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Maternal criticism and non-suicidal self-injury in school-aged children

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ABSTRACT

Although non-suicidal self-injury (NSSI) is a significant public health concern in youth, most of the extant research on NSSI has focused on adults and, to a lesser extent, adolescents. Therefore, little is known about the correlates and potential risk factors for NSSI in school-aged children. One factor that may be particularly important to children is their exposure to maternal criticism. Thus, the goal of this study was to examine the association between maternal expressed emotion-criticism (EE-Criticism) and NSSI in children, and to determine whether this relation is similar for girls and boys. Participants were 204 children (ages 7–11; 39.7% female, 81.9% Caucasian) and their mothers. Participants completed interviews assessing the child's history of NSSI. Mothers completed the Five-Minute Speech Sample to determine levels of EE-Criticism toward their child. We found that girls exposed to high levels of EE-Criticism were more likely to have a lifetime history of NSSI than girls of mothers exhibiting low levels of EE-Criticism; however, the relation between EE-Criticism and NSSI was not significant for boys. These results are consistent with interpersonal models of risk for NSSI, but suggest that one interpersonal factor, maternal criticism, is more strongly related to NSSI in girls than in boys.

1. Introduction

Non-suicidal self-injury (NSSI), the deliberate destruction of bodily tissue without the intent to die, is common in adolescents, with a lifetime prevalence rate of approximately 18% (Muehlenkamp et al., 2012; Swannell et al., 2014). Though less common in children, there is evidence that approximately 8% of third-graders in the U.S. report a history of NSSI (Barrocas et al., 2012). In addition to the distress and physical damage associated with NSSI itself, there is also evidence that NSSI increases risk for future suicide attempts (for a review, see Ribeiro et al. (2016)). Despite its prevalence and negative outcomes, however, little is known about correlates or potential risk factors for NSSI, particularly in children.

Research has shown that childhood maltreatment (i.e., physical, sexual, or emotional abuse and physical or emotional neglect) is a risk factor for NSSI (for a review, see Serafini et al. (2017)). Importantly, however, there is also evidence that less severe forms of negative parental behavior may also increase risk for NSSI. One factor that may be particularly important to youth is their exposure to maternal criticism. For example, one study found that adolescents with a history of NSSI reported that their parents were more critical than did adolescents with no history of NSSI (Ammerman and Brown, 2016). In a second study, adolescents' perceptions of parental criticism were associated with NSSI cross-sectionally and longitudinally (Yates et al., 2008). Finally, a third study found that parents of adolescents with a history of NSSI were rated as more critical of the adolescent by an independent coder than were parents of adolescents with no history of NSSI, a link that was at least partially independent of adolescents' history of psychopathology (Wedig and Nock, 2007). Although the precise mechanisms by which parent-related stress, like maternal criticism, may increase risk for NSSI is unclear, there is evidence that it may increase levels of self-criticism (Ammerman and Brown, 2016; Baetens et al., 2015a) or the perception of parental alienation (Yates et al., 2008) among youth. Such increases may, in turn, elevate youths' likelihood of engaging in maladaptive emotion regulation strategies such as NSSI.

Despite the strengths of this prior research, there are limitations as well, which the current study sought to address. First, each of these prior studies focused on adolescents. Therefore, it is unclear whether similar results would be observed in children. Nonetheless, there is reason to believe that the impact of parental criticism may be even stronger for children than for adolescents because children receive their primary support from their parents whereas adolescents rely upon support from peers as much, if not more, than from parents (Buhrmester, 1996; Furman and Buhrmester, 1992). Indeed, compared to children, adolescents spend less time with their parents, and communication between parents and their offspring decreases both in frequency and quality (Hill et al., 2007; Larson et al., 1996; Loeber et al., 2000). Instead, adolescents are more heavily influenced by peer than

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parent relationships (Berndt, 1979; Laible et al., 2000), which parallels the normative increase in responsiveness to social reward that occurs during adolescence (Spear, 2000). Of further importance, there is evidence that parenting factors are more relevant to self-injurious behavior for children than adolescents. For example, one study found that conflict within the parent-child relationship was a stronger predictor of completed suicide among children than adolescents (Soole et al., 2014). Although this study examined the relation between parent-child conflict and suicide rather than NSSI, these findings underscore the importance of examining factors across age groups as certain factors may be even more salient for children and adolescents.

A second limitation of prior research is that the majority has focused on adolescents' perceived levels of parental criticism, which may be subject to response or recall bias. In the current study, therefore, we focused on interviewer-coded levels of maternal expressed emotion-criticism (EE-Criticism), which does not rely on participants' self-report. Specifically, EE-Criticism reflects the extent to which a mother is hostile toward or critical of her child (Hooley, 1985, 2007) and is frequently assessed with the Five Minute Speech Sample (FMSS; Magaña et al., 1986), in which the mother is asked to speak for five uninterrupted minutes about her child and how the two of them get along together. Supporting the construct validity of this measure, ratings of high EE-Criticism obtained from the FMSS are related to levels of criticism, anger, and hostility coded by independent raters observing actual parent child interactions (Cruise et al., 2011; Hermanns et al., 1989; Kim Park et al., 2008; McCarty et al., 2004; Narayan et al., 2012; Rea and Shaffer, 2016). To date, only one study of which we are aware has specifically used a measure of EE-Criticism to examine the link between parental criticism and NSSI (Wedig and Nock, 2007). As described above, that study found that parents of adolescents with a history of NSSI were more critical of the adolescent than were parents of adolescents with no history of NSSI, and that this link was at least partially independent of adolescents' history of psychopathology (Wedig and Nock, 2007).

The primary goal of this study, therefore, was to examine the relation between maternal EE-Criticism and NSSI in children. We predicted that children of mothers exhibiting high levels of EE-Criticism would be more likely to have a history of NSSI than children of mothers exhibiting low levels of EE-Criticism. In addition, given evidence that girls may exhibit more negative reactions to interpersonal stress than boys (Hankin et al., 2007; Rose and Rudolph, 2006), combined with evidence that the relation between NSSI and interpersonal stress or childhood maltreatment is stronger in girls than boys (Burke et al., 2015; Serafini et al., 2017), we also conducted exploratory analyses to examine whether the link between EE-Criticism and NSSI would be moderated by children's sex.

2. Method

2.1. Participants

Participants were children aged 7–11 years old recruited from the community who were participating in a larger study focused on correlates of psychopathology in children. The only inclusion/exclusion criteria were that the child be living with the participating parent at least half the time and not have any learning or developmental disabilities would preclude study participation (per parent report). Of the 955 children participating in the larger study, 68 children endorsed a history of NSSI (7%). Using a 1:2 matching ratio, 136 children from the larger study who did not endorse a history of NSSI were matched to the NSSI group on sex, age, race, lifetime diagnoses of MDD and any anxiety disorder, household income, and mother lifetime diagnoses of MDD and any anxiety disorder. In order to reduce heterogeneity in our groups, exclusion criteria for both groups included maternal history of bipolar or psychotic disorder assessed via diagnostic interview. If more than one child from the same family participated in the study, one of the siblings was randomly selected to remain in our analyses. For children in our sample, the average age was 9.30 years (SD = 1.42) and 39.7% were female. In terms of children's race, 71.1% were Caucasian, 7.8% were African American, 17.2% were multiracial, and the remainder identified as some other race. The average age of mothers in our sample was 35.77 years (SD = 6.44, Range = 24–55). In terms of mothers' race, 81.9% were Caucasian, 10.8% were African American, 3.9% were multiracial, and the remainder identified as some other race. The median annual family income was $25,000-$30,000.

2.2. Measures

2.2.1. Children's non-suicidal self-injury

Children's engagement in NSSI was also assessed using the K-SADS-PL. Specifically, as a part of the K-SADS-PL interview, both parents and children were asked if the child had ever engaged in self-injurious behaviors without the intent of killing him/herself. Mothers and children who endorsed child's engagement in NSSI were asked follow-up questions to determine that the behavior occurred deliberately and whether the behavior was an isolated incident. Children with a history of any deliberate self-injurious behaviors (per either parent or child report) were coded as having lifetime NSSI and included in the NSSI group (n = 68), whereas those with no lifetime history of NSSI were included in the comparison group (n = 136). The NSSI group comprised children who received either a subthreshold or a threshold score on the K-SADS-PL per either parent or child report. On the K-SADS-PL, subthreshold ratings are defined as "1–3 times a year and never causing serious injury to self" and threshold ratings are defined as "4 or more times a year or has caused serious injury to self (e.g., burn with scarring or broken bone)." Methods of NSSI described by participants in the NSSI group include behaviors such as hitting self in the head, banging head against the wall, scratching self, and biting self.

2.2.2. Expressed emotion-criticism

The Five Minute Speech Sample (Magaña et al., 1986) was used to assess mothers' levels of EE-Criticism. During administration of the FMSS, the mother is asked to speak for five uninterrupted minutes about the child and how the two of them get along together. The response is audiotaped and coded by an independent rater for levels of EE-Criticism. Mothers are rated as high on EE-Criticism if any of the following three criteria are met: Their initial statement about the child is negative, they report a negative relationship, or they report one or more criticisms as defined by the FMSS coding system. Mothers are rated as borderline critical if they express dissatisfaction with the child not severe enough to be rated as a criticism. Responses to the FMSS were assigned values of 2, 1, and 0 to reflect high, borderline-high, and low EE-Criticism respectively. Consistent with recommendations based on evidence that the FMSS, if anything, tends to under-identify high EE individuals (Hooley and Parker, 2006), and with previous studies of EE-Criticism (Gar and Hudson, 2008; James et al., 2017; Kershner et al., 1996), responses were dichotomized such that mothers exhibiting borderline or high EE-Criticism were classified as critical (n = 53) while mothers exhibiting low EE-Criticism were classified as not critical (n = 151). All analyses involving EE-Criticism were conducted using this dichotomized variable. A number of studies have supported the reliability and validity of the FMSS EE-Criticism subscale (e.g., Asarnow et al., 2001; Burkhouse et al., 2012; Magaña et al., 1986; McCarty et al., 2004; Rogosch et al., 2004; Silk et al., 2009). Importantly, supporting the validity of FMSS EE-Criticism ratings, this research has shown that levels of EE-Criticism coded from the FMSS are significantly related to levels of criticism, anger, and hostility coded by independent raters observing parent child interactions (Cruise et al., 2011; Hermanns et al., 1989; Kim Park et al., 2008; McCarty et al., 2004; Narayan et al., 2012; Rea and Shaffer, 2016). In the current study, the FMSSs were coded by individuals who were trained to reliability standards and blind to the other study variables. All samples were independently rated

coded by two raters, and when discrepancies arose, a third rater was consulted and a consensus rating was reached. Inter-rater reliability was assessed with a subset of 40 speech samples. The kappa coefficient for EE-Criticism was good (κ = 0.90).

2.2.3. Psychiatric diagnoses

Mothers' and children's history of psychopathology was assessed using the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I; First et al., 1995) and the Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997), respectively. To assess inter-rater reliability, a subset of 20 SCID-I and 20 K-SADS-PL interviews from this project was coded by a separate rater and kappa coefficients for depression and anxiety diagnoses in mothers (κs = 0.89 and 0.86, respectively) and children (κs = 1.0 and 1.0, respectively) were good.

2.2.4. Symptoms

Children's symptoms of depression and anxiety were assessed using the Children's Depression Inventory (CDI; Kovacs, 1981) and the Multidimensional Anxiety Scale for Children (MASC; March et al., 1997), respectively. Mothers' symptoms of depression and anxiety were assessed using the Beck Depression Inventory (BDI; Beck et al., 1996) and the Beck Anxiety Inventory (BAI; Beck and Steer, 1993), respectively. Each of these measures demonstrated good internal consistency in this study (CDI: α = 0.80; MASC: 0.89; BDI: α = 0.89; BAI: α = 0.93, respectively).

2.3. Procedure

Children and their parents were recruited through Facebook, television, campus community email, and newspaper advertisements as well as through fliers and billboards. Upon arrival at the laboratory, mothers were asked to provide informed consent and children were asked to provide assent to be in the study. Immediately after consent/assent, the mothers completed the FMSS. Following the speech sample, mothers and their children separately completed the diagnostic interview and questionnaire assessments in adjacent interview rooms. As noted above, the mother and child were interviewed separately using the K-SADS-PL. Questionnaires, including the CDI and MASC, were read aloud to children to ensure complete comprehension of the items. As part of the larger study conducted in the northeastern United States, mothers were compensated $80 and children received a $10 gift card to a local store. All study procedures were approved by the University's Institutional Review Board.

3. Results

A preliminary inspection of the data revealed the presence of some missing demographic and questionnaire data (MASC: 8.3%, CDI: 6.4%; BAI: 3.4%; BDI2: 2.9%, Income: 2.5%, Parent Age: 0.5%). Given the presence of missing data, we examined whether the data were missing at random, thereby justifying the use of data imputation methods for estimating missing values (cf. Schafer and Graham, 2002). Little's missing completely at random (MCAR) test, for which the null hypothesis is that the data are MCAR (Little and Rubin, 1987) was non-significant, $\chi^2(157) = 165.00$, $p = 0.32$, providing support for the imputation of missing values. Given these results, maximum likelihood estimates of missing values were created and used in all subsequent analyses (see Schafer and Graham, 2002). Characteristics of each of the two groups for all study variables are presented in Table 1.

Next, we conducted a logistic regression analysis with NSSI group as the outcome variable and EE-Criticism, sex, and their interaction as predictor variables. Although the main effects of EE-Criticism, *Wald* = 0.99, $p = 0.32$, Odds Ratio (OR) = 0.64 (95% CI = 0.27, 1.54), and sex, *Wald* = 1.72, $p = 0.19$, OR = 0.62 (95% CI = 0.30, 1.27), were not significant, there was a significant EE-Criticism × sex interaction, *Wald* = 6.62, $p = 0.01$, OR = 6.17 (95% CI = 1.54, 24.65). To determine the form of this interaction, we examined the main effect of EE-Criticism separately in girls and boys. Among girls, we found that exposure to EE-Criticism was significantly associated with lifetime NSSI, *Wald* = 6.29, $p = 0.01$, OR = 3.95 (95% CI = 1.35, 11.57). Specifically, among girls with a critical mother, 57.9% had a history of NSSI compared to only 25.8% of girls with noncritical mothers. In contrast, there was no significant association between EE-Criticism and lifetime NSSI in boys, *Wald* = 0.99, $p = 0.32$, OR = 0.64 (95% CI = 0.27, 1.54). Finally, examining the robustness of these results, we tested whether they would be maintained after statistically controlling for the impact of children's and mothers' current depressive and anxiety symptoms. The link between EE-Criticism and girls' history of NSSI was maintained even after statistically controlling for the influence of these variables (all *p*s < 0.05), suggesting that this relation is at least partially independent of participants' depressive and anxiety symptoms.

Table 1
Characteristics of the two groups of children.

	NSSI group (n = 68)	Control group (n = 136)	$r_{effect\ size}$
Child Age	9.36 (1.46)	9.25 (1.41)	0.04
Child Sex (% girls)	39.7%	39.7%	0.00
Child Race (% Caucasian)	73.5%	69.9%	−0.03
Family Income (Median)	$25K–$30K	$25K–$30K	−0.01
CDI	9.73 (6.98)	6.83 (5.81)	0.23*
MASC	50.89 (18.19)	47.80 (18.14)	0.09
Child Lifetime MDD (% MDD)	23.6%	14.7%	0.12
Child Lifetime Anxiety Disorder (% Anx)	20.6%	16.9%	0.03
Parent Lifetime MDD (% MDD)	58.8%	58.8%	0.00
Parent Lifetime Anxiety Life (% Anx)	42.6%	49.3%	−0.07

Note: CDI = Children's Depression Inventory. MASC = Multidimensional Anxiety Scale for Children. MDD = Major Depressive Disorder. Anx = Anxiety Disorder.

* $p < 0.001$.

4. Discussion

The results of the present study add to a small but growing body of research supporting the link between parental criticism and NSSI in adolescents (Ammerman and Brown, 2016; Baetens et al., 2015a; Wedig and Nock, 2007; Yates et al., 2008) and suggest that this link is also evident in children, though only for girls. Moreover, that the main effects of EE-Criticism and sex were not significant highlights the complexity of identifying risk factors for NSSI engagement in youth. Indeed, our results suggest that NSSI engagement is related to maternal criticism for girls, but not for boys, suggesting the importance of examining interactive effects to determine which risk factors may be most influential for different groups of people. Thus, broadly, the current results are consistent with interpersonal models of NSSI risk, which suggest that negative interpersonal experiences often precede engagement in NSSI (Nock, 2007; Prinstein et al., 2009). Importantly, extant research indicates interpersonal stressors (e.g., conflict and rejection) increase risk for thoughts of, and engagement in, NSSI (Nock et al., 2010; Snir et al., 2015; Welch and Linehan, 2002), and interpersonal difficulties are specifically indicated as a risk factor of NSSI for adolescent girls (Adrian et al., 2011). Based on this theory and supporting research, to the extent that NSSI reduces negative affect, engagement in self-injury could be used as a functional, though maladaptive, emotion regulation strategy to reduce negative affect resulting from maternal criticism. That said, the results of the present study suggest that, for children, this model may be more relevant to risk for NSSI among girls than boys – at least when interpersonal stress takes the form of maternal

criticism. This finding is consistent with research on childhood maltreatment more broadly and NSSI, which shows that with a history of childhood maltreatment are more likely to engage in NSSI than males (Serafini et al., 2017).

Although the mechanisms through which maternal criticism may increase risk for NSSI remain unclear, one possible explanation is that exposure to maternal criticism increases levels of self-criticism in youth, which then increases risk for NSSI (see Ammerman and Brown, 2016; Baetens et al., 2015a). Therefore, it could be that maternal criticism is more likely to lead to self-criticism in girls than boys, which then increases girls' risk for NSSI. It is also possible that girls and boys have similar reactions to maternal criticism, but then have different behavioral consequences (e.g., boys may be more likely to engage in externalizing behavior). Future research is needed to explore these possibilities.

The present study exhibited several strengths including the large sample size, focus on children, and interviewer-coded levels of EE-Criticism. However, despite these strengths, there were limitations as well, which provide important areas for future research. First, based on interpersonal models of NSSI risk (Nock, 2007; Prinstein et al., 2009) we assume that maternal criticism increases future risk for NSSI. However, the current cross-sectional design precludes any type of causal conclusions, and there is evidence from other research highlighting the impact of parent's knowledge of their child's engagement in NSSI on parenting behavior, the parent-child relationship, and overall family functioning (Arbuthnott and Lewis, 2015; Baetens et al., 2015b; Hilt et al., 2008; Kelada et al., 2016a,b; Tatnell et al., 2018; Tatnell et al., 2014; Tschan et al., 2015; Whitlock et al., 2018). Therefore, future research is needed to examine the temporal, and perhaps bi-directional, relations between EE-Criticism and NSSI in children. A second limitation is that we focused on criticism from mothers and did not examine the potential impact of fathers. It is possible that criticism within same sex parent-child dyads has a greater impact on a child's engagement in NSSI than in opposite-sex dyads, which may have contributed to the specificity of our findings to girls. Future research is needed to examine the potential impact of fathers on both girls and boys. Third, because of the low base rates of NSSI typically observed in children, we focused only on the presence versus absence of NSSI and additional research is needed to more fully examine specific characteristics of NSSI (e.g., frequency, intensity, etc.). Finally, although a number of studies have supported the reliability and validity of EE-Criticism ratings from the FMSS, including strong correlations between ratings of EE-Criticism and behavior during parent-child interactions in the lab and in the home (Cruise et al., 2011; Hermanns et al., 1989; Kim Park et al., 2008; McCarty et al., 2004; Narayan et al., 2012; Rea and Shaffer, 2016), we cannot guarantee that EE-Criticism ratings obtained in this study reflect the daily interaction style of families in our study. Additional research with home-based observations is needed to more definitively address this question.

In conclusion, the current results highlight the potential role of maternal criticism in school-aged girls' risk for NSSI. Future research is needed to clarify the temporal relations between maternal criticism and NSSI in girls. To the extent that future longitudinal studies support the hypothesis that maternal criticism increases risk for future NSSI, or that there is a vicious cycle of influence between maternal criticism and NSSI, it would suggest additional avenues of intervention to reduce risk for NSSI in high-risk youth. That is, if rates of maternal criticism can be decreased (e.g., in family therapy), then such intervention coupled with simultaneous efforts to bolster the child's use of healthy emotion regulation strategies might reduce risk for the occurrence (and recurrence) of NSSI.

Declaration of interest

None.

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Supplementary materials

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References

Adrian, M., Zeman, J., Erdley, C., Lisa, L., Sim, L., 2011. Emotional dysregulation and interpersonal difficulties as risk factors for nonsuicidal self-injury in adolescent girls. J. Abnormal Child Psychol. 39 (3), 389–400. https://doi.org/10.1007/s10802-010-9465-3.

Ammerman, B.A., Brown, S., 2016. The mediating role of self-criticism in the relationship between parental expressed emotion and NSSI. Curr. Psychol. 1–9. https://doi.org/10.1007/s12144-016-9516-1.

Arbuthnott, A.E., Lewis, S.P., 2015. Parents of youth who self-injure: a review of the literature and implications for mental health professionals. Child Adolesc. Psych. Ment. 9 (1). https://doi.org/10.1186/s13034-015-0066-3.

Asarnow, J.R., Tompson, M., Woo, S., Cantwell, D.P., 2001. Is expressed emotion a specific risk factor for depression or a nonspecific correlate of psychopathology? J. Abnormal Child Psychol. 29 (6), 573–583. https://doi.org/10.1023/A:1012237411007.

Baetens, I., Claes, L., Hasking, P., Smits, D., Grietens, H., Onghena, P., Martin, G., 2015a. The relationship between parental expressed emotions and non-suicidal self-injury: the mediating roles of self-criticism and depression. J. Child Family Stud. 24 (2), 491–498. https://doi.org/10.1007/s10826-013-9861-8.

Baetens, I., Claes, L., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., 2015b. The effects of nonsuicidal self-injury on parenting behaviors: a longitudinal analyses of the perspective of the parent. Child Adolesc. Psych. Mental 9 (1). https://doi.org/10.1186/s13034-015-0059-2.

Barrocas, A.L., Hankin, B.L., Young, J.F., Abela, J.R.Z., 2012. Rates of nonsuicidal self-injury in youth: age, sex, and behavioral methods in a community sample. Pediatrics 130 (1), 39–45. https://doi.org/10.1542/peds.2011-2094.

Beck, A.T., Steer, R.A., Brown, G.K., 1996. Manual for the Beck Depression Inventory, Second ed. Psychological Corporation, San Antonio, TX.

Berndt, T.J., 1979. Developmental changes in conformity to peers and parents. Dev. Psychol. 15 (6), 608–616. https://doi.org/10.1037/0012-1649.15.6.608.

Buhrmester, D., 1996. Need fulfillment, interpersonal competence, and the developmental contexts of early adolescent friendship. The Company They keep: Friendship in Childhood and Adolescence. Cambridge University Press, New York, pp. 158–185.

Burke, T.A., Hamilton, J.L., Abramson, L.Y., Alloy, L.B., 2015. Non-suicidal self-injury prospectively predicts interpersonal stressful life events and depressive symptoms among adolescent girls. Psychiat. Res. 228 (3), 416–424. https://doi.org/10.1016/j.psychres.2015.06.021.

Burkhouse, K.L., Uhrlass, D.J., Stone, L.B., Knopik, V.S., Gibb, B.E., 2012. Expressed emotion-criticism and risk of depression onset in children. J. Clin. Child Adolesc. 41 (6), 771–777. https://doi.org/10.1080/15374416.2012.703122.

Cruise, R.C., Sheeber, L.B., Tompson, M.C., 2011. Behavioral correlates of maternal expressed emotion in interaction tasks. J. Family Psychol. 25 (5), 781–784. https://doi.org/10.1037/a0024699.

First, M.B., Spitzer, R.L., Gibbon, M., Williams, J.B.W., 1995. Structured clinical interview for DSM-IV Axis I disorders-Patient edition (SCID-I/P). Biometrics Research Department, NY State Psychiatric Institute, New York.

Furman, W., Buhrmester, D., 1992. Age and sex differences in perceptions of networks of personal relationships. Child Dev. 63 (1), 103–115. https://doi.org/10.2307/1130905.

Gar, N.S., Hudson, J.L., 2008. An examination of the interactions between mothers and children with anxiety disorders. Behav. Res. Ther. 46 (12), 1266–1274. https://doi.org/10.1016/j.brat.2008.08.006.

Hankin, B.L., Mermelstein, R., Roesch, L., 2007. Sex differences in adolescent depression: stress exposure and reactivity models. Child Dev. 78 (1), 279–295. https://doi.org/10.1111/j.1467-8624.2007.00997.x.

Hermanns, J., Florin, I., Dietrich, M., Rieger, C., Hahlweg, K., 1989. Maternal criticism, mother-child interaction, and bronchial asthma. J. Psychosom. Res. 33 (4), 469–476. https://doi.org/10.1016/0022-3999(89)90008-1.

Hill, N.E., Bromell, L., Tyson, D.F., Flint, R., 2007. Developmental commentary: ecological perspectives on parental influences during adolescence. J. Clin. Child Adolesc. 36 (3), 367–377. https://doi.org/10.1080/15374410701444322.

Hilt, L.M., Nock, M.K., Lloyd-Richardson, E.E., Prinstein, M.J., 2008. Longitudinal study of nonsuicidal self-injury among young adolescents: rates, correlates, and preliminary test of an interpersonal model. J. Early Adolesc. 28 (3), 455–469. https://doi.org/10.1177/0272431608316604.

Hooley, J.M., 1985. Expressed emotion: a review of the critical literature. Clin. Psychol.

Rev. 5 (2), 119–139. https://doi.org/10.1016/0272-7358(85)90018-2.
Hooley, J.M., 2007. Expressed emotion and relapse of psychopathology. Annu. Rev. Clin. Psychol. 3 (1), 329–352. https://doi.org/10.1146/annurev.clinpsy.2.022305.095236.
Hooley, J.M., Parker, H.a., 2006. Measuring expressed emotion: an evaluation of the shortcuts. J. Family Psychol. 20 (3), 386–396. https://doi.org/10.1037/0893-3200.20.3.386.
James, K.M., Woody, M.L., Feurer, C., Kudinova, A.Y., Gibb, B.E., 2017. Disrupted physiological reactivity among children with a history of suicidal ideation: moderation by parental expressed emotion-criticism. Biol. Psychol. 130, 22–29. https://doi.org/10.1016/j.biopsycho.2017.10.003.
Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., et al., 1997. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. J. Am. Acad. Child Psychiatry 36 (7), 980–988. https://doi.org/10.1097/00004583-199707000-00021.
Kelada, L., Hasking, P., Melvin, G., 2016a. The relationship between nonsuicidal self-injury and family functioning: adolescent and parent perspectives. J. Marital Family Ther. 42 (3), 536–549. https://doi.org/10.1111/jmft.12150.
Kelada, L., Whitlock, J., Hasking, P., Melvin, G., 2016b. Parents' experiences of non-suicidal self-injury among adolescents and young adults. J. Child Family Stud. 25 (11), 3403–3416. https://doi.org/10.1007/s10826-016-0496-4.
Kershner, J.G., Cohen, N.J., Coyne, J.C., 1996. Expressed emotion in families of clinically referred and nonreferred children: toward a further understanding of the expressed emotion index. J. Family Psychol. 10 (1), 97–106. https://doi.org/10.1037//0893-3200.10.1.97.
Park, Kim, J., I., Garber, J., Ciesla, J.A., Ellis, B.J., 2008. Convergence among multiple methods of measuring positivity and negativity in the family environment: relation to depression in mothers and their children. J. Family Psychol. 22 (1), 123–134. https://doi.org/10.1037/0893-3200.22.1.123.
Kovacs, M., 1981. Rating scales to assess depression in school-aged children. Acta Paedopsychiatr 46 (5–6), 305–315.
Laible, D.J.J., Carlo, G., Raffaelli, M., 2000. The differential relations of parent and peer attachment to adolescent adjustment. J. Youth Adolesc. 29 (1), 45–59. https://doi.org/10.1023/A.
Larson, R.W., Moneta, G., Richards, M.H., Holmbeck, G., Duckett, E., 1996. Changes in adolescents' daily interactions with their families from ages 10 to 18: disengagement and transformation. Dev. Psychol. 32 (4), 744–754. https://doi.org/10.1037/0012-1649.32.4.744.
Little, R.J.A., Rubin, D.B., 1987. Statistical Analysis with Missing Data. John Wiley & Sons, New York, NY.
Loeber, R., Drinkwater, M., Yin, Y., Anderson, S.J., Schmidt, L.C., Crawford, A., 2000. Stability of family interaction from ages 6 to 18. J. Abnormal Child Psych. 28 (4), 353–369. https://doi.org/10.1023/A:1005169026208.
Magaña, A.B., Goldstein, M.J., Karno, M., Miklowitz, D.J., Jenkins, J., Falloon, I.R.H., 1986. A brief method for assessing expressed emotion in relatives of psychiatric patients. Psychiatry Res. 17 (3), 203–212. https://doi.org/10.1016/0165-1781(86)90049-1.
March, J.S., Parker, J., Sullivan, K., Stallings, P., Conners, C., 1997. The multidimensional anxiety scale for children (MASC): factor structure, reliability, and validity. J. Am. Acad. Child Psychiatry 36, 554–565. https://doi.org/10.1097/00004583-199704000-00019.
McCarty, C.A., Lau, A.S., Valeri, S.M., Weisz, J.R., 2004. Parent-child interactions in relation to critical and emotionally overinvolved expressed emotion (EE): is EE a proxy for behavior? J. Abnormal Child Psychiatry 32 (1), 83–93. https://doi.org/10.1023/B:JACP.0000007582.61879.6f.
Muehlenkamp, J.J., Claes, L., Havertape, L., Plener, P.L., 2012. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. Child Adolesc. Psych. Mental 6 (1), 10. https://doi.org/10.1186/1753-2000-6-10.
Narayan, A.J., Herbers, J.E., Plowman, E.J., Gewirtz, A.H., Masten, A.S., 2012. Expressed emotion in homeless families: a methodological study of the five-minute speech sample. J. Family Psychol. 26 (4), 648–653. https://doi.org/10.1037/a0028968.
Nock, M.K., 2007. Actions speak louder than words: an elaborated theoretical model of the social functions of self-injury and other harmful behaviors. Appl. Prev. Psychol. 12 (4), 159–168. https://doi.org/10.1016/j.appsy.2008.05.002.
Nock, M.K., Prinstein, M.J., Sterba, S.K., 2010. Revealing the form and function of self-injurious thoughts and behaviors: a real-time ecological assessment study among adolescents and young adults. Psychol. Violence 1, 36–52. https://doi.org/10.1037/2152-0828.1.S.36.
Prinstein, M., Guerry, J., Browne, C., Rancourt, D., 2009. Interpersonal models of non-suicidal self-injury. In: Nock, M. (Ed.), Understanding Nonsuicidal Self-Injury: Origins, Assessment, and Treatment. American Psychological Association, Washington, D.C.. https://doi.org/10.1037/11875-005.
Rea, H.M., Shaffer, A., 2016. Expressed emotion in mothers of school-age children: relations to maternal altreatment and parenting behavior. J. Child Family Stud. 25 (12), 3749–3759. https://doi.org/10.1007/s10826-016-0500-z.
Ribeiro, J.D., Franklin, J.C., Fox, K.R., Bentley, K.H., Kleiman, E.M., Chang, B.P., Nock, M.K., 2016. Self-injurious thoughts and behaviors as risk factors for future suicide ideation, attempts, and death: a meta-analysis of longitudinal studies. Psychol. Med. 46 (2), 225–236. https://doi.org/10.1017/S0033291715001804.
Rogosch, F.A., Cicchetti, D., Toth, S.L., 2004. Expressed emotion in multiple subsystems of the families of toddlers with depressed mothers. Dev. Psychopathol. 16 (3), 689–709. https://doi.org/10.1017/S0954579404004730.
Rose, A.J., Rudolph, K.D., 2006. A review of sex differences in peer relationship processes: potential trade-offs for the emotional and behavioral development of girls and boys. Psychol. Bull. 132 (1), 98–131. https://doi.org/10.1037/0033-2909.132.1.98.
Schafer, J.L., Graham, J.W., 2002. Missing data: our view of the state of the art. Psychol. Methods 7 (2), 147–177. https://doi.org/10.1037//1082-989X.7.2.147.
Serafini, G., Canepa, G., Adavastro, G., Nebbia, J., Murri, M.B., Erbuto, D., et al., 2017. The relationship between childhood maltreatment and non-suicidal self-injury: a systematic review. Front. Psychia 8, 149. https://doi.org/10.3389/fpsyt.2017.00149.
Silk, J.S., Ziegler, M.L., Whalen, D.J., Dahl, R.E., Ryan, N.D., Dietz, L.J., et al., 2009. . Expressed emotion in mothers of currently depressed, remitted, high-risk, and low-risk youth: links to child depression status and longitudinal course. J. Clin. Child Adolesc. 38 (1), 36–47. https://doi.org/10.1080/15374410802575339.
Snir, A., Rafaeli, E., Gadassi, R., Berenson, K., Downey, G., 2015. Explicit and inferred motives for nonsuicidal self-injurious acts and urges in borderline and avoidant personality disorders. Personality Disord. 6 (3), 267–277. https://doi.org/10.1037/per0000104.
Soole, R., Kõlves, K., De Leo, D., 2014. Factors related to childhood suicides. Crisis 35 (5), 292–300. https://doi.org/10.1027/0227-5910/a000267.
Spear, L.P., 2000. The adolescent brain and age-related behavioral manifestations. Neurosci. Biobehav. R. https://doi.org/10.1016/S0149-7634(00)00014-2.
Swannell, S.V., Martin, G.E., Page, A., Hasking, P., St John, N.J., 2014. Prevalence of nonsuicidal self-injury in nonclinical samples: systematic review, meta-analysis and meta-regression. Suicide Life-Threat. 44 (3), 273–303. https://doi.org/10.1111/sltb.12070.
Tatnell, R., Hasking, P., Newman, L., 2018. Multiple mediation modelling exploring relationships between specific aspects of attachment, emotion regulation, and non-suicidal self-injury. Aust. J. Psychol. 70 (1), 48–56. https://doi.org/10.1111/ajpy.12166.
Tatnell, R., Kelada, L., Hasking, P., Martin, G., 2014. Longitudinal analysis of adolescent NSSI: the role of intrapersonal and interpersonal factors. J. Abnormal. Child Psych. 42 (6), 885–896. https://doi.org/10.1007/s10802-013-9837-6.
Tschan, T., Schmid, M., In-Albon, T., 2015. Parenting behavior in families of female adolescents with nonsuicidal self-injury in comparison to a clinical and a nonclinical control group. Child Adolesc. Psych. Mental 9 (1). https://doi.org/10.1186/s13034-015-0051-x.
Wedig, M.M., Nock, M.K., 2007. Parental expressed emotion and adolescent self-injury. J. Am. Acad. Child Psychiatry 46 (9), 1171–1178. https://doi.org/10.1097/chi.0b013e3180ca9aaf.
Welch, S.S., Linehan, M.M., 2002. High-risk situations associated with parasuicide and drug use in borderline personality disorder. J. Pers Disord. 16 (6), 561–569. https://doi.org/10.1521/pedi.16.6.561.22141.
Whitlock, J., Lloyd-Richardson, E., Fisseha, F., Bates, T., 2018. Parental secondary stress: the often hidden consequences of nonsuicidal self-injury in youth. J. Clin. Psychol. 74 (1), 178–196. https://doi.org/10.1002/jclp.22488.
Yates, T.M., Tracy, A.J., Luthar, S.S., 2008. Nonsuicidal self-injury among "privileged" youths: longitudinal and cross-sectional approaches to developmental process. J. Consult Clin. Psych. 76 (1), 52–62. https://doi.org/10.1037/0022-006X.76.1.52.