

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

Rita Cerutti^{1*}, Antonio Zuffiano², Valentina Spensieri¹

¹Department of Dynamic and Clinical Psychology, Sapienza Università di Roma, Italy, ²Department of Psychology, Liverpool Hope University, United Kingdom

Submitted to Journal:
Frontiers in Psychology

Specialty Section:
Clinical and Health Psychology

Article type:
Original Research Article

Manuscript ID:
332991

Received on:
22 Nov 2017

Revised on:
13 Feb 2018

Frontiers website link:
www.frontiersin.org

Conflict of interest statement

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

Author contribution statement

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

Word count: 329

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.

Ethics statements

(Authors are required to state the ethical considerations of their study in the manuscript, including for cases where the study was exempt from ethical approval procedures)

Does the study presented in the manuscript involve human or animal subjects: Yes

Please provide the complete ethics statement for your manuscript. Note that the statement will be directly added to the manuscript file for peer-review, and should include the following information:

- Full name of the ethics committee that approved the study
- Consent procedure used for human participants or for animal owners
- Any additional considerations of the study in cases where vulnerable populations were involved, for example minors, persons with disabilities or endangered animal species

As per the Frontiers authors guidelines, you are required to use the following format for statements involving human subjects: This study was carried out in accordance with the recommendations of [name of guidelines], [name of committee]. The protocol was approved by the [name of committee]. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

For statements involving animal subjects, please use:

This study was carried out in accordance with the recommendations of 'name of guidelines, name of committee'. The protocol was approved by the 'name of committee'.

If the study was exempt from one or more of the above requirements, please provide a statement with the reason for the exemption(s).

Ensure that your statement is phrased in a complete way, with clear and concise sentences.

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

Protocol number: 8/2017.

In review

1
2 **The role of difficulty in identifying and describing feelings in non-**
3 **suicidal self-injury behaviour (NSSI): Associations with perceived**
4 **attachment quality, stressful life events, and suicidal ideation.**
5
6

7 Rita Cerutti^{1*}, Antonio Zuffianò², Valentina Spensieri¹

8 ¹Department of Dynamic and Clinic Psychology, Sapienza University, Rome, Italy

9 ² Department of Psychology, Liverpool Hope University, Liverpool, United Kingdom
10

11 **Running Title:** Difficulty in identifying and describing feelings, NSSI and quality of attachment in
12 adolescents.
13

14 **Objective:** Core alexithymic features, such as the difficulty in identifying and describing feelings,
15 are associated with poor attachment styles and emotional trauma, which influence the capacity to
16 regulate affect. Additionally, emotional regulation has been found to be the most commonly
17 identified function associated with non-suicidal self-injury behavior (NSSI) in adolescents as they
18 attempt to modulate strong emotions. However, few studies have examined the link between
19 difficulty in identifying and describing feelings (core components of alexithymia), NSSI behaviors,
20 quality of attachment, life stressors and suicidal ideation in healthy early adolescents. Consequently,
21 this study aims to investigate these constructs and the relationship among them in a large non-
22 clinical sample of adolescents.
23

24 **Methods:** Seven hundred and nine middle school students (50.4% males), aged 10-15 years (M =
25 12.6; SD = 1.06) were involved in this study. In order to investigate the variables considered in the
26 study, the following measures were administered: the Deliberate Self-Harm Inventory exploring
27 non-suicidal self-injurious behaviors; the Alexithymia Questionnaire for Children examining
28 difficulty in identifying and describing feelings; the Inventory of Parent and Peer Attachment
29 assessing the quality of parental and peer attachment; the Life Stressor Checklist-Revised outlining
30 stressful/traumatic events and the Children's Depression Inventory evaluating suicidal ideation.
31

32 **Results:** We found significantly positive relationships among difficulty in identifying and
33 describing feelings, NSSI behaviors, stressful events, and suicidal ideation. Data indicated a
34 significant negative association of difficulty in identifying and describing feelings with quality of
35 attachment to parents and peers. Further findings highlighted that difficulty in identifying and
36 describing feelings significantly mediated the effect of quality of attachment (parent and peer) on
37 NSSI and suicidal ideation.
38

39 **Conclusion:**

40 The ability to identify and describing feelings is important to managing emotional expression and
41 understanding the feelings of others, both crucial in attaining successful interpersonal relationships.
42 Our data revealed that, while controlling for stressful life events, low levels of attachment may
43 increase adolescents' difficulty in identifying and describing their own feelings, which in turn may
44 increase the risk of both NSSI and suicidal ideation.
45
46

47 **Key words:** Alexithymic features, NSSI, attachment, stressful life events, adolescents.
48
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).¹

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 $.77$.²

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 χ^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.

¹Although 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).

²Before 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.

39
40
41
42
43
44
45
46
47
48
49
50

1 **REFERENCE**

2
3 Arbuthnott, A. E., and Lewis, S.P. (2015). Parents of youth who self-injure: a review of the
4 literature and implications for mental health professionals. *Child Adol Psych Men*, 9, 35.
5 <http://doi.org/10.1186/s13034-015-0066-3>

6
7 Armsden, G., and Greenberg, M.T. (1987).The Inventory of Parent and Peer Attachment: Individual
8 differences and their relation to psychological well-being in adolescence. *J Youth Adolescence*, 16,
9 427-454.doi: 10.1007/BF02202939

10
11 Bollen, K.A. (1989). *Structural Equations with Latent Variables*. New York: John Wiley & Sons,
12 Inc.

13
14 Byrne, B.M. (1994). *Structural equation modeling with EQS and EQS/Windows: Basic concepts,*
15 *applications, and programming*. Thousand Oaks, CA: Sage

16
17 Cerutti, R., Calabrese, M., and Valastro, C. (2014). Alexithymia and personality disorders in the
18 Adolescent Nonsuicidal Self-Injury: preliminary results. *Procedia Soc Behav Sci*, 114, 372-376.
19 <https://doi.org/10.1016/j.sbspro.2013.12.714>

20
21 Cerutti, R., Valastro, C., Tarantino, S., Valeriani, M., Faedda, N., Spensieri, V., and Guidetti, V.
22 (2016). Alexithymia and psychopathological symptoms in adolescent outpatients and mothers
23 suffering from migraines: a case control study. *J Headache Pain*, 17, 39. doi: 10.1186/s10194-016-
24 0640-y

25
26 Cerutti, R., Presaghi, F., Manca, M., and Gratz, K.L. (2012). Deliberate self-harm behavior among
27 Italian young adults: Correlations with clinical and nonclinical dimensions of personality. *Am J*
28 *Orthopsychiatry*, 82(3), 298-308. doi: 10.1111/j.1939-0025.2012.01169.x

29
30 Cerutti, R., Manca, M., Presaghi, F., and Gratz, K.L. (2011). Prevalence and clinical correlates of
31 deliberate self-harm among a community sample of Italian adolescents. *J Adolesc*, 2(34), 337-347.
32 doi:10.1016/j.adolescence.2010.04.004

33
34 Cerutti, R., Spensieri, V., Valastro, C., Presaghi, F., Canitano, R., and Guidetti, V. (2017). A
35 comprehensive approach to understand somatic symptoms and their impact on emotional and
36 psychosocial functioning in children. *PLOS ONE*, 12(2), e0171867.
37 <https://doi.org/10.1371/journal.pone.0171867>

38
39 Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. (2003). *Applied multiple regression/correlation*
40 *analysis for the behavioral sciences (3rd ed.)*. Mahwah, NJ: Lawrence Erlbaum

41
42 Conterio, K., and Lader, W. (1998). *Bodily harm: The breakthrough healing program for*
43 *selfinjurers*. New York: Hyperion

44
45 Di Trani, M., Tomassetti, N., Bonadies, M., Capozzi, F., De Gennaro, L., Presaghi, F., and Solano,
46 L. (2009). Un Questionario Italiano per l'Alessitimia in Età Evolutiva: struttura fattoriale e
47 attendibilità. *Psicologia Della Salute*, 2, 131-143. doi: 10.3280/PDS2009-002009

48
49 Favazza, A.R., and Rosenthal, R.J. (1993). Diagnostic issues in self-mutilation. *Hosp Community*
50 *Psychiatry*, 44, 134-140. <https://doi.org/10.1176/ps.44.2.134>

- 1 Ferrara, M., Terrinoni, A., and Williams, R. (2012). Non-suicidal self-injury (Nssi) in adolescent
2 inpatients: assessing personality features and attitude toward death. *Child Adol Psych Men*, 6, 12.
3 <http://doi.org/10.1186/1753-2000-6-12>
4
- 5 Garisch, J.A., Wilson, M.S. (2010). Vulnerabilities to deliberate self-harm among adolescents: the
6 role of alexithymia and victimization. *Br J Clin Psychol*, 49(Pt 2):151-62.
7 doi:10.1348/014466509X441709
8
- 9 Gatta, M., Dal Santo, F., Rago, A., Spoto, A., and Battistella, P.A. (2016). Alexithymia,
10 impulsiveness, and psychopathology in nonsuicidal self-injured adolescents. *Neuropsychiatr Dis*
11 *Treat*, 12, 2307-2317. doi: 10.2147/NDT.S106433
12
- 13 Giannantonio, M. (2005). *Psicotraumatologia e psicologia dell'emergenza*. Ecomind, Salerno
14
- 15 Grandclerc, S., De Labrouhe, D., Spodenkiewicz, M., Lachal, J., and Moro, M.R. (2016). Relations
16 between Nonsuicidal Self-Injury and Suicidal Behavior in Adolescence: A Systematic
17 Review. *PLoS ONE*, 11(4), e0153760. doi: 10.1371/journal.pone.0153760
18
- 19 Gratz, K.L. (2001). Measurement of deliberate self-harm: preliminary data on the Deliberate Self-
20 Harm Inventory. *J Psychopathol Beh Assess*, 23, 253-263.
21 <https://doi.org/10.1023/A:1012779403943>
22
- 23 Gratz, K. L., Conrad, S. D., and Roemer, L. (2002). Risk factors for deliberate self-harm among
24 college students. *Am J Orthopsychiatry*, 72, 128-140
25
- 26 Gratz, K.L. (2006). Risk for repeated deliberate self-harm among female college students: The role
27 and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity.
28 *Am J Orthopsychiatry*, 76, 238-250. doi: 10.1037/0002-9432.76.2.238
29
- 30 Hallab, L., and Covic, T. (2010). Deliberate self-harm: The interplay between attachment and stress.
31 *Behav Change*, 27(2), 93-103. <http://dx.doi.org/10.1375/beck.27.2.93>
32
- 33 Hamza, C.A., Willoughby, T., and Heffer, T. (2015). Impulsivity and nonsuicidal self-injury: A
34 review and meta-analysis. *Clin Psychol Rev*, 38, 13-24. doi: 10.1016/j.cpr.2015.02.010
35
- 36 Hayes, A.F., Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect
37 effect in statistical mediation analysis: does method really matter? *Psychol Sci*, 24(10), 1918-27.
38 doi: 10.1177/0956797613480187
39
- 40 Hilt, L.M., Nock, M.K., Lloyd-Richardson, E.E., and Prinstein, M.J. (2008). Longitudinal study of
41 nonsuicidal self-injury among young adolescents. *J Early Adolesc*, 28(3), 455-469.
42 <https://doi.org/10.1177/0272431608316604>
43
- 44 International Society for the Study of Self-Injury. *Definition of non-suicidal selfinjury* (2007).
45 Retrieved November 25, 2015, from <http://www.itriples.org/iss-aboutsself-i.html>.
46
- 47 Joiner, T.E., Di Ribeiro, J.D., and Silva, C. (2012). Nonsuicidalsself-injury, suicidal behavior, and
48 their co-occurrence as view ed through the lens of the interpersonal theory of suicide. *Curr. Dir.*
49 *Psychol.Sci*, 21, 342-347
50
- 51 Joiner, T.E. (2005). *Why People Die by Suicide*. Harvard University Press, Cambridge, MA

- 1
2 Kara, K., Ozsoy, S., Teke, H., Congologlu, M.A., Turker, T., Renklidag, T., and Karapirli, M.
3 (2015). Non-suicidal self-injurious behavior in forensic child and adolescent populations: Clinical
4 features and relationship with depression. *Neurosciences*, 20(1), 31-36
5
- 6 Kerns, K. A., Tomich, P. L., and Kim, P. (2006). Normative trends in children's perceptions of
7 availability and utilization of attachment figures in middle childhood. *Soc Dev*, 15, 1-22
8
- 9 Kline, R.B. (2010). *Principles and Practice of Structural Equation Modeling, 3rd edn.* Guilford
10 Press: New York, USA
11
- 12 Klonsky, E.D., and Muehlenkamp, J.J. (2007). Self-injury: A research review for the practitioner. *J*
13 *Clin Psychol*, 63, 1045-1056. doi:10.1002/jclp.20412
14
- 15 Klonsky, E.D., May, A.M., and Glenn, C.R. (2013). The relationship between nonsuicidal self-
16 injury and attempted suicide: Converging evidence from four samples. *J Abnorm Psychol*, 122(1),
17 231-237. <http://dx.doi.org/10.1037/a0030278>
18
- 19 Klonsky, E.D., Oltmanns, T.F., and Turkheimer, E. (2003). Deliberate Self-Harm in a Nonclinical
20 Population: Prevalence and Psychological Correlates. *Am J Psychiatry*, 160(8), 1501-1508. doi:
21 10.1176/appi.ajp.160.8.1501
22
- 23 Kojima, M., Senda, Y., Nagaya, T., Tokudome, S., and Furukawa, T.A. (2003). Alexithymia,
24 depression and social support among Japanese workers. *Psychother Psychosom*, 72,307-14.
25 <https://doi.org/10.1159/000073027>
26
- 27 Kojima, M. (2012). Alexithymia as a prognostic risk factor for health problems: a brief review of
28 epidemiological studies. *Biopsychosoc Med*, 6, 21. <https://doi.org/10.1186/1751-0759-6-21>.
29
- 30 Kovacs, M. (2015). *Children's Depression Inventory (CDI and CDI2)*. The Encyclopedia of
31 Clinical Psychology. doi: 10.1002/9781118625392.wbecp419
32
- 33 Laghi, F., D'Alessio, M., Pallini, S., and Baiocco, R. (2009). Attachment representations and time
34 perspective in adolescence. *Soc Indic Res*, 90, 181-194. <https://doi.org/10.1007/s11205-008-9249-0>
35
- 36 Laghi, F., Terrinoni, A., Cerutti, R., Fantini, F., Galosi, S., Ferrara, M., and Bosco, F.M. (2016).
37 Theory of mind in non-suicidal self-injury (NSSI) adolescents. *Conscious Cogn*, 43, 38-47.
38 doi: 10.1016/j.concog.2016.05.004
39
- 40 Laukkanen, E., Rissanen, M.L., Tolmunen, T., Kylvä, J., and Hintikka, J. (2013). Adolescent self-
41 cutting elsewhere than on the arms reveals more serious psychiatric symptoms. *Eur Child Adolesc*
42 *Psychiatry*, 22, 501. <https://doi.org/10.1007/s00787-013-0390-1>
43
- 44 Liu, R.T., Frazier, E.A., Cataldo, A.M., Simon, V.A., Spirito, A., and Prinstein, M.J. (2014).
45 Negative Life Events and Non-Suicidal Self-Injury in an Adolescent Inpatient Sample. *Arch Suicide*
46 *Res*, 18(3), 251-258. <http://doi.org/10.1080/13811118.2013.824835>
47
- 48 Lumley, M.A., Neely, L.C., and Burger, A.J. (2007). The assessment of alexithymia in medical
49 settings: implications for understanding and treating health problems. *J Pers Assess*, 89, 230-246.
50 doi: 10.1080/00223890701629698
51

- 1 MacKinnon, D.P. (2008). *Introduction to statistical mediation analysis*. Mahwah, NJ: Erlbaum
- 2 MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G., and Sheets, V. (2002). A
3 comparison of methods to test mediation and other intervening variable effects. *Psychol Methods*,
4 7(1), 83-104. doi: 10.1037//1082-989X.7.1.83
- 5
- 6 Manca, M., Presaghi, F., and Cerutti, R. (2014). Clinical specificity of acute versus chronic self-
7 injury: Measurement and evaluation of Repetitive Non Suicidal Self-Injury. *Psychiatry Res*, 125,
8 111-119. <http://dx.doi.org/10.1016/j.psychres.2013.10.010>
- 9
- 10 Muehlenkamp, J.J., Claes, L., Havertape, L., and Plener, P.L. (2012). International prevalence of
11 adolescents non-suicidal self-injury and deliberate self-harm. *Child Adol Psych Men*, 6, 10.
12 <http://dx.doi.org/10.1186/1753-2000-6-10>
- 13
- 14 Muthén, L.K., and Muthén, B.O. (1998-2017). *Mplus User's Guide. Eight edition*. Los Angeles,
15 CA: Muthén & Muthén
- 16
- 17 Nixon, M.K., and Heath, N.L. (2009). *Self-Injury in Youth: The Essential Guide to Assessment and*
18 *Intervention*. Routledge, New York, London
- 19
- 20 Nixon, M.K., Cloutier, P., and Jansson, S.M. (2008). Nonsuicidal self-harm in youth: a population-
21 based survey. *CMAJ*, 178(3), 306-312. <http://doi.org/10.1503/cmaj.061693>
- 22
- 23 Nock, M.K. (2010). Self-injury. *Ann Rev Clin Psychol*, 6, 339-363.
24 doi: 10.1146/annurev.clinpsy.121208.131258
- 25
- 26 Norman, H., and Borrill, J. (2015). The relationship between self-harm and alexithymia. *Scand J*
27 *Psychol*, 56,405-19. doi: 10.1111/sjop.12217
- 28
- 29 Pace, C.S., San Martini, P., and Zavattini, G.C. (2011). The factor structure of the Inventory of
30 Parent and Peer Attachment (IPPA): A survey of Italian adolescents. *Pers Indiv Differ*, 51(2), 83-88
31 <http://dx.doi.org/10.1016/j.paid.2011.03.006>
- 32
- 33 Paivio, S., and McCulloch, C.R. (2014). Alexithymia as a mediator between childhood trauma and
34 self-injurious behaviors. *Child Abuse Negl*, 28, 339-354.
35 <https://doi.org/10.1016/j.chiabu.2003.11.018>
- 36
- 37 Parker, J.D.A., Keefer, K.V., Taylor, G.J., and Bagby, R.M. (2008). Latent structure of the
38 alexithymia construct: A taxometric investigation. *Psychol Assessment*, 20, 385-396. doi:
39 10.1037/a0014262
- 40
- 41 Peh, C.X., Shahwan, S., Fauziana, R., Mahesh, M.V., Sambasivam, R., Zhang, Y., et al. (2017).
42 Emotion dysregulation as a mechanism linking child maltreatment exposure and self-harm
43 behaviors in adolescents. *Child Abuse Negl*, 67, 383-390. doi: 10.1016/j.chiabu.2017.03.013
- 44
- 45 Peterson, J., Freedenthal, S., Sheldon, C., and Andersen, R. (2008). Nonsuicidal Self injury in
46 Adolescents. *Psychiatry (Edgmont)*, 5(11), 20-26.
- 47
- 48 Rieffe, C., Oosterveld, P., and Terwogt, M.M. (2006). An alexithymia questionnaire for children:
49 Factorial and concurrent validation results. *Pers Indiv Differ*, 40(1), 123-133.
50 <https://doi.org/10.1016/j.paid.2005.05.013>
- 51

- 1 Ross, R.R., and McKay, H.B. (1979). *Self-mutilation*. Lexington: Lexington Books.
- 2
- 3 Serafini, G., Canepa, G., Adavastro, G., Nebbia, J., Belvederi Murri, M., Erbuto, D., et al. (2017).
4 The Relationship between Childhood Maltreatment and Non-Suicidal Self-Injury: A Systematic
5 Review. *Front Psychiatry*, 8,149. <http://doi.org/10.3389/fpsy.2017.00149>
- 6
- 7 Schore, A.N. (2001). The effects of early relational trauma on right brain development, affect
8 regulation, and infant mental health. *Infant Ment. Health J.*, 22, 201-269. doi:10.1002/1097-0355
- 9
- 10 Swannell, S., Martin, G., Page, A., Hasking, P., Hazell, P., Taylor, A., and Protani, M. (2012).
11 Child maltreatment, subsequent non-suicidal self-injury and the mediating roles of dissociation,
12 alexithymia, and self-blame. *Child Abuse Negl*, 36, 572-584. doi:10.1016/j.chiabu.2012.05.005
- 13
- 14 Sleuwaegen, E., Houben, M., Claes, L., Berens, A., and Sabbe, B. (2017). The relationship between
15 non-suicidal self-injury and alexithymia in borderline personality disorder: "Actions instead of
16 words". *Compr Psychiatry*, 77, 80-88. doi: 10.1016/j.comppsy.2017.06.006.
- 17
- 18 Tang, J., Yang, W., Ahmed, N.I., Ma, Y., Liu, H.Y., Wang, J.J., et al. (2016). Stressful Life Events
19 as a Predictor for Nonsuicidal Self-Injury in Southern Chinese Adolescence: A Cross-Sectional
20 Study. *Medicine*, 95(9), e2637. <http://doi.org/10.1097/MD.0000000000002637>
- 21
- 22 Taylor, G.J., Bagby, R.M., and Parker, J.D.A. (1997). *Disorders of affect regulation*. Cambridge
23 University Press, Cambridge.
- 24
- 25 Taylor, G.J. (2010). Affects, Trauma, and Mechanisms of Symptom Formation: A Tribute to John
26 C. Nemiah, MD (1918-2009). *Psychother Psychosom*, 79, 339-349. doi:10.1159/000320119
- 27
- 28 Terr, L.C. (1991). Childhood traumas: an outline and overview. *Am J Psychiatry*, 148(1), 10-20.
29 <https://doi.org/10.1176/ajp.148.1.10>
- 30
- 31 Timoney L.R., and Holder M.D. (2013). *Definition of Alexithymia*. In: Emotional Processing
32 Deficits and Happiness. Springer Briefs in Well-Being and Quality of Life Research. Springer,
33 Dordrecht.
- 34
- 35 Trickett, P. K., Negriff, S., Ji, J., and Peckins, M. (2011). Child maltreatment and adolescent
36 development. *J Res Adolescence*, 21(1), 3-20. <http://dx.doi.org/10.1111/j.1532-7795.2010.00711.x>
- 37
- 38 van der Kolk, B.A., Perry, J.C., and Herman, J.L. (1991). Childhood origins of self-destructive
39 behavior. *Am J Psychiatry*, 148(12), 1665-71. <https://doi.org/10.1176/ajp.148.12.1665>
- 40
- 41 van der Kolk, B.A., Pelcovitz, D., Roth, S., Mandel, F., McFarlane, A., and Herman, J.L. (1996).
42 Dissociation, somatization, and affect dysregulation: The complexity of adaptation to trauma. *Am J*
43 *Psychiatry*, 153(7), 83-93.
- 44
- 45 Walsh, B. W. (2006). *Treating self-injury: A practical guide*. New York: Guildford Press.
- 46
- 47 Williams, R., Leone, L., Faedda, N., Natalucci, G., Bellini, B., Salvi, E., et al. (2017). The role of
48 attachment insecurity in the emergence of anxiety symptoms in children and adolescents with
49 migraine: an empirical study. *J Headache Pain*, 18(1), 62. [http://doi.org/10.1186/s10194-017-0769-](http://doi.org/10.1186/s10194-017-0769-3)
50 3
- 51

1 Wolfe, J., Kimerling, R., Brown, P.J., Chrestman, K.R., and Levin, K. (1996). *Psychometric review*
2 *of the life stressor checklist-revised*. In: Stamm BH, editor. *Measurement of Stress, Trauma, and*
3 *Adaptation*. Lutherville, MD: Sidran Press, pp. 198-201.

4
5 Zetterqvist, M. (2017). Nonsuicidal Self-Injury in Adolescents: Characterization of the Disorder and
6 the Issue of Distress and Impairment. *Suicide Life Threat Behav*, 47, 321-335.

7 doi:10.1111/sltb.12283

8

9

In review