The association between family functioning and NSSI in adolescence:

the mediating role of depressive symptoms.

Authors: Baetens, I., Andrews, T., Claes, L., & Martin, G.

Abstract

Non-suicidal self-injury (NSSI) refers to socially unacceptable behavior causing intentional and direct injury to one’s own body tissue without conscious suicidal intent. Recent literature has highlighted the importance of examining the interaction between intrapersonal (e.g., coping, psychopathology) and interpersonal risk factors (e.g., psychopathology in family, family abuse, parenting), as a new pathway for enhancing our understanding of NSSI. The present study adds to this limited knowledge by investigating the association between NSSI, adolescent depressive feelings and perceived family functioning. A sample of 358 adolescents were assessed by means of self-report measures related to (1) NSSI behavior (NSSI-AT), (2) depressive symptoms (CDI-NL) and (3) perceived family functioning (FAD-NL). Prevalence of NSSI was 14.29%. Data suggest that general disfunctioning of the family as a whole, poor affective involvement and excessive behavioral control uniquely distinguish between adolescents engaging in NSSI and adolescents not engaging in NSSI. The association between family functioning and NSSI is partially mediated by depressive symptoms. The implications of the findings for further research on NSSI are discussed.

Keywords: NSSI, prevalence, depressive symptoms, family functioning, mediation
The association between family functioning and NSSI in adolescence: the mediating role of depressive symptoms.

Non-suicidal self-injury (NSSI) refers to socially unacceptable behavior causing intentional and direct injury to one’s own body tissue without conscious suicidal intent (Nock & Favazza, 2009). Among adolescents in the community, NSSI lifetime prevalence ranges from 7-24% (Baetens, Claes, Muehlenkamp, Grietens, & Onghena, 2011; Jacobson & Gould, 2007; Martin, Swannell, Hazell, Harrison, & Taylor, 2010), with a mean lifetime prevalence of 18% in non-clinical samples of adolescents (Muehlenkamp, Claes, Havertape, & Plener, 2012). NSSI research has received increased attention over the last decade due to its association with significant psychological morbidity, including psychopathology, severe chronic NSSI, suicide attempts, and completed suicide (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Recent literature (e.g., Baetens et al., 2014b; Whitlock & Selekman, in press.) has highlighted the importance for examining NSSI from a biopsychosocial perspective, and mapping interaction patterns between intrapersonal and interpersonal factors in relation to NSSI behaviors. Unique relationships between NSSI and several intrapersonal risk factors (e.g., depressive symptoms, coping, psychopathology, temperament, emotional reactivity, suicidality) are increasingly well documented and understood in the study of NSSI. Furthermore, new research findings underline the fact that intrapersonal/family factors are significantly associated with onset (e.g., Baetens et al., 2014; Braush & Gutierrez, 2010), continuation (Baetens et al., 2014b) and cessation of NSSI (Tatnell, Kelada, Hasking & Martin, 2013). More specifically, support of family is identified as the most salient predictor of NSSI cessation (Tatnell et al., 2013), while lack of support is significantly related to the onset of NSSI (Baetens et al., 2014). Regrettably, most research on associations between NSSI and family factors lack a clear conceptual model of family functioning and/or uses poorly validated instruments (e.g., Baetens et al., 2014; You & Leung, 2012). Furthermore, interactions between intrapersonal and interpersonal risk factors, framed in a biopsychosocial model, are poorly understudied to date, except for Baetens et al. (2014b) and Tatnell et al., (2013).
In the present study, we will broaden our insight into associations between NSSI and family factors by using a clear conceptual model of family functioning and an elaborated and well-validated questionnaire. Furthermore, interactions between the most salient intrapersonal factor (i.e. depressive feelings) and intrapersonal factor (i.e. family functioning) are examined to broaden our understanding of NSSI in adolescence.

**Family functioning associated with NSSI**

Most research examining the role of family factors related to NSSI lacks a sound theoretical model for examining influences of family variables. Therefore, the present study presents a clear conceptual model of the family, which is based on the process model (Steinhauer, Santa-Barbara, & Skinner, 1984) and the McMaster Model (Epstein, Bishop, Ryan, Miller, & Keitner, 1993) of family functioning. Family functioning is a sound theoretical concept, and conceptualizes how a family is organized as a family unit (Epstein, Baldwin, & Bishop, 1983). This model provides indices of family strengths and weakness of the family as a whole (beyond the child-parent dyade, the parents dyade, sibling relationships, …). The model gives an overview of major tasks of the family system which are important to maintain and achieve a family unit, providing a reasonable security, ensuring sufficient cohesion, making the family able to adapt to transitional and life cycle transitions, and function as part of the society (Rasheed, 2010). Family functioning identifies six important domains of family functioning, namely problem solving, differentiation of roles, effective communication, affective responsiveness, affective involvement, and behavioral control. Family functioning has been shown to have a central influence on the onset and continuation of emotional and behavioral problems in children and adolescents (Epstein, Baldwin, & Bishop, 1983; Hetherington & Martin, 1986). Several studies in the domain of adolescent NSSI have examined one/two aspect(s) of family functioning. In summary, family communication was examined by Tulloch, Blizzard, and Pinkus (1997). Baetens et al., (2014) examined parental behavioral control, and report higher levels of parental behavioral control to be associated with NSSI in adolescence. The role of affective responsiveness (mostly focusing on expressed emotions) and affective involvement (conceptualized as warmth and support)
are more thoroughly examined by several authors (see for example, Baetens et al., 2014; Baetens et al., 2014b; Bureau, Martin, Freynet, Poirier, Lafontaine, & Cloutier, 2010, Crowell, Beauchaine, McCauley, Smith, Vasilev & Stevens, 2008; Gratz, 2006; Marchetto, 2006; Wedig & Nock, 2007). Research findings consistently report dysfunctional levels of affective responsiveness (e.g., high parental criticism) and low affective involvement (i.e., warmth and support). Nock and Mendes (2008) have found a significant association between NSSI and social problem solving, but familial problem solving has never thus far been researched. Also the relationship between NSSI and differentiation of roles has never been researched. Although, some of the six main domains of family functioning are mapped, current research lacks an overview of all family functioning tasks, in relation to each other in the context of adolescent NSSI.

Moreover, the combination of low affective involvement (indicating emotional coldness and rejection) and high behavioral control (indicating intrusiveness and overprotection), coined as ‘affectionless control’, has been suggested to be key indicator of disfunctioning/unhealthy family functioning, and increases the risk for psychopathology of family members drastically. For example, research shows a significant association between affectionless control and adolescent depression (Parker, 1983; Patton, Coffey, Posterino, Carlin, & Wolfe, 2001) and suicidality (e.g., Freudenstein, Zohar, Apter, Shoval, Weizman, & Zalsman, 2011). Freudenstein and colleagues (2011) report that affectionless control significantly differentiates between adolescents with high versus low suicidality. With regard to deliberate selfharm (including both suicide attempt and non-suicidal self-injury), Martin and Waite (1994) report that a third of participants perceived their parents as less caring and more controlling than their non-self-injuring peers, suggesting a relative risk of NSSI more than three times the risk of those reporting optimal parenting. However, this study focused on NSSI as well as suicide attempts (ie. deliberate self-harm), failing to distinguish between these two behaviors, which makes it difficult to assess whether affectionless control is related to only NSSI. Similar findings have also been found within other studies examining self-harm behaviors (e.g., Coll, Law, Tabías, Hawton, & Tomàs, 2001). Only one study up-to-date (Baetens et al., 2014), examined the role of affectionless
control in engagement of NSSI, but only as a indices of parenting (not family as a whole) and used a poorly validated instrument. The present study will therefore elucidate on the role of affectionless control, as well as other domains of healthy family functioning, with regard to adolescent NSSI.

**Family functioning, depressive symptoms and NSSI: association and mediation**

Internalizing symptoms are highly correlated with NSSI behaviors in youth (e.g., Jacobson, Muehlenkamp, Miller, & Turner, 2008). In line with recent literature (e.g., Baetens et al., 2014; Whitlock & Selekman, in press), it is important to examine interaction between intrapersonal and interpersonal factors. In this regard, we focus on two hypotheses. In line with Martin & Waite (1994), we hypotheses that depressive symptoms mediate the interaction between NSSI and family functioning. In line with Baetens et al. (2014), examine a moderating role of depressive symptoms in the relationship between NSSI and family functioning.

In sum, the aims of the present study were threefold. First, to investigate differences between adolescents with and without NSSI in all six main domains of family functioning. Secondly, we focus on the role of affectionless control in relation to NSSI. In line with previous literature, it was hypothesized that those reporting NSSI would report the combination of poorer affective involvement and higher control, relative to non-self-injuring peers. Finally, the interactional pathway between an intrapersonal factor (i.e., depressive symptoms) and interpersonal factor (i.e. general family functioning) was investigated. Following Martin et al. (1994), we hypothesized that depressive symptoms mediate the relationship between family functioning and NSSI. In line with Baetens et al. (2014), we hypothesized a moderating effect of depressive symptoms in the relationship between family functioning and NSSI.

**Method**

**Participants**
In total, 358 adolescents from three Belgian secondary schools (two catholic and one governmental) participated in this study. Participants were aged 12-20 years (Mean age = 16.07 years, SD = 1.12) with an even distribution of gender (48% female; 52% male). The sample was almost exclusively Caucasian (96%).

**Measures**

**Brief Non-Suicidal Self-Injury Assessment Tool (BNSSI-AT; Whitlock & Purington, 2007 - BNSSI-AT-NL; Baetens & Claes, 2011).** BNSSI-AT is a self-report measure asking participants “Have you ever done any of the following with the purpose of intentionally hurting yourself, without suicidal intent?” and is followed by a list of nine NSSI behaviors: scratching, carving, cutting, burning, biting, hitting, banging, preventing wound healing and pulling out hair or eye lashes. Responses were dummy-coded with “0 = no” and “1 = yes” for each of the nine NSSI-methods separately. A method-frequency variable was created by adding number of NSSI methods reported. Supplementary questions follow a positive response on at least of one the nine listed NSSI-methods, and assess NSSI characteristics, including age of onset and cessation, lifetime frequency, psychological function (e.g., stress relief), motivation for initiating NSSI (e.g., self-punishment), body areas affected (e.g., arms, legs), routines and habits (e.g., self-injure in private setting only), addictive qualities (e.g., inability to control urge to self-injure), unintended severity (e.g., self-injured more severely than expected), and help-seeking and disclosure (e.g., seen by a mental health professional). We intended to exclude any adolescent who reported NSSI behavior with suicide intent, but none of the adolescents reporting NSSI behavior affirmed suicidal intent was the primary reason for their NSSI. When individuals only report NSSI forms ‘preventing wound healing’ and/or ‘pulling out hair or eye lashes’, they are not omitted in the NSSI group. In the BNSSI-AT-NL (Baetens & Claes, 2011), number of days within the past year that the individual has intentionally injured him-/herself is not examined, so we are unable to compare results to DSM-V criteria. Reliability and validity in adolescent and young adult samples is satisfactory, with Cronbach’s alphas ranging from .65 to .84 (Whitlock, Exner-Cortens & Purington, 2014). The Cronbach’s alpha in the current sample is .79.
**Psychopathology**

Respondents were asked whether they ever received a formal diagnosis of an emotional, behavioral or developmental disorder (e.g., depression, anxiety, mental retardation, autism, ADHD et cetera). The presence of any psychiatric disorder was dummy-coded with “0 = no disorder” and “1 = at least one disorder present”.

**Family assessment device (FAD-NL; Wenniger, Hageman, & Arrindell, 1993).** FAD is a 60-item questionnaire with seven subscales (problem solving, effective communication, differentiation of roles, affective responsiveness, affective involvement, behavior control and general functioning) assessing family functioning. General functioning is a separate subscale (i.e. not a composite score) and assesses the overall health/pathology of the family. Reliability and validity in adolescent samples is satisfactory. Internal reliability of the FAD has been demonstrated in prior research with Cronbach’s alphas ranging from .74-.92 (Epstein, Baldwin, & Bishop, 1983). In the present study, Cronbach’s alphas ranged from .60 to .89.

**Child Depression Inventory (CDI-NL; Timbremont & Braet, 2002).** CDI-NL is a well-known tool measuring severity of depressive symptoms in children and adolescents. Participants are asked to select a statement best describing their feelings in the past two weeks (e.g. I never feel sad – I sometimes feel sad – I always feel sad). The Cronbach’s alpha in the present study for the 27-item questionnaire was .87.

**Procedure**

School approval and parental passive informed consent were obtained before data collection. Participation was voluntary and no incentives were given. Adolescents present on the day of questionnaire administration completed questionnaires during class time, without discussion, in one teaching period (50 minutes). At least one researcher was available to provide assistance if necessary and ensure independent responding. Efforts were made to safeguard the welfare of the adolescents (e.g. informing the schools about NSSI in adolescents as well as providing participants
with phone numbers and e-mail addresses of professional and informal help centers). The study was approved by the ethical board of the first author’s university.

Data Analysis

Results of a correlation matrix can be found in Table 1. All main variables are significantly correlated, at a 0.01 significance level. To examine whether categorical variables (i.e. formal psychopathological diagnoses) were significantly associated with the presence of NSSI, the Pearson Chi Square statistic was used. A series of independent sample t-tests were used to examine individual differences between adolescents with and without a lifetime prevalence of NSSI with regard to the seven FAD subscales as well as depressive symptoms. If the Levene’s statistic showed significance differences between the standard deviations of both groups, results for ‘equal variances not assumed’ were reported. Given the number of comparisons, family wise error rate was reduced by using a conservative p-value based on Bonferroni correction (.05/8 = .006) to determine statistical significance. A binary logistic regression was conducted to explore which family functioning subscales found to differentiate between the two focal groups (model 1). A separate binary logistic regression was conducted including depressive symptoms to examine its impact on the family functioning subscales (model 2). This analysis served as a preliminary check to assess whether depressive symptoms moderate/mediates between general family functioning and NSSI. Those not engaging in NSSI were used as the control group.

A follow-up logistic regression, examining a moderating effect of depressive symptoms in relation to general family functioning was performed (model 3). Finally, to formally investigate the mediating role of depressive symptoms between perceived family functioning and NSSI, we used the model described by MacKinnon and Dwyer (1993) (Herr, 2006), to investigate mediation of a third variable between an interval-scaled independent and a dichotomous dependent variable. In order to be considered mediation, reduction in variance explained by the independent variable (after controlling for the mediation variable) must be significant as determined by the Sobel test. The Aroian version of the Sobel test, as suggested in Baron and Kenny (1986), was used.
Results

Rates and correlates of NSSI

Of the 358 adolescents included in analyses, 51 reported having self-injured at some point in their lives (14.29%), with 9.8% (35/358) reporting NSSI within the last 12 months. In total, 39.22% (20/51) of those who self-injured reported using one method of NSSI. The most prevalent methods of reported NSSI were scratching to the point of bleeding or until marks remained on the skin (6.70%; 24/358), punching or hitting objects to the point of bruising or bleeding (6.42%; 23/358), carving (6.15%; 22/358), and cutting (5.03%; 18/358).

The average age of NSSI onset was 12.77 years (SD = 2.56), ranging from 5 – 20 years, with 50.98% (26/51) indicating that they initiated NSSI between the ages of 13-15; and 7.84% (4/51) started at age 8 or younger.

With regard to disclosure, 54.90% (28/51) of the NSSI sample reported that no one knew about their NSSI activity. Eight percent reported seeking medical treatment for injuries. Adolescents who engaged in NSSI had more frequently visited a professional expert, compared to those who had not engaged in NSSI (x^2 (1) = 35.05, p < .01), although only 39.60% of all self-injurers had been in contact with a professional. Also, self-injurers did not receive significant more psychological treatment than adolescents who did not self-injure, x^2 (1) = 1.63, p = .20. Only 3.70% of all self-injurers reported having received a psychological treatment.

The role of family functioning, psychopathology and depressive symptoms

Results of a chi-square test showed that NSSI is significantly associated with formal psychopathological diagnoses (such as depression, ADHD, Autism, Eating disorders, ...), x^2 (1, N = 358) = 25.08, p ≤ 0.001. Although the proportion of adolescents engaging in NSSI who report a formal psychopathological diagnoses is significantly higher than adolescents without NSSI, not all adolescents who report NSSI have a formal psychopathological diagnoses (77.10% no diagnoses
versus 22.90% formal psychopathological diagnoses). To account for variance of psychopathology, formal psychopathological diagnoses was entered in all logistic regression models, always being a significant covariate at 0.001 level. A binary logistic regression with all FAD subscales (see Table 2 for a summary of results) revealed that poor general family functioning, low affective involvement and high behavior control have the strongest significant association with NSSI. All other family functioning domains fail to contribute to the model when taking into account affective involvement, behavioral control and general family dis-functioning. Also, when adding depressive symptoms into the model, which is positively associated with NSSI relative to non-NSSI, general dis-functioning and low affective involvement remain statistically significant ($p \leq .01$), suggesting main effects of family functioning above and beyond depressive symptoms. The predictive power of behavioral control diminishes when taking into account depressive symptoms.

**Relation between family functioning and NSSI: moderation and mediation**

In a follow-up binary logistic regression (see table 3) the interaction between general family functioning and depressive symptoms is examined. Results show no moderation effect of depressive symptoms. Finally, the association of general functioning via the hypothesized mediator depressive symptoms to NSSI is shown in Figure 3. An Aroian test confirmed depressive symptoms partially mediate the relationship between general functioning and NSSI, $Z = -3.68, p \leq .001$. The relationship between general functioning and NSSI is partially mediated by depressive symptoms, thus not being able to explain all variance in the relationship between poor general family functioning and NSSI.

**Discussion**

A very low percentage of self-injurers report receiving psychological or medical treatment. In line with previous research (e.g., Evans, Hawton, & Rodham, 2005), NSSI often remains hidden from friends, family and professionals. Given that the mean age of NSSI-onset was 12.77 years, ranging
from 5 to 20 years, it is important to start prevention and screening for NSSI symptoms as young as ages 10-12.

The current study expands on the limited knowledge we have regarding perceived family functioning and NSSI: all other family functioning domains fail to predict NSSI, when taking into account the role of affective responsiveness and higher behavioral control, next to general family dis-functioning. This results supports the hypothesis, in line with Baetens et al. (2014) that ‘affectionless control’ (i.e. combination of both high control and low warmth) is a significant predictor of adolescent NSSI. Furthermore, even after adding depressive symptoms to the model (and controlling for psychopathology) general family dis-functioning and affective involvement remain significant. Results show no moderating effect of depressive symptoms, but show that depressive symptoms partially mediate the relationship between general family functioning and NSSI. This finding suggests that interpersonal factors, such as (dis-)functioning of the family as a whole, are important to map when examining NSSI in adolescence, above and beyond intrapersonal risk factors, such as psychopathology and depressive symptoms. Further longitudinal research is needed to examine the causal nature of this finding, this cross-sectional data provides some preliminary evidence for partial mediation, but longitudinal research is needed to determine whether the factors explored in this study represent correlates, causes or consequences of NSSI (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). Caution should also be applied when generalizing the results given the sample is not representative of adolescents in Belgium. Furthermore, the results may be further biased given we did not explicitly account for possible clustering, although did examine whether focal groups differed based on possible cluster variables (e.g. gender, age, year level, classroom) and did not find significant differences. Consequently, there may be increased chance of Type 2 error in the data.

In sum, these findings present meaningful information with regard to the role of affectionless control, and interactions between intrapersonal and interpersonal risk factors in adolescent NSSI. This study extends our understanding of adolescent NSSI and provides a conceptual theoretical framework to guide future research exploring family links to this behavior.
References


