

**Associations between family functioning, emotion regulation, social support, and self-injury among emerging adult university students**

Mark E. Boyes<sup>1,2\*</sup>, Mechelle A. Mah<sup>2</sup>, and Penelope Hasking<sup>1,2</sup>

<sup>1</sup>*Curtin enAble Institute, Faculty of Health Sciences, Curtin University;* <sup>2</sup>*School of Population Health, Faculty of Health Sciences, Curtin University*

**Abstract**

We tested whether difficulties in emotion regulation mediated the association between family functioning and non-suicidal self-injury (NSSI), and whether associations between family functioning, emotion regulation, and NSSI were moderated by social support. University students ( $N = 846$ , 75.8% female, 35.5% with a history of NSSI,  $M_{age} = 20.76$ ) completed an online questionnaire including well-validated measures of family functioning, emotion regulation, social support, and NSSI. Poor family functioning was positively associated with history of NSSI, but not past 12-month frequency of NSSI. Difficulties in emotion regulation were positively associated with both history of NSSI and frequency of NSSI in the past 12 months. Social support from friends moderated the relationship between difficulties in emotion regulation and history of NSSI; the association was stronger at higher levels of support. Poor family functioning had an indirect effect on both history of NSSI and frequency of NSSI via difficulties in emotion regulation; however, for frequency the indirect effect was only observed when social support from friends and significant others were low. Poor family functioning, difficulties in emotion regulation, and social support work together to predict NSSI engagement among university students. Findings inform potential integration of current theories and design of targeted interventions.

**Keywords:** Family, Emotion regulation, Social Support, NSSI, Self-injury

Highlights

- We investigated family functioning, difficulties in emotion regulation, social support, and NSSI among university students
- Poor family functioning and emotion regulation difficulties were positively associated with NSSI.
- Emotion regulation difficulties mediated relationships between poor family functioning and history and frequency of NSSI
- This mediated effect was only present for NSSI frequency when social support from friends and significant others were low
- Early intervention may target family functioning; intervention for university students may target emotion regulation

Funding: Mark Boyes is supported by the National Health and Medical Research Council, Australia (Investigator Grant 1173043).

Word count: 5641 (excluding title page, abstract, highlights, reference, tables, and figures)

Corresponding author

\*Associate Professor Mark Boyes

NHMRC Emerging Leadership Fellow

Co-Lead, Mental Health Domain, Curtin enAble Institute

Curtin University, GPO Box U1987

Perth, 6845, Western Australia, Australia

Phone: +61 8 9266 7025

Email: [mark.boyes@curtin.edu.au](mailto:mark.boyes@curtin.edu.au)

**NOTICE:** this is the author's version of a work that was accepted for publication in the *Journal of Child and Family Studies*. Changes resulting from the publishing process, such as peer review, editing, corrections, structural formatting, and other quality control mechanisms may not be reflected in this document. Changes may have been made to this work since it was submitted for publication. A definitive version was subsequently published in the *Journal of Child and Family Studies* [Volume 32, 2023] DOI: 10.1007/s10826-022-02516-6.

### **Abstract**

We tested whether difficulties in emotion regulation mediated the association between family functioning and non-suicidal self-injury (NSSI), and whether associations between family functioning, emotion regulation, and NSSI were moderated by social support. University students ( $N = 846$ , 75.8% female, 35.5% with a history of NSSI,  $M_{age} = 20.76$ ) completed an online questionnaire including well-validated measures of family functioning, emotion regulation, social support, and NSSI. Poor family functioning was positively associated with history of NSSI, but not past 12-month frequency of NSSI. Difficulties in emotion regulation were positively associated with both history of NSSI and frequency of NSSI in the past 12 months. Social support from friends moderated the relationship between difficulties in emotion regulation and history of NSSI; the association was stronger at higher levels of support. Poor family functioning had an indirect effect on both history of NSSI and frequency of NSSI via difficulties in emotion regulation; however, for frequency the indirect effect was only observed when social support from friends and significant others were low. Poor family functioning, difficulties in emotion regulation, and social support work together to predict NSSI engagement among university students. Findings inform potential integration of current theories and design of targeted interventions.

**Keywords:** Family, Emotion regulation, Social Support, NSSI, Self-injury

### **Declaration of Interest Statement**

The authors report that there are no competing interests to declare.

### **Funding**

[Redacted for review] is supported by the National Health and Medical Research Council, Australia (Investigator Grant 1173043)

### **Data Availability Statement**

Data are available from the corresponding author upon reasonable request.

### Highlights

- We investigated family functioning, difficulties in emotion regulation, social support, and NSSI among university students
- Poor family functioning and emotion regulation difficulties were positively associated with NSSI.
- Emotion regulation difficulties mediated relationships between poor family functioning and history and frequency of NSSI
- This mediated effect was only present for NSSI frequency when social support from friends and significant others were low
- Early intervention may target family functioning; intervention for university students may target emotion regulation

The university years are associated with the transition from adolescence to emerging adulthood; a developmental stage distinguished by expanding academic, personal, and social opportunities (Arnett, 2000, 2016). However, emerging adulthood is also a period of heightened instability and uncertainty, with academic pressure, identity confusion, relationship concerns, financial hardship, and uncertainty about future employment all contributing to increased stress (Arnett et al., 2014). Given this, it is perhaps unsurprising that university students are at elevated risk for a range of mental disorders (Auerbach et al., 2016) and risky behaviours, including non-suicidal self-injury (NSSI, Kiekens et al., 2019).

NSSI is the direct, deliberate damage of one's own body tissue without suicidal intent for purposes not socially or culturally sanctioned (International Society for the Study of Self-Injury, 2018) and primarily serves an emotion-regulatory function (Taylor et al., 2018; Wolff et al., 2019). In community samples, there is a small but significant gender difference in NSSI, with females more likely to report a history of self-injury than males, with this gender difference more pronounced in clinical samples (Bresin & Schoenleber, 2015). Additionally, there are gender differences in method of self-injury, with females more likely than males to engage in cutting, and males more likely than females to engage in self-battery and hitting (Bresin & Schoenleber, 2015). While NSSI predominately begins during early adolescence (Swannell et al., 2014), a second peak of onset occurs in young adulthood (Gandhi et al., 2018), which for many coincides with the university years. Consistent with this, university students are at particular risk of NSSI, with rates (approximately 20%, Kiekens et al., in press; Swannell et al., 2014) substantially exceeding rates among young adults more generally (13.4%; Swannell et al., 2014). Indeed, over 16% of students begin to self-injure in the first two years of university (Kiekens et al., 2019) and self-injury is associated with poor academic outcomes (Bruffaerts et al., 2018), high rates of psychopathology, suicidal ideation, and suicide attempts (Kiekens et al., 2019). Of note, even a single instance of NSSI, or thoughts of NSSI, are associated with future suicidal thoughts and behaviour, as well as mental health difficulties generally (Kiekens et al., 2018; Whitlock et al., 2013). Given this, it is important to explore factors that may help explain self-injury among students.

### **Family functioning and self-injury**

In the integrated developmental model of NSSI, Nock (2009) argues distal risk factors such as childhood maltreatment and adverse familial environments can lead to interpersonal (e.g., poor communication skills) and intrapersonal vulnerabilities (e.g., poor emotion regulation) that make it difficult to effectively respond to stress. A significant body of literature links adverse childhood environments, particularly

early parent-child relational experiences, to biological processes involved in stress response maturation (Perry, 2009; Schore, 2001). Family environment is an important context in which emotion regulation skills develop. Positive family environments, conducive to healthy child-caregiver attachments, enable responsive caregiving providing the predictable, patterned neural stimulation required to develop an adaptive stress-response system (Perry, 2009). Conversely, childhood maltreatment and poor family functioning are linked to disruptions to the stress response system, producing emotion regulation difficulties (McGowan et al., 2009; Schore, 2001). Indeed, recent meta-analytic evidence indicates difficulties in emotion regulation mediate the relationship between childhood adversity and various psychopathologies (Miu et al., 2022).

One of the strongest predictors of NSSI engagement is an adverse family environment (Kelada et al., 2018). Poor family functioning, characterized by less cohesion (Crowell et al., 2008), more controlling parenting (Baetens et al., 2014), and parental invalidation (Adrian et al., 2018; Crowell et al., 2013), are reported by adolescents who engage in self-injury. Poor parent-child attachment, harsh parental punishment (Victor et al., 2019), and low parental support (Tatnell et al., 2014), have also been found to predict NSSI onset among adolescents, whereas improvement in parental support is predictive of NSSI cessation (Tatnell et al., 2014). These findings indicate that families play a crucial role in NSSI engagement among adolescents; however, there is limited research examining whether this applies to university students. Given the shift in family environment that university students often experience (e.g., increased independence; Arnett, 2000), family functioning may play a unique role for university students, as they navigate tensions between individuation and separation from the family (Johnson et al., 2010).

### **Family functioning, difficulties in emotion regulation, and self-injury**

While family functioning does appear to be important, the primary reason people report for engaging in NSSI is to manage and regulate overwhelming or unwanted emotions (Taylor et al., 2018; Wolff et al., 2019). Prior to NSSI, individuals report heightened negative emotion and physiological arousal, which is alleviated during and immediately after NSSI engagement (Claes et al., 2010; Haines et al., 1995). Further, NSSI is often associated with heightened emotional reactivity (Baetens et al., 2014; Glenn & Klonsky, 2011), lack of emotional clarity (Gratz & Roemer, 2008), and difficulties regulating one's emotions (Perez et al., 2012; Turner et al., 2012). For example, use of expressive suppression by university students is associated with greater perceived stress and NSSI (Ewing et al., 2019; Hasking et al., 2020; Midkiff et al., 2018; Silva et al., 2017),

whereas use of more helpful emotion regulation strategies such as cognitive reappraisal is associated with less perceived stress and NSSI (Zahniser & Conley, 2018).

Although there is evidence that poor family functioning and difficulties in emotion regulation may increase risk for NSSI engagement, Nock (2009) proposes the interplay of these factors needs to be considered to gain a more comprehensive understanding of the processes that underlie self-injury. Given that poor family functioning impedes emotion regulation development (Schoore, 2001), this may compound students' ability to manage stressors of university, increasing likelihood of self-injury. Research with adolescent samples shows that emotion regulation may mediate the relationship between various dimensions of family functioning and self-injury (Baetens et al., 2015a; Kelada et al., 2018; Tatnell et al., 2014). Kelada et al. (2018) found that two emotion regulation strategies, self-blame, and less use of planning, mediated the relationship between poor family functioning and NSSI. Similarly, Hasking et al. (2020) demonstrated that poor family functioning was indirectly related to NSSI via difficulties in emotion regulation among university students.

The findings of Hasking et al (2020) provide preliminary support that among university students, poor family functioning may increase risk for NSSI via emotion regulation difficulties, highlighting potential areas for intervention. However, identifying other factors that may reduce the likelihood of NSSI, or moderate the associations between family functioning, difficulties in emotion regulation, and NSSI, may provide additional opportunities for targeted intervention among university students. Social support is one factor that protects against many negative mental health outcomes across the lifespan (Liu et al., 2021; Urano & Ikeda, 2020). Social support also shows a clear developmental shift from adolescence to emerging adulthood, with family becoming less central and peer and romantic relationships becoming more important (Arnett, 2000, 2016).

### **Social support and self-injury**

Among adolescents, lack of social support is a significant predictor of NSSI engagement (Baiden et al., 2017; Victor et al., 2019). However, for adolescents, support from family appears a more salient factor than support from friends and significant others (Brausch & Gutierrez, 2010; Tatnell et al., 2014), reflecting the key role families play during this developmental period (Steinberg & Morris, 2001). As adolescents reach emerging adulthood, peer and romantic relationships often gain increasing importance (Arnett, 2000, 2016). Friendship at university can provide the opportunity for emotional support and can help to manage stress (Wilcox et al., 2005). For university students, lack of social support is associated with increased stress (Lagdon et al., 2021) suicidal ideation (Hirsch & Barton, 2011), and NSSI (Kiekens et al., 2019; Trujillo & Servaty-Seib, 2018; Whitlock

et al., 2015). Conversely, social support from various sources, including friends, family, and significant others is associated with reduced loneliness (Bohnert et al., 2007), less stress (Lidy & Kahn, 2006), reduced suicidal behaviour (Hirsch & Ellis, 1995), and NSSI cessation (Whitlock et al., 2015). These findings indicate that social support may be an important protective factor for self-injury among university students.

Several researchers assert that social support is integral to stress reduction and emotion regulation (Cohen & Wills, 1985; Zaki & Williams, 2013). Specifically, supportive interpersonal interactions can provide opportunities for people to seek reassurance and comfort, helping to regulate emotions (Zaki & Williams, 2013). Given its benefits, social support may decrease risk for NSSI by modulating associations between poor family functioning, emotion regulation difficulties, and self-injury. Recently, researchers have found social support to attenuate the relationship between adverse childhood experiences and self-injury, especially among older adolescents (Forster et al., 2020). Whilst this moderating effect was not found in younger students, these findings suggest that social support from friends may increase in importance as adolescents reach emerging adulthood, modulating the pathway from poor family functioning to self-injury (Brausch & Gutierrez, 2010; Tatnell et al., 2014).

There is also some evidence that social support may decrease risk for emotion regulation difficulties, despite poor family functioning. Social support has been shown to weaken the association between childhood adversity and activation of the amygdala and other neural correlates of emotion regulation (Wymbs et al., 2020), providing preliminary evidence that social support may protect people who experience challenging family environments from emotion regulation difficulties. Conversely, lack of social support strengthens the relationships between emotion regulation and psychological distress (Urano & Ikeda, 2020), and emotion regulation and suicide risk among university students (Thomas & Brausch, 2020). Therefore, social support may be important in reducing risk for NSSI, even in the context of family and emotion regulation difficulties.

### **The current study**

We aimed to investigate how family functioning, emotion regulation, and perceived social support may work together to predict history of NSSI, as well as frequency of NSSI among university students who self-injure. Given previous research, we hypothesised that poorer family functioning would be directly associated with both history of NSSI and frequency of NSSI, as well as indirectly associated with self-injury via difficulties in emotion regulation (Kelada et al., 2018; Hasking et al., 2020). We also hypothesised that social support from friends and significant others will be negatively associated NSSI. Finally, extending previous research (Kelada et



al., 2018; Hasking et al., 2020), we hypothesized that social support would moderate associations between family functioning and NSSI, as well as difficulties in emotion regulation and NSSI. Specifically, these associations were expected to be weaker among individuals with higher levels of social support.

## Materials and Methods

### Participants

Our initial sample comprised 835 Australian university students aged between 18 and 35 years ( $M = 20.76$ ,  $SD = 2.36$ ), and consistent with other university samples (Ewing et al., 2019; Midkiff et al., 2018), most participants were female (75.8%). Data from three participants (0.4%) identifying as a gender other than male or female were not included in the analysis, as there were too few to enable meaningful statistical comparisons. Participants were recruited from 18 Australian universities. Most students were born in Australia (74.6%), with nine participants identifying as Aboriginal or Torres Strait Islander (1.1%). Our final sample therefore comprised 832 university students (76.1% female,  $M$  age = 20.75 years,  $SD = 2.36$ ). Of the sample, 295 (35.4%) reported a history of self-injury; these rates are consistent with other studies examining self-injury among university students (Ewing et al., 2019; Wester et al., 2017).

### Measures

**NSSI.** History of NSSI and frequency of NSSI in the past 12 months were assessed using Part 1 of the Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009). The International Society for the Study of Self-Injury definition of NSSI was provided, and participants were asked whether they had ever engaged in self-injury. This response was coded as 0 (*no NSSI history*) and 1 (*history of NSSI*). Participants also indicated frequency of NSSI engagement in the past 12 months, ranging from 1 (*none*) to 6 (*5 or more times*). From a list of 12 NSSI behaviours (cutting, severe scratching, biting, banging or hitting self, burning, carving the skin, rubbing skin against rough surfaces, sticking self with needles, pulling hair, and swallowing dangerous substances), participants were also asked to indicate their main form of self-injury. The scale asked an additional three descriptive questions, including if participants experienced pain during NSSI (no/sometimes/yes), engaged in NSSI when alone, (no/sometimes/yes), and the time between urge to engage and NSSI behaviours (six options ranging from < 1hr to > 1day). The ISAS has demonstrated good test-retest reliability ( $r = .85$ ,  $p < .05$ ; Glenn & Klonsky, 2011) and good construct validity (Klonsky & Glenn, 2009).

**Family functioning.** The general functioning subscale of the McMaster Family Assessment Device (FAD-GF) was used to measure family functioning (Epstein et al., 1983). The scale consists of 12 statements an

individual could make about their family. For example, “We do not get along well with each other”.

Participants rated their agreement with the statement on a 4-point Likert-type scale, ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Items were summated for a total score, with higher scores indicating poorer functioning. The FAD-GF has demonstrated good test-retest reliability ( $r = .71, p < .05$ ; Miller et al., 1985) and good construct validity (Miller et al., 1985). The FAD-GF demonstrated excellent internal consistency in previous studies ( $\alpha = .92$ ; Epstein et al., 1983) and in our study ( $\alpha = .91$ ).

**Emotion regulation.** The total score of the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to assess emotion regulation difficulties. The scale consists of 36 items measuring six dimensions (lack of emotional awareness, nonacceptance of emotional response, impulse control difficulties, difficulties in goal directed behaviour, limited access to emotion regulation strategies, and lack of emotional clarity). Participants rated how often the statements applied to them on a 5-point Likert-type scale ranging from 1 (*almost never*) to 5 (*almost always*). Items are summed to a total score (Gratz & Roemer, 2004), with higher scores indicating greater difficulty in emotion regulation. The DERS has demonstrated excellent test-retest reliability ( $r = .88, p < .01$ ; Gratz & Roemer, 2004) and acceptable construct validity in previous research (Gratz & Roemer, 2004). The DERS demonstrated excellent internal consistency in past studies ( $\alpha = .94$ ; Hallion et al., 2018) and in our study ( $\alpha = .94$ ).

**Social support.** The friends and significant other subscales of the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) were used to assess social support. The family support subscale was not included in the analysis as it contains items that conceptually overlap with the FAD-GF. The friends subscale consists of four items measuring social support from friends. For example, “My friends really try to help me”. The significant other subscale consists of four items measuring social support from significant others. For example, “I have a special person who is a real source of comfort for me”. Responses for each subscale were provided on a 7-point Likert scale, ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). Items are summated to subscale scores, with higher scores indicating greater perceived social support. Both subscales have demonstrated excellent test-retest reliability, ( $r = .85, p < .05$ ;  $r = .72, p < .05$ , respectively; Zimet et al., 1988). Both subscales have also shown good discriminant validity with measures of depression (Zimet et al., 1988). The friends ( $\alpha = .88$ ) and significant others ( $\alpha = .91$ ) subscales have demonstrated high and excellent internal consistency, respectively (Bruwer et al., 2008; Zimet et al., 1988). In our study, both subscales demonstrated excellent internal consistency ( $\alpha = .94$  and  $\alpha = .96$ , respectively).

## Procedure

The study was part of a larger study on interpersonal and intrapersonal factors related to NSSI and was approved by the Human Research Ethics Committee. Participants were recruited through an advertisement via an online recruitment platform, where students could access the study and view the information sheet detailing the aim, data handling, risks, benefits, confidentiality, and participation requirements. After providing informed consent, participants were directed to the online survey containing demographic questions (i.e., age, gender, country of birth, and whether or not participants identified as Indigenous) and a battery of measures assessing NSSI, family functioning, social support, and emotion regulation. The survey took approximately 45-60 minutes to complete. Upon completion, participants were given contacts for counselling and links to resources about NSSI. Students were awarded course credit for taking part in the study.

## Data Analysis

SPSS v27 (IBM Corp, 2020) and the PROCESS macro (Hayes, 2018) were used to analyse the data. A missing values analysis was completed before preliminary analyses were conducted. Preliminary analyses included descriptive statistics and bivariate correlations between variables of interest, to describe patterns of association and identify potential confounding variables. PROCESS (model 76; Hayes, 2018) was then used to test the hypothesised moderated mediation models for both history of NSSI and frequency of NSSI. A bootstrapping procedure (5000 resamples) was used to generate coefficients and bias-corrected confidence intervals for all direct, indirect, and moderated effects. All continuous variables were standardised to reduce multicollinearity. Alpha was set at .05 for all analyses, and significance of indirect effects was indicated if bias-corrected 95% confidence intervals did not cross zero. Unstandardised coefficients are reported, as per the recommendations of Hayes (2018). Finally, simple slopes tests (at  $\pm$  one standard deviation from the means of interacting variables) were used to probe significant interactions (Aiken & West, 1996).

## Results

### Preliminary Analyses

Although the data were not missing completely at random  $\chi^2(4399) = 4813.60, p < .001$ , given the minimal amount of missing data across all variables (<1.2% across all variables), missing values were imputed using expectation maximisation (Tabachnick & Fidell, 2013). Of the participants, 295 (35.4%) reported a history of NSSI. Of these individuals, 261 (88.5%) had self-injured in the past 12 months. Among those who self-injured

in the past 12 months, 146 (55.9%) had self-injured once, 40 (4.8%) twice, 20 (2.4%) three times, 8 (1%) four times, and 47 (18%) had self-injured at least five times in the past 12 months. Among those who reported a history of NSSI, the primary form was cutting ( $n = 122$ , 44.5%), followed by severe scratching ( $n = 41$ , 15.0%), and self-battery ( $n = 34$ , 12.4%). Among participants with a history of self-injury, 181 (62.4%) reported always experiencing physical pain during self-injury, 258 (89.3%) reported self-injuring when alone, and 147 (52.3%) reported a delay of less than one hour between the urge to self-injure and engaging in self-injury.

Females were more likely to have a history of self-injury than males,  $\chi^2(1, n = 832) = 8.90, p < .01, V(1, 832) = .10$ . Additionally, females reported more difficulties in emotion regulation ( $M = 93.52, SD = 23.09$ ) than males ( $M = 88.91, SD = 20.93$ ),  $t(830) = -2.51, p = .01, 95\% CI [-8.30, -1.00]$ . Females also reported greater levels of social support from significant others ( $M = 22.93, SD = 5.89$ ) than males ( $M = 21.39, SD = 6.57$ ),  $t(304) = -2.96, p < .01, 95\% CI [-2.57, -0.52]$ . Given this, as well as previously reported gender differences in NSSI (Bresin & Schoenleber, 2015), gender was statistically controlled in the analyses. Age did not significantly correlate with any variables of interest and was not controlled for in the models (Table 1). Descriptive statistics and correlations between variables of interest, disaggregated by history of self-injury, are provided in Table 1. All correlations between variables were in the expected direction.

***[Insert Table 1 approximately here]***

### **History of NSSI**

Poor family functioning and difficulties in emotion regulation were positively associated with NSSI (Figure 1). Further, poor family functioning had an indirect effect on NSSI via emotion regulation,  $b = .14, 95\% CI [0.09, 0.22]$ . Social support from friends,  $b = .01 [-0.05, 0.07]$ , and significant others,  $b = -.02 [-0.08, 0.05]$  did not moderate the relationship between poor family functioning and emotion regulation. However, social support from friends and significant others were both negatively associated with difficulties in emotion regulation. Social support from friends,  $b = .02 [-0.14, 0.19]$ , and significant others,  $b = -.05 [-0.23, 0.13]$ , did not moderate the relationship between poor family functioning and NSSI. Social support from friends and significant others were not directly associated with NSSI,  $b = -.09 [-0.28, 0.10]$  and  $b = .14 [-0.05, 0.34]$ , respectively. Social support from significant others did not moderate the relationship between emotion regulation and NSSI,  $b = -.10 [-0.30, 0.09]$ ; however, social support from friends moderated the relationship between emotion regulation and NSSI.

***[Insert Figure 1 approximately here]***

Simple slopes analysis (Figure 2) indicated a positive relationship between difficulties in emotion regulation and NSSI at high,  $b = .73$ ,  $p < .001$ , 95% CI [0.47 – 0.99], and low,  $b = .27$ ,  $p < .05$  [0.01 – 0.52], levels of social support from friends. However, this relationship was stronger at high levels of social support. The final model accounted for 18% of the variance in emotion regulation,  $R^2 = .18$ ,  $F(6, 825) = 29.74$ ,  $p < .001$ , and between 8.6% (McFadden  $R^2$ ) and 14% (Nagelkerke  $R^2$ ) of the variance in NSSI,  $\chi^2(9, N = 832) = 92.78$ ,  $p < .001$ .

*[Insert Figure 2 approximately here]*

#### **Frequency of NSSI among Individuals Who Self-Injured in the Past 12 Months**

Poor family functioning was not directly associated with NSSI frequency,  $b = .11$ ,  $p = .26$ , 95% CI (-0.08, 0.29); however, poor family functioning was positively related to difficulties in emotion regulation,  $b = .12$ , 95% CI (0.01, 0.23),  $p < .05$ . Further, difficulties in emotion regulation were positively associated with NSSI frequency,  $b = .36$ , 95% CI (0.15, 0.57),  $p < .001$ . Social support from friends and significant others did not moderate the relationship between family functioning and emotion regulation difficulties, or family functioning and NSSI. Social support from friends and significant others were not directly associated with NSSI frequency and did not moderate the relationship between emotion regulation and NSSI. The final model accounted for 8.7% of the variance in emotion regulation,  $R^2 = .09$ ,  $F(6, 254) = 4.05$ ,  $p < .001$ , and 7.3% of the variance in NSSI frequency,  $R^2 = .07$ ,  $F(9, 251) = 2.19$ ,  $p = .02$ . Although none of the two-way interactions were significant, the indirect effect between family functioning and NSSI via emotion regulation, was moderated by social support; this effect was only present when social support from friends and significant others were low,  $b = .11$ , 95% CI [0.01, 0.25].

#### **Discussion**

Grounded within Arnett's conceptualisation of emerging adulthood (2000, 2016) and Nock's integrated developmental model of NSSI (2009), this study examined associations between family functioning and NSSI among university students, both directly and indirectly through difficulties in emotion regulation. Further, this study expanded on previous research (Baetens et al., 2015a; Hasking et al., 2020) by exploring the moderating role of social support from friends and significant others. As predicted, family functioning was directly associated with a lifetime history of NSSI, whereas no direct effect was observed for NSSI frequency in the past 12 months. However, for both NSSI history and frequency, family functioning exerted an indirect effect via difficulties in emotion regulation. The indirect effect on NSSI frequency was moderated by perceived support from friends and significant others, such that the relationship was present only when support was low.

Further, although perceived social support from friends and significant others were not directly associated with NSSI history or frequency, perceived social support from friends moderated the relationship between emotion regulation and NSSI history. These findings indicate that family functioning, emotion regulation, and social support may work in concert to explain NSSI engagement among university students and have important implications for future research and the design of tailored interventions.

Consistent with previous literature (Kelada et al., 2018; Hasking et al., 2020), family functioning was directly related to lifetime history of NSSI. However, a direct effect of family functioning was not observed for frequency of NSSI in the past 12 months. One could speculatively consider factors associated with any history of NSSI (which could have been just one instance) as those related to the initiation or onset of self-injurious behaviour, whereas factors related to frequency of NSSI likely captures more recent or ongoing self-injury. Given that family functioning was related to lifetime history of NSSI, rather than NSSI frequency, poor family functioning may be an important risk factor for the initial onset of self-injury. When examining more recent self-injury among students, a direct effect of family functioning was not observed, and difficulties in emotion regulation appeared more salient in predicting frequency of self-injury. As such, whilst poor family functioning may trigger onset of self-injury, difficulties in emotion regulation may underlie the maintenance of self-injurious behaviour among university students into emerging adulthood. However, longitudinal research is clearly needed to test these predictions.

Additionally, there was an indirect effect of family functioning on both NSSI history and frequency, operating via difficulties in emotion regulation. This mediating effect of emotion regulation is consistent with previous literature (Baetens et al., 2015a; Hasking et al., 2020; Kelada et al., 2018; Tatnell et al., 2014), and lends support to Nock's (2009) integrated model. It is recognised that the family environment is an important context in which emotion regulation skills develop, and adverse environments characterised by unhealthy child-caregiver attachments disrupt adaptive emotion regulation development (Perry, 2009; Schore, 2001). As such, poor family functioning may be a catalyst to initial onset of self-injury by impeding development of more adaptive emotion regulation coping. Difficulties in coping with unwanted emotions may carry on into emerging adulthood, and such difficulties may provoke use of self-injury as a means to cope in the face of stress, whether that be university related stress or otherwise. That the direct effect of family functioning dissipates for more recent or ongoing self-injury, underscores difficulties in emotion regulation appear the central driver for NSSI engagement among university students.

However, the indirect effect of family functioning on NSSI frequency via difficulties in emotion regulation was only present when people reported a lack of social support from friends and significant others. One reason social support may help to mitigate ongoing or recent NSSI is that students may be offsetting difficulties in emotion regulation abilities by turning to friends and significant others to help regulate their emotions. This interplay between social support and emotion regulation extends on traditional conceptualisations of emotion regulation as an intrapersonal process (Gross, 1999), and lends support to theories that incorporate interpersonal aspects of emotion regulation. One such theory, the Interpersonal Emotion Regulation Framework (Zaki & Williams, 2013), posits that people may use interpersonal interactions to manage their own emotions (e.g., seeking comfort from a partner), or to help manage someone else's (e.g., empathetic responding). In this view, social support may be both integral and helpful within the emotion regulation process and could explain why the indirect effect was only observed when lack of support was reported. Additionally, akin to behavioural activation in the context of depression (Hopko et al., 2003), it may be the case that social support serves as a distraction from stressors and/or generally improves mood, thereby leading to decreased NSSI. While future research is clearly needed to test these possibilities, given university students typically experience a shift away from family and increased involvement in peer and romantic relationships (Arnett, 2000, 2016), social support may be particularly important for promoting adaptive ways of coping with stress among university students.

Further, social support from friends moderated the relationship between difficulties in emotion regulation and history of NSSI, but not frequency. A positive relationship between difficulties in emotion regulation and history of NSSI was present at both levels of social support from friends but was stronger at high levels. One possible explanation for this pattern of findings is that in the onset of self-injury, there are more interpersonal reasons for engaging in NSSI (Victor et al., 2016). Previous longitudinal research has shown that knowing others or being part of a group of people who engage in self-injury increases the likelihood of self-injury (Prinstein et al., 2010). Hence, while people may feel more supported, they may also be more likely to engage in the behaviour. Alternatively, it may simply be that individuals with a history of self-injury and difficulties with emotion regulation seek social support as a coping strategy. A final consideration is that initial disclosure of self-injury may increase support from others, however, over time as a person continues to self-injure, support may decrease. Indeed, there is research suggesting that initial disclosure is associated with increased support which diminishes over time in response to ongoing self-injury (Hasking et al., 2015).

### **Theoretical and practical implications**

Our findings are consistent with Arnett's (2000, 2016) conceptualisation of emerging adulthood as a stressful period, characterised by a transition to independence during which support from peers and romantic partners becomes particularly salient. Our findings are also in line with Nock's (2009) assertion that the interplay between distal (e.g., family functioning) and more proximal factors (e.g., emotion regulation) need to be considered if we are to gain a fuller understanding of the processes that underlie self-injury. Additionally, consistent with previous research (Baiden et al., 2017; Victor et al., 2019), our findings highlight interpersonal factors, such as social support, are also important to consider in the context of self-injury, as they may work with family functioning and emotion regulation to influence self-injurious behaviour.

Given our findings, early intervention or prevention efforts may benefit from targeting and improving family functioning, whereas among university students who continue to self-injure, targeting emotion regulation and increasing social support may be important. Improvements in family functioning via treatments which involve family members in the treatment process has been shown to contribute to the cessation of NSSI engagement (Glenn et al., 2019; Tatnell et al., 2014). However, given that the inclusion of family members in the treatment process may not be an option for university students, and difficulties in emotion regulation are more predictive of NSSI engagement during this developmental period, the use of current best-practice treatments for NSSI, including Mentalizing Based Therapy (Bateman & Fonagy, 2008) and Dialectical Behaviour Therapy (Lynch et al., 2007), which focus on improving emotion regulation skills and distress tolerance may prove most fruitful.

Further, given that social support appears to play a role in mitigating recent NSSI despite the experience of poor family functioning and difficulties in emotion regulation, interventions designed to foster positive social relationships within the university context may help to reduce NSSI engagement (Mattanah et al., 2010). However, the lack of a direct effect between social support and NSSI, coupled with the interplay between social support and emotion regulation, suggests that intervention efforts may benefit from educating students in ways in which supportive relationships facilitate adaptive emotion regulation.

### **Limitations and directions for future research**

The findings from this study should be interpreted with some limitations in mind. First, the cross-sectional nature of this study prevents claims regarding temporal ordering of the variables. For example, previous studies have found self-injury among adolescents can evoke more controlling parental behaviours



over time (Baetens et al., 2015b), and that increased social support following NSSI disclosure may function to reinforce self-injurious behaviour (Turner et al., 2016). As such, future studies could use Ecological Momentary Assessment methods, to detect real time changes in family functioning, emotion regulation, social support, and NSSI, to assess how these factors may interact over time (Rodriguez-Blanco et al., 2018). Second, the time at which students completed the survey may have impacted results, as stress level likely fluctuates across semester and assessment periods, and this could have impacted self-reported emotion regulation, social support, and self-injury. Additionally, although the focus on family functioning was informed by attachment theory, we did not assess attachment style. Future research should consider assessing attachment in the context of both family relationships as well as relationships with friends and significant others.

Third, although family functioning and social support tend to be stable over time (de la Vega et al., 2019; Sianko, 2020), it is important to note that current family functioning, emotion regulation, and social support were measured, and assessments were limited to self-report. Therefore, associations with life-time history of NSSI should be interpreted with caution. Importantly, it should be noted that early parent-child relationships underlie relational templates that people draw upon to navigate interpersonal situations throughout life (Perry, 2009). Specifically, if children learn that caregivers are unreliable and unable to meet emotional needs, this relational experience may be replicated in relationships later in life, compounding any positive impact that social support may have for people's emotion regulation, despite its availability (Schoe, 2001). Considering this, longitudinal research is crucial, not only in assessing how poor family functioning may impact on emotion regulation development to potentially increase use of self-injury, but to examine how social support may interact with family functioning and emotion regulation difficulties over time. Additionally, including observational assessments of family functioning would strengthen future research. We would also urge caution in generalising these findings to samples with different cultural beliefs around family structures and relationships.

Finally, although we aimed to explore self-injury among university students, we cannot necessarily generalise these findings to other populations. Additionally, although consistent with previous studies (Ewing et al., 2019; Midkiff et al., 2018), males were under-represented in the sample. Considering NSSI is highly prevalent in treatment-seeking samples (Gratz et al., 2015), it is recommended that future research explore the relationships between family functioning, emotion regulation, social support, and NSSI among treatment-seeking samples, as well as how these variables may be associated with other mental health outcomes such as

depression, anxiety, and suicidal thoughts and behaviours, as well as treatment-related factors (e.g., currently seeking or accessing care, type of treatment, any medication use etc). Additionally, information on other sociodemographic characteristics that may be important to consider (e.g., socioeconomic status, living arrangements, academic status, and health) were not collected. Future research should consider the potential impacts of such variables.

## **Conclusion**

Guided by Arnett's theory of emerging adulthood (2000, 2016) and Nock's integrated model of self-injury (2009), we investigated associations between family functioning, emotion regulation, social support, and self-injury among university students. Bearing the limitation outlined above in mind, our findings suggest that poor family functioning, difficulties in emotion regulation, and social support from friends are all important in understanding NSSI in emerging adulthood. However, while poor family functioning is associated with lifetime history of NSSI, difficulties in emotion regulation appears more salient in terms of recent self-injurious behaviour. Additionally, social support appears to mitigate risk of NSSI engagement, despite difficulties in emotion regulation and poor family functioning. As such, consideration of interpersonal aspects of emotion regulation may improve understanding of processes that underlie self-injurious behaviour and provide an important target for intervention efforts.

## References

- Adrian, M., Berk, M. S., Korslund, K., Whitlock, K., McCauley, E., & Linehan, M. (2018). Parental validation and invalidation predict adolescent self-harm. *Professional Psychology: Research and Practice, 49*(4), 274. <https://doi.org/10.1037/pro0000200>
- Aiken, L. S., & West, S. G. (1996). *Multiple regression: Testing and interpreting interactions*. Sage
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *The American Psychologist, 55*(5), 469-480. <https://doi.org/10.1037/0003-066X.55.5.469>
- Arnett, J. J. (2016). College students as emerging adults: The developmental implications of the college context. *Emerging Adulthood, 4*(3), 219-222. <https://doi.org/10.1177/2167696815587422>
- Arnett, J. J., Žukauskienė, R., & Sugimura, K. (2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *The Lancet Psychiatry, 1*(7), 569–576. doi: 10.1016/S2215-0366(14)00080-7
- Auerbach, R., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D., Green, J., Hasking, P., Murray, E., Nock, M., Pinder-Amaker, S., Sampson, N., Stein, D., Vilagut, G., Zaslavsky, A., Kessler, R.; WHO WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology, 127*(7), 623-638. doi: 10.1037/abn0000362.
- 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. *Journal of Child and Family Studies, 24*(2), 491-498. <https://doi.org/10.1080/19424620.2015.1056917>
- Baetens, I., Claes, L., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., Wiersema, J. R., & Griffith, J. W. (2015b). The effects of nonsuicidal self-injury on parenting behaviors: a longitudinal analyses of the perspective of the parent. *Child and Adolescent Psychiatry and Mental health, 9*(1), 1-6. <https://doi.org/10.1186/s13034-015-0059-2>
- Baetens, I., Claes, L., Martin, G., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., Wiersema, J. R., & Griffith, J. W. (2014). Is nonsuicidal self injury associated with parenting and family factors? *The Journal of Early Adolescence, 34*(3), 387-405. <https://doi.org/10.1177/0272431613494006>

- Baiden, P., Stewart, S. L., & Fallon, B. (2017). The role of adverse childhood experiences as determinants of non-suicidal self-injury among children and adolescents referred to community and inpatient mental health settings. *Child Abuse & Neglect, 69*, 163-176. <https://doi:10.1016/j.chiabu.2017.04.011>
- Bateman, A., & Fonagy, P. (2008). 8-year follow-up of patients treated for borderline personality disorder: Mentalization-based treatment versus treatment as usual. *American Journal of Psychiatry, 165*(5), 631-638. <https://doi.org/10.1176/appi.ajp.2007.07040636>
- Bohnert, A. M., Aikins, J. W., & Edidin, J. (2007). The role of organized activities in facilitating social adaptation across the transition to college. *Journal of Adolescent Research, 22*(2), 189-208. <https://doi.org/10.1177/0743558406297940>
- Brausch, A. M., & Gutierrez, P. M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence, 39*(3), 233-242. <https://doi:10.1007/s10964-009-9482-0>
- Bresin, K. & Schoenleber, M. (2015). Gender differences in the prevalence of nonsuicidal self-injury: A meta-analysis. *Clinical Psychology Review, 38*, 55-64. <https://doi.org/10.1016/j.cpr.2015.02.009>
- Bruffaerts, R., Mortier, P., Kiekens, G., Auerbach, R. P., Cuijpers, P., Demyttenaere, K., Green, J. G., Nock, M. K., & Kessler, R. C. (2018). Mental health problems in college freshmen: Prevalence and academic functioning. *Journal of Affective Disorders, 225*, 97-103. <https://doi.org/10.1016/j.jad.2017.07.044>
- Bruwer, B., Emsley, R., Kidd, M., Lochner, C., & Seedat, S. (2008). Psychometric properties of the Multidimensional Scale of Perceived Social Support in youth. *Comprehensive Psychiatry, 49*(2), 195-201. <https://doi.org/10.1016/j.comppsy.2007.09.002>
- Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*(3), 371-394. <https://doi.org/10.1016/j.brat.2005.03.005>
- Claes, L., Houben, A., Vandereycken, W., Bijttebier, P., & Muehlenkamp, J. (2010). Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. *Journal of Adolescence, 33*(5), 775-778. <https://doi.org/10.1016/j.adolescence.2009.10.012>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310. <https://doi.org/10.1037/0033-2909.98.2.310>

- Crowell, S. E., Baucom, B. R., McCauley, E., Potapova, N. V., Fitelson, M., Barth, H., Smith, C. J., & Beauchaine, T. P. (2013). Mechanisms of contextual risk for adolescent self-injury: Invalidation and conflict escalation in mother–child interactions. *Journal of Clinical Child & Adolescent Psychology, 42*(4), 467-480. <https://doi.org/10.1080/15374416.2013.785360>
- Crowell, S. E., Beauchaine, T. P., McCauley, E., Smith, C. J., Vasilev, C. A., & Stevens, A. L. (2008). Parent-child interactions, peripheral serotonin, and self-inflicted injury in adolescents. *Journal of Consulting and Clinical Psychology, 76*(1), 15. <https://doi.org/10.1037/0022-006X.76.1.15>
- de la Vega, R., Molton, I. R., Miró, J., Smith, A. E., & Jensen, M. P. (2019). Changes in perceived social support predict changes in depressive symptoms in adults with physical disability. *Disability and Health Journal, 12*(2), 214-219. <https://doi.org/10.1016/j.dhjo.2018.09.00>
- Rodriguez-Blanco, L., Carballo, J. J., & Baca-Garcia, E. (2018). Use of ecological momentary assessment (EMA) in non-suicidal self-injury (NSSI): A systematic review. *Psychiatry Research, 263*, 212-219. <https://doi.org/10.1016/j.psychres.2018.02.051>
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy, 9*(2), 171-180. <https://doi.org/10.1111/j.1752-0606.1983.tb01497.x>
- Ewing, L., Hamza, C. A., & Willoughby, T. (2019). Stressful experiences, emotion dysregulation, and nonsuicidal self-injury among university students. *Journal of Youth and Adolescence, 48*(7), 1379-1389. <https://doi:10.1007/s10964-019-01025-y>
- Forster, M., Grigsby, T. J., Gower, A. L., Mehus, C. J., & McMorris, B. J. (2020). The role of social support in the association between childhood adversity and adolescent self-injury and suicide: Findings from a statewide sample of high school students. *Journal of Youth and Adolescence, 49*(6), 1195-1208. <https://doi.org/10.1007/s10964-020-01235-9>
- Gandhi, A., Luyckx, K., Baetens, I., Kiekens, G., Sleuwaegen, E., Berens, A., Maitra, S., & Claes, L. (2018). Age of onset of non-suicidal self-injury in Dutch-speaking adolescents and emerging adults: An event history analysis of pooled data. *Comprehensive Psychiatry, 80*, 170-178. <https://doi.org/10.1016/j.comppsy.2017.10.007>
- Glenn, C. R., & Klonsky, E. D. (2011). One-year test-retest reliability of the Inventory of Statements about Self-Injury (ISAS). *Assessment, 18*(3), 375-378. <https://doi.org/10.1177/1073191111411669>

- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54.  
<https://doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Gratz, K. L., & Roemer, L. (2008). The relationship between emotion dysregulation and deliberate self-harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour Therapy*, 37(1), 14-25. <https://doi.org/10.1080/16506070701819524>
- Gratz, K. L., Bardeen, J. R., Levy, R., Dixon-Gordon, K. L., & Tull, M. T. (2015). Mechanisms of change in an emotion regulation group therapy for deliberate self-harm among women with borderline personality disorder. *Behaviour Research and Therapy*, 65, 29-35. <https://doi.org/10.1016/j.brat.2014.12.005>
- Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion*, 13(5), 551-573.  
<https://doi.org/10.1080/026999399379186>
- Haines, J., Williams, C. L., Brain, K. L., & Wilson, G. V. (1995). The psychophysiology of self-mutilation. *Journal of Abnormal Psychology*, 104(3), 471. <https://doi.org/10.1037/0021-843X.104.3.471>
- Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the Difficulties in Emotion Regulation Scale (DERS) and its short forms in adults with emotional disorders. *Frontiers in Psychology*, 9, 539. <https://doi.org/10.3389/fpsyg.2018.00539>
- Hasking, P., Dawkins, J., Gray, N., Wijeratne, P., & Boyes, M. (2020). Indirect effects of family functioning on non-suicidal self-injury and risky drinking: The roles of emotion reactivity and emotion regulation. *Journal of Child and Family Studies*, 29, 2070-2079. <https://doi.org/10.1007/s10826-020-01722-4>
- Hasking, P., Rees, C. S., Martin, G., & Quigley, J. (2015). What happens when you tell someone you self-injure? The effects of disclosing NSSI to adults and peers. *BMC Public Health*, 15(1), 1-9.  
<https://doi.org/10.1186/s12889-015-2383-0>
- Hayes, A. F. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis. A Regression-Based Approach* (2nd Ed.). The Guilford Press.
- Hirsch, J. K., & Barton, A. L. (2011). Positive social support, negative social exchanges, and suicidal behavior in college students. *Journal of American College Health*, 59(5), 393-398.  
<https://doi.org/10.1080/07448481.2010.515635>

- Hirsch, J., & Ellis, J. B. (1995). Family support and other social factors precipitating suicidal ideation. *International Journal of Social Psychiatry, 41*(1), 26-30.  
<https://doi.org/10.1177/002076409504100103>
- Hopko, D., Lejuez, C., Ruggiero, K., & Eifert, G. (2003). Contemporary behavioral activation treatments for depression: Procedures, principles, and progress. *Clinical Psychology Review, 23*, 699-717.
- IBM Corporation. (2020). *IBM SPSS Statistics for Windows, Version 27.0*. Armonk, New York: IBM Corporation.
- International Society for the Study of Self-Injury. (2018). *About self-injury*. <https://itriples.org/category/about-self-injury>
- Johnson, V. K., Gans, S. E., Kerr, S., & LaValle, W. (2010). Managing the transition to college: Family functioning, emotion coping, and adjustment in emerging adulthood. *Journal of College Student Development, 51*(6), 607-621. <https://doi.org/10.1353/csd.2010.0022>
- Kelada, L., Hasking, P., & Melvin, G. (2018). Adolescent NSSI and recovery: The role of family functioning and emotion regulation. *Youth & Society, 50*(8), 1056-1077. <https://doi.org/10.1177/0044118X16653153>
- Kiekens, G., Hasking, P., Bruffaerts, R., Alonso, J., Auerbach, R., Bantjes, J., . . . Kessler, R. (2021). Non-suicidal self-injury among first-year college students and its association with mental disorders: Results from the World Mental Health International College Student (WMH-ICS) initiative. *Psychological Medicine, 1*-12. doi:10.1017/S0033291721002245
- Kiekens, G., Hasking, P., Claes, L., Boyes, M., Mortier, P., Auerbach, R., . . . Bruffaerts, R. (2019). Predicting the incidence of non-suicidal self-injury in college students. *European Psychiatry, 59*, 44-51.  
<https://doi.org/10.1016/j.eurpsy.2019.04.002>
- Klonsky, E. D., & Glenn, C. R. (2009). Assessing the functions of non-suicidal self-injury: Psychometric properties of the Inventory of Statements About Self-injury (ISAS). *Journal of Psychopathology and Behavioral Assessment, 31*(3), 215-219. <https://doi.org/10.1007/s10862-008-9107-z>
- Lagdon, S., Ross, J., Robinson, M., Contractor, A. A., Charak, R., & Armour, C. (2021). Assessing the mediating role of social support in childhood maltreatment and psychopathology among college students in Northern Ireland. *Journal of Interpersonal Violence, 36*(3-4), NP2112-2136NP.  
<https://doi.org/10.1177/0886260518755489>

- Lidy, K. M., & Kahn, J. H. (2006). Personality as a predictor of first-semester adjustment to college: The mediational role of perceived social support. *Journal of College Counseling, 9*(2), 123-134.  
<https://doi.org/10.1002/j.2161-1882.2006.tb00099.x>
- Liu, Q., Jiang, M., Li, S., & Yang, Y. (2021). Social support, resilience, and self-esteem protect against common mental health problems in early adolescence: A nonrecursive analysis from a two-year longitudinal study. *Medicine, 100*(4), e24334-e24334. <https://doi.org/10.1097/MD.00000000000024334>
- Lynch, T. R., Trost, W. T., Salsman, N., & Linehan, M. M. (2007). Dialectical behavior therapy for borderline personality disorder. *Annual Review of Clinical Psychology, 3*, 181-205.  
<https://doi.org/10.1146/annurev.clinpsy.2.022305.095229>
- Mattanah, J. F., Ayers, J. F., Brand, B. L., Brooks, L. J., Quimby, J. L., & McNary, S. W. (2010). A social support intervention to ease the college transition: Exploring main effects and moderators. *Journal of College Student Development, 51*(1), 93-108. <https://doi.org/10.1353/csd.0.0116>
- McGowan, P. O., Sasaki, A., D'alessio, A. C., Dymov, S., Labonté, B., Szyf, M., . . . Meaney, M. J. (2009). Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nature Neuroscience, 12*(3), 342-348. <https://doi.org/10.1038/nn.2270>
- Midkiff, M. F., Lindsey, C. R., & Meadows, E. A. (2018). The role of coping self-efficacy in emotion regulation and frequency of NSSI in young adult college students. *Cogent Psychology, 5*(1), 1520437.  
<https://doi.org/10.1080/23311908.2018.1520437>
- Miller, I. W., Epstein, N. B., Bishop, D. S., & Keitner, G. I. (1985). The McMaster Family Assessment Device: Reliability and validity. *Journal of Marital and Family Therapy, 11*(4), 345-356.  
<https://doi.org/10.1111/j.1752-0606.1985.tb00028.x>
- Miu, A. C., Szentágotai-Táatar, A., Balazsi, R., Nechita, D., Bunea, I., & Pollak, S. D. (2022). Emotion regulation as mediator between childhood adversity and psychopathology: A meta-analysis. *Clinical Psychology Review, 102*141. <https://doi.org/10.1016/j.cpr.2022.102141>
- Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science, 18*(2), 78-83. <https://doi.org/10.1111/j.1467-8721.2009.01613.x>
- Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The Difficulties in Emotion Regulation Scale: Factor structure and association with nonsuicidal self-injury in adolescent inpatients. *Journal of*



*Psychopathology and Behavioral Assessment*, 34(3), 393-404. <https://doi.org/10.1007/s10862-012-9292-7>

Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the neurosequential model of therapeutics. *Journal of Loss and Trauma*, 14(4), 240-255.

<https://doi.org/10.1080/15325020903004350>

Prinstein, M. J., Heilbron, N., Guerry, J. D., Franklin, J. C., Rancourt, D., Simon, V., & Spirito, A. (2010). Peer influence and nonsuicidal self injury: Longitudinal results in community and clinically-referred adolescent samples. *Journal of Abnormal Child Psychology*, 38(5), 669-682.

<https://doi.org/10.1007/s10802-010-9423-0>

Selby, E. A., & Joiner, T. E. (2009). Cascades of emotion: The emergence of borderline personality disorder from emotional and behavioural dysregulation. *Review of General Psychology*, 13, 219–229.

<https://doi.org/10.1037/a0015687>.

Schore, A. N. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, 22(1-2), 7-66. [https://doi.org/10.1002/1097-0355\(200101/04\)22:1<7::AID-IMHJ2>3.0.CO;2-N](https://doi.org/10.1002/1097-0355(200101/04)22:1<7::AID-IMHJ2>3.0.CO;2-N)

Sianko, N., & McDonnell, J. R. (2020). Is family functioning stable and consistent over time and stakeholders? A comparison of adolescents' and caregivers' views. *Children and Youth Services Review*, 113, 104996.

<https://doi.org/10.1016/j.childyouth.2020.104996>

Silva, E., Machado, B. C., Moreira, C. S., Ramalho, S., & Gonçalves, S. (2017). Romantic relationships and nonsuicidal self-injury among college students: The mediating role of emotion regulation. *Journal of Applied Developmental Psychology*, 50, 36-44. <https://doi.org/10.1016/j.appdev.2017.04.001>

<https://doi.org/10.1016/j.appdev.2017.04.001>

Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, 52(1), 83-110.

<https://doi.org/10.1146/annurev.psych.52.1.83>

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 and Life-Threatening Behavior*, 44(3), 273-303. <https://doi.org/10.1111/sltb.12070>

<https://doi.org/10.1111/sltb.12070>

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. (6<sup>th</sup> ed.). Pearson.

- Tatnell, R., Kelada, L., Hasking, P., & Martin, G. (2014). Longitudinal analysis of adolescent NSSI: The role of intrapersonal and interpersonal factors. *Journal of Abnormal Child Psychology, 42*(6), 885-896. <https://doi.org/10.1007/s10802-013-9837-6>
- Taylor, P. J., Jomar, K., Dhingra, K., Forrester, R., Shahmalak, U., & Dickson, J. M. (2018). A meta-analysis of the prevalence of different functions of non-suicidal self-injury. *Journal of Affective Disorders, 227*, 759-769. <https://doi.org/10.1016/j.jad.2017.11.073>
- Thomas, A. L., & Brausch, A. M. (2020). Family and peer support moderates the relationship between distress tolerance and suicide risk in black college students. *Journal of American College Health, 1*-8. <https://doi.org/10.1080/07448481.2020.1786096>
- Trujillo, N. P., & Servaty-Seib, H. (2018). Parental absence and non-suicidal self-injury: Social support, social constraints and sense-making. *Journal of Child and Family Studies, 27*(5), 1449-1459. <https://doi.org/10.1007/s10826-017-0976-1>
- Turner, B. J., Chapman, A. L., & Layden, B. K. (2012). Intrapersonal and interpersonal functions of non suicidal self-injury: Associations with emotional and social functioning. *Suicide and Life-Threatening Behavior, 42*(1), 36-55. <https://doi.org/10.1111/j.1943-278X.2011.00069.x>
- Turner, B. J., Cobb, R. J., Gratz, K. L., & Chapman, A. L. (2016). The role of interpersonal conflict and perceived social support in nonsuicidal self-injury in daily life. *Journal of Abnormal Psychology, 125*(4), 588. <https://doi.org/10.1037/abn0000141>
- Urano, Y., & Ikeda, T. (2020). Perceived social support moderates the association between emotion regulation and psychological distress: A cross-sectional study among Japanese adults. *Psychology, Health & Medicine, 1*-11. <https://doi.org/10.1080/13548506.2020.1802051>
- Victor, S. E., Hipwell, A. E., Stepp, S. D., & Scott, L. N. (2019). Parent and peer relationships as longitudinal predictors of adolescent non-suicidal self-injury onset. *Child and Adolescent Psychiatry and Mental Health, 13*(1), 1-1. <https://doi.org/10.1186/s13034-018-0261-0>
- Victor, S. E., Styer, D., & Washburn, J. J. (2016). Functions of nonsuicidal self-injury (NSSI): Cross-sectional associations with NSSI duration and longitudinal changes over time and following treatment. *Psychiatry Research, 241*, 83-90. <https://doi.org/10.1016/j.psychres.2016.04.083>
- Wester, K. L., & Trepal, H. C. (2015). Non-suicidal self-injury: Exploring the correlations among race, ethnic identity, and ethnic belonging. *Journal of College Student Development, 56*, 127– 139.

- Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Baral Abrams, G., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health, 52*(4), 486-492. doi: 10.1016/j.jadohealth.2012.09.010.
- Whitlock, J., Prussien, K., & Pietrusza, C. (2015). Predictors of self-injury cessation and subsequent psychological growth: Results of a probability sample survey of students in eight universities and colleges. *Child and Adolescent Psychiatry and Mental Health, 9*(1), 1-12.  
<https://doi.org/10.1186/s13034-015-0048-5>
- Wilcox, P., Winn, S., & Fyvie-Gauld, M. (2005). 'It was nothing to do with the university, it was just the people': The role of social support in the first-year experience of higher education. *Studies in Higher Education, 30*(6), 707-722. <https://doi.org/10.1080/03075070500340036>
- Wolff, J. C., Thompson, E., Thomas, S. A., Nesi, J., Bettis, A. H., Ransford, B., . . . Liu, R. T. (2019). Emotion dysregulation and non-suicidal self-injury: A systematic review and meta-analysis. *European Psychiatry, 59*, 25-36. <https://doi.org/10.1016/j.eurpsy.2019.03.004>
- Wymbs, N. F., Orr, C., Albaugh, M. D., Althoff, R. R., O'Loughlin, K., Holbrook, H., . . . Kaufman, J. (2020). Social supports moderate the effects of child adversity on neural correlates of threat processing. *Child Abuse & Neglect, 102*, 104413. <https://doi.org/10.1016/j.chiabu.2020.104413>
- Zahniser, E., & Conley, C. S. (2018). Interactions of emotion regulation and perceived stress in predicting emerging adults' subsequent internalizing symptoms. *Motivation and Emotion, 42*(5), 763-773.  
<https://doi.org/10.1007/s11031-018-9696-0>
- Zaki, J., & Williams, W. C. (2013). Interpersonal emotion regulation. *Emotion, 13*(5), 803.  
<https://doi.org/10.1037/a0033839>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*(1), 30-41.  
[https://doi.org/10.1207/s15327752jpa5201\\_2](https://doi.org/10.1207/s15327752jpa5201_2)

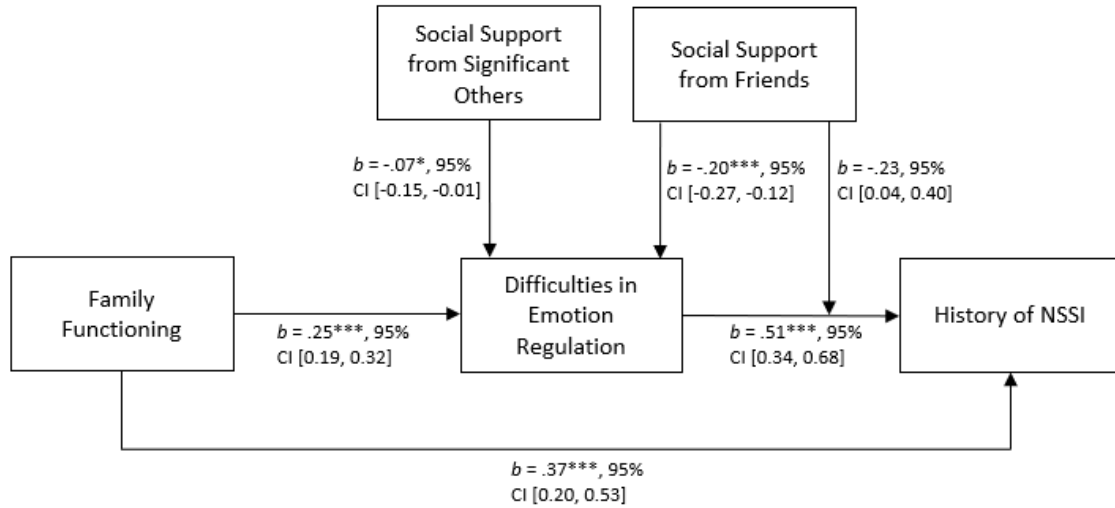
**Table 1***Descriptive Statistics and Correlations of Overall Sample*

Variable	<i>History of NSSI</i>		<i>No History of NSSI</i>		1	2	3	4	5	6	7	8
	(n = 295)	<i>M</i>	<i>SD</i>	(n = 537)								
1. Age	20.78	2.25	20.75	2.45	–	-.07*	.05	.05	-.05	-.01	.02	-.08
2. Gender	–	–	–	–	–	–	-.03	.09*	.06	.12*	.10**	.02
3. Family Functioning	27.05	7.37	23.98***	6.13	–	–	–	.34***	-.35***	-.28***	.22***	.10
4. Emotion Regulation	100.60	22.68	87.92***	21.38	–	–	–	–	-.32***	-.24***	.27***	.23**
5. Social Support (Friends)	21.46	5.50	22.60**	5.02	–	–	–	–	–	.52***	-.10**	-.08
6. Social Support (Significant Others)	22.21	6.36	22.76	5.93	–	–	–	–	–	–	–	-.04
7. History of NSSI	–	–	–	–	–	–	–	–	–	–	–	–
8. Frequency of NSSI	–	–	–	–	–	–	–	–	–	–	–	–

*Note.* Gender (0 = male, 1 = female); \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Point-biserial correlations are reported where one variables is dichotomous.

**Figure 1.**

Associations between family functioning, difficulties in emotion regulation, social support from friends, social support from significant others, and history of NSSI.



Note. Unstandardised coefficients reported (Hayes, 2018) with 95% confidence intervals; only significant paths shown;  $*p < .05$ .  $***p < .001$ .

**Figure 2.**

Moderating effect of social support from friends on the relationship between difficulties in emotion regulation and history of NSSI.



**List of Figure Captions**

*Figure 1.* Associations between family functioning, difficulties in emotion regulation, social support from friends, social support from significant others, and history of NSSI.

*Figure 2.* Moderating effect of social support from friends on the relationship between difficulties in emotion regulation and history of NSSI.