

NON-SUICIDAL SELF-INJURY AMONG ITALIAN ADOLESCENTS: THE ROLE OF PARENTAL REJECTION, SELF-CONCEPT, ANGER EXPRESSION, AND BODY INVESTMENT

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Abstract

Objective: Parental rejection, poor self-concept, anger expression, and negative body investment have often been associated with non-suicidal self-injury (NSSI). However, research has investigated each factor separately. To address this shortcoming, the main aim of the study was to integrate these factors and test a hierarchical regression to examine the impact of each factor above and beyond the others.

Method: A cross-sectional sample of 481 Italian high school students aged 13-19 ($M_{age}=15.48$; $SD=1.46$) were screened by self-report measures that assess parental rejection, self-concept, anger expression, body emotional investment, and NSSI. A semi-structured interview was administered in order to assess the characteristics of self-injurious behaviors.

Results: After the interview, twenty-three (4.8%) students reported having engaged in NSSI ($M_{age}=12.63$; $SD=1.58$). Neither gender nor age differences were found. The hierarchical regression revealed the NSSI was associated with the inward expression of anger ($ORs=1.1-1.7$) and the negative body investment ($ORs=.037-.281$).

Conclusions: These findings point out that the expression of anger inwardly and the emotional investment in the body may be salient factors to consider in understanding the occurrence of NSSI among adolescents. The clinical relevance of these findings was discussed.

Key words: non-suicidal self-injury, parental acceptance-rejection, self-concept, body emotional investment, anger expression, epidemiology

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Citation: Cipriano, A., Cella, S., Cotrufo, P. (2020). Non-suicidal self-injury among Italian adolescents: the role of parental rejection, self-concept, anger expression, and body investment. *Clinical Neuropsychiatry*, 17(6), 330-338.

doi.org/10.36131/cnforitieditore20200602

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Funding: None.

Competing interests: None.

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Background

Non-suicidal self-injury (NSSI) is a clinically relevant condition that refers to the socially unacceptable and intentional destruction of one's own body tissue in the absence of suicidal intent (Favazza, 1996). Culturally sanctioned practices, such as tattoos and piercings, are not considered as forms of NSSI (Claes, Vandereycken, & Vertommen, 2005). NSSI emerges as a major mental-health concern, as it is highly prevalent among youths (Cipriano, Cella, & Cotrufo, 2017). The international average prevalence was found to be approximately 18% among adolescents (Muehlenkamp, Claes, Havertape, & Plener, 2012; Swannell, Martin, Page, Hasking, & St John, 2014), with a mean age of onset around 12 years old (Gandhi et al., 2018; Plener, Schumacher, Munz, & Groschwitz, 2015).

According to the existing literature, a variety of interpersonal and personal factors has been recognized as being vulnerability factors for the onset of NSSI. Research has demonstrated that the overall poor quality of parent-child relationships (e.g., lack of care and support) significantly discriminated between those who engage in NSSI compared to the no-NSSI group (Bureau

et al., 2010). In a study by Bifulco and colleagues (2014), for example, poor parental care emerged as a predictor of NSSI behaviors. Also, Di Pierro and colleagues (2012) found that the presence and severity of NSSI were significantly associated with inadequate parenting (i.e., low support, care, and communication). Exploring a broader range of family dimensions, researchers have found that neglect and criticism increased the odds of engaging in NSSI (Kaess et al., 2013; Wedig & Nock, 2007). Cumulatively, these findings suggest that careless, non-protective, and invalidating caregiving relationships may have a substantial impact on NSSI development and severity among adolescents.

Consistent with Rohner's conceptualization (1986), an affectional bond between parents and offspring characterized by the absence of care and support, and the presence of hurtful behaviors is marked by parental rejection that, in turn, has been extensively linked to psychological maladjustment (Khaleque & Rohner, 2002; Miranda, Affuso, Esposito, & Bacchini, 2016). Although the relation between parental rejection and NSSI is largely understudied, the few studies available have demonstrated that parental rejection is directly and indirectly associated with NSSI (e.g., Cipriano, Claes,

Gandhi, Cella, & Cotrufo, 2020).

Recent studies have also suggested that self-concept may be a salient factor in understanding NSSI. Claes and colleagues (2010), for example, reported that adolescents with a history of NSSI scored lower on self-concept compared to no-NSSI peers. Similar findings have been established within Canadian students as Ross and colleagues (2009) found that those who engage in NSSI reported greater feelings of ineffectiveness (i.e., inadequacy, worthlessness, insecurity), compared to no-NSSI counterparts. These findings were conceptually replicated by Andrews and colleagues (2014), who demonstrated that negative self-esteem was salient in predicting NSSI. Lastly, a recent meta-analysis has shown an overall moderate effect size for the association between self-esteem and NSSI (Forrester, Slater, Jomar, Mitzman, & Taylor, 2017). Notably, those with negative self-concept also report psychopathological correlates strictly related to NSSI, such as eating disorders and suicide (Brausch & Gutierrez, 2010; Cella, Cipriano, Iannaccone, & Cotrufo, 2017; Cella, Iannaccone, & Cotrufo, 2019).

A growing body of research suggests that anger may trigger self-injurious behaviors (Chapman & Dixon-Gordon, 2007). Muehlenkamp and colleagues (2009), for example, demonstrated that the individuals' emotional state resulted in an increase of negative feelings (e.g., anger) prior to NSSI acts. In addition, Chapman and Dixon-Gordon (2007) have found that the most reported emotional antecedent of self-injurious behaviors was anger. Consistently, several studies have shown that the expression of anger inwardly places individuals at risk for NSSI. For instance, NSSI patients showed a significantly higher level of inner-directed anger compared to no-NSSI groups (Claes, Muehlenkamp, et al., 2010). The suppression of angry feelings (i.e., redirect anger inwardly) was also found to increase the likelihood to engage in NSSI among both Caucasian and Asian students (Turner, Arya, & Chapman, 2015).

However, some studies do not support such an association. In a cross-sectional study, for example, Evren and colleagues (2012) have found that a significantly higher score of anger expressed outwardly, and impaired anger control characterized self-injurers compared to those without NSSI.

Theoretical and empirical literature argues that how one perceives and experiences the body influences the process of the emotional investment of the body (Orbach, 1996). In this regard, an emerging body of research suggests that negative experiences and perceptions related to the body may facilitate a devaluing of and feelings of detachment from the body, supporting the salient role of body attitudes and experiences in the occurrence of NSSI (Muehlenkamp, Bagge, Tull, & Gratz, 2013). Using a combined sample of inpatient and community adolescents, Muehlenkamp and Brausch (2012), for example, found a significant effect of body image on NSSI development. The risk of engaging in repetitive self-injury was three times higher within ninth-grade students with both NSSI history and body dissatisfaction than the no-NSSI group (Brunner et al., 2007). Likewise, high school students who engage in NSSI showed greater body dissatisfaction than the control group (Ross et al., 2009). More recently, a longitudinal research studied the maintenance and cessation of NSSI related to body objectification among adolescents. Results indicated that body control and shame were significantly greater for both current and stopped NSSI groups compared

to those without NSSI history (Duggan, Heath, & Hu, 2015). From this perspective, negative body investment might represent a critical component in NSSI, as body disregard may lead to a sense of detachment from caring for or protecting the body.

Building from this evidence, it would seem that each of these risk factors might contribute to understanding NSSI. Notwithstanding, up till now, no studies have investigated these factors connectedly. To address this gap, we designed the present study to examine the unique contribution of each risk factors above and beyond the other predictors.

Thus, the present study had two main objectives. Firstly, the study aimed to examine the prevalence and characteristics of NSSI behaviors within a sample of Italian adolescents. The second aim of the study was to examine a model of theoretical-based factors that place adolescents at risk for engaging in NSSI. Consistent with the literature presented above, it was expected that (1) parental rejection would be significantly associated with NSSI, and that (2) self-concept, and (3) body investment would be predictive of NSSI occurrence. In addition, as studies on adolescents have shown an association with NSSI and emotional suppression (Tatnell, Kelada, Hasking, & Martin, 2014), it was hypothesized that (4) the expression of anger inwardly would be uniquely associated with NSSI above and beyond the effect of other anger expression manners.

Methods

Participants and procedures

Participants were Italian adolescents recruited in a public high school located in Southern Italy. In total, 590 students were invited to participate in the study during the school year 2017/2018. Ethical approval was obtained from the Ethic Board of the Department of Psychology (University of Campania "Luigi Vanvitelli"), and school headmasters. Informed consent forms were provided to the students in the weeks preceding the data collection. A total of 510 informed consent forms were returned. Twenty-three were absent or engaged in math competitions during data collection days, one refused to participate, and five were excluded due to the incompleteness of information, resulting in a final sample of 481 students (response rate=86.44%). Students were informed that participation in the study was voluntary and confidential, and all the information would be treated for research purposes. The study was conducted at two different times: in the first phase, all participants were asked to complete self-report questionnaires. The test administration was completed during school hours under the supervision of research assistants, taking about 60 minutes. In order to protect the confidentiality, every student was provided with an alphanumeric code that was used throughout the entire study. Then, students who have provided a positive or an undecided response to the item "Sometimes I purposefully injure myself" were assessed with a semi-structured interview. Students were invited to describe what they intend for injuring themselves on purpose. Moreover, the characteristics of NSSI behaviors (i.e., rates, frequency, duration, type, and severity) were examined. All interviews were conducted by members of the research team in a private room in the school. Furthermore, students were reminded of available resources in the community, including a university service that provides free-of-charge counseling service.

The study was performed in accordance with the ethical standards of the Helsinki declaration (World Medical Association, 2013).

Materials

Participants were given a packet of questionnaires to complete.

Demographic information

Participants were asked to fill in a form in order to obtain information about age, gender, and family composition. Information about health risk behaviors (i.e., regular use of substance) and presence/intention of body modification (i.e., piercing and tattoos) were also collected by means of a single-item question.

Non-suicidal self-injury

Non-suicidal self-injury was assessed using a single-item measure: "Sometimes I purposefully injure myself" – item 22 of the Body Investment Scale (BIS; Orbach & Mikulincer, 1998). After the initial screening, all the participants that had endorsed positively and undecidedly the item (3 "Undecided" – 4 "Agree" – 5 "Strongly agree") were invited for an interview. Consistent with the suggestion to use a gold standard assessment process (Muehlenkamp et al., 2012), the Deliberate Self Harm Inventory (DSHI; Gratz, 2001) was administrated as a semi-structure interview. Participants were asked if they have ever engaged in each of 16 types of NSSI behaviors presented (e.g., cutting, burning, hitting), without the intent to die. An additional item assesses "other forms" of NSSI, not previously listed. All positively endorsed items were followed by free-ended questions assessing the frequency, duration and severity of the behavior. Gratz (2001) reported that DSHI had demonstrated good internal consistency and test-retest reliability and adequate construct, convergent, and discriminant validity. Consistent with the original study (Gratz, 2001), two variables were created. A dichotomous variable was computed by assigning "1" to who engaged in NSSI and "0" to who did not report NSSI. A continuous variable was created to measure frequency by summing the number of NSSI episodes reported on each frequency item.

Parent-child relationship

The child's version of the Parental Acceptance-Rejection Questionnaire-Short Form (PARQ-SF; Rohner, 2005) was used to assess individuals' perceptions of maternal and paternal acceptance-rejection. The short version of the questionnaire consists of two identical forms (mother/father) of 24 items, divided into 4 subscales: warmth/affection ("Lets me know she/he loves me"), hostility/aggression ("Yells at me when she/he is angry"), indifference/neglect ("She/He pays no attention to me as long as I do nothing to bother her/him"), and undifferentiated rejection ("She/He does not really love me"). Items are scored on a 4-point Likert-scale from 4 ("Almost always true") to 1 ("Almost never true"). After reverse scoring the entire warmth/affection scale – to obtain a measure of lack of affection and coldness – an overall score of perceived acceptance-rejection is achieved by summing the four subscales, with higher scores reveal greater parental rejection. Extensive evidence has shown the robust psychometric proprieties of the instrument (Rohner, 2005). In the current study, a single measure of parental acceptance-rejection was obtained by summing the total

scale score of each parent (Senese et al., 2017). The Cronbach's alpha coefficient of the parental acceptance-rejection scale was .84.

Self-concept

The Multidimensional Self Concept Scale (Bracken, 1992) is a multidimensional measure of the self-concept of youths in the ranged age from 9 to 19. The MSCS is composed of six subscales (life-domains) of 25 items that are scored on a 4-point Likert-type scale from "strongly agree" (4) to "strongly disagree" (1), without mid-point. Subscale scores are obtained by summing the value of each response, with a higher score indicating higher levels of self-concept in that domain. According to empirical research that supports the close association between specific life-domains and NSSI (Baetens, Andrews, Claes, & Martin, 2015; Muehlenkamp & Brausch, 2012; Victor, Hipwell, Stepp, & Scott, 2019), and the independence of the MSCS facets (Bracken, 1992), the subscales social ("I am too shy"), affect ("I am not a happy person"), family ("My parents care about my future"), and physical ("I feel good about how I look") were used in this study. A general score of self-concept was obtained by summing up the subscales administered. The MSCS has demonstrated good internal consistency for each subscale, with alpha coefficients ranged between .85 and .90. The Cronbach's alpha for the total score was .98. (Bracken, 1992). Within the current study, the total score was used as an indicator of the self-concept. A reliability coefficient of .97 was obtained.

Anger

The State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988) is a self-report measure that assesses the experience, expression, and control of anger. The STAXI consists of 44 items, divided into six scales: State-Anger ("I am furious"), Trait-Anger ("It makes me furious when I am criticized in front of others"), Anger-In ("I keep things in"), Anger-Out ("I lose my temper"), Anger-Control ("I calm down faster"), and a general index of anger expression (Anger AX/EX). The participant responses are rated on a 4-point scale from "Not at all" (1) to "Very much so" (4) for State-Anger scale, and from "Almost Never" (1) to "Almost Always" (4) for all the other scales. Higher scores indicate higher levels of anger experience and expression. The measure has shown adequate validity and good reliability with α estimates ranging from .73 to .93 (Spielberger, 1988). In the present work, Cronbach's alpha coefficients indicate acceptable reliability ($r > .70$). The whole measure was administered, but only the anger expression scales (i.e., Anger-In, Anger-Out, and Anger-Control) were used in the study.

Body emotional investment

The Body Investment Scale (BIS; Orbach & Mikulincer, 1998) is a brief self-report measure assessing emotional investment in the body. The factorial structure consists of four unique subscales: (a) feelings and attitudes towards the body ("I feel comfortable with my body"); (b) body care ("I believe that caring for my body will improve my well-being"); (c) body protection ("It makes me feel good to do something dangerous"); and (d) comfort in physical touch ("I like to touch people who are close to me"). Each of the four subscales consists of six items that are scored on a 5-point scale from 1 ("I do not agree at all") to 5 ("Strongly agree"). Averaging value of all items in

each factor results in four separate sub-scores. Summing up the total subscale scores yield the overall total score, with lower scores indicating lower emotional investment in the body. For the purpose of this study, the item “Sometimes I purposefully injure myself” was excluded when calculating the Body Protection scale score and the Total score. Orbach & Mikulincer (1998) tested the psychometric properties of the measure among youths, and found appropriate internal consistency levels (.75 to .92). In the present study, the internal consistency (Cronbach's alpha coefficients) for each of the subscale was: body feelings/attitudes $\alpha = .89$; body care $\alpha = .60$; body protection $\alpha = .60$; comfort in physical touch $\alpha = .57$; total score $\alpha = .78$.

Analytical strategy

All statistical analyses were performed using the IBM Statistical Package for the Social Sciences, Version 24 (IBM Corp, 2016). Descriptive statistics were computed for all study variables. Categorical variables were examined by Chi-square (χ^2) statistic, whereas the *t*-test was used with continuous variables (e.g., age) to assess any significant differences between participants with and without NSSI. Person's correlation analysis was used to investigate the strength of the association between variables of interest. A series of hierarchical logistic regression was used to investigate the predictive power of parental rejection, self-concept, anger expression, and body investment in increasing the likelihood of NSSI. NSSI (0 = “no-NSSI”; 1 = “NSSI”) served as the dependent variable. The predictors were entered into the model in subsequent steps. Age and gender were entered in Step 1 as covariates. After controlling for age and gender, theory-based hypothesized predictors were entered. Parental acceptance/rejection was included in Step 2. Self-concept was entered in Step 3 of the regression analysis, followed by the anger expression

scales (i.e., Anger-In, Anger-Out, Anger-Control) in Step 4. Finally, body investment was included in the last block (Step 5). Significance was set at $p < .05$.

Results

Preliminary analysis

The prevalence of missing data was less than 1%. The Little's test (Little, 1988) was found to be not significant ($\chi^2_{(8227)} = 8401.256, p = .088$), allowing to conclude that the data were Missing Completely At Random (MCAR). Expectation-Maximization (EM) algorithm was used to impute missing values (Tabachnick & Fidell, 2001). The data were checked for potential violations of normalcy. All variables fell within the acceptable range of normality (Tabachnick & Fidell, 2001), with the exception of NSSI frequency (skewness=5.34; kurtosis=31.06). Given that NSSI frequency has not been included in the regression model, no transformation was applied, making results more comprehensible. To avoid bias in model parameters, the correlation matrix was examined, and collinearity diagnostics were computed. The magnitude of the relationship was moderate for all variables, with no correlation above .90 (Tabachnick & Fidell, 2001). Tolerance values ranged from .406 to .826 (Allison, 1999). All VIF scores were below 2.5, suggesting an acceptable range (Belsley, Kuh, & Welsch, 1980). The association within all study variables was examined. Person's correlation coefficients showed that all main variables were significantly correlated in the expected direction. Results of the bivariate correlation matrix are reported in **table 1**.

Descriptive statistic

The sample consisted of 481 adolescents, of whom 229 were female (47.6%). Age ranged from 13 to 19

Table 1. Means, Standard Deviations, Correlation Coefficients and Reliability Estimates (Cronbach's alpha) of the Study Variables

	M	SD	2.	3.	4.	5.	6.	7.	α
1. NSSI	-		.225**	-.268**	.195**	.114*	-.111*	-.321**	-
2. PARQ	74.31	19.06	-	-.639**	.434**	.287**	-.143**	-.307**	.84
3. MSCS	298	37.37		-	-.585**	-.187**	.154**	.551**	.97
4. AX-In	18.54	5.50			-	.285**	-.178*	-.405**	.76
5. AX-Out	16.77	4.81				-	-.442**	-.114*	.74
6. AX-Con	21.38	4.94					-	.121**	.84
7. BIS	13.96	1.63						-	.78

Note. NSSI: Non-suicidal self-injury; PARQ: Parental Acceptance-Rejection Questionnaire (total score for mother and father); MSCS: Multidimensional Self-concept Scale; AX-In: Anger-In; AX-Out: Anger-Out; Ax-Con: Anger-Control; BIS: Body Investment Scale.

* $p < .05$. ** $p < .01$.

years old, with a mean age of 15.48 years ($SD=1.46$). Nearly all the samples ($n=474$; 98.5%) reported having alive parents. Twenty-seven adolescents reported body modification (i.e., at least three tattoos or piercings), and 328 (68.2%) indicated future intention to modify their body. Nearly 7% ($n=35$) reported using substances regularly. Specifically, 6.7% ($n=32$) indicated alcohol use, and 3.3% ($n=16$) cannabis use.

Descriptive characteristics of NSSI

Forty-seven students (9.78%) were interviewed. After the interview, twenty-one reported that they have never engaged in NSSI, three students indicated having performing behaviors that were not consistent with the operational definition of NSSI (i.e., dysfunctional eating attitudes, emotionally hurt), and twenty-three students (4.8%) reported that they have engaged in NSSI at least once in their life. The most endorsed behavior was cutting ($n=11$, 47.8%), followed by severe scratching ($n=8$, 34.78%), and punching self ($n=7$, 30.43%). About half of those who engaged in NSSI ($n=11$) reported using at least two methods. The mean age of the first NSSI behaviors was 12.63 years ($SD=1.58$, range 10 – 15 years), ten adolescents (2.07%) indicated that they have started at age 12 or younger. The average lifetime frequency, as reported by adolescents, was 53.20 ($SD=172.21$) episodes, while the average duration was 23.89 ($SD=17.36$) months. Last episode of NSSI happened roughly 10 ($SD=10.22$) months before. No one reported

seeking medical treatment for injuries. There were no statistically significant gender differences ($\chi^2_{(1)}=3.003$, $p=.083$), neither age differences ($t_{(474)}=1.169$; $p=.243$). Regarding health-risk behaviors, the Chi-square analyses showed no significant difference for the regular use of substances ($\chi^2_{\text{Yates}(1)}=.462$, $p=.497$). No significant differences emerged with respect to body modifications ($\chi^2_{\text{Yates}(1)}=.038$, $p=.846$), whereas self-injurers were more prone to modify their body in the future ($\chi^2_{(1)}=3.921$, $p=.048$) than no-NSSI counterparts.

Predicting presence of NSSI

A five-step hierarchical logistic regression was performed to determine whether parental rejection, self-concept, anger expression, and body investment predicted the odds of NSSI presence within the sample (table 2). Gender and age were entered in the first step and were statistically controlled in all analyses. The first logistic regression revealed that neither gender ($OR=.465$, 95% CI [.19, 1.12], $p=.087$) nor age ($OR=.839$, 95% CI [.62, 1.13], $p=.243$) were significant predictor of NSSI ($\chi^2_{(2)}=4.479$, $p=.107$). In Step 2, parental rejection was regressed onto NSSI, accounting for age and gender ($\chi^2_{(3)}=23.715$, $p<.001$). Parental rejection increased the likelihood to engage in NSSI ($OR=1.04$, 95% CI [1.02, 1.06], $p<.001$). In the third block, the addition of self-concept improved significantly the model ($\chi^2_{(4)}=33.911$, $p<.001$), accounting for unique variance. Individuals who scored higher on the MSCS (i.e., self-concept) were less likely

Table 2. Hierarchical logistic regression

Block	Predictor Variables	B	Wald	OR (95% CI)	χ^2	Cox & Snell R ²	Nagelkerke R ²
1	Age	-.175	1.365	.839 (.626-1.126)	4.479	.009	.029
	Gender	-.767	2.921	.465 (.193-1.119)			
2	Age	-.162	.981	.851 (.618-1.171)	23.715***	.049	.152
	Gender	-.721	2.441	.486 (.197-1.202)			
	Parental Rejection	.042	19.360***	1.043 (1.023-1.062)			
3	Age	-.198	1.340	.820 (.587-1.147)	33.911***	.069	.215
	Gender	-.547	1.334	.579 (.229-1.464)			
	Parental Rejection	.010	.461	1.010 (.982-1.038)			
	Self-concept	-.025	9.276***	.975 (.960-.991)			
4	Age	-.273	2.251	.761 (.532-1.087)	59.767***	.118	.368
	Gender	-.171	.106	.843 (.301-2.364)			
	Parental Rejection	-.002	.013	.998 (.971-1.027)			
	Self-concept	-.013	2.421	.987 (.971-1.003)			
	Anger-In	.272	16.112***.970	1.313 (1.149-1.499)			
	Anger-out	.049	1.786	1.050 (.953-1.156)			
	Anger Control	-.079		.924 (.822-1.038)			
5	Age	-.027	.008	.973 (.544-1.742)	134.834***	.248	.769
	Gender	-.340	.177	.712 (.146-3.477)			
	Parental Rejection	.003	.011	1.003 (.947-1.062)			
	Self-concept	.005	.130	1.005 (.977-1.034)			
	Anger-In	.315	6.155*	1.371 (1.068-1.759)			
	Anger-Out	.078	.958	1.081 (.925-1.263)			
	Anger Control	-.031	.070	.970 (.773-1.217)			
	Body Investment	-2.288	19.365***	.101 (.037-.281)			

Note. * $p < .05$. *** $p < .001$.

to engage in NSSI ($OR=.975$, 95% CI [.96, .99], $p=.002$). In the fourth step ($\chi^2_{(7)}=59.767$, $p<.001$), only one (i.e., Anger-In) of the anger expression scales entered (i.e., Anger-In, Anger-Out, Anger-Control) reached significance. The expression of anger directed inwardly was found to be associated with NSSI ($OR=1.313$, 95% CI [1.149, 1.499], $p<.001$). The final model predicted a significant amount of variance in NSSI ($\chi^2_{(8)}=134.834$, $p<.001$), correctly classifying 65.2% of self-injurers (Cox & Snell $R^2=.248$, Nagelkerke $R^2=.769$). Out of all predictors in the model, Anger-In (STAXI) and body investment (BIS) were significant predictors of the likelihood of engaging in NSSI. An Odd Ratio value greater than 1 indicated that self-injurers were more likely to direct their anger inwardly than no-NSSI ($OR=1.37$, 95% CI [1.07, 1.76], $p=.01$), while an Odd Ratio value less than 1 indicated that self-injurers were more likely to report a negative emotional investment in the body ($OR=.101$, 95% CI [.03, .28], $p<.001$).

Discussion

The primary aim of the study was to explore the prevalence and extent of NSSI in a community sample of Italian adolescents. The lifetime prevalence (4.8%) was in line with findings reported in previous studies among non-clinical samples of adolescents (Hawton, Rodham, Evans, & Weatherall, 2002), though somewhat lower than the national rates (Di Pierro et al., 2012). One potential explanation of such a lower prevalence may be that, although a two-step assessment (single-item question – interview) was acknowledged as gold standard procedure for NSSI, the use of a single question leads to lower prevalence compared to behavioral checklists (Muehlenkamp et al., 2012).

The most common method was cutting, confirming results from earlier studies (Tatnell, Hasking, & Newman, 2018). Despite a large body of research has defined NSSI to be specific to women (e.g., Suyemoto, 1998), findings of the current study show no difference in the rates of NSSI between genders, according to recent cross-sectional work (Baetens, Claes, et al., 2015; Bifulco et al., 2014). Notwithstanding, it could be assumed that the non-significance difference could be attributed to the small sample size, as it decreases the statistical power and does not allow to detect statistically significant differences (Batterham & Atkinson, 2005). Additionally, the mean age of onset of NSSI was found to be around 12 years of age, which confirms the findings of previous studies (Gandhi et al., 2018).

To pursue the second objective, this exploratory study examined a risk factors model for NSSI. Theoretical-based predictors were entered step by step in the model to test their abilities to uniquely predict NSSI. The hierarchical logistic regression showed that the expression of anger inwardly and the emotional investment in the body predicted NSSI above and beyond all other predictors, partially confirming the hypotheses. The present findings are consistent with previous theorizations suggesting that adolescents who have a disregard for the body are at higher risk of engaging in NSSI (Walsh, 2006). A sense of detachment from the body may facilitate the occurrence of NSSI, making it easy to injure the body (Muehlenkamp & Brausch, 2012). Building from a functional model of NSSI (Chapman, Gratz, & Brown, 2006), negative body image (i.e., low body protection and body care) may contribute to engaging in NSSI as means to punish oneself. In this sense, adolescence is a critical

stage for the initiation of NSSI behaviors, due to the developmental changes regarding bodily dimension (Cassels & Wilkinson, 2016). Research by Rosenblum and Lewis (1999) has indeed shown that relevant concerns over body and its appearance typically emerge during adolescence.

Consistent with a self-punishment function of NSSI (Chapman et al., 2006), anger-in emerged as the only NSSI predictor among the examined manners of anger expression, confirming the hypothesis (4). An association between NSSI and the internalized anger has been previously described (Claes, Muehlenkamp, et al., 2010), suggesting anger is an important emotion to NSSI. For example, García-Nieto and colleagues (2015) showed that individuals who tend to inwardly direct their anger are more prone to engage in NSSI. Also, expressing anger inwardly seems to be in line with the self-criticism, self-devaluation, and self-hatred found in NSSI adolescents (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Nock, Prinstein, & Sterba, 2009). Previous works have also demonstrated that inner-directed anger was associated with feelings of inadequacy and defeat, and the desire to attack the self (Gilbert, Clarke, Hempel, Miles, & Irons, 2004). In line with this contribution, it could be hypothesized that adolescents who show a tendency to redirect their angry feelings inwardly may be more likely to engage in NSSI to punish the self, viewed as unworthy.

Moreover, there were a number of findings that need to be taken into account. Firstly, despite acceptance/rejection – as it stands – has not been examined as NSSI predictor so far, it is certainly an indicator of parent-child relationship quality. Parental rejection indicates an affective and behavioral parental pattern of carelessness, neglect, hostility, and rejection (Khaleque & Rohner, 2012). Such a pattern is consistent with self-injurers' perceptions of their parents as unreliable, neglectful, and affectionless (Baetens et al., 2014; Bureau et al., 2010). In line with previous studies (Bifulco et al., 2014; Di Pierro et al., 2012), the second step of the regression showed that parental rejection significantly predicted NSSI. However, the last step revealed that parental rejection was not a significant predictor of NSSI, contrary to the initial hypothesis (1). It is worth noting that parental rejection became no longer significant when taking self-concept into account. In this sense, these findings are in line with a growing body of research suggesting that exists a non-linear relationship between parent-child relationship and NSSI (Baetens, Andrews, et al., 2015; Muehlenkamp, Claes, Smits, Peat, & Vandereycken, 2011). For example, in a longitudinal study, Quirk and colleagues (2015) have demonstrated that the pathway from parental rejection (i.e., maternal and paternal) to NSSI is mediated by maladaptive self-concept. Thus, the non-significant effect of parental rejection after self-concept is included in the model may suggest that self-concept acts as an underlying factor mediating the association between parental rejection and NSSI. From this perspective, inadequate caregiving experiences figure predominantly in the development of negative self-experience and self-evaluation, facilitating the NSSI act due to a sense of ineffectiveness.

Despite self-concept improved prediction above and beyond the influence of parental rejection, when anger expression manners are included in the model, it did not emerge as a significant predictor, rejecting the hypothesis (2). Speculatively, the existence of a possible mediating effect could be hypothesized. Hence, the unique contribution of anger-in to NSSI occurrence may be explained by the fact that individuals

who experience impairment in self-worth may be more prone to redirect angry feelings inwardly and, in turn, engage in NSSI.

These results expand the range of family dynamics and personal factors that influence adolescents NSSI and suggest the need to examine a more complex model of NSSI vulnerability factors to better explain the underlying mechanism involved in the development of NSSI.

Limitations and future directions

The results of the current study should be interpreted in light of the following limitations. First, the study only included a non-clinical sample of Southern Italian adolescents, limiting the generalizability of the results to other samples. Second, despite the gold-standard method of NSSI assessment, the single-item question could have affected the NSSI prevalence, due to its secretive nature (Baetens, Claes, Muehlenkamp, Grietens, & Onghena, 2011). Future studies should also include a comparison group in order to ascertain the truthfulness of participant responses. Third, the cross-sectional nature of the study precludes examining the interplay between the variables of interest. Future longitudinal research could clarify the temporal order and the directionality of effects between the study variables. Fourth, using self-report measures could result in reporting bias and shared method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Fifth, the adolescent's perception of the quality of the parent-child relationship may differ from the existing relationship quality (Demo, Small, & Savin-Williams, 1987). To tackle this limitation, future studies should include both parents and offspring's reports. Sixth, we used a cumulative score for parents, limiting the understanding of each parents' contribution. Future research should explore mother and father independently. Lastly, the subscales of the BIS, except the Body Feelings, have shown low reliability (around .60), and as such, findings utilizing this measure should be interpreted with caution until replicated.

In spite of these limitations, the present study adds to the research literature by purporting a new perspective to the research about NSSI risk factors. Although these vulnerability factors have been previously investigated, the present work is the first to integrate them and assess the predictive value of each risk factor, above and beyond the others. From this perspective, this preliminary study opens the door for potential mediating effects to be tested, and suggests potential NSSI development pathways that warrant further consideration and replication. Specifically, future research should integrate these factors into a conceptual model to better explore the impact of parental rejection, self-concept, and anger-in in the occurrence of NSSI, and investigate the underlying mechanism that may be involved in explaining why adolescents engage in NSSI.

Clinical implications

Identifying how interpersonal and personal factors interact in predisposing to NSSI might improve our understanding of the behavior, and, in turn, have both practical and clinical implications. From a clinical perspective, understanding factors associated with NSSI may help practitioners identify adolescents at heightened risk for engaging in NSSI and provide more targeted treatment to improve psychological well-being

and avoid negative outcomes (e.g., suicide). Also, our results may help in designing specific prevention and intervention programs. Given that adolescence is at high risk for NSSI onset (Gandhi et al., 2018), school-based programs may be appropriate, as the school may serve as a secure environment. An effective approach should involve both intrapersonal and interpersonal domains in order to foster resilience in youth. Based on study findings, involving the family in such programs may be a key preventive strategy to decrease the incidence of NSSI, through improving family-school connectedness and relationship quality between parents and adolescents. In this sense, the school can become a place of inclusion and connectedness, in which to work preventively. Also, specific attention should be paid to helping adolescents improve their overall self-concept and promote positive attitudes towards the body. Notably, the present findings also suggest that teaching anger management techniques (Walsh, 2006), may be an effective intervention for NSSI.

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