to date, is which caregiver is (retrospectively) identified as the perpetrator of abuse or maltreatment. Previous research documented varying influences of maternal vs. paternal caregiving experiences on NSSI [21–23], including in maltreatment contexts. For instance, one study by Martin et al. [22] found that paternal (but not maternal) maltreatment was a significant predictor of NSSI's addictive features, an increasingly relied-upon indicator of NSSI severity (see [24]). However, research has yet to explore the indirect—and possibly distinct—influences of maternal and paternal maltreatment on NSSI through ER deficits.

Perceived Alienation and NSSI

Peripherally to research on maltreatment and NSSI, researchers are also increasingly interested in examining the impact of emotionally invalidating, yet less objectively abusive parental behavior on NSSI [23, 25, 26]. In particular, the degree to which a young person feels misunderstood, unsupported, and alienated by parental figures, a central characteristic of invalidating developmental contexts [11], has been linked with increased engagement in NSSI across two independent investigations. First, Yates et al. [27] found that perceived alienation accounted for a large portion of the association between parental criticism and NSSI in a cross-sectional sample ($n = 1036$) of upper-middle-class adolescents. Likewise, in their sample of over 1000 university students, Bureau et al. [26] found that perceived alienation predicted recent NSSI behavior, over and above other relational predictors. Subsequently, this same research group

found that young adults' emotion dysregulation mediated this link [9], thus aligning with the previously-discussed findings on maltreatment, ER, and NSSI.

Despite this apparent alignment across studies, however, no research to date has sought to determine whether maltreatment and perceived alienation are associated with vulnerability for NSSI via shared or distinct risk pathways. In particular, it remains unclear whether young people's general feelings of isolation and alienation from caregiving figures is merely a byproduct of distressing maltreatment experiences, or if such feelings could confer risk for NSSI independently of maltreatment experiences.

The Current Study

Using a young adult population, the current study first aimed to explore a range of specific ER deficits (i.e., lack of emotional awareness, lack of emotional clarity, non-acceptance of emotions, limited access to ER strategies, difficulties with goal-directed behavior, impulse control difficulties) as mediators of the link between maltreatment and NSSI, separately for maternal and paternal maltreatment. Second, the same mediating pathways via ER difficulties were explored in an additional model, which used perceived alienation (i.e., feeling misunderstood and unsupported within one's caregiving environment, without specificity to either parent) as a predictor of NSSI, while controlling for maltreatment experiences. We hypothesized that greater ER deficits, particularly those identified in past literature as associated with maltreatment and invalidating experiences (i.e., emotional clarity and limited access to ER strategies), would mediate the link between maltreatment and the presence of NSSI, and similarly the link between perceived alienation and NSSI. Analyses exploring maternal versus paternal maltreatment were exploratory, so no specific hypotheses were proposed regarding which perpetrator of maltreatment would drive the aforementioned mediational links.

Method

Participants and Procedure

One hundred and twenty young adults between the ages of 17 and 25 years were recruited from one of two sources. Seventy participants (40 self-injurers[1]) were recruited through external advertisements posted across a Canadian university campus and online (i.e., Craigslist, Kijiji). The remaining 50 participants (20 self-injurers) were recruited through an online participant pool reserved for undergraduate students enrolled in introductory psychology courses at a Canadian university. This online participant pool was originally used for a wider study on relationships and coping; individuals interested in participating in a follow-up study were instructed to leave their contact information. Individuals who expressed interest in the study via either of these two sources were contacted by phone or email for screening of age, sex, and NSSI status. All 60 eligible participants with an NSSI history were retained for the study (88% female; $M_{age} = 20.3$ years, $SD_{age} = 2.0$). Sixty individuals of the same age and sex as the NSSI group ($M_{age} = 20.4$ years, $SD_{age} = 2.0$), but without a history of NSSI, were then selected as comparison participants ("No-NSSI" group). All participants completed the measures described below during an in-person session led by the second author. Participants with incomplete data were dropped from analyses, leading to a final sample of 114 individuals, with 57 self-injurers (89% female; $M_{age} = 20.5$ years, $SD_{age} = 2.0$) and 57 comparison participants (88% female; $M_{age} = 20.3$ years, $SD_{age} = 2.1$). Missing data were limited for all study variables (1.7–5%) and missing completely at random (Little's MCAR test: $\chi^2(27) = 32.34$, $p = 0.22$).

The total sample was comprised of a majority (84.2%) of undergraduate students. Others self-identified as white-collar workers (6.1%), unemployed (3.5%), or other (e.g., blue-collar workers, self-employed, or homemakers; 4.5%). The majority (74.6%) of the sample was Caucasian, with others self-identifying as Asian (6.1%), Black (6.1%), Latino (4.4%), Middle Eastern (4.4%), or Other (4.4%). Self-injurers were less likely than non-self-injurers to be students, $\chi^2(1) = 4.67$, $p = 0.03$. Other demographics did not differ between the two groups.

Measures

Maternal and Paternal Maltreatment

The Comprehensive Child Maltreatment Scale (CCMS) [28] was used as a retrospective measure of childhood maltreatment, separately for mothers and fathers. Items from this measure are designed to assess the frequency of various parental behaviors that reflect psychological abuse, physical abuse, and neglect (scored on a five-point scale from 1 = *never or almost never* to 5 = *very frequently*) and sexual abuse (scored on a six-point scale from 1 = *never* to 6 = *more than 20 times*). Due to low endorsement of sexual abuse items (0.8% maternal, 2.5% paternal), these scales were excluded from analyses. Composites were created for maternal and paternal maltreatment by summing scores across the remaining maltreatment types (neglect, psychological and physical abuse). These composite scores, which ranged

[1] The term "self-injurers" will be used herein to refer to young adults with a history of NSSI.

from 9 to 30 (maternal) and 9 to 32 (paternal), were used in analyses. Internal consistency was satisfactory for both maternal (α = 0.73) and paternal (α = 0.84) composites in the current sample. The CCMS has demonstrated adequate validity and reliability in past research [28].

Perceived Alienation

General feelings of alienation were assessed using the Alienation subscale of the Inventory of Parent and Peer Attachment (IPPA) [29]. Items measure the degree to which the young person feels misunderstood and unsupported by parents (e.g., *I don't know whom I can depend on these days*; *I feel that no one understands me*). Seeing as the subscale aims to assess the young person's general subjective experience within their caregiving environment, without reference to specific or factual parental behaviors, we did not aim to distinguish between experiences with mothers versus fathers. Items are scored on five-point scales (from 1 = *almost never or never true* to 5 = *almost always or always true*). Scores ranged between 8 and 38, with higher scores indicating greater perceived alienation. The scale has demonstrated good psychometric properties in previous research [29] and was found to have excellent internal consistency (α = 0.90) using the current sample.

ER Difficulties

The *Difficulties in Emotion Regulation Scale* (DERS) [17] is a 36-item self-report measure of emotion dysregulation. The instrument was used to assess six specific ER difficulties based on the following subscales: Lack of emotional awareness (six items [reverse scored]; e.g., *I pay attention to how I feel*); Lack of emotional clarity (five items; e.g., *I have no idea how I am feeling*); Limited access to ER strategies (eight items; e.g., *When I'm upset, I believe that I'll end up feeling very depressed*); Non-acceptance of emotions (six items; e.g., *When I'm upset, I feel like I am weak*); Difficulties engaging in goal-directed behavior (five items; e.g., *When I'm upset, I can still get things done* [reverse scored]); and Impulse-control difficulties (six items; e.g., *When I'm upset, I feel out of control*). All items are scored along a five-point scale from 1 (*almost never*) to 5 (*almost always*). The DERS's validity and reliability have been demonstrated in previous psychometric work [17]. Using the current sample, all subscales demonstrated good internal consistency (α = 0.84–0.90).

Non-suicidal Self-injury

The *Ottawa Self-Injury Inventory* (OSI) [30] was used to as a measure of NSSI behavior. Answers (yes/no) to the question "In your lifetime, have you purposefully injured yourself without the intention to kill yourself?" were used to determine group membership, in addition to the initial screening via phone/email. For descriptive purposes, participants were also asked to report on the recency of their NSSI behaviors (*in your lifetime*, *in the past year*, and/or *in the past 6 months*) and their frequency (*1–5 times*, *monthly*, *weekly*, or *daily*). NSSI methods were also recorded based on endorsement of methods from a list (e.g., cutting, scratching, burning, piercing skin with sharp objects, head-banging, trying to break bones), excluding behaviors deemed more trivial in nature (e.g., interfering with wound healing) or that did not meet tissue damage criteria (e.g., alcohol or drug use). The OSI has demonstrated good psychometric properties in past research [24, 31].

Results

Descriptive Statistics

Average age of onset for NSSI was 13.9 years (*SD* = 3.45). Twenty-five percent of self-injurers had engaged in NSSI within the past month, while approximately half (48.3%) had self-injured within the past 6 months. The remaining 26.7% of the NSSI subsample had not self-injured for at least 6 months. NSSI frequency in the past 6 months was 1–5 times (30%), monthly (8.5%), weekly (8.5%) and daily (1.7%). Young adults most commonly reported self-injuring by way of cutting (78.9%), scratching (57.9%), hitting (35.1%), burning (31.6%), biting (31.6%), and piercing the skin with sharp objects (29.8%).

The rates of maternal and paternal maltreatment across NSSI and No-NSSI groups are presented in Table 1. Overall, across both groups, the rates are higher than one would expect for a community-based sample for at least two reasons. First, the study was advertised as a project on relationships and coping, which may have had particular appeal to individuals affected by relational trauma. In addition, experiences of maltreatment are typically overrepresented among self-injurers [10], and self-injurers populated 50% of our sample.

Intercorrelations among study variables are presented in Table 2. A MANOVA was also used to compare self-injurers and comparison participants across the six ER deficits, maternal and paternal maltreatment, and perceived alienation (see Table 2 for complete results). Results showed that self-injurers reported significantly greater deficits across all ER dimensions, except difficulties with goal-directed behavior and lack of emotional awareness. Self-injurers were also more likely to have experienced both paternal maltreatment and perceived alienation, but not maternal maltreatment (marginally significant result at the $p = 0.10$ level).

Table 1 Rates of maternal and paternal maltreatment across NSSI and No-NSSI groups

Maltreatment subtype[a]	NSSI group		No-NSSI group	
	Never (%)	Occasional to frequent (%)	Never (%)	Occasional to frequent (%)
Maternal maltreatment				
Psychological	16.7	84.3	21.7	79.3
Physical	46.7	54.3	55.0	45.0
Neglect	51.7	49.3	70.0	30.0
Paternal maltreatment				
Psychological	20.0	80.0	33.3	66.7
Physical	41.7	59.3	65.0	45.0
Neglect	45.0	55.0	80.0	20.0

"Never" represents the proportion of participants who gave negative ratings (never or almost never) on all items from the subscale. "Occasional to Frequent" represents the proportion of participants who gave a positive rating (occasionally, sometimes, frequently, or very frequently) on 1 or more items from the subscale

[a]Sexual abuse was removed due to low endorsement (0.8% maternal, 2.5% paternal)

Mediational Models

Our primary hypotheses were tested using three parallel mediation models (one each for maternal maltreatment, paternal maltreatment, and perceived alienation) bootstrapped with 5000 re-samples using Hayes' PROCESS macro [32] with all six ER deficits entered simultaneously as mediators. Note that results that regressed NSSI (outcome) on predictor variables were analyzed using logistic regression, and are thus expressed in a log-odds metric. McFadden's R^2 values [33] are presented as goodness-of-fit indices.

Model 1 (Maternal Maltreatment)

In the first model ($R^2_{\text{McFadden}} = 0.19$), results yielded significant indirect effects of maternal maltreatment on NSSI through limited access to ER strategies [$B = 0.06$, $SE_{\text{boot}} = 0.04$, 95% CI_{boot} (−0.002, 0.18)], lack of emotional clarity [$B = 0.05$, $SE_{\text{boot}} = 0.03$, 95% CI_{boot} (0.01, 0.13)], and difficulties engaging in goal-directed behavior [$B = -0.04$, $SE_{\text{boot}} = 0.03$, 95% CI_{boot} (−0.11, −0.01)]. Specifically, greater maternal maltreatment was linked to greater ER difficulties, namely limited access to ER strategies [$b = 0.51$, 95% CI (0.27, 0.75)] and lack of emotional clarity [$b = 0.25$, 95% CI (0.10, 0.40)], which were in turn associated with increased odds of belonging to the NSSI group [$b = 0.13$, 95% CI (0.02, 0.23), and $b = 0.20$, 95% CI (0.05, 0.34), respectively]. Greater maternal maltreatment was also linked with greater difficulties engaging in goal-directed behavior [$b = 0.22$, 95% CI (0.05, 0.39)], but in contrast with previous results, this was associated with decreased odds of belonging to the NSSI group [$b = -0.04$, 95% CI (−0.11, −0.01)]. No indirect effects were found through lack of emotional awareness [$B = -0.01$, $SE_{\text{boot}} = 0.01$, 95% CI_{boot} (−0.04, 0.01)], non-acceptance of emotions [$B = 0.005$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.03, 0.04)], or impulse control difficulties [$B = 0.01$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.01, 0.06)].

Model 2 (Paternal Maltreatment)

In the second model ($R^2_{\text{McFadden}} = 0.20$), results indicated that indirect effects from paternal maltreatment to NSSI were only apparent through poorer emotional clarity [$B = 0.05$, $SE_{\text{boot}} = 0.03$, 95% CI_{boot} (0.01, 0.12)]. Specifically, greater paternal maltreatment was related to a greater lack of emotional clarity [$b = 0.28$, 95% CI (0.11, 0.44)], which in turn was associated with NSSI group membership [$b = 0.17$, 95% CI (0.03, 0.33)]. No mediational effects were found for limited access to ER strategies [$B = 0.02$, $SE_{\text{boot}} = 0.03$, 95% CI_{boot} (−0.01, 0.09)], difficulties engaging in goal-directed behavior [$B = -0.01$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.06, 0.03)], lack of emotional awareness [$B = -0.01$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.05, 0.01)], non-acceptance of emotions [$B = -0.0004$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.04, 0.03)], or impulse control difficulties [$B = 0.01$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.01, 0.06)].

Model 3 (Perceived Alienation)

Results from this model ($R^2_{\text{McFadden}} = 0.19$), which controlled for the effects of maltreatment, revealed indirect links from greater perceived alienation to NSSI through a lack of emotional clarity [$B = 0.04$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (0.01, 0.11)], and greater difficulties engaging in goal-directed behavior [$B = -0.04$, $SE_{\text{boot}} = 0.02$, 95% CI_{boot} (−0.11, −0.01)]. Specifically, greater perceived alienation was associated with poorer emotional clarity, [$b = 0.24$, 95% CI (0.14, 0.35)], which in turn was associated with increased odds of belonging to the NSSI group [$b = 0.17$, 95% CI (0.02, 0.32)]. Similar to model 1, greater

Table 2 Intercorrelations and mean differences between NSSI and No-NSSI groups across all study variables

	1	2	3	4	5	6	7	8	9	NSSI Group M (SE)	No-NSSI group M (SE)	F	df
1. Maternal maltreatment	–	0.36**	0.45**	0.25**	0.24*	0.23*	0.13	0.37**	0.30**	15.51 (0.70)	13.88 (0.69)	2.74	1, 106
2. Paternal maltreatment		–	0.32**	0.24*	0.05	0.16	0.19	0.13	0.31**	14.93 (0.66)	12.68 (0.65)	5.89*	1, 106
3. Perceived alienation			–	0.46**	0.39**	0.41**	0.37**	0.53**	0.50**	23.52 (1.04)	19.39 (1.02)	8.05**	1, 106
4. Nonacceptance of emotions				–	0.26**	0.33**	0.21*	0.53**	0.42**	15.22 (0.79)	12.07 (0.78)	8.10**	1, 106
5. Difficulties with goaldirected behavior					–	0.45**	0.19*	0.55**	0.32**	16.53 (0.68)	16.38 (0.66)	0.02	1, 106
6. Impulse control difficulties						–	0.31**	0.67**	38**	14.06 (0.72)	10.94 (0.70)	9.63**	1, 106
7. Poor emotional awareness							–	0.34**	0.60**	15.45 (0.73)	13.75 (0.71)	2.78	1, 106
8. Limited access to ER strategies								–	0.42**	20.08 (0.94)	12.46 (0.92)	12.24***	1, 106
9. Lack of emotional clarity									–	13.38 (0.58)	10.50 (0.57)	12.50***	1, 106

Estimated marginal means and standard errors are presented. Multivariate test of significance was significant, Wilks' $\lambda = 0.77$, $F(9, 98) = 3.30$, $p = 0.002$, partial $\eta^2 = 0.23$

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

perceived alienation was also linked to greater difficulties engaging in goal-directed behavior [$b = 0.26$, 95% CI (0.13, 0.38)], but this was associated with a decreased likelihood of belonging to the NSSI group [$b = -0.17$, 95% CI (-0.29, -0.05)]. Indirect paths through limited access to ER strategies [$B = 0.05$, $SE_{boot} = 0.04$, 95% CI_{boot} (-0.01, 0.12)], lack of emotional awareness [$B = -0.01$, $SE_{boot} = 0.02$, 95% CI_{boot} (-0.07, 0.01)], non-acceptance of emotions [$B = -0.001$, $SE_{boot} = 0.02$, 95% CI_{boot} (-0.04, 0.04)], and impulse difficulties [$B = 0.01$, $SE_{boot} = 0.02$, 95% CI_{boot} (-0.01, 0.07)] were not significant.

Discussion

The present study contributes to a growing body of literature on the developmental risk factors underlying NSSI behavior. Findings from the study were partially consistent with hypotheses. First, as anticipated, both greater maternal (model 1) and paternal (model 2) maltreatment were associated with the presence of NSSI via a lack of emotional clarity. This finding is consistent with the theoretical literature [11] and empirical data [7, 8, 15, 16] showing that individuals exposed to maltreatment are more vulnerable to NSSI due to difficulties in understanding their emotions (e.g., confusion about feelings, general lack of insight into the reasons underlying emotional distress). Our finding also suggests that the impact of maltreatment on the development of this particular ER skill is not parent-specific, implying that abusive/neglectful behavior from either parent likely interferes with the young person's ability to develop insight into their emotional experiences. Interestingly, additional results from the present study (model 3) suggest that the young person's subjective feelings of alienation and isolation in the parent–child relationship, beyond the influence of maltreatment, compromises the development of their emotional clarity, and may in turn increase their propensity toward NSSI. Taken together, findings suggest that lacking insight into emotional experiences may be a particularly common risk factor for NSSI, stemming broadly from a parent–child relationship in which the youth's emotions were dismissed as unworthy of attention or care, even in the absence of maltreatment. Helping self-injurers gain insight into their emotional experiences should therefore continue to be outlined as an important therapeutic target in clinical intervention, such as in dialectical behavior therapy or emotion focused therapy.

In contrast with previous results, findings from model 1 pointed to a specific mechanism linking young people's experiences of maltreatment by mothers and the presence of NSSI. Specifically, maternal maltreatment was uniquely related to engagement in NSSI through limited access to ER strategies. This particular ER deficit, as measured by the DERS [17], encapsulates a sense of powerlessness and

lack of self-efficacy with respect to ER, whereby negative emotions are viewed by the young person as insurmountable, overwhelming, and long-lasting. This tendency to evaluate one's ER ability as deficient has been found to mediate the link between maltreatment and NSSI in one investigation [18], but not in another more recent study [16]. A factor that may be responsible for these studies' misalignment is a lack of specification of the perpetrator of maltreatment. Specifically, our finding suggests that youth exposed to maternally perpetrated maltreatment struggle to find effective ways to cope with negative emotions, which may be the combined result of reduced maternal modeling of healthy coping behavior and the youth's generalized dysregulation as result of trauma. In turn, this state of vulnerability may have resulted in young adults perceiving their ability to regulate emotional distress as inherently deficient, thus rendering them more vulnerable to using NSSI as a compensatory ER strategy. This finding is consistent with general research underscoring mothers' key roles in socializing ER in children and in the family [34]. In addition, results align with those from a recent study of 237 young adults by Tatnell et al. [23], which found that attachment-related anxiety with mothers indirectly predicted engagement in NSSI through limited access to ER strategies. Given that our study was, to the best of our knowledge, the first to investigate parent-specific mediation effects in the link between maltreatment and NSSI, it would warrant verification in future research.

Additional findings from the present study suggested that maternal maltreatment (model 1) and perceived alienation (model 3) were both linked to greater difficulties engaging in goal-directed behavior during emotional upsets (i.e., difficulties in accomplishing energy-taxing activities such as concentrating, getting work done, getting things done). However, contrary to theoretically-driven hypotheses and existing research [20, 23], this ER deficit was in turn associated with *decreased* odds of belonging to the NSSI group. Despite appearing theoretically incongruent, our finding may be pertinently explained in the context of NSSI's emotion-regulating functions. Specifically, since NSSI is primarily described by youth and young adults as a strategy to regulate intense negative emotions that may otherwise interfere with activity-completion (e.g., self-hatred, anger, sadness) [6], our findings may indicate that relationally traumatized youth who do *not* resort to NSSI as a strategy to regulate their emotions have a particularly difficult time engaging in cognitively-taxing, goal-oriented activities, such as concentrating on homework or staying focused on a given task. By extension, this may indicate that in spite of the clear maladaptive and self-destructive effects of NSSI in the broader context of youth's socioemotional adjustment, the behavior may nevertheless facilitate a temporary return to emotional baselines, and could therefore engender greater activity-completion in the short-term. Should this be accurate, the behavior may become positively-reinforcing over time—and perhaps especially so for youth with excessively high standards of performance and maladaptive perfectionistic tendencies, who have been shown to be at increased risk for NSSI in past research [35]. This may also help to explain why a portion of self-injurers rely particularly heavily on NSSI, and go as far as to report feeling dependent on it [24, 31, 36]. Nevertheless, given their contradictory nature [20, 23], results should be explored in future research.

As a final discussion point, it is interesting to note that although maltreatment experiences are known to be overrepresented in populations of self-injurers [10], such experiences are not unique to self-injurers, as indicated by elevated rates of maltreatment across both our NSSI and No-NSSI groups (see Table 1). Thus, several questions remain regarding which specific factors drive engagement in NSSI—or protect against it—in the context of relational trauma. As demonstrated in the present study, difficulties with specific ER processes—particularly emotional clarity and coping—may be among those factors that "tip the scale" towards engagement in NSSI following exposure to an invalidating caregiving environment. Future research would benefit from focusing on additional discriminating risk and protective factors, such as the neuropsychological substrates of affect regulation [37], body self-esteem [38], or corrective relational experiences [39] as potential avenues to explain why differential NSSI vulnerability is observed across similar relational histories.

Limitations

The current study is not without limitations. First, all study variables were measured via self-report methods only, which could have rendered our data vulnerable to response biases. As mentioned previously, our recruitment strategy likely led to inflated rates of maltreatment across both our NSSI and No-NSSI groups. Moreover, seeing as females comprised the majority (89%) of our sample, results may be less generalizable to young men. Finally, given that our data were collected cross-sectionally and analyzed using correlational methods, we cannot ascertain causation in results. Findings should therefore be interpreted cautiously, and revisited using a larger sample size with a prospective design to clarify the temporality of mediation effects. Limitations notwithstanding, this study contributes to a more nuanced understanding of the various risk pathways to NSSI by illustrating how distinct aspects of invalidating environments compromise the development of specific ER competencies in youth.

Summary

This study investigated the mechanisms by which distinct aspects of invalidating caregiving environments (maternal maltreatment, paternal maltreatment, and perceived

alienation) may confer vulnerability for NSSI. First, results suggest that a young person's general experience of emotionally invalidating caregiving—whether characterized by exposure to maltreatment from fathers or mothers, and/or by feeling alienated from caregivers more generally—is linked with increased vulnerability for NSSI through poor emotional clarity. Lacking insight into emotional experiences may therefore represent a particularly common risk factor for NSSI, stemming broadly from caregiving relationships in which the youth's emotions were chronically dismissed, even in the absence of maltreatment. In contrast, findings point to a more specific mechanism linking maternal maltreatment and NSSI; that is, maltreatment by mothers was indirectly associated with engagement in NSSI through a limited access to ER strategies, which could in part reflect a lack of maternal efforts to model and teach youth about healthy coping behavior. Findings also indicated that young adults who had reportedly experienced an invalidating caregiving environment (i.e., maternal maltreatment and/or perceived alienation) had a particularly difficult time engaging in cognitively-taxing, goal-oriented activities during emotional upsets; however, these individuals were found to be less likely to resort to NSSI as a compensatory ER strategy, thus perhaps offering added insight into the positively-reinforcing functions of NSSI. Overall, findings illustrate how distinct aspects of invalidating caregiving environments operate via both unique and joint mechanisms to predict vulnerability for NSSI. Clinically, findings reinforce the importance of assessing the specific caregiving environment that shaped youth's emotional development, in addition to considering multiple ER deficits when tailoring clinical interventions for self-injurers. Future research would benefit from exploring how different caregiving environments and ER difficulties contribute to young people's exact profiles of NSSI use.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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

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