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# What predicts ongoing nonsuicidal self-injury? A comparison between persistent and ceased self-injury in emerging adults

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# **What predicts ongoing nonsuicidal self-injury? A comparison between persistent and ceased self-injury in emerging adults**

## **Abstract**

Although nonsuicidal self-injury (NSSI) peaks in adolescence, a significant proportion of young people continue to self-injure into emerging adulthood. Yet, little is known about factors prospectively associated with persistent NSSI. Using data from a three-year longitudinal study (n = 1466), we compared 51 emerging adults (67.3% female; average age = 20.0) who continued to self-injure from adolescence and 50 emerging adults (83.7% female; average age = 20.3) who had ceased NSSI, on a broad range of psychosocial factors. More frequent NSSI, use of a greater number of methods, specific NSSI functions, academic and emotional distress, and lack of perceived emotion regulatory capability differentiated emerging adults who continued with NSSI and those who had ceased the behavior. Further, the relationships between social support, life satisfaction and NSSI were mediated by perceived ability to regulate emotion. Findings from this study point to the role of personal belief in the ability to effectively regulate emotion in the cessation of NSSI. Future research directions and clinical implications are discussed.

**Keywords:** Nonsuicidal self-injury, persistence, cessation, emotion regulatory capability, emerging adulthood

## Introduction

Nonsuicidal self-injury (NSSI) refers to the deliberate and direct injury to one's own body tissue without suicidal intent, and includes behaviors such as cutting and burning oneself (Nock and Favazza, 2009). Lifetime prevalence estimates are close to 8% in children, 18% in adolescents, and between 12-20% in emerging adults (Barrocas et al., 2012; Muehlenkamp et al., 2012; Swannell et al., 2014). NSSI typically has its onset in early to mid-adolescence (Whitlock and Selekmán, 2014) and an age of onset past adolescence is considered rare (Hamza and Willoughby, 2014; Martin and Swannell, 2016; Riley et al., 2015). However, previous epidemiological studies report 12-month prevalence rates in the 2-14% range in emerging adults (Serras et al., 2010; Wilcox et al., 2012), indicating that a significant proportion of young people continue to self-injure past adolescence (Glenn and Klonsky, 2011; Hamza and Willoughby, 2014; Riley et al., 2015). Emerging adulthood represents a unique and important developmental period, characterized by rapid personal, social, and academic changes (Arnett, 2015). Emerging adults who self-injure potentially face additional challenges including psychiatric illnesses (Gollust et al., 2008; Taliaferro et al., 2015), suicidal thoughts and behaviors (Hamza and Willoughby, 2016; Mortier et al., in press; Whitlock et al., 2013), and lower academic performance (Kiekens et al., 2016). From a preventative viewpoint, this raises the crucial, but understudied, question as to what differentiates these individuals from peers who cease their NSSI.

### *Inter- and intrapersonal factors that might drive NSSI.*

Previous research shows that emerging adults who self-injure are more likely to be female and non-heterosexual, experience significant distress and emotion regulation difficulties, and report low life satisfaction and support from parents and peers (Kiekens et al., 2016; Kress et al., 2015; Muehlenkamp et al., 2013; Whitlock et al., 2015; Wilcox et al., 2012). However,

longitudinal data on NSSI trajectories into emerging adulthood is scarce, meaning little is known about young people who continue to self-injure past adolescence compared to those who cease their NSSI. The few prospective studies suggest that persistent NSSI among emerging adults is predicted by more severe NSSI (i.e., higher lifetime frequency and greater number of methods), own prediction of future NSSI, suicidal ideation, borderline personality features, lack of perseverance, and emotional distress (Glenn and Klonsky 2011; Hamza and Willoughby 2014; Riley et al., 2015).

While limited work has focused on emerging adulthood, there are several studies that have examined persistence of NSSI in clinical, and non-clinical samples of adolescents. Overall, low levels of family support and self-esteem (Tatnell et al. 2014), cognitive vulnerability (Guerry et al., 2010), maladaptive emotion regulation strategies (Andrews et al., 2013), and engaging in NSSI primarily to generate feelings or emotions (Yen et al., 2016) all increase the likelihood of persistent NSSI. Although these studies shed light on predictors of ongoing NSSI in adolescents, it is unclear to what extent these are also salient factors in predicting the continuation of NSSI into emerging adulthood. This is key, as developmentally appropriate intervention initiatives demand an understanding of the risk and protective factors of most relevance to the specific age group of interest.

*Emotional distress, perceived emotion regulatory capability, and NSSI*

Individuals who engage in NSSI often report significant emotional distress which is proposed to be a key mechanism underlying NSSI (e.g., Claes et al., 2015; Glenn and Klonsky 2011; Kiekens et al., 2015; You et al. 2015), particularly for people who have difficulties in managing such distress. Given the emotion regulatory function of NSSI (Chapman et al. 2006; Klonsky, 2007; Nock and Prinstein 2004; Whitlock et al. 2011), a significant body of work has explored how people who self-injure and those who do not differ in their emotion regulation

strategies (see Hasking et al., 2016). Researchers examining this relationship have primarily relied on the Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004), with converging evidence indicating that the ‘limited access to emotion regulation strategies’ subscale of the DERS most strongly and uniquely differentiates individuals who self-injure from those who do not (Emery et al. 2016; Perez et al. 2012; Zelkowitz et al. 2016). According to Gratz and Roemer (2004), this subscale assesses the *belief* that little can be done to regulate one’s inner state when emotionally upset. Thus, higher scores on this scale do not necessarily indicate that people who self-injure lack strategies to regulate emotion, but rather *perceive* themselves as less competent in this process. This underscores the importance of cognitive processes in emotional models of NSSI (Hasking et al., 2016; Hasking 2017). Importantly, perceived emotion regulatory capability may represent an important pathway through which risk factors (e.g., lack of support, academic stress, low self-esteem) exert their effect on NSSI (e.g., Gratz and Roemer, 2008). Conversely, a belief in one’s ability to regulate negative emotional states could serve to protect against NSSI, or facilitate cessation of the behavior. However, to date, this proposition has not been examined.

#### *The current study*

In the current study, we aim to examine a broad range of inter- and intrapersonal factors that may confer risk, or protect against, NSSI which persists beyond adolescence and into emerging adulthood. First, we hypothesized that persistent NSSI would be predicted by more frequent NSSI, use of a greater number of methods, and functions related to the stimulation of affective states (e.g., ‘*to feel something*’). Second, we anticipated that persistent NSSI would be predicted by higher levels of academic stress, emotional distress, and less perceived emotion regulatory capability. Conversely, we expected higher levels of family and peer support, self-

esteem, and life satisfaction to predict cessation of NSSI. Third, we explored whether emotional distress and perceived emotion regulatory capability might underlie these relationships.

## Method

### 2.1 Participants and procedures

The data used in this study come from the Surveys of Student Wellbeing, a three-year longitudinal study of health risk behaviors in American college students. Participants were sent an annual invitation that contained a secure link to the online survey and an information sheet that explained the purpose of the survey, confidentiality of responses, and participation requirements. A detailed description of the sample and procedures has been reported elsewhere (Whitlock et al. 2013). The larger three-wave longitudinal sample ( $n = 1,466$ ) from which participants for the current study were drawn is a representative sample in terms of age, ethnicity, sexual orientation, socioeconomic status and NSSI history (Whitlock et al. 2013). The survey was approved by institutional review boards, and links to local mental health resources were provided to all participants.

For the current study, we followed a person-centered approach and restricted our sample to participants reporting an onset of NSSI before age 20, who either reported ongoing NSSI in *at least* two waves of data collection (persistent trajectory)<sup>1</sup>, or reported cessation of NSSI in all three measurement waves (cessation trajectory). Of the total sample, 51 participants with persistent ( $M_{age_{t1}} = 20.0$ ,  $SD = 3.0$ ; 67.3% female), and 50 participants ( $M_{age_{t1}} = 20.3$ ,  $SD = 2.4$ ; 83.7% female) with ceased NSSI were included in the analyses. Of those in the persistent group, 82.4% engaged in NSSI at baseline, 89.6% engaged in NSSI at follow-up one, and 81.4%

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<sup>1</sup> There was some unit-missingness at follow-up one ( $n = 3$ ) and two ( $n = 8$ ).

engaged in NSSI at follow-up two. The mean age and sex did not differ between the groups ( $p < .05$ ).

## 2.2 Measured constructs

### 2.2.1. Nonsuicidal Self-Injury

NSSI characteristics were assessed with the Non-Suicidal Self-Injury Assessment Tool, (NSSI-AT), a reliable and valid measure of NSSI (Whitlock et al., 2014). An initial screening question for NSSI “*Have you ever done any of the following with the purpose of intentionally hurting yourself?*” was followed by a list of 19 NSSI methods (e.g., cutting oneself). Participants were considered to have engaged in NSSI if they reported engaging in at least one of the specified behaviors within the past year. Participants were then asked questions about NSSI characteristics including, but not limited to, NSSI frequency (coded as 1-5, 6-20, 21-50, and more than 50) and age of onset. Number of NSSI methods used was assessed by summing the total number of self-injurious behaviors (e.g., cutting, burning, hitting) reported by participants.

The NSSI-AT also differentiates 18 functions, or motives, for NSSI that were developed through iterative analyses of qualitative interviews with emerging adults who self-injured, treatment specialists, and a review of the research literature (Whitlock et al., 2014). The functions were assessed using a dichotomous (yes/no) format, and have high test-retest reliability (ICC = 0.79). These 18 functions load onto five higher-order dimensions: Affective Imbalance, Low Pressure (e.g., “*I hurt myself to cope with uncomfortable feelings*”; KR = .62), Affective Imbalance, High Pressure (e.g., “*I hurt myself to deal with frustration*”; KR = .55), Social Communication and Expression (“*I hurt myself in hopes that someone would notice that something is wrong or pay attention to me*”; KR = .28), Self-Retribution and Deterrence (“*I hurt myself as a self-punishment or to atone for sins*”; KR = .49), and Sensation-Seeking (“*I hurt*



*myself to get a rush or surge of energy*”; KR = .58; Whitlock et al., 2014). Although similar to those reported by Whitlock and colleagues (2014; range 0.38-0.64), in light of the low Kuder-Richardson values, we examined the individual functions assessed by the NSSI-AT rather than analyzing data at the dimensional level.

### 2.2.2. Interpersonal factors at time 1

*Perceived Social Support* was assessed using 3 items based on the Friends subscale of the Multidimensional Scale of Perceived Social Support (e.g., “*I can open up to my friends if I need to talk about my worries*”), which is a reliable and valid measure of perceived social support (Zimet et al., 1988). Items are assessed on a four-point rating scale that ranges from ‘never true’ to ‘often true’. The internal consistency of the scale was good in the current sample ( $\alpha = .79$ ).

*Perceived Family Support* was assessed using selected key items from psychometrically sound measures such as the McMaster Family Assessment Device (e.g., Epstein et al., 1983). Participants responded to 4 items (e.g., “*There was usually someone in my family who noticed when I was upset*” or “*My family was not comfortable discussing emotional issues*”) on a five-point Likert scale ranging from ‘very untrue’ to ‘very true’. Together these items tap into perceptions of family support when the respondent still resided with caregivers ( $\alpha = .83$ ).

### 2.2.3. Intrapersonal factors at time 1

*Non-heterosexual orientation* was assessed with the Kinsey Scale (Kinsey et al., 1948) that asked respondents whether they are sexually attracted to, or aroused by, individuals of the same and/or opposite sex. Respondents were considered non-heterosexual if indicated to be sexually attracted or aroused to some degree by members of the same sex.

*Perceived Emotion Regulatory Capability* was assessed with the Limited Access to Emotion Regulation Strategies subscale of the Difficulties in Emotion Regulation Scale (Gratz and Roemer 2004). This subscale consists of 8 items (e.g., “*When I am upset, I believe there is*

*nothing I can do to make myself feel better*”), with five-point Likert response options that range from ‘almost always’ to ‘almost never’. This scale is highly correlated with negative mood regulation expectancies (i.e., the belief that something can be done to alleviate negative affect;  $r = .69$ ) and is no longer significantly associated with NSSI once the latter is taken into account (Gratz and Roemer, 2004), indicating that the scale taps into the belief in one’s emotion regulatory capability. For the purpose of the current study, the scale was reversed scored, so that higher scores reflect a greater belief in one’s emotion regulatory capability. The internal consistency of the scale was excellent in the current sample ( $\alpha = .90$ ).

*Emotional Distress* was assessed with the K-6 scale (Kessler et al., 2002), a valid measure to assess current emotional distress and screen for the presence of non-specific mental disorders (Kessler et al., 2003; Kessler et al., 2010). The internal consistency of the K-6 was good in the current sample ( $\alpha = .81$ ).

*Academic Stress* was assessed with a single item similar to those used in the Annual National College Health Assessment Surveys (ACHA, n.d.). Participants were asked to indicate, on a 10 point scale, the overall level of academic stress experienced in the current school year (i.e., “*Within the current school year, how would you rate the overall level of academic stress you have experienced?*”).

*Self-Esteem* was assessed with the Single-Item Self-Esteem Scale, a reliable and valid alternative to longer questionnaires in the target population (Robins et al., 2001). Using this five-point item that ranges from ‘not at all’ to ‘extremely’, respondents were asked to report the degree to which they feel the statement “*I have high self-esteem*” accurately describes them.

*Life Satisfaction* was assessed with the 6 item Satisfaction With Life Scale (Diener et al., 1985; e.g., “*In most ways my life is close to my ideal*”). Items are assessed on a seven-point

rating scale that ranges from ‘strongly disagree’ to ‘strongly agree’, and showed excellent internal consistency in our sample ( $\alpha = .91$ ).

### 2.3 Statistical analyses

Descriptive statistics are reported for the primary study variables as proportions (%) and associated standard errors (SE), or mean values (M) and associated standard deviations (SD). The  $\chi^2/t$  statistic, together with associated measures of effect size, were used to examine associations between the persistence/cessation trajectory of NSSI and categorical/continuous variables respectively. The Cochran-Armitage test, which tests for linear trends in binomial proportions across the levels of an ordinal variable, was used to examine whether persistent relative to ceased NSSI was associated with more frequent NSSI reported at baseline. The predictive value of NSSI functions, and inter- and intrapersonal factors, was assessed using bivariate and multivariate logistic regressions (odds ratio's and 95% confidence intervals are reported). Nagelkerke pseudo  $R^2$  and the concordance (c-static) are reported as measures of the explained variability and discriminant ability in group membership of the multivariate model. Finally, using multiple mediation models with 10,000 bootstrap samples, we calculated 95% bias-corrected confidence intervals to test the indirect effects of inter- and intrapersonal variables on NSSI, via emotional distress and perceived emotion regulatory capability. All continuous inter- and intrapersonal factors were standardized, and the analyses were conducted using SPSS 23.0 (macro PROCESS 2.15; Hayes, 2013) and SAS 9.4.

## Results

### *NSSI characteristics that differentiate persistent and ceased NSSI*

[PLEASE INSERT TABLE 1 ABOUT HERE]

Severely scratching and pinching oneself were the most commonly reported methods of NSSI in both groups (Table 1). At baseline, emerging adults who continued with NSSI reported having used more NSSI methods than those who ceased NSSI ( $M_{t1} = 3.29$ ,  $SD = 2.24$  vs  $M_{t1} = 2.48$ ,  $SD = 1.60$ ,  $t(99) = 2.10$ ,  $p = .039$ , Cohen's  $d = 0.42$ ), and continued to expand the number of methods used over the three-year study period ( $M_{t3-t1} = 0.90$ ,  $SD = 1.23$ ,  $t(50) = 5.21$ ,  $p < .001$ , Cohen's  $d = 0.73$ ). Participants who persisted to self-injure over the course of the study reported more frequent NSSI at baseline than those who ceased NSSI (Table 2). Age of onset did not differ between groups (Persistent group:  $M = 14.56$ ,  $SD = 2.57$ ; Ceased group:  $M = 13.86$ ,  $SD = 3.36$ ,  $t(97) = 1.16$ ,  $p = .249$ ).

[PLEASE INSERT TABLE 2 ABOUT HERE]

Among participants who had ceased their NSSI, the most commonly reported functions of NSSI were related to the affective imbalance dimensions of the NSSI-AT (Table 3; range 44-66%). While the same trend was observed for participants who persisted to self-injure (range 58.8-76.5%), participants in this group also reported more frequent engagement in NSSI because 'they get the urge and cannot stop it' (56.9% versus 20.0%), an item loading on the sensation-seeking dimension of the NSSI-AT. As can be seen in Table 4, this function was uniquely related to persistent NSSI. In addition, engaging in NSSI 'to get a rush or surge of energy' (19.6% versus 2%) significantly differentiated participants who persisted rather than ceased their NSSI (Table 4).

[PLEASE INSERT TABLES 3-4 ABOUT HERE]

*Inter- and intrapersonal factors that differentiate persistent and ceased NSSI*

In bivariate models, persistent NSSI was related to higher levels of academic stress and emotional distress (Table 5). Cessation of NSSI was related to higher levels of perceived social support, life satisfaction, and perceived emotion regulatory capability. In the multivariate model, however, only perceived emotion regulatory capability explained unique variance in group membership ( $R^2_{\text{nagelkerke}} = 0.41$ ,  $c\text{-statistic} = 0.82$ ).

[PLEASE INSERT TABLE 5 ABOUT HERE]

*Emotional distress and perceived emotion regulatory capability as mediators between inter- and intrapersonal factors and group membership*

Perceived social support, academic stress, and life satisfaction were each indirectly related to persistent NSSI via perceived emotion regulatory capability, but not through emotional distress (Figure 1a-c, respectively). Higher levels of social support and life satisfaction, and lower levels of academic stress were associated with an enhanced belief in one's emotion regulatory capability, which was, in turn, negatively and uniquely predictive of persistent NSSI. When controlling for shared variance between the predictors, effects remained significant for social support ( $\beta^* = 0.23$ ,  $SE = 0.10$ ,  $p = .025$ , Indirect effect =  $-0.26$ ,  $SE = 0.16$ , 95%  $BCCI = -0.65$ ;  $-0.02$ ) and life satisfaction ( $\beta^* = 0.38$ ,  $SE = 0.10$ ,  $p < .001$ , Indirect effect =  $-0.47$ ,  $SE = 0.20$ , 95%  $BCCI = -0.93$ ;  $-0.18$ ), but not academic stress ( $\beta^* = -0.10$ ,  $SE = 0.09$ ,  $p = .243$ , Indirect effect =  $0.13$ ,  $SE = 0.16$ , 95%  $BCCI = -0.14$ ;  $0.50$ ).

[PLEASE INSERT FIGURE 1 ABOUT HERE]

## Discussion

This study is one of the first to address the need for a more detailed understanding of factors related to NSSI persistence in emerging adulthood. Two main findings stand out. First, more severe NSSI (i.e., higher frequency and number of methods) and specific functions predicted persistence of NSSI past adolescence. Second, while both inter- and intrapersonal factors differentiated participants, perceived emotion regulatory capability was confirmed as a potentially important pathway to NSSI cessation.

The first aim of the study was to examine NSSI characteristics that differentiate emerging adults who have continued to self-injure since adolescence, and those who have ceased the behavior. More frequent engagement in NSSI, and relying on a broader range of methods predicted persistent NSSI, which aligns with previous longitudinal research (Glenn and Klonsky 2011; Hamza and Willoughby 2014; Riley et al., 2015). Of note, the number of NSSI methods used has been related to suicide attempts above and beyond frequency of the behavior (Anestis et al. 2015; Turner et al. 2013). Thus, it may be important for future work to consider the co-occurrence of suicide attempts and heightened suicide risk among emerging adults who continue to self-injure. Further, in line with previous research (e.g., Klonsky, 2007; Whitlock et al. 2011), participants most often reported negative affective imbalance motives (assessed by the NSSI-AT) for NSSI. Although we anticipated that NSSI functions that relate to the positive automatic reinforcement domain (i.e., stimulation of affect and cognitions) would be more frequently reported by emerging adults persisting with NSSI (Yen et al., 2016), the function ‘to feel something’ did not differentiate groups. However, engaging in NSSI to ‘get a rush or surge of energy’ was associated with persistent NSSI, suggesting that, for some people, NSSI is associated, not only with negative reinforcement, but with positive automatic reinforcement.

Interestingly, emerging adults who continued to self-injure also reported engaging in NSSI because they cannot resist the urge to self-injure. This might indicate that, for some young adults, NSSI may have become a conditioned behavior, with little volitional control, which emerges after repeated negative reinforcement (Hasking et al. 2016; Chapman et al. 2006). These features, such as an inability to reduce NSSI, increase the risk that young people engage in more severe NSSI than anticipated (Buser et al., 2017). Taken together, we found that emerging adults who continue to self-injure have a more severe NSSI history, and report both positive arousal-eliciting contingencies and an inability to control their NSSI.

A second aim of the study was to examine inter- and intrapersonal factors that differentiated young people who continue to self-injure into emerging adulthood and those who had ceased the behavior. As expected, emerging adults who continued to self-injure reported more academic and emotional distress, and less peer support, life satisfaction, and belief in their emotion regulatory capability than those who ceased the behavior. Interestingly, however, non-heterosexuality and perceived family support were not related to persistent NSSI. This might mean that these factors are only predictive of lifetime history of NSSI (e.g., non-hetero sexuality; Wilcox et al. 2012), rather than being related to persistent NSSI in emerging adults. Alternatively, it might be that the factors that predict persistent NSSI change over time. Compared to adolescence, emerging adulthood represents an accelerated period of independence from parents (e.g., many leave their home context to live on campus), and a further increased interest in social relationships (especially romantic relationships; Arnett, 2015; Guarnieri et al. 2014). As such, while family support is noted as important in adolescent samples (Tatnell et al., 2014), social support was the more salient protective factor in our sample of emerging adults. To examine this hypothesis, future cohort studies could examine the differential roles of specific

support networks through different developmental periods by operationalizing family, peer and partner relationships as time-invariant protective factors against NSSI.

The last aim of our study was to examine emotional distress and perceived emotion regulatory capability as potential pathways between inter- and intrapersonal factors and NSSI. Overall, our findings revealed that less perceived social support and life satisfaction predicted persistent NSSI, working through an enhanced belief in one's lack of emotion regulatory capability. These findings support previous work that found that the relationships between risk factors and lifetime NSSI were mediated by emotion regulation (Adrian et al. 2011; Duggan et al. 2013; Gratz and Roemer 2008; Yurkowski et al. 2015). Arguably, greater life satisfaction and stronger social relationships are associated with positive emotional experiences, which prior work suggests might counter negative self-beliefs and induce behavioral flexibility, resilience, and emotion regulation efforts (Diamond & Aspinwall, 2003; Garland et al., 2010). Conversely, it might also be that ongoing NSSI contributes to less quality of life and poorer social relationships over time (Burke et al., 2015). Surprisingly, emotional distress had no predictive value above and beyond perceived emotion regulatory capability. This suggests that *perceiving* oneself to be competent to downregulate emotion in the face of adversity, rather than experiencing low levels of emotional distress, might be key to successfully cease NSSI. Experience sampling studies would provide a unique opportunity to examine these tentative hypotheses.

The role of cognition in NSSI has largely been ignored, with a primary focus on the importance of emotion and emotion regulation. However, researchers have recently drawn attention to the importance of cognitions, particularly those related to perceived ability to cease NSSI (Hasking et al. 2016; Hasking 2017). Future work exploring specific emotion regulation self-efficacy beliefs has potential to significantly advance our understanding of factors related to



the continuation and cessation of NSSI. While we used one subscale of an emotion regulation measure to assess perceived emotion regulatory capability, use of specific emotion regulation self-efficacy scales is warranted to explore this possibility further. Caprara et al's (2008) Regulatory Emotional Self-Efficacy scale makes a distinction between perceived self-efficacy in expressing positive and managing negative affect (anger/irritation and despondency/distress). Use of such a measure would allow a more fine-grained examination of how belief in ability to regulate emotions is related to NSSI.

#### *Limitations and further research directions*

The findings of this study should be interpreted within the context of several limitations. First, because factors were assessed at baseline as predictors of a persistent relative to a ceased NSSI trajectory, our mediational analyses lack the temporal precedence criteria of causality. Future cohort studies that follow young individuals from early adolescence into adulthood will be able to elucidate the time-dynamics and developmental specificity of the examined models. Such studies would also allow more complex models to be tested, including invariance across sexes, which the current sample size precluded. Second, while we relied on a validated measure to detect non-specific emotional distress and serious mental illness, it may be that specific psychiatric comorbidities (e.g., major depressive disorder) hold incremental value for the prediction of persistent NSSI above and beyond emotion regulatory capability. Third, in an effort to assess multiple constructs, while reducing demand on participants, we used brief or single-item measures to assess some constructs; replication using more extended measures is warranted. In a similar vein, future research should consider a broader range of NSSI severity indicators such as medical severity and location of injury, as well as the newly proposed DSM-5 NSSI disorder (American Psychiatric Association, 2013). For instance, an important avenue for future research might be to examine whether youth who meets disorder criteria are more likely to

continue to self-injure into emerging adulthood. In addition, several inter- (e.g., romantic relationships) and intrapersonal factors (e.g., gender identity; Marshall et al., 2016) that were not examined are subject to future empirical scrutiny.

Fourth, while the use of a three-year study period means that we can be more confident that participants in our cessation group really had ceased their NSSI than studies using 6-12 month cessation (Glenn and Klonsky 2011; Hamza and Willoughby 2014; Riley et al., 2015), it is possible that some individuals in this group relapsed after the study. Kelada and colleagues (2017) recently showed that young people who ceased NSSI often remain ambivalent about their recovery. This demonstrates that recovery is a multifaceted construct that not only refers to the behavioral outcome (i.e., cessation of NSSI over certain time period), but also entails a psychological component (i.e., an individuals' own perception). To get a better insight into the latter, future longitudinal work would benefit from a mixed method approach. Finally, as these data are based on college students, replication is warranted in community samples of emerging adults to ensure generalizability of findings.

#### *Clinical implications*

These limitations notwithstanding, the current findings have some important clinical implications. First, preventative interventions in emerging adults, for instance at college entrance, could include screening questions related not just to NSSI characteristics but also to perceptions of emotion regulatory capability. This might identify emerging adults most likely to persist with NSSI, and potentially at elevated risk for suicidal thoughts and behaviors and psychiatric comorbidity (Groschwitz et al., 2015; Hamza and Willoughby 2016; Mortier et al., in press; Whitlock et al. 2013). Second, clinicians could assess the belief their clients have in their own emotion regulation strategies; addressing these negative self-focused cognitions may be a pre-cursor to successful acquisition of effective emotion regulation skills. Behavioral functional

analysis may be particularly suited to map the environmental situations, feelings, and cognitions that precede and follow NSSI acts (Andover et al. 2015). In the same way, clinicians could assess whether strong positive arousal-eliciting contingencies are involved and/or engagement in NSSI has become conditioned, which would also necessitate learning more adaptive ways to increase positive affect and ways to alter the environmental context that triggers NSSI.

### **Conclusion**

Given the adverse outcomes associated with persistent NSSI, there is a need for a more detailed understanding of factors which differentiate emerging adults who continue to self-injure from those who successfully cease the behavior. Such information is necessary to inform early intervention initiatives and facilitate cessation of NSSI among emerging adults. Awaiting future research on this important topic, our findings suggest that adolescents with a history of NSSI are more likely to follow a persistent NSSI trajectory into emerging adulthood when: a) they engage in more frequent and varied forms of self-injury, b) report strong positive arousal-eliciting reasons for NSSI or an inability to resist the urge to self-injure, c) and hold negative beliefs about their emotion regulatory capability. This intrapersonal factor was not only uniquely predictive of persistent NSSI, but might also operate as an underlying pathway driving NSSI past adolescence into emerging adulthood. Future studies examining the role of these emotion regulation self-efficacy beliefs have considerable potential to provide clues to help guide interventions targeted at the cessation of NSSI.

### **Conflict of interest:**

The authors declare that they have no conflicts of interest concerning this article.

## References

- Adrian M, Zeman J, Erdley C, Lisa L, Sim L (2011) Emotional dysregulation and interpersonal difficulties as risk factors for nonsuicidal self-injury in adolescent girls. *J Abnorm Child Psychol* 39:389-400.
- American College Health Association National College Health Assessment (ACHA-NCHA) (n.d.). ACHA NCHA. Retrieved from: [http://www.acha-ncha.org/reports\\_acha-nchaa.html](http://www.acha-ncha.org/reports_acha-nchaa.html)
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Andover MS, Schatten HT, Morris BW, Miller IW (2015) Development of an Intervention for Nonsuicidal Self-Injury in Young Adults: An Open Pilot Trial. *Cogn and Behav Prac* 22:491-503.
- Andrews T, Martin G, Hasking P, Page A (2013) Predictors of continuation and cessation of nonsuicidal self-injury. *J Adolesc Health* 53:40-6.
- Anestis MD, Khazem LR, Law KC (2015) How many times and how many ways: the impact of number of nonsuicidal self-injury methods on the relationship between nonsuicidal self-injury frequency and suicidal behavior. *Suicide Life Threat Behav* 45:164-77.
- Arnett JJ. (2015). *Emerging Adulthood: The winding road from the late teens through the twenties*. (Second edition. ed.). New York: Oxford University Press
- Barrocas AL, Hankin BL, Young JF, Abela JRZ (2012) Rates of Nonsuicidal Self-Injury in Youth: Age, Sex, and Behavioral Methods in a Community Sample. *Pediatrics* 130:39-45.
- Burke TA, Hamilton JL, Abramson LY, Alloy LB. (2015). Non-suicidal self-injury prospectively predicts interpersonal stressful life events and depressive symptoms among adolescent girls. *Psychiatry Res* 228: 416-24.
- Buser TJ, Buser JK, Rutt CC. (2017). Predictors of Unintentionally Severe Harm During Nonsuicidal Self-Injury. *J Couns Dev* 95:14-23.
- Caprara GV, Di Giunta L, Eisenberg N, Gerbino M, Pastorelli C, Tramontano C (2008) Assessing regulatory emotional self-efficacy in three countries. *Psychol Assess* 20:227-37
- Chapman AL, Gratz KL, Brown MZ (2006) Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behav Res and Ther* 44:371-394.
- Claes L, Luyckx K, Baetens I, Van de Ven M, Witteman C (2015) Bullying and Victimization, Depressive Mood, and Non-Suicidal Self-Injury in Adolescents: The Moderating Role of Parental Support. *J Child Fam Stud* 24:3363-3371.
- Diener E, Emmons RA, Larsen RJ, Griffin S (1985) The Satisfaction With Life Scale. *J Pers Assess* 49:71-5.
- Diamond LM, Aspinwall GL (2003). Emotion Regulation Across the Life Span: An Integrative Perspective Emphasizing Self-Regulation, Positive Affect, and Dyadic Processes. *Motiv Emot* 27: 125-56.
- Duggan JM, Toste JR, Heath NL (2013) An examination of the relationship between body image factors and non-suicidal self-injury in young adults: the mediating influence of emotion dysregulation. *Psychiatry Res* 206:256-64.
- Emery AA, Heath NL, Mills DJ (2016) Basic Psychological Need Satisfaction, Emotion Dysregulation, and Non-suicidal Self-Injury Engagement in Young Adults: An Application of Self-Determination Theory. *J Youth Adolesc* 45:612-23.
- Epstein BN, Baldwin LM, Bishop DS (1983) The McMaster Family Assessment Device. *J Marital Fam Ther* 9:171-180.

Garland EL, Fredrickson B, Kring AM, Johnson DP, Meyer PS & Penn DL (2010) Upward spirals of positive emotions counter downward spirals of negativity: insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clin Psychol Rev* 30:849-64.

Gollust SE, Eisenberg D, Golberstein E (2008) Prevalence and correlates of self-injury among university students. *J Am Coll Health* 56:491-8.

Glenn CR, Klonsky ED (2011) Prospective Prediction of Nonsuicidal Self-Injury: A 1-Year Longitudinal Study in Young Adults. *Behav Ther* 42:751-762.

Gratz KL, Roemer L (2004) Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *J Psychopathol Behav Assess* 26:41-54.

Gratz KL, Roemer L (2008) The relationship between emotion dysregulation and deliberate self-harm among female undergraduate students at an urban commuter university. *Cogn Behav Ther* 37:14-25.

Groschwitz RC, Plener PL, Kaess M, Schumacher T, Stoehr R, Boege I (2015) The situation of former adolescent self-injurers as young adults: a follow-up study. *BMC Psychiatry* 15:160.

Guarnieri S, Smorti M, Tani F (2014) Attachment Relationships and Life Satisfaction During Emerging Adulthood. *Soc Indic Res* 121:833-847.

Guerry JD, Prinstein MJ (2010) Longitudinal prediction of adolescent nonsuicidal self-injury: examination of a cognitive vulnerability-stress model. *J Clin Child Adolesc Psychol* 39:77-89.

Hamza CA, Willoughby T. (2014). A Longitudinal Person-Centered Examination of Nonsuicidal Self-injury Among University Students. *J Youth Adolesc* 43:671-685.

Hamza, CA, Willoughby, T. (2016). Nonsuicidal Self-Injury and Suicidal Risk Among Emerging Adults. *J Adolesc Health* 59: 411-415.

Hasking P (2017) Differentiating Non-Suicidal Self-Injury and Risky Drinking: a Role for Outcome Expectancies and Self-Efficacy Beliefs. *Prev Sci*. doi: 10.1007/s11121-017-0755-7

Hasking P, Whitlock J, Voon D, Rose A (2016) A cognitive-emotional model of NSSI: using emotion regulation and cognitive processes to explain why people self-injure. *Cogn Emot*:1-14.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York: Guilford Press.

Kelada L, Hasking P, Melvin G, Whitlock J, Baetens I (2017) "I Do Want to Stop, At Least I Think I Do": an international comparison of recovery from nonsuicidal self-injury among young people. *J Adolesc Res*. doi: 10.1177/0743558416684954

Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, Walters EE, Zaslavsky AM (2002) Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med* 32:959-76.

Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, Howes MJ, Normand SL, Manderscheid RW, Walters EE, Zaslavsky AM (2003) Screening for serious mental illness in the general population. *Arch Gen Psychiatry* 60:184-9.

Kessler RC, Green JG, Gruber MJ, Sampson NA, Bromet E, Cuitan M, Furukawa TA, Gureje O, Hinkov H, Hu CY, Lara C, Lee S, Mneimneh Z, Myer L, Oakley-Browne M, Posada-Villa J, Sagar R, Viana MC & Zaslavsky AM (2010) Screening for serious mental illness in the general population with the K6 screening scale: Results from the WHO World Mental Health (WMH) survey initiative. *Int J Methods Psychiatric Res* 19: 4-22.

Kiekens G, Bruffaerts R, Nock MK, Van de Ven M, Witteman C, Mortier P, Demyttenaere K, Claes L (2015) Non-suicidal self-injury among Dutch and Belgian adolescents: Personality, stress and coping. *Eur Psychiatry* 30:743-9.

Kiekens G, Claes L, Demyttenaere K, Auerbach RP, Green JG, Kessler RC, Mortier P, Nock MK, Bruffaerts R (2016) Lifetime and 12-Month Nonsuicidal Self-Injury and Academic Performance in College Freshmen. *Suicide Life Threat Behav* 46:563-576.

Kinsey AC, Pomeroy WB, Martin CE (1948). Sexual behavior in the human male. Philadelphia, PA: Saunders

Klonsky ED (2007) The functions of deliberate self-injury: a review of the evidence. *Clin psychol rev* 27:226-39.

Kress VE, Newgent RA, Whitlock J, Mease L (2015) Spirituality/Religiosity, Life Satisfaction, and Life Meaning as Protective Factors for Nonsuicidal Self-Injury in College Students. *J Col Couns* 18:160-174.

Marshall E, Claes L, Bouman WP, Witcomb GL & Arcelus J (2016) Non-suicidal self-injury and suicidality in trans people: A systematic review of the literature. *Int Rev Psychiatry* 28:58-69.

Martin, G, Swannell, S. (2016). Non-suicidal Self-injury in the Over 40s: Results from a Large National Epidemiological Survey. *Epidemiology*: 6:266. doi:10.4172/2161-1165.1000266

Mortier P, Kiekens G, Auerbach RP, Cuijpers P, Demyttenaere K, Green JG, Kessler RC, Nock MK, Zaslavsky AM, Bruffaerts R (in press) A risk algorithm for the persistence of suicidal thoughts and behaviors during college. *J Clin Psychiatry*. doi: 10.4088/JCP.17m11485

Muehlenkamp JJ, Brausch A, Quigley K, Whitlock J (2013) Interpersonal features and functions of nonsuicidal self-injury. *Suicide Life Threat Behav* 43:67-80.

Muehlenkamp JJ, Claes L, Havertape L, Plener PL. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child Adolesc Psychiatry Ment Health* 6:10.

Nock MK, Favazza AR (2009) Nonsuicidal self-injury: Definition and classification. In MK Nock (Ed), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp 9-18). Washington: American Psychological Association

Nock MK, Prinstein MJ (2004) A functional approach to the assessment of self-mutilative behavior. *J Consult Clin Psychol* 72:885-890.

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. *J Psychopathol Behav Assess* 34:393-404.

Riley EN, Combs JL, Jordan CE & Smith GT (2015) Negative Urgency and Lack of Perseverance: Identification of Differential Pathways of Onset and Maintenance Risk in the Longitudinal Prediction of Nonsuicidal Self-Injury. *Behav Ther* 46:439-48.

Robins WR, Holly MH, Kali HT (2001) Measuring Global Self-Esteem: Construct Validation of a Single-Item Measure and the Rosenberg Self-Esteem Scale. *Pers Soc Psychol Bull* 27:151-161.

Serras A, Saules KK, Cranford JA, Eisenberg D (2010) Self-injury, substance use, and associated risk factors in a multi-campus probability sample of college students. *Psychol Addict Behav* 24:119-28.

Swannell SV, Martin GE, Page A, Hasking P, St John NJ (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression *Suicide Life Threat Behav* 44: 273-303.

Taliaferro LA, Muehlenkamp JJ (2015) Risk factors associated with self-injurious behavior among a national sample of undergraduate college students. *J Am Coll Health* 63:40-8.

Tatnell R, Kelada L, Hasking P, Martin G (2014) Longitudinal analysis of adolescent NSSI: the role of intrapersonal and interpersonal factors. *J Abnorm Child Psychol* 42:885-96.

- Turner BJ, Layden BK, Butler SM, Chapman AL (2013) How Often, or How Many Ways: Clarifying the Relationship Between Non-Suicidal Self-Injury and Suicidality. *Arch Suicide Res* 17:397-415.
- Whitlock J, Exner-Cortens D, Purington A (2014) Assessment of nonsuicidal self-injury: development and initial validation of the Non-Suicidal Self-Injury-Assessment Tool (NSSI-AT). *Psychol Assess* 26:935-46.
- 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. *J Adolesc Health* 52:486-492.
- Whitlock J, Muehlenkamp J, Purington A, Eckenrode J, Barreira P, Baral Abrams G, Marchell T, Kress V, Girard K, Chin C, Knox K (2011) Nonsuicidal self-injury in a college population: general trends and sex differences. *J Am Coll Health* 59:691-8.
- 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 Adolesc Psychiatry Ment Health* 9:19.
- Whitlock J, Selekman MD (2014) Nonsuicidal self-injury across the life span. In M. K. Nock (Ed), *The Oxford handbook of suicide and self-injury*. New York: Oxford University Press.
- Wilcox HC, Arria AM, Caldeira KM, Vincent KB, Pinchevsky GM, O'Grady KE (2012). Longitudinal predictors of past-year non-suicidal self-injury and motives among college students. *Psychol Med* 42: 717-726.
- Yen S, Kuehn K, Melvin C, Weinstock LM, Andover MS, Selby EA, Solomon JB, Spirito A (2016) Predicting Persistence of Nonsuicidal Self-Injury in Suicidal Adolescents. *Suicide Life Threat Behav* 46:13-22.
- You J, Lin MP, Leung F (2015) A longitudinal moderated mediation model of nonsuicidal self-injury among adolescents. *J Abnorm Child Psychol* 43:381-90.
- Yurkowski K, Martin J, Levesque C, Bureau JF, Lafontaine MF, Cloutier P (2015) Emotion dysregulation mediates the influence of relationship difficulties on non-suicidal self-injury behavior in young adults. *Psychiatry Res* 228:871-8.
- Zelkowitz RL, Cole DA, Han GT, Tomarken AJ (2016) The Incremental Utility of Emotion Regulation But Not Emotion Reactivity in Nonsuicidal Self-Injury. *Suicide Life Threat Behav* 46:545-562.
- Zimet GD, Dahlem NW, Zimet SG, Farley GK (1988) The Multidimensional Scale of Perceived Social Support. *J. Pers. Assess* 52:30-41.

### Legend figure 1

Standardized coefficients and standard errors between parentheses are presented. Associations between the predictor variable and the mediators are controlled for sex. Indirect point estimates are shown together with Bias-Corrected 95% Confidence Intervals (BCCI) using 10,000 bootstrap samples. NSSI = Nonsuicidal Self-Injury. \*  $p < .01$ , \*\*  $p < .001$ , two-sided tested.

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**Table 1.**  
Methods of nonsuicidal self-injury

	<b>Ceased NSSI group % (S.E.)</b>	<b>Persistent NSSI group % (S.E.)</b>	$\chi^2$	<b>Phi</b>
Severely scratched or pinched with finger nails or other objects to the point that bleeding occurs or marks remain on the skin	60.0% (7.0)	78.4% (5.8)	4.03*	0.20
Cut wrists, arms, legs, torso or other areas of the body	50.0% (7.1)	45.1% (7.0)	0.24	0.05
Banged or punched <i>objects</i> to the point of bruising or bleeding	16.0% (5.2)	37.3% (6.8)	5.82*	0.24
Banged or punched <i>oneself</i> to the point of bruising or bleeding	14.0% (4.9)	27.5% (6.3)	2.77	0.17
Bitten yourself to the point that bleeding occurs or marks remain on skin	14.0% (4.9)	43.1% (7.0)	10.47**	0.32
Carved words or symbols into skin	18.0% (5.5)	17.6% (5.4)	0.00	0.00
Intentionally prevented wounds from healing	10.0% (4.3)	51.0% (7.0)	19.93***	0.44
Ripped or torn Skin	14.0% (4.9)	31.4% (6.5)	4.33*	0.21
Pulled out hair, eyelashes or eyebrows (with the intention of hurting yourself)	14.0% (4.9)	17.6% (5.4)	0.25	0.05
Burned wrists, hands, arms, legs, torso, or other areas of the body	12.0% (4.6)	13.7% (4.8)	0.07	0.03
Rubbed glass into skin or stuck sharp objects such as needles or pins into or underneath the skin (with the intention of hurting yourself)	8.0% (3.9)	21.6% (5.8)	3.68	0.19
Other methods	18.0% (5.5)	35.3% (6.7)	3.86*	0.20

Note: NSSI = Nonsuicidal self-injury, S.E. = Standard error.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , two-sided tested

**Table 2.**

Lifetime frequency of nonsuicidal self-injury

	<b>Ceased NSSI group</b>	<b>Persistent NSSI group</b>		Cochran- Armitage test	<i>p</i>
	% (S.E.)	% (S.E.)	OR (95% CI)		
1- 5 times	60.0% (7.1)	33.3% (6.6)	(ref)	3.23*	.001
6-20 times	22.0% (4.3)	25.5% (6.1)	2.09 (0.77-5.67)		
21-50 times	12.0% (4.7)	11.8% (4.5)	1.77 (0.49-6.33)		
More than 50 times	6.0% (3.4)	29.4% (6.4)	8.82 (2.23-34.90)		

Note: NSSI = Nonsuicidal self-injury, S.E. = Standard error.

\**p* < .01, two-sided tested

**Table 3.**

The five most frequently reported functions of nonsuicidal self-

<b>Ceased NSSI group</b>		<b>Persistent NSSI group</b>		i n j u r y
	% (S.E.)		% (S.E.)	
1. ... to deal with frustration	66.0 (6.7)	1. ... to cope with uncomfortable feeling	76.5 (6.0)	
2. ... to cope with uncomfortable feeling	64.0 (6.8)	2. ... to deal with anger	74.5 (6.1)	
3. ... to relieve stress or pressure	64.0 (6.8)	3. ... to relieve stress or pressure	74.5 (6.1)	

*Note:* NSSI = Nonsuicidal self-injury, S.E. = Standard error.

4. ... to change my emotional pain into something physical	62.0 (6.9)	4. ... to change my emotional pain into something physical	58.8 (6.9)
5. ... to deal with anger	44.0 (7.0)	5. ... because I get the urge and cannot stop	56.9 (7.0)

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**Table 4.**

Functions associated with persistent nonsuicidal self-injury

	<b>Bivariate</b>		<b>Multivariate</b>	
	OR	95% CI	OR	95% CI
<i>Affective imbalance, low pressure dimension</i>			-	-
... to cope with uncomfortable feeling	1.83	0.77-4.35	-	-
...to change my emotional pain into something physical	0.88	0.39-1.95	-	-
... to feel something	1.53	0.66-3.53	-	-
... to get control over myself or my life	1.25	0.57-2.82	-	-
<i>Affective imbalance, high pressure dimension</i>			-	-
... to relieve stress or pressure	1.64	0.70-3.86	-	-
... to deal with frustration	1.51	0.64-3.56	-	-
... to deal with anger	0.97	0.44-2.12	-	-
<i>Social communication and expression dimension</i>			-	-
...in hopes that someone would notice that something is wrong or pay attention to me	1.77	0.73-4.30	-	-
... to shock or hurt someone	0.98	0.27-3.61	-	-
...because my friends hurt themselves	0.47	0.08-2.69	-	-
<i>Self-retribution and deterrence dimension</i>				
... as a self-punishment or to atone for sins	2.29	0.96-5.48	-	-
... because of my self-hatred	2.16	0.93-5.00	-	-
...so I do not hurt myself in other ways	5.85*	1.21-28.26	4.93	0.92-26.42
... to avoid committing suicide	6.53	0.76-56.39	-	-
<i>Sensation-seeking dimension</i>				
...because I get the urge and cannot stop it	5.27***	2.17-12.81	4.36**	1.64-11.62
... because it feels good	3.19*	1.28-7.94	1.27	0.42-3.80
...to get a rush or surge of energy	11.95*	1.47-97.31	12.25*	1.36-110.01
...because I like the way it looks	3.20	0.61-16.68	-	-
<b>Total number of functions</b>	<b>1.19**</b>	<b>1.05-1.36</b>	<b>0.95</b>	<b>0.77-1.17</b>

Note: the multivariate analyses included only significant bivariate functions. OR = Odds ratio, CI = Confidence interval.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , two-sided tested

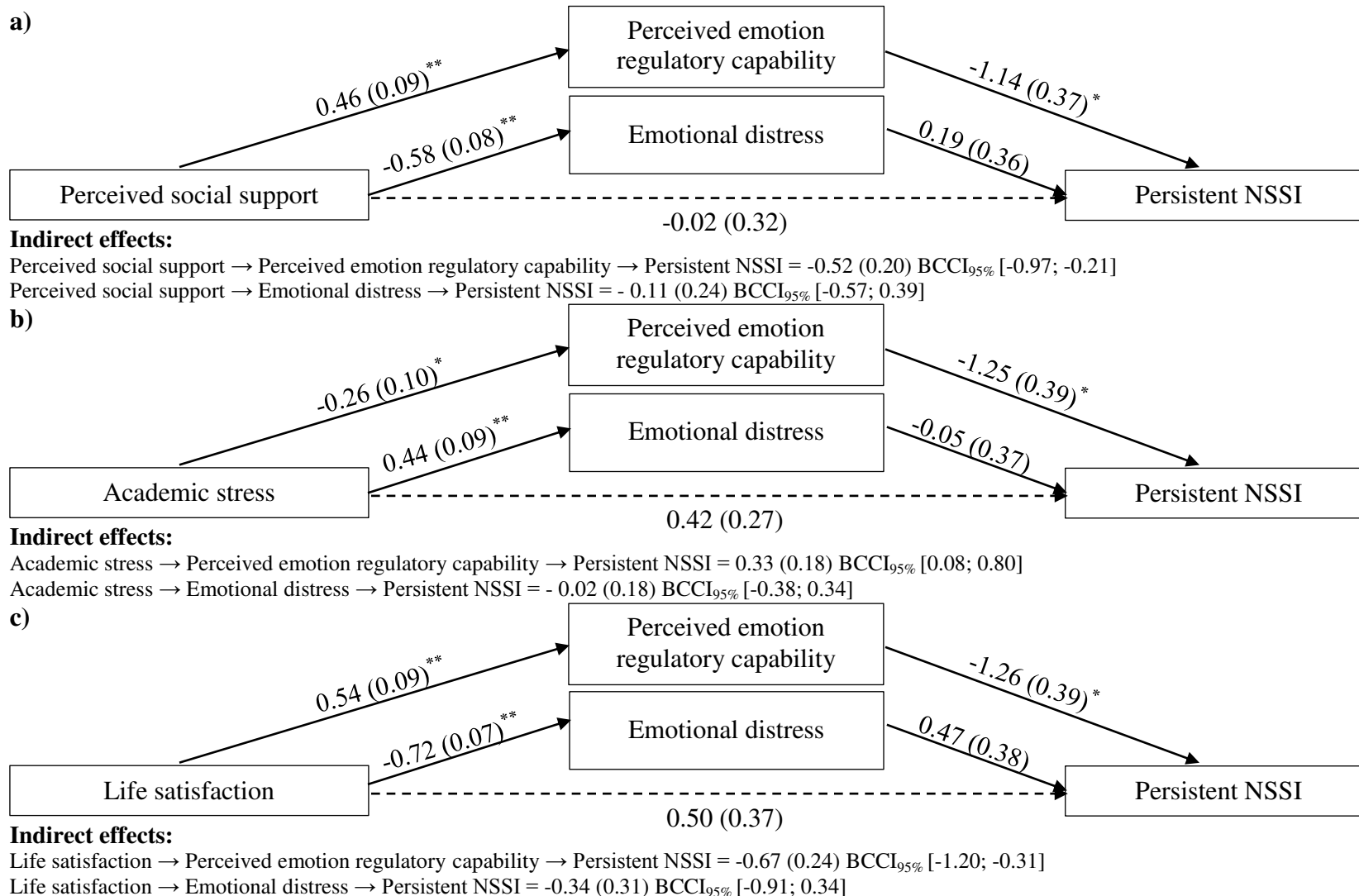
**Table 5.**

Inter- and intrapersonal factors differentiating persistent and ceased nonsuicidal self-injury

	<b>Bivariate</b>		<b>Multivariate</b>	
	OR	95% CI	OR	95% CI
<b>Interpersonal factors</b>				
Perceived family support	0.81	0.54-1.21	1.00	0.59-1.69
Perceived social support	0.57*	0.36-0.90	0.86	0.44-1.68
<b>Intrapersonal factors</b>				
Non-hetero sexual feelings	0.72	0.32-1.60	0.57	0.20-1.60
Academic stress	1.83**	1.19-2.82	1.62	0.92-2.85
Self esteem	0.68	0.45-1.03	1.04	0.58-1.86
Life satisfaction	0.64*	0.42-0.97	1.65	0.76-3.58
Emotional distress	2.47***	1.52-4.02	1.14	0.48-2.72
Perceived emotion regulatory capability	0.28***	0.16-0.49	0.23**	0.10-0.57

Note: All continuous measures were standardized. Reference = ceased group. OR = Odds ratio, CI = Confidence interval

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , two-sided tested



**Figure 1.**

Multiple mediation models from perceived social support, academic stress, and life satisfaction via emotional distress and perceived emotion regulatory capability to persistent nonsuicidal self-injury

Standardized coefficients and standard errors between parentheses are presented. Associations between the predictor variable and the mediators are controlled for sex. Indirect point estimates are shown together with Bias-Corrected 95% Confidence Intervals (BCCI) using 10,000 bootstrap samples. NSSI = Nonsuicidal self-injury. \*  $p < .01$ , \*\*  $p < .001$ , two-sided tested