

# The role of difficulty in identifying and describing feelings in non-suicidal self-injury behaviour (NSSI): Associations with perceived attachment quality, stressful life events, and suicidal ideation

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest

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All the authors substantially have equally contributed to the development and preparation of the manuscript. Furthermore, all authors have approved the final version of the manuscript. Finally, the authors have agreed to be accountable for all aspects of the manuscript in ensuring that questions related to the accuracy or integrity of any part of it are appropriately investigated and resolved.

### *Keywords*

Alexithymic features, NSSI, Attachment, stressful life events, adolescents

### *Abstract*

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**Objective:** Core alexithymic features, such as the difficulty in identifying and describing feelings, are associated with poor attachment styles and emotional trauma, which influence the capacity to regulate affect. Additionally, emotional regulation has been found to be the most commonly identified function associated with non-suicidal self-injury behavior (NSSI) in adolescents as they attempt to modulate strong emotions. However, few studies have examined the link between difficulty in identifying and describing feelings (core components of alexithymia), NSSI behaviors, quality of attachment, life stressors and suicidal ideation in healthy early adolescents. Consequently, this study aims to investigate these constructs and the relationship among them in a large non-clinical sample of adolescents.

**Methods:** Seven hundred and nine middle school students (50.4% males), aged 10-15 years ( $M = 12.6$ ;  $SD = 1.06$ ) were involved in this study. In order to investigate the variables considered in the study, the following measures were administered: the Deliberate Self-Harm Inventory exploring non-suicidal self-injurious behaviors; the Alexithymia Questionnaire for Children examining difficulty in identifying and describing feelings; the Inventory of Parent and Peer Attachment assessing the quality of parental and peer attachment; the Life Stressor Checklist-Revised outlining stressful/traumatic events and the Children's Depression Inventory evaluating suicidal ideation.

**Results:** We found significantly positive relationships among difficulty in identifying and describing feelings, NSSI behaviors, stressful events, and suicidal ideation. Data indicated a significant negative association of difficulty in identifying and describing feelings with quality of attachment to parents and peers. Further findings highlighted that difficulty in identifying and describing feelings significantly mediated the effect of quality of attachment (parent and peer) on NSSI and suicidal ideation.

#### **Conclusion:**

The ability to identify and describing feelings is important to managing emotional expression and understanding the feelings of others, both crucial in attaining successful interpersonal relationships. Our data revealed that, while controlling for stressful life events, low levels of attachment may increase adolescents' difficulty in identifying and describing their own feelings, which in turn may increase the risk of both NSSI and suicidal ideation.

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Approved by: Ethical Committee of Department of Dynamic and Clinical Psychology.

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In review

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5  
6

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11 **Running Title:** Difficulty in identifying and describing feelings, NSSI and quality of attachment in  
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49

## 1 INTRODUCTION

2  
3 In recent years, there has been growing interest in research on alexithymia, as documented by a  
4 series of major systematic reviews in the international literature. Although the literature is not  
5 always unanimous about the definition of "alexithymia", research suggests that alexithymia is a  
6 multi-dimensional deficit in affect recognition and regulation (Timoney and Holder, 2013). For  
7 some authors, it refers to a personality construct normally distributed in the population (Parker et  
8 al., 2008) whilst others use the term to denote a limited ability to identify, describe and communicate  
9 one's feelings, which in turn reflects difficulties in affective self-regulation (Taylor et al.,  
10 1997). Thus a reduced ability to connect emotions with words (or "absence of words for emotions"  
11 as attested by its etymology from the Greek alpha = absence, lexis = language, thymos = emotions)  
12 has been used to define the construct of alexithymia (Taylor, 2010; Taylor, Bagby and Parker,  
13 1997). In general, the following clinical features have been considered as dimensions of  
14 alexithymia: difficulty in identifying and describing emotions, difficulty in distinguishing between  
15 subjective emotional states and the somatic components of emotional activation, poverty of  
16 imaginative processes, and cognitive style oriented towards external reality.

17 In line with previous investigation of healthy adults (Paivio and McCulloch, 2004), difficulties in  
18 identifying and describing inner feelings have been conceptualized as core components of  
19 alexithymia which may be associated with problems in building and maintaining close relationships  
20 with others and using social support to protect themselves against the potentially pathological  
21 influences of stressful events (Kojima et al., 2003). The difficulty in "identifying and describing  
22 ones' own inner feelings" may make people reluctant to participate in social activities (Kojima et  
23 al., 2012).

24 It has been suggested that alexithymia is broadly associated with various mental and physical health  
25 problems (Cerutti et al., 2017; Cerutti et al., 2016; Gatta et al., 2016). Individuals with alexithymia  
26 are more likely to have a limited ability to adaptively cope with stressful conditions and tend to  
27 encompass unhealthy behaviours such as alcohol and drug use (Lumley et al., 2007). Some studies  
28 have indicated that self-injuries are associated with a higher level of alexithymia than non self-  
29 injuries among high school students and adolescent inpatient populations (Garisch and Wilson,  
30 2010; Cerutti et al., 2014). Other studies have highlighted that adolescents inpatients with non-  
31 suicidal self- injury (NSSI) are more likely to have a pervasive and comprehensive Theory of Mind  
32 impairment (Laghi et al., 2016).

33 NSSI is defined as the intentional injuring of one's body without apparent suicidal intent and for  
34 reasons not socially acceptable within one's culture (Muehlenkamp, 2012). Similar to other risky  
35 behaviors (e.g., alcohol and substance abuse), it typically begins between the age of 13 to 15  
36 years (Muehlenkamp, 2012; Cerutti et al., 2011; Hilt et al., 2008; Favazza and Rosenthal., 1993). The  
37 transition to adolescence seems to mark a developmental period distinguished by its increased rates  
38 of NSSI behaviors (Manca et al., 2014; Cerutti et al., 2014; Peterson et al., 2008). International  
39 studies have revealed a wide variability in prevalence rates, with percentages ranging from 12% to  
40 56% in non clinical populations of adolescents (Muehlenkamp, 2012; Cerutti et al., 2011) and from  
41 20% - 80% in clinical populations (Ferrara et al., 2012; Hilt et al., 2008; Kara et al., 2015; Cerutti et  
42 al., 2014).

43 During the last two decades, NSSI has attracted the attention of researchers among clinical and  
44 nonclinical settings (International Society for the Study of Self-Injury, 2015; Klonsky and  
45 Muehlenkamp, 2007; Nixon and Heath, 2009; Nixon et al., 2008; Muehlenkamp et al., 2012;  
46 Zetterqvist, 2017) since this phenomenon is widespread across the Western world. It represents a  
47 serious public health problem (Cerutti et al., 2014; Klonsky et al., 2013; Serafini et al., 2017) owing  
48 to the greater risk for later suicidal behaviour especially among individuals who engaging NSSI  
49 repeatedly (Grandclerc et al., 2016; Joiner et al., 2012; Joiner, 2005).

50 There is evidence that NSSI is generally used to cope with distressing negative affective states,  
51 especially anger and depression, and mixed emotional states. However, to date, there is a paucity of

1 studies exploring how individuals who engage in self-injury may experience difficulty expressing  
2 and verbalizing emotions in early adolescence and adolescence (Cerutti et al., 2014). Research is  
3 needed to examine a broader range of stressful childhood experiences, as few studies have  
4 examined the relationship between negative experiences or stressful life events, alexithymia and  
5 NSSI among young people. In a previous study, Paivio and McCulloch (2004) found that  
6 alexithymia partially mediated the relationship between traumatic experience and self-injurious  
7 behaviors among female undergraduate students.

8 Furthermore, it has been suggested that stressful and traumatic life events (e.g. abuse) in childhood  
9 may be related to self-injurious behavior in adulthood (Ross and McKay, 1979; Terr, 1991; van der  
10 Kolk et al., 1991). Studies have also highlighted that not all individuals with a history of abuse later  
11 engage in NSSI, and not all individuals who self-injure have been abused (Klonsky and  
12 Muehlenkamp, 2007). The stress exposure model of psychopathology indicate that experiencing  
13 higher rates of life stressors or negative life events contribute to a higher risk for negative mental  
14 health outcomes (Liu et al., 2014). Nock (2010) suggested that stressful life events have the  
15 similarly prominent role as proximal risk factors for NSSI behavior, since in presence of stressful  
16 life events specific physiological responses are experienced by some individuals, who further may  
17 be at risk for engaging in NSSI as a coping strategy. This is more evident in individuals with  
18 difficulties in emotional regulation (Tang et al., 2016). Additionally, negative life events ranging  
19 from traumatic stressors to major life changes are consistently associated with suicidal ideation (Liu  
20 et al., 2014). It is well known that environmental influences have a particular impact on children's  
21 psychological development, especially the 'emotional climate' provided by the parents (Taylor,  
22 2010). Studies have highlighted that early attachment difficulties may contribute to later self-  
23 injurious behaviors (Conterio and Lader, 1998; van der Kolk et al., 1996; Walsh, 2006).

24 Specifically, Gratz and colleagues (2002) examined the role of the parent-child relationship as a risk  
25 factor for NSSI revealing that emotional neglect and the quality of the parent-child relationship  
26 were associated with risk of developing NSSI later. In view of new forms of sociality, adolescents  
27 make an important transition from family to peer group through gradual autonomy from primary  
28 attachment figures. The interest towards the peer group, with whom adolescents can share  
29 experiences and affection, becomes a determining factor to promote the growth and construction of  
30 personal identity.

31 Although research supports the relation between stressful life events and NSSI behaviors, to date  
32 there are few studies that have been undertaken on the degree to which stressful life events lead to  
33 NSSI among adolescents, except for research focusing on childhood abuse and other severe early  
34 life adversities (Tang et al., 2016). Only a small number of empirical studies have investigated the  
35 relationship between NSSI and core alexithymic features (i.e., difficulty in identifying and  
36 describing feelings) in different populations while no systematic review of the literature has been  
37 conducted to date. Moreover, the overall relationships among the difficulty in identifying and  
38 describing feelings, quality of parental and peer attachment, NSSI, suicidal ideation, and of stressful  
39 life events among young adolescents have not been sufficiently investigated).

## 41 **The Present Study**

42  
43 In light of the above considerations, this study aimed to investigate the plausibility of a theoretical  
44 model in which low quality of attachment towards both peers and parents could represent emotional  
45 risk factors that may predispose adolescents to have increased difficulties in identifying and  
46 describing their own feelings which, in turn, may heighten the likelihood of developing both NSSI  
47 and suicidal ideation. Specifically, we hypothesized NSSI and suicidal ideation to be positively  
48 correlated with adolescents' difficulty in identifying and describing feelings. NSSI, suicidal ideation  
49 and difficulty in identifying and describing feelings, instead, were hypothesized to be negatively  
50 related to the quality of attachment towards both parents and peers. Lastly, in line with previous  
51 arguments (Klonsky, 2007; Cerutti et al., 2011; Laukkanen et al., 2013) highlighting the positive

1 relationship of stressful life events to NSSI, suicidal ideation, and difficulty in identifying and  
2 describing feelings, we also included in our model the number of stressful life events as a control  
3 variable.

## 4 5 **MATERIAL AND METHODS**

### 6 7 **Participants**

8  
9 Seven hundred and nine Italian early adolescents (50.4% male), aged 10 to 15 years were involved  
10 in the present study. Participants were recruited in two middle schools in Rome. Exclusion criteria  
11 for participation included the presence of a diagnosed psychiatric illness and/or history of  
12 psychiatric treatment, history of significant neurological illness or brain injury, history of chronic  
13 pains and recurrent somatic symptoms. The vast majority (92.5%) of the participants were  
14 Caucasian.

### 15 16 **Procedure**

17  
18 The participants and their parents/caregivers gave their written informed consent before inclusion in  
19 the present study. The administration of the self-reported questionnaires took place during school  
20 time in the classrooms. Anonymity of participants was ensured. Questionnaires took approximately  
21 30 to 45 minutes to complete. All participants completed the questionnaire battery.  
22 This study was approved by the Ethics Committee of the Department of Dynamic and Clinical  
23 Psychology, Sapienza University of Rome.

### 24 25 **Measures**

26  
27 ***Deliberate Self-Harm Inventory.*** The Deliberate Self-Harm Inventory (DSHI; Gratz, 2001)  
28 was used to assess non-suicidal self-injury behavior (NSSI). The DSHI is a 17-item self-report  
29 measure that assesses lifetime history of NSSI (defined as the deliberate, direct destruction of body  
30 tissue without suicidal intent), including frequency, duration, and type of NSSI behavior. The DSHI  
31 was recently validated in the Italian context by Cerutti and colleagues (2012) and was found to have  
32 adequate internal consistency, and good convergent and discriminant validity. An overall score of  
33 NSSI was created by summing participants' scores on the 10 items (Gratz, 2006). In the present  
34 study, good reliability ( $\alpha = .62$ ) was found.

35 ***Suicidal Ideation.*** Suicidal Ideation was assessed by using one item from the Children's  
36 Depression Inventory-2 (CDI-2; Kovacs, 2015; Italian adaptation by Camuffo and Cerutti, in press)  
37 The item has three response options that score 0 (*absence of suicidal ideation*), 1 (*mild suicidal*  
38 *ideation*), or 2 (*severe suicidal ideation*). For our purposes, we recoded this item by merging the last  
39 two response-choices into one. The new dichotomous variable ranged from 0 (absence of suicidal  
40 ideation) and 1 (presence of suicidal ideation).

41 ***Difficulty in Identifying and Describing Feelings.*** For this study, we assessed the difficulty  
42 in identifying feelings (DIF) and describing feelings (DDF) by using the difficulty in identifying  
43 feelings subscale (DIF-S) and difficulty in describing feelings subscale (DDS) of the Alexithymia  
44 Questionnaire for Children (AQC; Rieffe et al., 2006; Di Trani et al., 2009). The DIF-S is  
45 composed by seven items (e.g., "I am often confused about the way I am feeling inside";  $\alpha = .77$ )  
46 whereas the DDF-s by 5 items (e.g., "I find it difficult to say how I feel inside";  $\alpha = .64$ ). Both  
47 subscales are scored on a three point rating scale (from 0 = not true to 2 = often true) and assessed  
48 the degree to which children feel unable to recognize and describe their own feelings. Both

1 subscales showed positive correlations with somatic problems and several negative moods like  
2 anger, sadness and fear (Rieffe et al., 2006).<sup>1</sup>

3 ***The Inventory of Parent and Peer Attachment.*** The Inventory of Parent and Peer  
4 Attachment (IPPA; Armsden and Greenberg, 1987) was used to measure the quality of parent  
5 (IPPA-PA) and peer (IPPA-PE) attachment in adolescence. The good psychometric properties of  
6 the IPPA have been already confirmed in several studies with Italian samples (Laghi et al., 2009;  
7 Pace et al., 2011). The Parent Attachment Scale consists of 28 items whereas the Peer Attachment  
8 Scale consists of 25 items. The items of both instruments were scored on a five-point scale (from 1  
9 = “not true at all” to 5 = “completely true”) and assessed three dimensions of attachment,  
10 respectively: “Trust”, “Communication”, and “Alienation”. The Trust scale measures the extent to  
11 which adolescents trust their parents ( $\alpha = .82$ ) and peers ( $\alpha = .88$ ) to respect and accept their  
12 feelings (e.g., “My parents/peer respect my feelings”). The Communication scale measures the  
13 extent adolescents experience having a high quality of communication (e.g., “When my  
14 parents/friends know that something is bothering me, they ask me about it”) with their parents ( $\alpha =$   
15  $.78$ ) and peers ( $\alpha = .85$ ). The Alienation scale measures the degree to which adolescents experience  
16 negative feelings (e.g., “I don't get much attention from my parents/friends”) toward parents ( $\alpha =$   
17  $.80$ ) and peers ( $\alpha = .71$ ). For our purposes, the individual's mean score on the three scales was  
18 considered as the indicator of parent and peer attachment. Furthermore, these aggregated scores  
19 were highly reliable: alphas for the global attachment scale toward parent and peers were  
20 respectively  $.84$  and  $.77$ .<sup>2</sup>

21 ***Life Stressor Checklist-Revised.*** A reduced 13-item version of the *Life Stressor Checklist-*  
22 *Revised* (Wolfe et al., 1996; Giannantonio, 2005) was used to assess the presence and impact of a  
23 variety of stressful or traumatic events that may have occurred in the participant's life. Specifically,  
24 participants are asked to indicate whether or not they experienced each event, as well as their level  
25 of distress in response to the events they endorsed. For the present study, the dichotomous  
26 responses (yes vs. no) to all of the items were summed to create an overall measure of the number  
27 of stressful life events experienced.

## 28 29 **Data Analytical Approach**

30  
31 As a preliminary step, we computed the correlations among the variables of interest. Then, we  
32 examined the hypothesized model (see Figure 1) in a structural equation modeling (SEM)  
33 framework using *Mplus8* (Muthén and Muthén, 2017). A general latent factor measuring  
34 participants' difficulty in identifying and describing their feelings was modeled by using the two  
35 subscales DIF-S and DDS-S. The composite mean scores of IPPA-PA and IPPA-PE scales were  
36 used as the indicators to model parental and peer attachment. These variables were posited as single  
37 indicator latent variables by estimating the error terms from their reliabilities (Kline, 2010). As  
38 suicidal ideation was coded as a dichotomous variable, parameter estimates were based on the  
39 Weighted Least Squares Mean-Variance adjusted (WLSMV) estimator. This method is particularly  
40 suited for dealing with categorical data. Specifically, *Mplus 8* computed probit regression  
41 coefficients (Muthén and Muthén, 2017) to assess the impact of our predictors on the dichotomous  
42 outcome variable suicidal ideation (Muthén and Muthén, 2017). Non-significant  $\chi^2$  likelihood ratio  
43 statistic, comparative fit index (CFI) and Tucker-Lewis index (TLI) greater than  $.95$ , and root mean  
44 square error of approximation (RMSEA) values lesser than  $.05$  (Kline, 2010) were considered as  
45 indicators of a good model fit. According to the principle of *parsimony* (i.e., reducing the model's  
46 complexity by increasing the number of degrees of freedom without worsening the fit), we tested a  
47 series of increasingly liberal mediational models, in which direct paths from independent variables  
48 to our outcome variables (i.e., suicidal ideation and self-harm) were sequentially freely estimated.

---

<sup>1</sup>Although we also assessed the subdimension of externally-oriented thinking, we did not include it because it showed very low reliability (for similar findings and considerations, see also Rieffe et al., 2006).

<sup>2</sup>Before computing the reliability the Alienation scale was recoded.



1 In detail, we estimated a full mediational model (i.e., without direct effects from our focal  
2 predictors parent and peer attachment to our distal outcomes suicidal ideation and self-harm). Next,  
3 we added the direct effects to evaluate if a partial mediational model significantly fit the data.  
4 According to MacKinnon (2008), paths were retained only if they resulted in a significant  
5 increment of model fit (we compared these nested models by using the DIFFTEST function in  
6 *Mplus8*; Muthén and Muthén, 2017). In line with recent recommendations (Hayes and Scharkow,  
7 2013), we computed the 95% bias-corrected confidence intervals (CI) to formally test the  
8 significance of our hypothesized mediational effects (ab). If the lower and upper limits of the  
9 95%CI did not include zero, we concluded that the mediated effect was statistically different from  
10 zero. Finally, both participants' sex and life events were used as control variables in order to partial  
11 out their effects.

12  
13 Insert Figure 1 about here  
14

## 15 RESULTS

### 16 Sample Characteristics

17 The participants mean age was 12.6, with a standard deviation of 1.06. Among adolescents  
18 83% reported at least one brother or sister. Socio-demographic characteristics of parents are  
19 described in Table 1.

20  
21 Insert Table 1 about here  
22

23 According to Gratz inventory (Gratz, 2001), results indicated that 204 adolescents (28.8%)  
24 endorsed at least one lifetime episode of NSSI and 97 of them (13.7%) reported more than one  
25 episode with at least two different methods while only 1.4% reported engaging in repetitive NSSI ( $\geq$   
26 5 episodes) during the last year. Detailed results are reported in Table 1. No statistical differences  
27 between boys and girls emerged regarding the presence or absence of NSSI behavior.  
28

### 29 Correlation analysis

30 Correlations were mostly as expected (see Table 2). Suicidal ideation, NSSI, difficulty in  
31 identifying and describing feelings were (a) positively correlated with stressful life events and (b)  
32 negatively correlated with both parental and peer attachment. Girls were more likely to report  
33 higher difficulties in identifying their feelings than boys.  
34

35  
36 Insert Table 2 about here

### 36 Mediational Models

37 The full mediational model showed a marginal fit  $\chi^2(9) = 25.82, p < .001, CFI = .98, TLI = .94,$   
38  $RMSEA = .05 [90\%CI: .03, .08]$ . Thus, we proceeded by testing two partial mediational models.  
39 First, we added the direct paths from peer attachment to both suicidal ideation and NSSI. This  
40 partial mediational model showed a marginal fit  $\chi^2(7) = 26.01, p < .001, CFI = .98, TLI = .92,$   
41  $RMSEA = .06 [90\%CI: .04, .09]$  and was not statistically different from the full mediational model  
42  $\Delta\chi^2(2) = 2.22, p = .33$ . Then, we estimated a second partial mediational model in which we added  
43 the direct paths from parental attachment to both suicidal ideation and NSSI. This partial  
44 mediational model showed a perfect fit to the data and  $\chi^2(7) = 10.01, p = .19, CFI = 1.00, TLI = .99,$   
45  $RMSEA = .03 [90\%CI: .00, .06]$  and was statistically different from the full model  $\Delta\chi^2(2) = 13.91,$   
46  $p = .001$ , thereby providing evidence for freely estimating the direct effects of parental attachment.  
47 Once selected the second partial mediational model as the best fitting one, we computed the 95%CI  
48 for our hypothesized mediational effects. Results indicated that higher levels of parental attachment  
49 ( $ab = -.27, [95\%CI: -.44, -.15]$ ) and peer attachment ( $ab = -.10, [95\%CI: -.21, -.03]$ ) were related to  
50 a lack of suicidal ideation via the mediational role of difficulty in identifying and describing  
51 feelings (the 95% asymmetric lower and upper CI limits did not include zero). Similarly, the

1 difficulty in identifying and describing feelings significantly mediated the effect of parental  
2 attachment ( $ab = -.18$ , [95%CI:  $-.23$ ,  $-.02$ ]) and peer attachment ( $ab = -.04$ , [95%CI:  $-.10$ ,  $-.01$ ]) on  
3 NSSI.  
4

5 Insert Figure 1 about here

### 6 **Alternative Mediation Model**

7 We also investigated the fit of three alternative models representing plausible alternative  
8 explanations of the covariance structure. First, we tested an alternative model in which we posited  
9 NSSI and suicidal ideation as independent variables and parental and peer attachment as distal  
10 outcomes (the difficulty in identifying and describing feelings was the mediator). This alternative  
11 model showed a good fit,  $\chi^2(7) = 12.31$ ,  $p = .09$ , CFI = .99, TLI = .98, RMSEA = .03 [90%CI: .00,  
12 .06] similar to the hypothesized mediational model, suggesting that both models could be equally  
13 appropriate to explain our data. The second alternative model, in which we posited the difficulty in  
14 identifying and describing feelings as the primary predictor, parent and peer attachment as the  
15 mediators, and NSSI and suicidal ideation as outcomes, showed a lower fit  $\chi^2(7) = 30.61$ ,  $p < .001$ ,  
16 CFI = .97, TLI = .90, RMSEA = .07 [90%CI: .05, .10] compared to the hypothesized model. Finally,  
17 the third alternative model, in which we considered parent and peer attachment as primary  
18 predictors, NSSI and suicidal ideation as mediators, and the difficulty in identifying and describing  
19 feelings as distal outcome, showed an unacceptable fit  $\chi^2(7) = 73.74$ ,  $p < .001$ , CFI = .92, TLI = .70,  
20 RMSEA = .12 [90%CI: .09, .14] compared to the hypothesized model.  
21  
22

## 23 **DISCUSSION**

24 The primary aim of this study was to investigate the difficulties in identifying and describing  
25 feelings, two core facets of alexithymia, and NSSI behavior among a sample of Italian students. Our  
26 findings highlighted that self-harmers have higher difficulties in identifying and describing their  
27 own feelings, confirming the fact that they are perplexed about their emotions and find it difficult to  
28 distinguish between them (Hamza et al., 2015; Taylor et al., 1997). This result moves us in the  
29 direction of supporting an affect regulation function of NSSI in which adolescents with difficulties  
30 in identifying and describing their feelings may use NSSI as a way of regulating their emotions  
31 (Klonsky, 2007), and is consistent with a previous study using a community sample of high school  
32 students (Laukkanen et al., 2013).

33 Importantly, we also tested a theoretical mediational model in which the difficulty in identifying  
34 and describing feelings was the mediator of the associations between NSSI and quality of  
35 attachment towards both parents and peers. Results supported the hypothesized mediation model:  
36 low levels of quality of attachment may enhance the risk of both NSSI and suicidal ideation by  
37 compromising adolescents' abilities to identify their own feelings. This result is in line with  
38 findings showing the importance of quality attachment in emotion regulation. Specifically, a  
39 negative environment (i.e.: neglectful environments) influences the nature and quality of the  
40 relationships in which parents and children engage and it may interrupt the development of healthy  
41 emotion regulation skills in children and adolescents (Trickett et al., 2011; Peh et al., 2017;  
42 Williams et al., 2017). There is evidence that a lack of attachment security in early life affects the  
43 development of processes involved in emotion regulation (Shore, 2001; Taylor, 2010). In other  
44 words, the child who in absence of a secure attachment to parents fails to develop adequate self-  
45 regulatory capacities (Taylor, 2010). Similarly, our results also support the importance in extending  
46 the investigation on attachment beyond early childhood through to adolescence, and particularly in  
47 investigating the perceptions adolescents have of the quality of their actual attachment relationships.  
48 Specifically during adolescence age, the interactions with peers assume an increasingly higher  
49 priority, attachment behavior is also often oriented towards non-parental figures (Kerns, Tomich,  
50 and Kim, 2006) because peers are perceived as primary sources of consolation and support.

1 Accordingly, it seems that poor emotional bonds with both parents and peers may act as distal risk  
2 factors for developing later psychopathology. Our findings confirm that NSSI behaviours can be  
3 considered as a dysfunctional emotion-regulation strategy in presence of a inability to identifying  
4 feelings, consistent with recent results of Peh and colleagues (Peh et al., 2017) that suggested how  
5 NSSI may be viewed as maladaptive attempts to cope with negative affects.  
6 However, our model also suggests that these negative effects might be counteracted by helping  
7 adolescents understand and recognize their own feelings. In a systematic review of the literature  
8 exploring the link between alexithymic features and NSSI, Norman and Borrill (2015) showed that  
9 individuals, who are able to understand and communicate their feelings, are likely to engage in  
10 NSSI behaviors in order to regulate their emotions. Furthermore, identifying and labelling an  
11 emotional experience in itself reduces emotional intensity that, in turn, may help to prevent the  
12 perceived need to engage in NSSI (Sleuwaegen et al., 2017).  
13 This result can have high clinical relevance if we consider that, to date, only a few studies have  
14 investigated the mediational role played by core alexithymic facets in association with NSSI  
15 behaviors and other risk factors during early adolescence and adolescence. For instance, Garisch  
16 and Wilson (2010) found that alexithymia mediated the association between bullying and self-harm  
17 in high school students. This is in line with the findings of the present study supporting the  
18 hypotheses that the inability to regulate and communicate emotions in a normally adaptive way  
19 plays an important role in NSSI behaviors. The role of alexithymia in maladaptive behavior was  
20 also explored by Swannell and colleagues (2012) who reported that alexithymia (i.e., difficulty in  
21 describing feelings) partially mediated the effect of childhood abuse on self-harm in females but not  
22 in males.

23 Consistent with other studies, our findings indicated that NSSI is moderately prevalent  
24 among a non-clinical adolescent population (Hilt, 2008). Specifically, 28.8% reported one or more  
25 lifetime histories of NSSI behaviours (< 5) while 1.4% reported engaging in repetitive NSSI (five or  
26 more episodes during the last year) using different methods.

27 Moreover, adolescents who engaged in NSSI showed a poor perception of quality of attachment  
28 with both parents and peers. This is consistent with literature indicating that early attachment  
29 relationships have important implications for mental health later in life (Arbuthnott and Lewis,  
30 2015) and in line with Hallab and Covic's study (2010), which measured attachment by the same  
31 tool adopted in this paper and showed that those who self-injured had the worst perceived quality of  
32 attachment to parents compared with those who did not intentionally hurt themselves.

33 With regards to suicidal ideation, findings revealed that suicidal ideation is negatively related to  
34 quality of attachment to parents and peers and positively correlated with DIF. Suicidal thought is  
35 also positively correlated with the number of stressful events.

36 Parcel and part of our analysis, we also confirmed that a greater number of life events (as reported  
37 by adolescents) were an additional risk factor for NSSI episodes. While a positive perception of the  
38 quality of attachment to parents and to peers was related to a smaller number of NSSI behaviors.  
39 However, while a history of childhood trauma has been reported as a common risk factor for NSSI,  
40 the role of family, peer relationships and attachment has not been thoroughly explored. Given the  
41 limited studies investigating these interrelations, the current study is an important contribution to  
42 the extant literature. With regard to the relationship between stressful life events and NSSI, a  
43 previous cited study by Paivio and McCulloch, (2004) restricted its focus exclusivity on child  
44 maltreatment as predictor variable in their mediational model, and did not consider other types of  
45 traumatic or stressful life events.

46 Conversely, consistent with recent research findings (Liu et al., 2014; Cerutti et al., 2011), the  
47 present study extend the focus on other important adverse experiences not only maltreatment. In  
48 fact, our results provide evidence that an increased frequency of NSSI is associated with a greater  
49 number of stressful life events as experience of sexual harassment, being victim of bullying,  
50 witnessing potentially traumatic events, etc.

51

1 **Limitation**

2  
3 Our study has several limitations that should be addressed. First, our data were correlational in  
4 nature and, therefore, no relationships of cause-effect could be established. Second, although we  
5 tested for possible alternative models, we recognize that longitudinal data are superior for analyzing  
6 mediational hypotheses. In particular, future longitudinal studies should test the possible reciprocal  
7 influences among attachment, NSSI, and suicidal ideation as suggested by the good model fit  
8 reported by the first alternative model. Third, the value of retrospective histories of stressful or  
9 traumatic experiences might be questionable, given the possibility of under-reporting, over-  
10 reporting or false memory. Lastly, social desirability response bias may also have affected the  
11 results.

12  
13 **Clinical implication**

14  
15 Despite these limitations, the present study highlights the risk factors having a significant impact  
16 upon NSSI among early adolescents who reported engaging in self-injury behavior when compared  
17 to their non-injuring counterparts. These findings add further information to the scant existing  
18 literature about possible links between core alexithymic facets (i.e., difficulty in identifying and  
19 describing feelings) and NSSI and their relationships with perceived attachment quality, stressful  
20 life events and suicidal ideation. Specifically, when the quality of attachment with both peers and  
21 parents is compromised, helping children understand their own emotions may reduce the risk of  
22 higher NSSI and suicidal thoughts.

23 However more research is needed to further explore the variables considered in this study. There is,  
24 therefore, a need for more data to better understand this association in order to provide useful  
25 information for the planning of preventive interventions in younger populations.

26  
27  
28 **Author Contributions**

29  
30 All of the authors have substantially and equally contributed to the development and preparation of  
31 the manuscript. Furthermore, all authors have approved the final version of the manuscript. Finally,  
32 the authors have agreed to be accountable for all aspects of the manuscript in ensuring that  
33 questions related to the accuracy or integrity of any part of it are appropriately investigated and  
34 resolved.

35  
36 **Conflict of Interest Statement**

37 The authors declare that the research was conducted in the absence of any commercial or financial  
38 relationships that could be construed as a potential conflict of interest.

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In review